APPROACH TO THE NEW LOWER SECONDARY CURRICULUM

CHEMISTRY PAPER 1

FIRST EDITION 2024

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Preface

My objective in writing this chemistry book was to prepare O'level students for the UCE examinations which compressively covers the modern approach to the new lower secondary curriculum.
The content in this book has been extended considerably to make it suitable for all students at ordinary level.

This workbook has been written in line with the revised chemistry syllabus for the new Lower Secondary Curriculum. The knowledge and skills which have been incorporated are what is partly required to produce a learner who has the competences that are required in the 21st century.

This book provides summary notes on assessable areas for each of the four elements of construct for the chemistry paper 1.
This book also contains a variety of sample examination papers for the learner to widen his/her subject knowledge.

The learner is expected to be able to work as an individual, in pairs and groups according to the nature of the item in order to be able to share learning experiences with their colleagues.

SSEKYANZI RONALD

Acknowledgement

I would like to express my sincere appreciation to all those who worked tirelessly towards the production of this book.

My sincere gratitude goes to my family and friends for supporting all my initiatives both financially and spiritually. Many thanks go to my parents Mr. Kaliisa John Musisi and Mrs. Joan Kaliisa for educating me.

My task has been made possible through my being able to draw on the counsel of the staff of chemistry department of Nakaseke Christian Secondary School. I am indebted to Mr. Mabiike Deo the head of science department Kololo High School and Mr. Otiya Muhammad head of science department NCSS and head chemistry department Mbogo College School Kawempe.

I have been fortunate in receiving once again the guidance from my former teachers Mr. Mulisa Brian and Mr. Basingura Fredrick.
My work has benefited from advise on content and presentation which I received from Mr. Ofwono and Mr. Otiya Muhammad.

I welcome any suggestions for improvement to continue making my service delivery better.
Please get to me through ssekyanzironaldjr123@gmail.com or contact 0708540273/0788610321

RONALD SSEKYANZI

INTRODUCTION TO CHEMISTRY PAPER 1 (545/1)

The revised new lower secondary curriculum requires a learner to do **two** papers ie theory and practical compared to the old curriculum which had three papers.

In this book we shall concentrate on the theory paper 545/1.

The entire content of theory was grouped into four elements of construct to avoid duplicating/ multiple testing of competences.

The paper has **two** sections; section **A** that has **two** compulsory items and section **B** has **two** parts ie part **I** having **two** items and **part II** also having **two** items and the learner is requested to attempt only **one** item from each of the two parts. The learner will be required to attempt a total **four** examination items **two** from section A and **two** from section B from the four elements of construct which we are going to explore in details.

THE LISTS OF ALL TOPICS IN THE THEORY PAPER ARE AS FOLLOWS

SENIOR 1	THEME	TOPIC
Term 1	Introduction to chemistry and experimental	Chemistry and society
		Experimental chemistry
	Particle nature of matter	States and changes of states of matter
		Using materials
Term 2	Temporary and permanent changes to materials	Temporary and permanent changes
		Mixtures, elements and compounds
Term 3	Air and environment	Air
		Water
	Earth and space	Rocks and minerals

SENIOR 2	THEME	TOPIC
Term 1	Acids and alkalis	Acids and alkalis
		Salts
	The periodic table	The periodic table
Term 2	Carbon in the environment	Carbon in the environment
Term 3	Order of reactivity of metals	The reactivity series

SENIOR 3	THEME	TOPIC
Term 1	Carbon in life	Carbon in life
	Structures and Bonds	Structures and Bonds
Term 2	Using equations in Chemistry	Formulae, stoichiometry and mole concept
	Structures and substances	Properties and structures of substances
Term 3	Fuels and energy	Fossil Fuels
	Reactants and products	Chemical reactions

SENIOR 4	THEME	TOPIC
Term 1	Redox reactions	Oxidation and reduction reactions
		Industrial processes
Term 2	Periodicity	Trends in the periodic table
	Thermochemistry	Energy changes during chemical reactions
Term 3	Consumable chemicals	Chemical for consumers Nuclear processes.

A breakdown of the first four elements of construct

FIRST ELEMENT OF CONSTRUCT

The learner appreciates the contribution of chemistry to our economy. (For items 3 and 4 in part one of section B)

Topics

- Air (oxygen)
- Industrial processes
- Chemistry and society
- Carbon in life (mainly on crude oil, fermentation and saponification)
- Chemical reactions (contact and haber processes)
- Oxidation and reduction. (in iron extraction and for the concepts of electrolysis in extraction of aluminum, copper, manufacture of sodium hydroxide and chlorine)

ASSESSABLE AREAS

(a) Manufacture of oxygen gas (b) Manufacture of chlorine gas (c) Extraction of metals(Na, Al, Fe, Cu, Zn) (d) Manufacture of fertilizers (e) Manufacture of detergents	(f) Manufacture of sodium hydroxide (g) Manufacture of sulphuric acid (h) Manufacture of cement (i) Manufacture of Ethanol (j) Manufacture of bio gas	Each Process involves **V – vessel** **Cp – chemical processes** **Cd – conversion to desired product** **Ch – coherence** **Pr -purification**

BASIS OF ASSESSMENT

BASIS OF ASSESSMENT		CRITERIA OF ASSESSMENT
A	Raw materials Rm	All raw material
		any one raw material
		no raw material
B	Process of production Pp	Process of production with all V, Cp, Ch, Pr
		Process of production with any three of V, Cp, Ch, Pr
		Process of production with any one of V, Cp, Ch, Pr
		No process of production
C	Side effects of the process of production and mitigation Se	Any one danger identified, explained and mitigated
		Any one danger identified and explained OR identified and mitigated OR explained and mitigated
		Any one danger identified OR explained OR mitigated
		No danger identified, explained or mitigated
D	Social benefits of the process of production Sb	Any one social benefit identified, effect of the benefit and impact of the benefit
		Any one social benefit identified and effect of the benefit OR identified and impact of the benefit OR effect of the benefit and impact of the benefit
		Any one social benefit identified OR effect of the benefit OR impact of the benefit
		No social benefit identified

LET'S EXPLORE THE SUMMARY NOTES ON THE ASSESSABLE AREAS FOR THIS ELEMENT OF CONSTRUCT

MANUFACTURE OF OXYGEN

Air is a mixture of different components contains 21% oxygen. Due to respiratory illnesses caused by COVID-19, there was an increased demand for oxygen by patients in hospitals. The government supply of oxygen is not enough and is planning to set up an oxygen production plant with minimal environmental impact.



However, the science club members in your school would like to know how the process of production of oxygen will be carried out.

Task:

As a chemistry student, make a summary you will use during the presentation.

Expected responses following the basis of assessment

Raw materials

Liquid air/air

Process of production

Air is passed through air filters to remove dust and smoke particles.

Air is passed through concentrated sodium hydroxide solution to absorb/ remove carbon dioxide which is acidic.

$$2NaOH_{(aq)} + CO_{2(g)} \longrightarrow Na_2CO_{3(aq)} + H_2O_{(l)}$$

Air is free from Carbon dioxide is now passed through Silicon (IV) oxide/silica get to absorb water vapor. Carbon dioxide and water vapor are removed from air before it is liquefied because they solidify and block the apparatus.

The air is now compressed at 200 atmospheres and allowed to cool by making it escape into a large space through a jet. The process of cooling is repeated several times to obtain liquid air at about -200^0C. The liquid air is fractionally distilled using a fractionating column/tower. Nitrogen boils off first because it has a lower boiling point (-196^0C) leaving behind Oxygen with a higher boing point (-183^0C). Both nitrogen and Oxygen collected contain traces of noble gases. Pure oxygen is then stored under pressure in steel cylinders.

Side effects of the production and mitigation

(a) Explosion of oxygen cylinders due to high pressure. This can cause other materials to ignite spontaneously/ catch fire. The resulting fire can cause damage to equipment and injury to people.

Mitigation

- ✓ Regular maintenance and monitoring of cylinders
- ✓ Keeping cylinders in a cool area/ avoid exposure to heat.

(b) Exposure to liquid oxygen can cause severe skins and eye irritation and burns. This may cause loss of vision and cancer.

Mitigation

- ✓ Posting hazard and warning information in the working area.
- ✓ Communicating all information on the health and safety hazards of oxygen to potentially exposed workers; for example submerging the affected body in warm water.

(c) Air pollution by waste gases. Acidic gases can cause acidic rain which leads to crumbling of buildings, lowering the soil PH and corrosion of roofs made of iron.

Mitigation

- ✓ Fitting catalytic converters in exhaust pipes of machines to convert oxides of nitrogen into nitrogen and Carbon monoxide to Carbon dioxide.
- ✓ Neutralize the acidic gases before releasing waste gases into the atmosphere.

Social benefits of the process of production

- ✓ Employment opportunity; improved income thus better standard of living.
- ✓ Development of infrastructure eg electricity lines, roads, hospitals and schools. Etc., improved road network will facilitate trade hence improved income and better standards of living.

MANUFACTURE OF CHLORINE (INDUSTRIAL)

Sample scenario

One of the large scale uses of chlorine is treating water, to ensure that chlorine is readily available and at a cheaper cost, Government has cleared a local investor to set up a chlorine production plant near Lake Katwe in Kasese district. However, the community is concerned about its environmental effects and how the environmental process will occur

Grab your copy at 15k

ANSWERING SCENARIO BASED QUESTIONS IN GEOGRAPHY NEW CURRICULUM

- ✓ set items are categorized into three types namely
- **indirect- task seeking items**
- **skill task-based seeking items**
- **complex scenario items**

INDIRECT-TASK SEEKING ITEMS

- **these are items that are designed with a problem in the text (back ground information in the scenario narration).**
- **the problem in the text becomes the basis of learners analysis to come up with better ways of answering it.**
- **they are supported by materials in form of photographs that express (show) the text narration in a pictorial form.**
- **such items have tasks that are intended to bring out the following responses,**
  - **pr**oper identification of the problem
  - causes of the problem
  - effects of the problem identified
  - measures/recommendations/learner's opinions towards solving the problem
  - advice on conservation of nature

NB: They are mainly concentrated in section B part I

SKILL TASK SEEKING ITEMS

- **These are items that are set with a purpose of enabling learners to demonstrate abilities of sketching maps from survey maps, photographs and cross sections of relief as well as drawing and interpreting statistical information**
- **they contain survey maps(map extracts) , other maps, photographs, statistical charts, tables and graphs as support materials**
- **The support materials in this case are part of the information to be studied and analysed.**
- **The text (scenario) is an addition to enable the learner understand the problem in the area**
- **such items have tasks that are intended to bring out the following responses;**
  - drawing a sketch map/ cross section/ land scape sketch of the photograph
  - drawing charts and statistical graphs
  - analyzing maps and statistical information
  - proper identification of the problem
  - advise/ recommendations/learners opinion in regards to the problem identified

NB**;** They are mainly set in section A and part II of section B

COMPLEX SCENARIO ITEMS

- **these are multi-tasking items that are made up of short texts with related tasks, they contain support materials that are limited to a few tasks in the items.**
- **Such items have multiple support materials to enable the learner identify the problem to be solved.**
- **they can integrate knowledge from concepts that apply to daily activities in the society.**
    - cost
    - time
    - distance
    - bearing
    - direction
    - size of the land

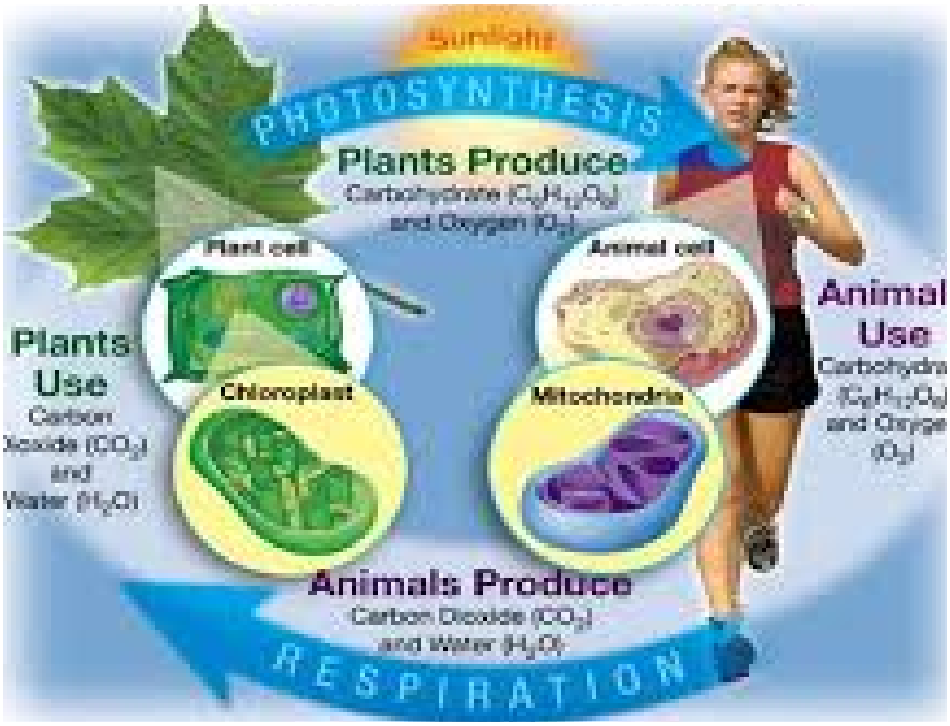
NB: They are mainly examined in section A. therefore, section A is composed of skill-task seeking items and complex scenario items.

IN THE DETERMINATION OF RAIN EVERY DROP COUNTS

HOW TO PASS NEW CBC

BIOLOGY IN ONE DAY

2024



STUDENT'S NAME;.....

CLASS.....

SCHOOL.....

Pass without cramming

COMPILED BY DANIEL KAGIRI

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HOW TO PASS NEW CBC BIOLOGY IN ONE DAY
BY DANIEL KAGIRI SERIES 2024

Rationale;
This manual is enriched with easy to understand study skills for passing the new competency based curriculum biology. It covers wide areas of concern that prepare a new curriculum O'level candidate for end of cycle assessment.

Summary;
The manual covers a thorough breakdown of the following;

- ✔ Biology Paper structure; both paper 1 and paper 2
- ✔ Elements of construct in biology papers 1 and 2
- ✔ Topics, sub topics and content assessed in each element of construct
- ✔ Item approach for both paper 1 and 2
- ✔ Sample items in biology paper 1 and 2

👉 **FOOD FOR THOUGHT**; In the new competency based curriculum, a learner MUST have a lot of information i.e must read wide / research more.

Biology is set in EC -Elements of Construct (areas of examination) In paper 1 and 2

PAPER 1
- Has 5 elements of construct; EC 1, 2, 3, 4, and 5 across both sections A and B.

Section A
-Items set require short and right on point responses. Section A consists of three (3) elements of construct i.e EC 2, EC 4 and EC 5.

Element of Construct 2 (EC 2)
Plant science - plant cells, nutrition in plants, transport in plants, gaseous exchange and respiration in plants, movement in and out of a plant cell, germination reproduction in plants

HOW TO WRITE A GOOD ESSAY / APPROACH TO ITEMS FROM EC 2

-Plant structures and organs and processes
- description, explanation of plant processes e.g transpiration, translocation, germination, absorption, fertilisation, pollination, photosynthesis, respiration etc
- plant challenges, deficiencies, diseases and disorders e.g water stress, wilting, chlorosis
- how plants overcome challenges, e.g increasing mitotic division

Element of construct 4 (EC 4)

Coordination in man and locomotion in man - nerves, reflex arc, hormones (plant and animals), receptor organs, skeletons, bones, action of muscles, disorders.

HOW TO WRITE A GOOD ESSAY / APPROACH TO ITEMS FROM EC 4

- description, explanation of the structures e.g nerves, receptors; processes e.g reflex arc, hearing, accomodation, action of muscles and hormones
- identification of symptoms, causes, effects of the disorder, disease, challenge e.g hormonal imbalances, goitre, osteoporosis, diabetes , muscle cramps
- how to manage; either behavioural or physiological

Element of construct 5 (EC 5)
Reproduction in man, growth and development in animals, genetics, variation and selection

HOW TO WRITE A GOOD ESSAY / APPROACH TO ITEMS FROM EC 5
- description, explanation of the structures e.g vagina, organs e.g testicles, concepts e.g genetic crosses(these must be worded as much as possible), processes e.g corpulation, fertilisation, implantation, meiosis, mitosis,
- symptoms, causes, effects of disorders e.g hormonal imbalances, diseases e.g haemophilia; challenges e.g albinism
- how to manage, either behavioural or physiological e.g avoiding cold, going for medical treatment

Section B

It consists of two (2) parts i.e part 1 and 2

Part 1 contains two (2) items from EC 1 where a learner attempts only one (1)

Part 2 contains two (2) items from EC 3 where a learner attempts only one (1)

👉NB; All items require open essay responses and all items have 1 block task unlike in section A, where a single scenario can have one or more tasks

👉Stick on the scenario, it will direct you what to write as your responses to avoid writing irrelevant.

👉More of what is required is required is RELEVANT, but more of what is not required is IRRELEVANT

A BREAKDOWN OF SECTION B

It contains two (2) elements of construct/ areas of examination. I.e EC 1 and EC 3

Element of construct 1 (EC 1)

Diversity and sustainability of natural resources (ecosystem) - destruction of ecosystem by either natural factors or human influence

HOW TO WRITE A GOOD ESSAY / APPROACH TO ITEMS FROM EC 1

Organised in 3 stages i.e

STAGE 1 - Paragraphs indicating
- problem identified
- problem explained
- 3 examples of natural resources affected by the problem 2 must be living

STAGE 2 - paragraphs explaining
- conservation measures/solutions to problems identified

STAGE 3 - paragraphs explaining
- benefits of conservation ; introduce a breaker e.g start with "however, ...

👉**NB** - Never give less than 5 paragraphs
👉 - A good essay MUST not contain a candidate's name, religion, village, school, age, parent's job and names etc

Element of construct EC 3
Cells, Nutrition in Man, transport in Man, gaseous exchange and respiration and excretion

HOW TO WRITE A GOOD ESSAY / APPROACH TO ITEMS FROM EC 3
- Structure, organ and process involved
- description explanation or function of the above
- Identification of challenges, problems, disorders or deficiencies
- explanation of stragies to manage the above - only behavioural or physiological e.g going for medication, surgery, changing diet

👉**NB** focus - what enters the organ, what happens to it (process) and what is formed/ product/ what comes out

👉Logical flow important e.g start with mouth to stomach then to duodenum if digestion was asked
👉what food eaten, nutrient contained, it's digestion (site, enzyme and product), it's absorption and it's assimilation.
👉talk about one nutrient at a time

GENERAL APPROACH TO INTEGRATIONS

To avoid writing irrelevant and remain on track, the following two steps should be put into consideration whenever attempting an integration or a SBTI - Scenario based test item.

- ✔ **Identification of the problem;** > involving stating, describing and explaining the problem.
- ✔ **Solving the problem**; > involving stating, describing and explaining the solution(s).

However, another approach can be opted for, in substitute for the above approach. It is called the **5W's + H,** and these are questions a learner has to ask him/ herself after reading a scenario twice and before writing any responses from which a fine piece of responses can be obtained without writing the unnecessary information. In details, the **5W'S+ H,** stands for;

1) **What** > stating the problem
2) **Why** > cause of the problem
3) **Where** > site of occurrence of the problem
4) **When** > time of occurrence of the problem
5) **Who** > one affected by the problem
6) **How** > way forward/ solution (s)

Questions 3 and 4 (where and when) may be applicable in some areas and not all, commonly applied in areas involving physiology(body processes).

👌**NOTE**; All responses to the above questions should be detailed in terms of, stating, describing and explaining the response to each question hence a 3×3×3 score criteria which allows a learner to maximise scores from a given item.

SAMPLE PAPER ONE TEST ITEMS

Item 1

Scenario

John's mother dropped out of school when she was in primary two (P.2), got married and produced John. With all the little money she had from selling porriadge, John managed to attend school and he is now in Senior two (S.2), John's head teacher punishes John wherever he speaks vanacular and now John speaks much of the English most times even when at home. One day John came singing about cells, and the mother became unhappy thinking John was a busing her. Another day John told his mother that she has very many types of cells and that they parts that enable them do their functions in her body. With a lot of anger, thinking it was too much, John's mother is planning to remove John out of school and they sell porriadge together.

Task;

Assuming you are John's biology teacher, write a speech you would deliver to John's mother to address the situation.

Item 2

Scenario

Tendo is a 15 year old girl at Kayera primary school. Her Auntie used to complain about her that she had started sleeping away from home. As much as the Aunt complained, Tendo did not change her behaviours. It is now 3 months and she rarely sleep at home. One day Tendo developed mild fever, mouth lips became re, and dry, lymph nodes became swollen, lost appetite and body weight and body was generally weak. In a lot of fear, Tendo now went back home and on first sight, Aunt asked what had happened. Tendo replied that it was the porriadge served at school that caused her all such signs and symptoms. This annoyed the Aunt to the extent of coming to school with a police officer to arrest the Director, head teacher and all the teachers; for serving porriadge that caused Tendo the above sings.

Task;

Having called by the director, as a specialized medical officer, write a piece of advise you would give Tendo's Aunts.

Item 3

Scenario

It is now a month without electricity in Buzibwera B many residents have now resorted to using of firewood for cooking. One day an old lady went to a nearby shrub, where she cut several trees down on stems. After 14 days, she went back to check on the firewood, only finding the tree stumps releasing watery substances from where she cut. It came to her surprise to see such and thought that parts of trees that remained in the soil after cutting the upper stem were urinating. She gathered the whole village to have a look at a tree urinating. On reaching that scene, village members came to agree that the woman might have ran mad. Immediately the chairman solicited some funds to take the lade to Butabika hospital, which the lady she resisted. The woman added that she is ready to remove all the clothes to whoever says that she is mad and the village members claim that the woman can do it because she once did it.

Task;

Assuming the police was notified and hired you as an expert in Botany, write a speech you would deliver in Buzibwera B to address the situation.

Item 4

Scenario

Akwakor is a 5 year old girl who is known to eat a lot. One day Akwakor's mother prepared posho which they ate for lunch with water. Akwakor became confused that every after eating she could become more energetic and satisfied. Her mother was also not sure on what is contained in posho that could make Akwakor to get satisfied and more energetic, the process through which it is formed, equation for the process, importance of the process and how energy was formed. When the mother consulted, the LC1 chairman , he told Akwakor's mother that she should not bather so much after all it might be the hold spirit that entered Akwakor's stomach and cause he to get satisfied and energetic. This confused Akwakor's mother the more.

Task;

Suppose you are the District Nutritionist, write an essay to explain to both the LC1 chairman and Akwakor's family about the truth of the issue at hand.

BIOLOGY PRACTICAL (PAPER TWO 553/2&3)

To score highly in a biology practical, the following skills have been proved to work for any candidate;

- Structure and approach of practical items
- How to present responses
- How to gain confidence

STRUCTURE OF THE BIOLOGY PRACTICAL PAPER

- Paper has One section
- Paper consists of two compulsory items
-The duration is 2 hours and 15 minutes or 30 minutes
- All items set in a scenario format and the scenarios do not contain a parameter a learner will be tasked to investigate e.g if a learner is tasked to carry out an investigation on starch, starch will not be talked about anywhere in the scenario.
- You work alone

ELEMENTS OF CONSTRUCT

Biology practical is set covering two (2) elements of construct/ areas of examination. I.e

Element of construct 1 (EC 1) - Involving Scientific skills, discovery and processes. Requires extended responses.

Element of construct 2 (EC 2) - Involving structure and function of living things. (Plants and animals)

Biology practical paper has two test items i.e number 1 and number 2

INTERPRETING ITEM 1 (REQUIRING SCIENTIFIC SKILLS)

- know it's a scenario
- know there's a real life problem/ challenge
- know that a problem needs an explained solution
- know that solution only through scientific investigation is required
- write a report

Element of construct 1 (EC 1)

This covers;

- food tests, enzyme activities, soil experiments, osmosis

🤔 Question? what is a scientific investigation?

✍ Response; a set of practical procedures to solve a certain problem

SKILLS AND METHODS INVOLVED;

- food tests
- observation
- incubation (enzyme)
- effect of solutions of different concentrations on living tissues..
- reading instruments
- recording results.

SAMPLE ITEM 1

Scenario;

5 year old son falls sick frequently; thin muscles; poor hair quality; doctor recommended to change diet. Sample of the food that constitute the main diet of the child has been provided before you.

TASK;

carryout a scientific investigation to determine the cause of the child's condition, explain and make a recommendation

✍ **Suggested response;**

Ask yourself, do i have

- any experiment i know in all the experiments, which one can solve the problems in the scenario?
- knowledge on how to write a report?

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SAMPLE ITEM 2

An old lady watered her plants with water whose source is not known, plant leaves seen bending and stems weak while others healthy with turgid leaves. The water she used is provided to you as solutions A and B.

TASK;

Carry out an investigation on solutions A and B, and advise the lady accordingly.

✍**Suggested response;**

> You can try it out with your teacher.

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WRITING A REPORT;

Components;
- aim
- hypothesis/ prediction
- materials
- variables
- procedures
- presentation/ observation and deductions
- analysis/ interpretation/ explanation/ conclusion
- recommendations

AIM

- This is not obtained from the task, but from the scenario and the cause of the problem
- should be brief and precise
- must investigate what is lacking because what is present is not the cause of the problem, and if found out, can't solve the problem because what's lacking will still cause the problem.

You can't investigate what's present because you are not sure what's contained in the food sample after all you (learners) are not the one who prepared a food sample.

HYPOTHESIS

- a guessed/ predictable cause of the problem
- is not a true and final cause of the problem
- assumed cause of the problem
- should not be a non - hypothesis e.g "calcium carbonate is not responsible for the colour of chalk " , " without light plants can not make food"
- should contain variables i.e dependent, independent and/ or controlled.

- should have cause and effect i.e " if " ..... " then "... e.g calcium carbonate is responsible for the colour of chalk.

Cause > presence of calcium carbonate

Effect > chalk being white "

Or Light affects the amount of food made by the plant.

Cause > presence of light

Effect > amount of food made

- should be testable
- E.g proteins are lacking in Jane's diet, where a buirettes test can be carried out.

VARIABLES

- what can be changed/ altered to achieve results from the investigation. Types of variables include;

- - **controlled** > one that the experimenter is able to adjust/ control/ measured e.g volume of solutions, length of specimens, duration of incubation, temperature of incubation
- - **independent variable** > known before an experiment begins, experimenter can not change and fixed e.g concentrations of solutions
- - **dependent variable** > not known before experiment is done, recorded as an outcome/ an observation/ result of the experiment and keeps on changing i.e not fixed

MATERIALS

- any tangible apparatus provided and reagents
- quantifying the apparatus/ materials is not recommended because number of apparatus required in different experiments keep on varrying.
- they have a maximum of 3 scores and they are marked based on errors made. More errors made the more reduction in scores from the 3 which is the maximum.

PROCEDURE / STEPS

- involves how to work with apparatus/ materials to produce steps rather than reproducing steps as it was in the KBC - knowledge based curriculum.
- must be coherent
- must be relevant
- must solve the problem
- volumes used must be indicated
- recorded in past tense

OBSERVATION AND DEDUCTIONS

- any chance/ results seen as a result of working with the apparatus/ materials
- results recorded in past tense
- initial, intermediate and final changes must be recorded
- colour and states (solution or precipitate) more important
- these deductions are not the final concrete conclusions, these are instead direct and instant remarks/ comments on/ about the steps taken and observations made.

DATA ANALYSIS / INTERPRETATION/ EXPLANATION/ CONCLUSION

- fact full interpretation of the hypothesis
- linking the results to solving the problem/ true cause of the problem

RECOMMENDATION

- advice to overcome the problem in the scenario

Element of construct 2 (EC 2)

How items are set;

- Scenario format

- Skills required to solve the problem are;

e.g drawing, observation, identification, functions, comparisons, and adaptations of structures of arthropods (insects), plants (roots, stems, leaves, fruits, flowers, and seeds), mammals (bones) and birds (feathers).

- involves construction of a dichotomous key to identify structures of arthropods, plants, mammals and birds
- drawings should cover at least three thirds of the drawing space.
- always your drawing is in the right view i.e dorsal, anterior, posterior, ventral, lateral, longitudinal or transverse/ cross section.
- sketching before actual drawing is not allowed.
- labelling lines should not be broken, label space (should touch part and labelling word/ name) or even bear arrow heads

QUALITIES OF A GOOD DRAWING

- Title; a word drawing should be used but not diagram
- Neatness; achieved without rubbing
- Magnification; obtained from; $\frac{\text{image length}}{\text{specimen length}}$
- Continuous and good outline
- Labelled; without labelling lines meeting each other.
- sharp HB pencil should be used

SUCCESS BEGINS AT THE END OF YOUR COMFORT ZONE









ANSWERING QUESTIONS IN ECONOMICS

Economics is examined at advanced level as a principle subject. It is one of those subjects that cut across Arts and Science combinations. It is a popular subject, however many students are challenged when it comes to answering questions.

In this edition, we try to point out the proper question answering techniques that will ensure quality grades in the subject.

Question interpretation

Students are encouraged to read and understand each and every word in the question to ensure proper interpretation.

The setters of questions dictate the nature of the answer to be given and the student is expected to be in line with the wishes of the setter for proper interpretation.

Students are encouraged to read the question a number of times until they are sure of the answer. Clarity must be emphasised by the learners while answering the questions. Unclear answers lead to loss of marks.

Parts of a question.

There are three main parts of a question and these determine the nature of the answer to be written. They include;

1. **Qualifier.** This is a word or group words that indicate what the respondent to the question must do e.g. explain, examine, assess, analyze, how, why, state, give, outline etc.
2. **Key word(s).** This indicates what the respondent must work upon e.g. causes, effects, intentions, challenges etc.
3. **Concept.** This indicates what is being examined e.g. Price mechanism, inflation, demand, changes in demand etc.

Examples:

1. Explain the role of price mechanism in the allocation of resources in an economy.

   Qualifier - explain

   Key word - role

   Concept - price mechanism

   The question requires only positive roles

2. Assess the role of price mechanism in the allocation of resources in an economy.
   The question requires both positive and negative roles due to the change of the qualifier from explain to assess which requires a critical analysis of the roles.

Parts of an answer

There are two main parts of an answer to the question and they include;

1. **Statement of the point**: This should clearly answer the question as vague statements will lead to loss of marks. Avoid hanging answers and ensure that every statement of the point has a qualifier e.g. size of the market and not 'market', 'level of skills' and not 'skills', 'leads to creation of employment' and not 'employment' etc.
2. **Explanation of the point**: This should clearly expound on the statement of the point and the respondent should restrict himself to the point statement. Explanations in economics should clearly bring out the 'how' or 'why' as the situation may demand.

Structure and demands of the papers in Economics:

P220/1:

This tests learners on knowledge of Economics theory and concepts without emphasing application. It requires a student to have good knowledge of the economics theory and concepts of economics.

The questions are open ended(**nonrestrictive**) because they don't tie the respondent to any particular economy. This therefore allows a variety of answers to the learners.
e.g. What are features of oligopolistic firms? This accommodates all the features as studied in class.

In this paper the present simple tense is used when answering questions on outcomes, causes, roles and contributions while for solution questions strictly the future tense is used.

P220/2:

This tests learners on their ability to apply the concepts learnt in context of Uganda. It requires learners to have facts about Uganda's economy. The questions are highly restrictive since the learners are tied to only what happens in Uganda.

In this paper the present simple tense is used when answering questions on outcomes, roles and contributions while for causes we can use present simple tense, present continuous tense and past tense depending on the question. Solution questions require a candidate to use the future tense, past tense and present continuous tense.

Note: The questions for both papers are selected from the same content, therefore there are no specific topics for each paper.

Both papers have two sections A and B

SECTION A

The questions in this section require short but complete answers. i.e. precise and concise. Learners are encouraged to write meaningful statements. The common qualifiers used include; define, state, list, outline, give etc. It requires one to have read comprehensively since the questions are few and are chosen from a wide range of topics and sub-topics.
e.g. State two roles of price mechanism in the allocation of resources in an economy.
- Give four sources of monopoly power in Uganda

SECTION B

This requires the student to explain explicitly the points given. The explanation depends on the key words and the concept used in the question.
In most cases the setters do not indicate the number of points to be given but the candidate can be guided by the marks allocated to the question. The candidate is encouraged to give adequate number of points.

The points should be well stated and explained depending on the nature of the question.

EXAMINABLE AREAS IN ECONOMIES

Questions in economics focus on the following areas

1. Causes
2. Solutions
3. Outcomes
4. Role/contribution
5. Importance
6. Intentions
7. Conditions
8. Features
9. Procedures
10. Theories

CAUSES:

A cause is a factor which when happens or occurs has the ability to bring about an effect or a change in a situation or an activity. Some causes are deliberate while others are not deliberate (unintended).

Deliberate causes; these can be manipulated to bring about a positive effect or negative effect/change.

The common terms used by the setters for deliberate causes include;

Factors influencing, affecting, determining, limiting, promoting etc.

Example:

Explain the factors that affect the level of demand in an economy

The question requires a neutral/well balanced statement and explanation of the point.

Sample answer:

1. Level of income: low level of income limits demand because the consumers have a low purchasing power, while high level of income leads to high demand because the consumers have a high purchasing power.

Explain the factors that lead to low demand for a commodity.

Note: the question requires biased but negative statement and explanation of the point.
e.g. low income: consumers buy small quantities of goods due to low purchasing power.

Explain the factors that may lead to high demand for a good.
Note: The question requires biased but positive answers.
e.g. High level of income. Consumers buy big quantities of goods because they have a high purchasing power.

Discuss the factors that may lead to a change in demand for a commodity
Note: The question requires neutral/well balanced statement and explanation of the point but indicating a **change** or a **shift** in the answers.

Sample answer

Change in income of the consumers. An increase in income increases demand because of a rise in the consumer's purchasing power while a decrease in income leads to a fall in demand because of a reduction in the purchasing power.

Explain the factors that may lead to a fall in demand for a good.

Sample answer

Decrease in income: consumers buy less quantity of the good due to a fall in their purchasing power.

Discuss the factors that may lead to an increase in demand for a good

Sample answer

Increase in income: consumers buy more quantities of a good due to a rise in their purchasing power

Unintended causes:

These are factors that happen uninfluenced or without manipulation and they usually lead to negative effects/change.

e.g. **Explain the factors that are responsible for the instabilities in prices of agricultural products in Uganda.**

Note: The answers should focus on what causes an increase or decrease in prices of agricultural products.

Sample answer.

Long gestation period of agricultural products. The supply of agricultural products cannot be increased in the short-run which leads to shortages in the short-run leading to increase in prices however supply increases in the long-run as farmers harvest and bring to the market which leads to a decrease in prices.

Explain the causes of inflation in Uganda.

Note: Emphasis should be put on what triggers prices to rise but not necessarily being high.

SOLUTIONS:

A solution is answer/remedy to a problem/challenge. Solutions are given in form of measures/steps/policies/ways. Good measures/solutions should have the following characteristics:

1. It should be workable and with measurable output. i.e. one should be able to determine the effect of the measure.
2. It should indicate effort e.g. Something being done, been done, to be done i.e. solutions don't happen miraculously.
3. It should indicate the period of action(tense)
4. Explanations to solutions should focus on how the measures solves the problem and not how you achieve the measure.

Example:

1. Suggest measures that **should be taken** to increase the rate of economic growth in Uganda.

Note: This is an opinion seeking question which requires one to express an idea to solve the problem at hand. The candidate should suggest a measure using the future tense.

Sample answer:

Improve the state of infrastructure/ infrastructure should be improved e.g. construct better roads. This will reduce the costs of transportation of goods to markets and attracts more to invest and increase production.

1.Explain the measures that **have been taken** to increase the rate of economic growth in Uganda.

Note: This requires a student to give measures which are already on ground and therefore using past tense/ past participle(has/have). Suggestive answers are not applicable in this case.

Sample answer.

Improved infrastructure/ infrastructure has been improved e.g. better roads have been constructed. This has lowered transportation costs of goods to the markets which has attracted people to invest and increase production.

Explain the measures that **are being taken** to increase the rate of economic growth in Uganda.

Note: This requires the student to give measures that are happening now or are ongoing. This necessitates the use of present continuous tense (now tense).

Sample answer

Improving infrastructure/ infrastructure is being improved e.g. better roads are being constructed. This is reducing transportation costs of goods to the market and attracting many people to invest and increase production.

Note: To avoid giving wrong/irrelevant solutions, one should know the nature of the problem to be solved.

Sample answer.

Political instability: This destroys productive infrastructure e.g. destroys factories and roads which brings production to a standstill leading to shortages in the market and hence increasing prices of goods.

OUTCOMES. These are results of a process/situation/activity. The common terms used by setters to indicate outcomes include; effects/consequences/impacts/ implications.

These may be positive or negative. Positive outcomes are also known as benefits/merits/advantages while negative outcomes can be called dangers/ costs/ demerits/ adverse effects/shortcomings/defects.

Note: The statement of the outcome should be a direct result of the process/activity and not a secondary one. The explanation of the outcome should focus on how the process leads to the outcome and not the effect of the effect.

E.g.: 1. Explain the effects of economic growth in Uganda

2. Assess the effects of economic growth in Uganda.

Note: The two questions require both positive and negative outcomes.

Sample answer of a positive effect

1. **Increases government revenue.** This is because many investments firms /economic activities are set up and the government imposes taxes on their incomes/profits.

   Note: It may not be necessary to show the use of the tax revenue**.**

   Sample answer of a negative effect

2. **Leads to rural urban migration and its evils.** This is because rising levels of urbanization attracts many people to leave rural areas and go to urban areas to look for employment.

   Discuss the benefits of economic growth in Uganda. This requires only the positive outcomes of the process.

   Explain the costs of economic growth in Uganda. This requires only the negative outcomes of the process.

   There are some concepts in Economics which are negative in nature such that even

   when one is asked to explain or assess the effects, only negative effects are given e.g.

   1. Explain the effects of hyperinflation in an economy.
   2. Explain the effects of unemployment in Uganda

   Note: Sometimes setters demand for outcomes indirectly when they use key words such as case for and against, arguments for and against. Such questions are set using the qualifier "discuss"

   Sample questions

   1. **"**Developing countries should rely on foreign aid to achieve a faster rate of economic growth". Discuss
   2. Explain the arguments for and against relying on foreign aid in developing countries.

3. Explain the case for and against relying on foreign relying on foreign aid in developing countries.

The questions above require the candidate to give the likely outcomes of relying on foreign aid in developing countries.

Learners are advised to use the present simple tense when stating and explaining the outcomes for both paper one and two.

ROLE/ CONTRIBUTION: These are in most cases confused with outcomes which is not right. This is because roles and contributions are duties/responsibilities which are performed or done on a regular basis. Due to the nature of roles and contributions, certain precautions have to be taken by candidates when answering such questions and these include;

1. The recommended tense is present simple tense e.g. promotes,
2. Roles and contributions should not be stated as objectives e.g. don't use "to" etc.
3. Avoid using words like "leads", "results", "helps" because they will indicate an outcome and not a role.

Note: Roles and contributions are positive in nature. Therefore, a candidate is not expected to give negative roles except in certain situations.

When setters use qualifiers such as explain, describe and what … the candidate is expected to give only the positive role.

Examples;

1. Explain the role of price mechanism in resource allocation in an economy
2. Describe the contribution of public enterprises in the development of Uganda
3. What is the role the informal sector in Uganda?

However, when the setter uses qualifiers such as examine and assess, the candidate is expected to give two sides i.e. the roles/contributions and the demerits.

Examples

1. Assess the role of price mechanism in resource allocation in an economy
2. Examine the contribution of public enterprises in Uganda

IMPORTANCE: This refers to the significance or use of something. The setter can use importance or significance or use as key words in the question and the presentation of the answers remains the same.

Examples:

1. Explain the importance of a national budget in Uganda
2. Explain the significance of a national budget in Uganda
3. Explain the uses of a national budget in Uganda

Sample answer

Used to generate government revenue. The government identifies tax and non-tax sources of revenue.

Used to promote economic growth. The government provides incentives to the producers to lower the costs to increase production.

INTENTIONS:

These are targets set to be achieved in a given period of time. They indicate what one intends to achieve in some time to come. Common terms used by setters to indicate intentions include; objectives, aims, purpose, rationale, motive, why, account for etc.

The easiest way to present intentions is to use qualifiers such as "To", "In order to", '' so as to" "for purposes of".

Some questions are direct while others are not.

DIRECT QUESTIONS: Such questions are easy to interpret because the key word is leading.

1. What are the **objectives** of measuring national income in Uganda?
2. Explain the **aims** of compiling price indices in an economy

INDIRECT QUESTIONS: Such questions are not easy to interpret because the key word is hidden

1.Why is it necessary to encourage economic liberalisation in Uganda?

2. Account for the need to promote economic liberalisation in Uganda

Note: The intention is to target benefits i.e. the candidate turns the benefits into objectives.

Both the benefits and objectives have the same explanation

Sample answer:

To increase employment opportunities. This is because the government will ease restrictions on economic activities which will attract many people to set up economic activities and increase jobs.

Why may economic liberalisation be discouraged in Uganda? The question requires one to set targets to get rid of the demerits.

Note: The intention is to remove or minimise demerits.

The explanation focuses on how do away with the demerit.

Sample answer

To ensure stable prices of goods. This is because with reduced liberalisation the state will have control over the prices of goods and hence minimise the influence of forces of demand and supply.

CONDITIONAL/CIRCUMSTANCIAL QUESTIONS:

A condition is a situation/factor that seems to be very paramount or necessary for something to happen or to be done.

Conditional questions are of two types namely;

1. Conditional questions that require one to give a condition that justifies one's action, with such questions the learners are encouraged to use qualifiers such as **when**, **where, in case, if** etc. When making statement of the points.

Examples:

Under what circumstances may price mechanism be encouraged?

Sample answer:

When there is need there is need to improve the quality of goods. This is because it will encourage competition among the producers.

Under what circumstances may price mechanism be discouraged?

Sample answer

If there is need to stabilise the economy. This is because the state will control prices and interest rate and thus avoid fluctuations.

2. Conditional questions that require the candidate to give the conditions that must exist for something to happen.

Examples:

1. Explain the conditions necessary for price discrimination to succeed
   Sample answer:
   The seller **must** be a monopolist
2. Explain the conditions necessary for devaluation to succeed
   Sample answer
   The demand for exports **should** be price elastic
3. Discuss the conditions that are necessary for economic integration to succeed

   Sample answer

The countries **should** in the same region

Explain the conditions that should exist for development planning to succeed in Uganda.

Sample answer

There **should** be good infrastructure

FEATURES/CHARACTERISTICS/TRAITS:

A feature is a statement which describes the identify of something. Many aspects/concepts in economics have got features. Learners are advised to use qualifiers while stating features in order to give them clear meanings. The common qualifiers used are mainly, many, majorly, high, few etc.

Note: a qualifier is a word or a group of words added to the points stated to give it meaning i.e. it reveals the quantity or the extent of something

e.g. What are the features of the agricultural sector in Uganda?

Sample answers

- Majorly rural based
- Mainly labour intensive
- Few cash crops grown

Note: qualifiers may not be used for certain features for fear of distorting the meaning e.g. features of market structures and some of the features of Uganda's economy.

Examples

1. What are the features of monopoly power?

Existence of one producer and Not mainly one producer

2. What are features of Uganda's economy?

It is an open economy and Not mainly an open economy

PROCEDURAL QUESTIONS: These require a candidate to present the points in a systematic and logical way.

Examples:

1. How is the cost of living index compiled in Uganda?
2. Explain the process of credit creation

ECONOMICS THEORIES: These are people's thoughts about how certain things happen.

They are supported by assumptions to ensure that the desired effect is achieved.

The common theories studied in Economics include;

1. Rostow's stages of economic growth
2. Balanced growth theory
3. Unbalanced growth theory
4. Keynesian theory of unemployment
5. Marginal productivity of wages
6. Comparative and absolute costs advantages
7. Malthusian theory of population growth
8. Iron law/subsistence of wages

The main interest of the setter on theories is on the following aspects;

1. **Statement of the theory**: this requires the candidate to write briefly about the originator of the theory
2. **Explanation of the theory:** this requires the candidate to write the statement of the theory and give more description about.
3. **Assumptions:** A question on assumptions requires the candidate to write the statements that supports the theory.
4. **Relevancy/applicability of the theory:** This requires the candidate to give aspects of the theory that are in agreement with the current situation in the economy.
5. **Irrelevancy/inapplicability/limitations/criticism of the theory:** This requires the candidate to give aspects of the theory that are not in agreement with the current situation in the economy.

Sample questions:

1. State the Malthusian theory of population growth
2. Explain the Malthusian theory of population growth in Uganda
3. What are the assumptions of Malthusian theory of population?
4. What are the applicabilities of Malthusian theory of population in Uganda?
5. How relevant is the Malthusian theory of population growth?
6. Explain the weaknesses of Malthusian theory of population in Uganda
7. To what extent is the Malthusian population theory of population relevant to developing countries?

Note: All theories studied are to a larger extent irrelevant because their usefulness to explain certain situations has been overridden by passage of time.

Candidate's Name: …….Signature: ……..…

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PHYSICS

Paper 1

2024

$2^{1}/_{2}$ hours

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ASSESSMENTS TO CANDIDATES

PHYSICS PAPER 1

THEORY SENIOR

FOUR

INSTRUCTIONS TO CANDIDATES:

This paper consists of **several** examination items.
Answer **all items for your good academic performance** all.



Item 1

In a certain town, it is a must for drivers to be tested with their vehicles for road-worthiness. On a certain day, a car started from rest and accelerated to **50 ms^{-1}** in **10 seconds**. The driver maintained that velocity for **20 seconds** and suddenly decelerated to rest in **2 seconds** causing him to crush into windscreen. As a result, the car tyres wore out on the tarmac causing a lot of heat on the ground.

Support material



Task

You have been tasked to write a report to explain the scene. In your report include a motion graph, find the rate at which the car's velocity reduces and explain, with reasons, why driver crushed into the wind screen. Advise by stating whether the driver's average speed exceeded the speed limit of **8 ms^{-1}** and how he would prevent the crushing. (20 scores)

Item 2

Challenges arise in a community of an isolated district in Uganda. Mixed beliefs, anxiety, mistrust and poverty have cropped up. Rainbows happening to some places when it rains and illusionary water pools on sunny days on road surfaces have been attributed to area clergy and witch-doctors. Furthermore, there is change in color where different objects when placed in the night security lights of one of the residents, who is believed to have miraculous powers of God. A lot of money is being spent by residents to get miracles to avoids misfortunes and evil spirits from spiritual people.

Prepare a speech you would give in the upcoming community gathering to address this challenge. (20 scores)

Item 3

Of recent, a storied building being constructed in Kampala near Munyonyo collapsed and took very many lives. However, when police arrested the contractor and asked the cause of the collapse, he complained that the client did not give enough money to buy the appropriate materials for constructing the building given that the place is affected much by harsh weather conditions. However, when the **KCCA** Engineer was tasked to analyze the situation, he said "the mechanical properties of the materials being used are below the standard required for a storied building near such areas. He said Young's modulus of steel should be about **2.0×10^{11} Nm^{-2}**". This statement confused the public the more.

Support material



A force of **500 N** causes an extension of **20 mm** on an iron bar of length **100 cm** whose cross-sectional area is **0.05 cm^2**.

Task

As a learner of Physics, you have been asked by police to produce a report about the scene to help the police carry out investigation on the contractor. (20 scores)

Item 4

There has been an outbreak of malaria in your community and your friend is admitted in hospital. You have been delivering a warm meal; however, you are required to deliver a hot meal for her in the hospital.

TASK

Without using a food flask, how would you ensure that the food you have prepared remains hot until you reach the hospital? (20 scores)

Item 5

On evening, Catherine kept juice in a tightly filled and corked glass bottle in a deep freezer. On opening the freezer, the following morning, she found the glass bottle broken with the juice frozen. As a Physics learner, explain to her what happened and advise her on what to do next time. (20 scores)

Item 6

A boy was travelling with her parents by means of water transport. He carried a ball and a phone taking selfies along the journey. On their way, water waves disturbed the boat and all he had on his hands dropped in water. However, with much disappointment of losing his phone, allover sudden, he realized the ball was still on top of water though his phone was nowhere to be seen. This scene left them wondering the magic with the ball. As they continued, they looked in the air and saw two people seated in a bucket connected to a balloon with burning flame was carrying them in space. The boy was confused and wondered how the two men would land safely on the ground though his parents could not explain anything to him.

Support information



Take the density of water = 1000 kgm^{-3}

- Acceleration due to gravity = 10 ms^{-2}
- Mass of the boat = 200 kg
- Mass of a phone = 500 g
- Volume of a phone = 50 cm^3
- Volume of a ball = 20 cm^3
- Volume of the boat = 3000 cm^3

Task

As a Physics learner, help the boy understand what happened while on the boat and explain for him how the two heavy men were carried by just a balloon with burning air. (20 scores)

Item 7

The rampant rains in the country have caused destruction of lives and property. The citizens have been advised to relocate to the nearby camp gazetted by the government. However, they do not have enough food. The World Food Programme (**WFP**) has supplied bags of maize flour packed in **50 kg** sacks, but wishes to give the flour in different ratios. That is,

- Families with more than **10** members: **25 kg**.
- Between **7-9** members: **20 kg**
- Between **4-6** members: **15 kg**
- Below **4** members: **10 kg**
- All district leaders to take **50 kg** each

Unfortunately, they did not carry the weighing machine, but there is a nearby carpentry with a uniform piece of wood of mass **30 kg** and length **4 m**.

Task

Write a report to the store man explaining how he can measure the different masses using the piece of wood (20 scores)

Item 8

The school welfare department is facing a challenge of rain affecting their catering activities due to lack of a kitchen. The school is planning to construct a modern kitchen, which can save energy and reduce on the temperature inside.

Task

You are appointed as the head of construction committee for this kitchen, conduct a survey and compile a report you will present to the school welfare department showing the kind of cooking utensils required, how to paint the walls to reduce heat inside and outside the kitchen and how to manage air exchange inside the kitchen. (**20 scores**)

Item 9

At a construction site, Mbwali Milly was tasked to carry bricks from where they were to the

masons. The task was tiresome. She applied a lot of energy and would carry a few bricks a day. She asked the foreman for a wheelbarrow. Soon, she had to take the bricks up the building. This time, she asked for a plank of wood which she used to make an inclined plane. But she would be tired by noon! So, the foreman suggested that she makes a single machine that would move the bricks up vertically.

When the foreman looked in the vicinity, he realised that there was a motorcycle wheel, long ropes, straight poles, tall enough to reach the position where the bricks were to be put, and a large hemispherical pan.

Tasks

(a) Make a brief explanation why and how each machine was able to simplify work.(**08 scores**)

(b) Show how Milly could assemble the items to come up with a simple machine and how she would use it to lift the building materials up to the floor in the shortest time possible.

Item 10

During preparation for the function or party at your school, two decorators disagreed on the right position to hang the balloons. One preferred the balloons to be placed in direct sunshine. However, the other insisted that they should be inside the tent.

Task

As a Physics Learner, write an advisory message, with reasons, indicating the place where the balloons should be placed. (**20 scores**)

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FORM ONE & TWO

Preparation for Necta examinations

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PHYSICS COMPETENCE BASED QUESTIONS WITH ANSWER FORM 1& 2

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PHYSICS COMPETENCE BASED QUESTIONS WITH ANSWER FORM 1& 2

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10. Force
11. Archimedes principle and the Law of Floatation
12. Structure and Properties of Matter
13. Static Electricity
14. Magnetism
15. Motion in a Straight Line
16. Temperature and Sustainable Energy Sources.

PHYSICS COMPETENCE BASED QUESTIONS WITH ANSWER FORM 1& 2

WORK, ENERGY AND POWER



SHORT SUMMARY AND FORMULA

Work; is the product between force applied and the distance in the same direction. The S I unit of work **JOULE'S** (J) or Newton meter (NM)

Thus work done =Force× distance

Energy; is ability of doing work and its S I unit of work **JOULE'S** (J)

Types of energy

There are two type of energy which are;

(i) Kinetic energy

(ii) Potential energy

Kinetic energy; are form of energy possessed by a body due to its motion. It was given by K.E=$\frac{1}{2}mv^2$ and its S I unit is **joules**

Examples of kinetic energy are

(i) Moving car

(ii) Moving water

(iii) Ocean Waves and Ocean Tides

(iv) Moving Machines

(v) Falling bodies

Potential energy; are type of energy possessed by a body due to its rest or position

Potential energy it depend on Mass of an object, acceleration due to gravity and height

Thus PE=mgh

Examples of potential energy are;

(i) A man sleeping on a bed

(ii) A book placed onto a table

(iii) A ruler put on the table

There was many form of energy, but the following below are some of form of energy are;

(i) Heat energy

(ii) Electromagnetic energy

(iii) Sound energy

(iv) Electrical energy

(v) Nuclear energy

(vi) Mechanical energy

The law of conservation of energy state that *"energy cannot be created nor be destroyed but can be transformed from one form to another"*

Transducer; are those device which are used to convert one form of energy to another, for example **Generator** convert mechanical energy to electrical energy, **A motor** convert electrical energy to mechanical energy, **A microphone** converts sound energy to electrical energy, **Solar panel** convert

solar energy to electrical energy, **Heater** convert electrical energy to heat energy and other like.

POWER; is the rate of doing work, its S I unit are **Watts** (W)

Thus power $=\frac{work\ done}{time}$ or $\frac{energy\ consumed}{time}$

WORKED EXAMPLES

1. **Calculate the amount of work done in raising a block of mass 5 kg through a height of 40 cm. (Take g = 10 ms^{-2})**

Solution

Work done = force × distance

Work done = (mg) h = (5 × 10) × 0.4

Work done = 20 J.

2. **Find kinetic energy of a body of mass 20kg moving with speed of 30m/s**

Solution

Mass (m) =20kg, velocity (v) =30m/s

From K.E=$\frac{1}{2}mv^2$ thus, K.E=$\frac{1}{2}20 \times 30^2$=9000J

The kinetic energy is 9000J or 9KJ

3. **A body of mass 5 kg initially at rest is subjected to a force of 20 N. What is the kinetic energy acquired by the body at the end of 10 S.**

Solution:

Here, m = 5 kg, F = 20 N, t = 10 sec, K.E=?

From F=ma thus a=$\frac{F}{m}=\frac{20}{5}=4ms^{-2}$

Also v=$\frac{a}{t}=\frac{4}{10}=0.\frac{4m}{s}$

Since K.E=$\frac{1}{2}mv^2$

Then K.E=$\frac{1}{2}(5 \times 0.4^2)=0.4$J

The kinetic energy was 0.4J

4. **The momentum of a body of mass 4 kg is 400 kg ms^{-1}. Calculate its K.E.**

Solution.

Here, m = 4 kg, Momentum (p) = 400 kgm/s

From formula P = mv then V=$\frac{P}{m}=\frac{400}{4}$=100m/s

The velocity =100m/s

Since K.E=$\frac{1}{2}mv^2$

Then K.E=$\frac{1}{2}(4 \times 100^2)=20000$J or 20KJ

The kinetic energy was 20000J or 20KJ

5. **. Define the term energy. A ball of mass 0.2 kg is dropped from a height of 20 m. On impact with the ground it losses 30 J of energy. Calculate the height it reaches on the rebound.**

Solution.

Energy; is ability of doing work.

Given that, mass (m) =0.2kg, height (h) =20m, the energy loss (E_T) =30J, Height due to the energy loss (h_2) =?

From E_1=mgh=0.2×10×20=40J

The energy total was given by $E_T = E_1 + E_2$

$E_2 = E_T - E_2$=40J-30J=10J

$$then\ , h_2 = \frac{E_2}{mg} = \frac{10}{0.2 \times 10} = 5m$$

Height it reaches is 5m

6. **A man drops a 10kg of stone from the top of ladder of a 5m, what will be kinetic energy when reach the ground? And what will be the speed just before hits the ground?**

Solution.

Mass (m) =10kg, height (h) =5m, K.E=? and V=?

From law of conservation of energy

Kinetic energy =potential energy

Kinetic energy =mgh=10×5×9.8=490J

Kinetic energy when reach the ground is 490J

Velocity is obtained from

$$K.E=\frac{1}{2}mv^2$$

$$\text{Thus V}=\sqrt{\frac{2K.E}{m}} = \sqrt{\frac{2\times490}{10}} = 9.89m/s$$

The speed just before hits the ground is 9.89m/s

7. A boy of mass 30kg climbs 12steps of a stair case ,each measuring 15cm high in 20sec.calculate the power developed by the boy(Take g = 10 ms^{-2})

Solution

Mass (m) =30kg, number of steps=12, the height of stair case =15cm

Vertical height climbed =height of stair case× number of steps

So height =15cm×12=180cm=1.8m

Time (t)=20sec , force (F)=Mg=30×10=300N

Then Work done =F×d=300N×1.8m=540J

Hence power =$\frac{Work\ done}{time} = \frac{540J}{20sec}$=27watts

The power developed by the boy was 27watts

8. **A man pulls a bucket of water from a well. If he is able to take out 3kg of water from the depth of 20m in 5sec. calculate the power used by man(Take g = 10 ms^{-2})**

Solution.

Given that, mass (m) =3kg, height (h) =20m, time =5sec

$$\text{From Power= XE "energy" time} = \frac{mgh}{t} = \frac{3\times10\times20}{5} = 120W$$

Power used by man is 120J

9. An electrical motor of power 100W is used to drive the stirrer in water bath. Energy supplied to the motor is 20% of power stirring the water. Calculate the work done in one minutes.

Solution.

Power supplied=100W

Power consumed =20%×power supplied=$\frac{20}{100} \times 100W = 20W$

Time =60sec, then work done =power consumed × time

Work done =20W×60sec=1200J

The work done =1200J

10. A man weight 300N runs up a flight of 13steps, each step15cm high, in 3sec.calculate the power of the man.

Solution

Force=300N, number of steps=13, the height of each step=15cm,

Then the vertical height=number of step × height of each step

Thus, vertical height=13×15cm=195cm=1.95m

From Power=$\frac{\text{work done}}{\text{time}} = \frac{F \times h}{t} = \frac{300 \times 1.95}{3} = 195\text{W}$

The power of the man is 195W.



OBJECTIVE QUESTIONS TEST 01

1. As object falls towards the ground, its potential energy

A. Increase B. Remain the same C. Decrease

2. The speed of an object having mass of 5kg and kinetic energy about 400J, what will be the value of its velocity in m/s

A. 10m/s B. 12.6m/s C. 14.5m/s

3. When the velocity of a body is doubled
   A. Its K.E. is doubled
   B. Its P.E. is doubled
   C. Its momentum is doubled
   D. Its acceleration is doubled
4. A moving body need not have
   A. kinetic energy C. potential energy
   B. momentum D. velocity
5. Two spheres of the same size, one of mass 5 kg and the other of mass 10 kg, are dropped simultaneously form a tower. When they are about to touch the ground, they have the same
   A. momentum B. kinetic energy

C. potential energy
D. acceleration

6. Has a K.E. of 1 joule when its speed is
   A. 0.45 m/s
   B. 1 m/s
   C. 1.4 m/s
   D. 4.4 m/s
7. A 1 kg mass has a P.E. of 2 joule relative to the ground when it is at a height of
   A. 0.2 m
   B. 1m
   C. 9.8 m
   D. 32 m
8. A body of mass 5 kg, initially at rest, is moved by a force of 2 N on a smooth horizontal surface. The work done by the force in 10 s is
   A. 20 J
   B. 30 J
   C. 40 J
   D. 60 J
9. Work is always done on a body when
   A. a force acts on it
   B. it moves through a distance
   C. its momentum changes
   D. it experiences an increases in energy through a mechanical influence
10. The kinetic energy of a body becomes four times it initial value. The new linear momentum will be
   A. thrice the initial value
   B. four times the initial value
   C. same as the initial value
   D. twice the initial value

ANSWER FOR TEST 1

1	2	3	4	5	6	7	8	9	10
B	B	C	C	D	C	A	C	D	D

OBJECTIVE QUESTIONS NECTA (FTN 2010-2022)

1. Which of the following is not form of energy
   A. Light
   B. Friction
   C. Magnetism
   D. Electron
2. Work and energy have the same SI unit of ; (FTN 2011)
   A. Calories
   B. Joule
   C. Watts
   D. Pascal

3. Heat energy is transferred from the sun to the earth by process of
   A. Convection
   B. Radiation
   C. Conduction
   D. None of the above
4. The quantity of energy possessed by a body which cause the vibrations of its molecules is;
   A. Temperature
   B. Energy
   C. Heat
   D. Current
5. When a body of mass M, is lifted through a height h, it possesses energy known(FNE 2019) and (FTN 2017)
   A. Kinetic energy
   B. Chemical energy
   C. Light energy
   D. Potential energy
6. Which of the following unit could be used for kinetic energy (FTN 2018)
   A. Kg
   B. N
   C. JS
   D. NM
7. When a body is performing a work, it is said to have (FTN 2018)
   A. Moment
   B. Energy
   C. Momentum
   D. Work
8. The energy which obtained from hot rocks underground is called (FTN 2016)
   A. Geothermal energy
   B. Solar energy
   C. Wind energy
   D. Water energy
9. The rate at which work is done is called; (FTN 2015)
   A. Energy
   B. Watts
   C. Joule per time
   D. Power
10. The energy associated with areas of frequent earthquakes is known as
    A. Tidal energy
    B. Solar energy
    C. Geothermal energy
    D. Wind energy
11. The energy formed due to the rising and falling in the level of water in the ocean or sea known as
    A. Electrical energy
    B. Tidal energy
    C. Water energy
    D. Wind energy
12. The product of force and displacement is known as (FTN 2012)
    A. Energy
    B. Momentum
    C. Power
    D. Work done

13. What is the SI unit of power? (FTN 2020)

A. Joule per metre
B. Meter per second
C. Meter per second^2
D. Joule per second

Answer for objective necta questions (FTN 2010-2022)

1	2	3	4	5	6	7	8	9	10	11	12	13
D	B	B	D	D	D	B	A	A	C	B	D	D

COMPETENCE QUESTIONS WITH ANSWERS.

1. Give three distinction between potential energy and kinetic energy

Answer.

Kinetic energy	Potential energy
(i) Are energy possessed by a body due to its motion	Are energy possessed by a body due to its rest or position.
(ii) It was given by K.E=$\frac{1}{2}mv^2$	It was given by P.E=mgh
(iii) Example moving car	Example a book is placed on a table.

2. (a) how work differ from energy

(b) What are the main sources of energy give at least four sources

(C) Can a body have momentum without energy, explain.

Answer.

a) Energy is ability of doing work while work is force times perpendicular distance.
b) The main source of energy are
   - ✓ Sun
   - ✓ Wind
   - ✓ Fuel
   - ✓ Water
c) Yes, since When energy E=0 ,a body can possessed kinetic energy which can be given from this relation E=K.E+ P.E=0, since kinetic energy relate with momentum thus K.E=$\frac{1}{2}$pv, where p=mv-momentum

3. Give an example when a work done by force acting on a body is zero even though the body gets displaced from original position by application of force.

   Answer.

   The work done is zero when the displacement and applied force are perpendicular to each other. Thus example are When a person pushes a wall and When a farmer carrying a hole

4. Explain why in trying to move a rigid wall, a person is said to be doing no work

   Answer.

   Because there is no changing position of the wall in term of distance, thus distance d=0m, while great force are applied. Hence no work is done at all.

5. . Name one device which converts:
   a) Heat energy into electrical energy
   b) Mechanical energy into heat energy
   c) Electrical energy into heat energy
   d) Electrical energy into sound energy

   Answer
   a) Thermal power station
   b) Generator
   c) Heater
   d) Speaker

6. An apple of mass 0.3 kg falls to the ground from a height of 21.9 m. If the acceleration due to gravity is 10 m/s^2
   (i) Mention all energy changes that take place in this process
   (ii) Find the energy it possesses before falling Find the energy possessed by the apple when it just reaches the ground.

   Answer

   a) The energy change that place in the process are;
      - ✓ Kinetics energy
      - ✓ Potential energy

   b) Data given

   Mass (m) =0.3Kg, height (h) =21.9m, acceleration due to gravity (g) = 10 m/s^2, potential energy (P.E) = mgh
   P.E=0.3×21.9×10=65.7J

   The potential energy are 65.7J

7. DENSITY AND RELATIVE DENSITY

SHORT SUMMARY AND FORMULA

Density; is the mass per unit volume of a substance.

Thus density $(\rho) = \frac{\text{mass(kg)}}{\text{volume(cm}^3\text{)}}$

The SI unit of density is kg/m^3 or g/cm^3

The instrument which are used to measure density was hydrometer

The density of water was 1000 kg/m^3 or 1 g/cm^3

The density of liquid was given by

$$\text{density of liquid } (\rho) = \frac{(m_1 - m_o)g}{\text{volume of liquid(cm}^3\text{)}}$$

Where $m_0 - mass\ of\ empty\ bottle$

$m_1 - mass\ of\ water\ filling\ the\ bottle$

Relative density; is the ratio of density substance to the density of water

Relative density have no S I unit

Thus Relative density (R. D) = density of water(g/cm^3)

Also relative density can be given by

(R. D) = mass of equal volume of water(kg)

The instrument which are used to determine relative density of a substance are density bottle

WORKED EXAMPLES

1. While doing dishes, Zawadi drops his 3.00×10^{-3}kg of platinum wedding band into the dishwater, displacing a volume of $1.40 \times 10^{-4}m^3$ of water. What is the density of the plantinum band?

   Solution

   Mass of platinum (m) = 3.00×10^{-3}kg

   Volume (v) =$1.40 \times 10^{-4}m^3$

   $$\text{density } (\rho) = \frac{\text{mass(kg)}}{\text{volume(cm}^3\text{)}} = \frac{3.00\times 10^{-3}\text{kg}}{1.40 \times 10^{-4}m^3} = 21.43\ kg/m^3$$

   The density of platinum is 21.43 kg/m^3

2. In an experiment to determine the density of water, Pendo a form one student obtain the following results; mass of beaker =105.7g, mass of water filled in a beaker was 296.8g and the volume of water is 200cm^3, what6 did Pendo obtain as the density of water

Solution

Mass of empty beaker (m_0) =105.7g

Mass of water filled in a beaker (m_1) =286.7g

Volume of water (v) = 200cm^3

From

$$\text{density of liquid } (\rho) = \frac{(m_1 - m_o)\text{g}}{\text{volume of liquid}(\text{cm}^3)}$$

$$= \frac{296.8 - 105.7}{200} = \frac{191.1}{200} = 0.955\text{g/cm}^3$$

The density of water obtained is 0.955g/cm^3

3. Diamond has a density of 3.52 g/cm^3. During a physics lab, a diamond drops out of Virginia's necklace and falls into her graduated cylinder filled with 50cm^3 of water. This causes the water level to rise to the 50.5cm^3 mark. What is the mass of Virginia's diamond?

Solution

The density of diamond =3.52 g/cm^3

Volume of water (v_0) =50cm^3

Volume of water with piece of diamond (v_1) =50.5cm^3

Volume of diamond (v) =$v_1 - v_0$

Mass of diamond (M) =?

From

$$\text{density of diamond } (\rho) = \frac{\text{mass of diamond (m)}}{\text{volume of diamond } (v_1 - v_0)}$$

Mass of diamond=$\rho \times v_1 - v_0 = 3.52 \times (50.5 - 50) = 1.76g$

Mass of diamond was $1.76g$

4. Sir Kimaro was measuring density of liquid in the laboratory by using hydrometer, he wandered when saw the reading of hydrometer read from lowest at upper part to highest at lower part, as form two student explain why the parameter of hydrometer scale are reading so

Answer.

Because the material with high density the hydrometer always sink while the material with less density it float, so in order to measure density the reading of hydrometer should be high at bottom and lower at the top so as to read accurate density of a certain substance.

5. If Marium measure the relative density of stone which is 11.2, what will be the density of stone measured by Mariam

Solution

Relative density =11.2

Density of water=1 g/cm^3

Density of stone =

From

$$\text{Relative density (R.D)} = \text{density of water}(g/cm^3)$$

$$11.2 = \frac{\text{Density of stone}}{1}$$

Density of stone = $11.2 g/cm^3$

6. A rectangular block measures length 6.0cm, width 2.5cm and height 4.0cm
   (i) Name the instrument used to measure the side of rectangular block
   (ii) Calculate the volume and density if their mass is 400g

   Solution

   (i) The instrument used to measure the side of rectangle are venier caliper

   (ii) Volume = length× width ×height

   Volume =6.0cm×2.5cm ×4.0cm=60cm^3

   Mass=400g, density(ρ) $= \frac{\text{mass(kg)}}{\text{volume}(cm^3)} = \frac{400}{60}$

   $= 6.7\ g/cm^3$

   The density of rectangular block is 6.7 g/cm^3

7. Asha a form one student at Marian secondary school, perform an experiment of determining the relative density of cork, the following observations was obtained.

Weight of sinker in water W_1=200g, weight of cork in air and sinker in waterW_2=250g, weight of cork and sinker in water W_3=145g

Solution

The up thrust on cork due to water=weight of the water displaced by the cork

The up thrust on cork due to water=weight of cork in air-weight of cork in water

The up thrust on cork due to water= $(W_2 - W_1)$-$(W_3 - W_1)$

$=(W_2 - W_3)$

=250g-145g=105g

The up thrust on cork due to water=105g

The volume of water displaced by cork= the up thrust on cork due to water

Hence the volume of water displaced by cork=105cm^3

The Relative density (R. D) = volume of water displaced by cork(cm^3)

$$\text{Relative density (R. D)} = \frac{(W_2-W_1)}{(W_2-W_3)} = \frac{250g-200g}{250g-145g}=0.47$$

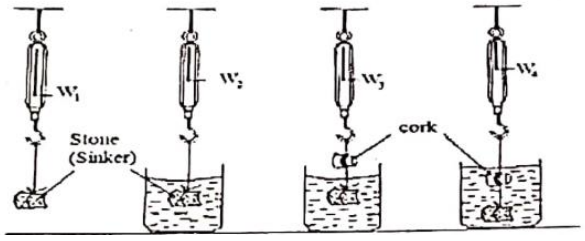
The relative density of cork is 0.47



OBJECTIVE QUESTIONS TEST 06

1. Samia have two copper cylinder with the same cross section area, but one is longer than other. Which quantity is the same for both cylinders?
   A. Density
   B. Volume
   C. Mass
   D. Weight
2. Yohana measure a cube made from a wood with density of 0.6 g/cm^3, he obtain 4cm of its length, 10cm of height and 3cm of its width. What is the mass of cube did he obtain?
   A. 55g
   B. 72g
   C. 120g
   D. 250g
3. Selina measure the length, height and width of the rectangular glass block. Which of these measurement must be used to in order to find the density of glass block?
   A. Length and height only
   B. Mass only
   C. Mass, length, width and height
   D. Both length, width and height

4. Amina measure the volume of alcohol and its masses which are 120 cm^3 and 95g respectively, how does the density of alcohol measured by Amina compared with the density of water?
   A. Its density is greater than that of water
   B. It's impossible to say with only this data
   C. Its density is the same as the water
   D. Its density is less than that of water
5. Why hydrometer has large number in the lower part while small number at upper part?
   A. The hydrometer tend to sink much more in the liquid with high density
   B. The hydrometer float on the liquid with small density
   C. The hydrometer sink much more in the liquid with lower density
   D. The hydrometer measure the density of liquid by placing liquid inside
6. The diagram below shows series of experiments performed by Delphine a student at Bitale secondary school to determine the relative density of a cork that floats in water. Four reading of the spring balance were obtained. The relative density of the cork is given by;



A. $\frac{W_1}{W_1-W_2}$
B. $\frac{W_1-W_2}{W_3-W_2}$
C. $\frac{W_3-W_2}{W_3-W_4}$
D. $\frac{W_3}{W_3-W_4}$

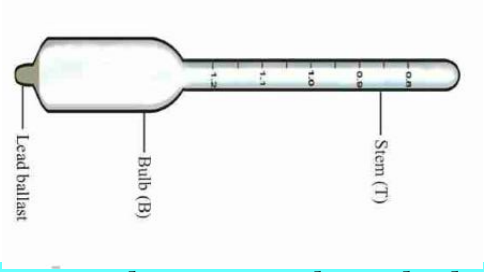
ANSWER TEST 6

1	2	3	4	5	6
A	B	C	C	C	C

PHYSICS COMPETENCE BASED QUESTIONS WITH ANSWER FORM 1& 2

COMPETENCE QUESTIONS WITH ANSWERS

1. In the figure below, explain why are the large numbers on a hydrometer below and small numbers above?



This is because the material with high density the hydrometer always sink while the material with less density it float, so in order to measure density the reading of hydrometer should be high at bottom and lower at the top so as to read accurate density of a certain substance.

2. If a 400g of sold Gold is placed in a eureka can filled with water, what will volume of water over flow

Answer

The volume over flow is equal to the mass of piece of Gold immersed eureka can which is equal to $400cm^3$.

3. The relative density of milk are the same as that of skimmed milk, explain

Answer

No, because the skimmed milk is less dense than milk, hence their relative density are quietly different.

4. The density of water $1000kg/m^3$is what does it imply

Answer

This imply that there is a mass of 1000kg in $1m^3$ space of water.

5. Mawazo saw a wood floating on water, he decided to call a teacher to explain to him the condition made a wood to float on the surface of water. Name the condition a teacher explained to Mawazo

Answer

i. The upthrust due to the liquid must be equal to the total weight of the object
ii. The density of body must lees than thatof fluid
iii. Volume of submerged object must belarge enough to displace a lot of fluid

6. Fishes are very sensitive to a change in salinity. Explain how can you monitor the water in a fish tank to ensure the proper amount of salt.

Answer

Ensure regular testing with hydrometer

7. Rebecca a form one student want to convert the density of water from 1g/cm^3 to $1000kg/\text{m}^3$ but she was confused to do so, as physicist help Rebecca to convert it

Answer

$$1\text{g} = 1000\text{kg}$$

$$1\text{m}^3 = 1000000c\text{m}^3 \; then$$

$$\frac{1\text{g}}{\text{cm}^3} = \frac{1kg/1000g}{(1\text{m}/100\text{cm})^3} = \frac{0.001\text{kg}}{0.000001\text{m}^3} = 1000\text{kg/m}^3$$

Hence $1\text{g/cm}^3 = 1000\text{kg/m}^3$

8. Hydrometer is made heavy near the bottom

Answer

A hydrometer is made heavy near its bottom so that it can float with stem in the vertical position.

9. A hydrometer float with its 8cm immersed in water. What length will it be when immersed in alcohol

Solution

density of water $(\rho_w) = 1g/cm^3$

density of alcohol $(\rho_a) = 0.8g/cm^3$

The length immersed in water$(h_w) = 8cm$

The length when immersed in alcohol$(h_a) =$

From $\frac{\rho_w}{\rho_a} = \frac{h_w}{h_a} = \frac{1g/cm^3}{0.8g/cm^3} = \frac{8cm}{h_a}$

$$h_a = 6.4cm$$

The length when immersed in alcohol(h_a) *is* $6.4cm$

10. Distinguish between density and relative density

Answer

Density	Relative density
Is the mass per unit volume	Is the ratio of density of substance to the density of water
It was symbolized by ρ	It symbolized by R.D
It was measure by using hydrometer	The instrument used to determine relative density was density bottle
The S I unit is g/cm^3	It has no S I unit

OBJECTIVE QUESTIONS NECTA (FTN 2010-2022)

1. The volume of a piece of metal with a mass of 150g and density of 0.03g/cm^3 is (FTN 2011)
   A. $5 \times 10^{-3} cm^3$
   B. $5 \times 10^{1} cm^3$
   C. $5 \times 10^{2} cm^3$
   D. $5 \times 10^{3} cm^3$
2. When buying sugar from a shop you pay for (FTN 2011)
   A. Density
   B. Mass
   C. Volume
   D. Weight
3. A piece of metal with a volume of 0.00012 m^3 has a mass of 0.12kg. the density of metal will be (FTN 2013)
   A. 100 kg/m^3
   B. 1000 kg/m^3
   C. 10,000 kg/m^3
   D. 1,000,000 kg/m^3
4. From the Archimedes principle, the upthrust acting on a body equal to the ; (FTN 2013)
   A. Apparent loss weight
   B. Apparent weight
   C. Weight of a body in air
   D. Weight of a body in water
5. As one goes away from the earth, the density of air; (FTN 2014)
   A. Decrease
   B. Increase
   C. Remain constant
   D. Become greater than its weight
6. Ferry boat float in sea water because its density is; (FTN 2014)
   A. Greater than that water
   B. Small than that water
   C. The same as its weight
   D. Greater than its weight.

7. The tendency of an object to fall or drop lower levels in fluid is called. (FTN 2015)
   A. Floating
   B. Sinking
   C. Upthrust
   D. Buoyant
8. Buoyant force is mainly determined by; (FTN 2016)
   A. volume and density
   B. volume and mass
   C. weight and mass
   D. weight and density
9. An upthrust experienced by the body which weighs 5N in air and 3.2N when it is completely immersed in a liquid is; (FTN 2016)
   A. 0.4N
   B. 0.6N
   C. 1.6N
   D. 1.8N
10. Hydrometer is an instruments used to measure; (FTN 2017)
   A. The volume of liquid
   B. The density of liquid
   C. The density of solids
   D. The volume of liquid

Answer for objective necta questions (FTN 2010-2022)

1	2	3	4	5	6	7	8	9	10
D	B	A	A	C	B	B	A	D	B

NECTA QUESTIONS (FTN 2010-2022

1. The mass of an empty density bottle was 50g. When filled with a curtain liquid of volume 20 $c\text{m}^3$its mass become 75g. find the ;
   (a) Density of liquid
   (b) Relative density of liquid; (FTN 2010)

Solution.

(a) Mass of empty bottle (m_0) =50g
Mass of water filled in a bottle (m_1) =75g
Volume of water (v) = 20cm^3
From

$$\text{density of liquid } (\rho) = \frac{(m_1 - m_o)\text{g}}{\text{volume of liquid}(\text{cm}^3)}$$

$$= \frac{75g - 50g}{20} = \frac{25g}{20} = 1.25\text{g/cm}^3$$

density of liquid (ρ) = $1.25 g/cm^3$

(b) relative density of liquid

From

Relative density (R. D) = XE "Mass"

of water filled in a bottleMass of empty bottle

$$\text{Relative density of liquid(R. D)} = \frac{75g}{50g}$$

Relative density of liquid(R. D) = $1.5 g/cm^3$

2. A body weighs 10N in air and 8N when completely immersed in a liquid in a density 0.8 g/cm^3. find
   (i) The volume of the liquid displaced
   (ii) The density of the body(FTN 2011)

   Solution

   (i) The volume of the liquid displaced= XE "Mass" of fluid displaceddensity of liquid

   Mass of fluid displaced =upthrust

   Upthrust=realweight-apparent weight

   Upthrust =10N-8N=2N

   $$\text{Mass of fluid displaced} = \frac{2N}{10m/s^2} = 0.2kg$$

   Mass of fluid displaced = 0.2kg

   Then

   The volume of the liquid displaced= XE "Mass" of fluid displaceddensity of liquid

   $$= \frac{0.2kg}{0.8\ g/cm^3} = \frac{200g}{0.8\ g/cm^3} = 250 cm^3$$

   The volume of the liquid displaced= $250 cm^3$

   (ii) $$\text{density of body } (\rho) = \frac{\text{mass of body}}{\text{volume displaced}(cm^3)} = \frac{1kg}{250 cm^3}$$

   $$= \frac{1000g}{250 cm^3} = 4 g/cm^3$$

   The density of body is $4 g/cm^3$

3. A spring balance read 12N when a metal block is suspended from it and 10N when the block completely immersed in water. Calculate the;
   (i) Upthrust on the block
   (ii) Relative density of the block(FTN 2013)

   Solution

Upthrust=realweight-apparent weight

Upthrust =12N-10N=2N

(i) Upthrust is 2N

(ii) Relative density (R. D) =

weight of equal volume of water

$$= \frac{real\ weight\ of\ an\ object}{upthrust} = \frac{12N}{2N} = 6$$

Relative density (R. D) = 6

4. (i) Define density and give its SI unit. (FTN 2015)

(ii) list three applications of density in real life

Solution

(i) Density; is the mass per unit volume of a substance.

The SI unit of density is kg/m^3 or g/cm^3

(ii) Application of relative density

- ✓ in designing and constructing ship and boat
- ✓ in operating submarine
- ✓ in the operation of hydrometer
- ✓ in designing aircrafts

5. (a) state Archimedes principle

(b) Define relative density

(c) The mass of a density bottle is 15g. When it is fully with a fluid of density 1.2 g/cm^3, its mass is 51g. Find the volume of the bottle. (FTN 2016)

6. Mention three things that apply the Law of floatation in daily life

- ✓ Balloons
- ✓ Ships/Boats
- ✓ Submarines
- ✓ Hydrometer

PHYSICS COMPETENCE BASED QUESTIONS WITH ANSWER FORM 1& 2

ARCHIMEDES PRINCIPLE AND LAW OF FLOATATION

1. **Why a large ship floats in seas, while the coin sinks into water**?
   - ✓ This is because water displaced by its immersed portion (of a ship/submarine) equal to its weight.
2. **Explain how a steel needle is made to float on water.**
   - ✓ The needle is placed gently on the water surface in a horizontal position due to the Surface tension of the water makes it float
3. **State conditions for a body to float**.
   - ✓ **Conditions for floating are:**
     - **(i)** The object's submerged volume must be large enough so as to displace a lot of fluid.
     - **(ii)** The density of the body must be less than the density of the surrounding fluid.
     - **(iii)** The upthrust due to the liquid must be equal to the total weight of the object.

15. Explain why apparent weight of a body is less than a real weight

- ✓ Because when a body submerged in a fluid it experience an upward force known as **upthrust** which cause the apparent weight to be less than actual weight.

4. **A form one student was arguing that, if you drop a dry wood into water obviously you it floating.**
   a) **With their discussion state all forces acting to the wood while submerged**
      - ✓ **Up thrust**
      - ✓ **Weight of an object**
5. **Majuto saw a wood floating on water, he decided to call a teacher to explain to him the condition made a wood to float on the surface of water. Name the condition a teacher explained to Majuto**
   - ✓ The upthrust due to the liquid must be equal to the total weight of the object
   - ✓ The density of the body must be less than that of fluid.

- ✓ The Volume of submerged object must be large enough to displace a lot of fluid.

6. As form one student how sinking and floatation of an object differ

Answer

Floatation	Sinking
The body stays at the surface of the liquid	The body drops to the bottom of the liquid
Takes place when the density of the body is less than that of the liquid	Takes place when the density of the body is greater than that of the liquid
Takes place when the upward force is greater than the weight of the body	Takes place when the upward force is less than the weight of the object

7. Elaborate about the following terms as applied in physics
   (i) Real weight
   (ii) Upthrust
   (iii) Archimedes principle

   Answer

   i) Real weight is the exactly weight of a body in air.
   (ii) Up thrust is the upward force exerts on an object immersed in a fluid.
   (iii) Archimedes principle state that "Anybody (object) partially or completely immersed in a fluid experiences an up thrust which is equal to the weight of fluid displaced by the body "

8. i) Why does stone a stone weigh more in air than when immersed in water?
   - ✓ A stone weigh more in air than in water because there is more upthrust in water than in air. So the apparent weight is less in air nearly negligible but in water there is more considerably apparent weight.

9. Why when a body is immersed in liquid its weight tends to be reduced?
   - ✓ When a body is immersed in liquid it exerts an upward force on a body .This force tend to reduce the weight of a body

10. Explain why it is extremely so easy to raise a cargo in water but extremely very difficult to raise the same cargo in air?
    - ✓ It is easy to raise or lift anything in water because some weight is lost due to the presence of considerably upthrust in water, but in air it is not easy because the upthrust of air is very small, nearly negligible.

11. Briefly explain why a hole at the bottom of ship is more dangerous than one near the surface

- ✓ Because pressure is greater at bottom than at the surface.

12. Your young sister who is form one student at Mwembeni secondary school, opting physics subject.as form two student how would advise her continue taking physics subject?

Importance of physics

- ✓ *It help to acquire skill that are required in different professional like doctor, engineer and teachers*
- ✓ *It help to answer fundamental question about physics like how rainbow is formed*
- ✓ *It help to improve our technologies*
- ✓ *It help to know sources of energy like solar energy*
- ✓ *It help to manufacture and designing different equipment's that are used in transport and other activities like car, ship, house etc.*

SUSTAINABLE ENERGY SOURCE

1. Batholomeo is an expert environmental conservation. He was inverted by WEO of Mkongoro village to educate about the environmental effects of using charcoal as sources of energy but he did not attend the meeting. As a form two student use that vacancy to educate mkongoro villagers use three points
   - ✓ The effect of charcoal to our environment
     - (i) It change climatic condition
     - (ii) Deforestation
     - (iii) Destruction of ozone layer due to the production of carbon dioxide gas

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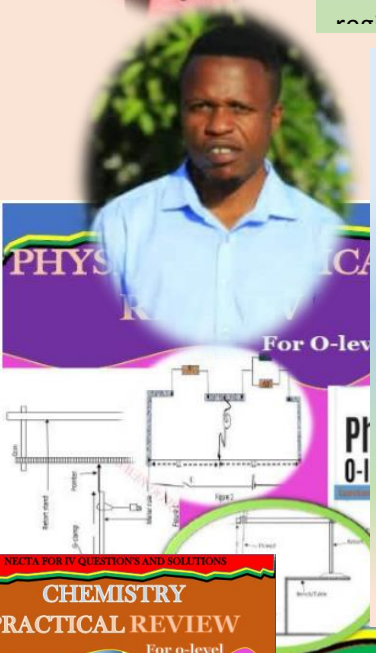
PHYSICS COMPETENCE BASED QUESTIONS WITH ANSWER FORM 1& 2

PHYSICS COMPETENCE BASED QUESTIONS WITH ANSWERS FORM 1 AND

ABOUT AUTHOR



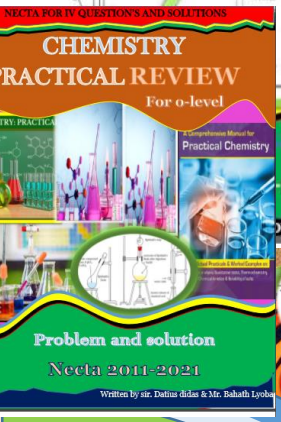
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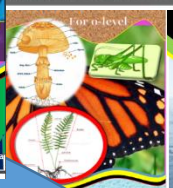
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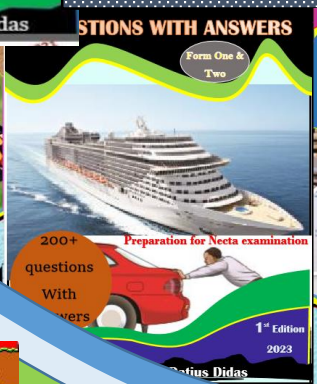
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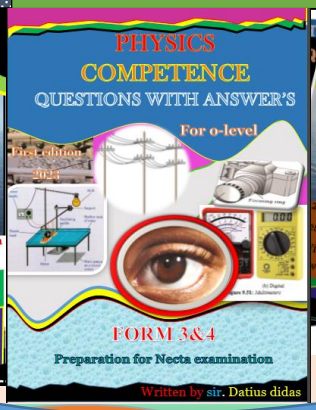
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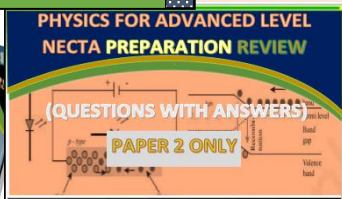


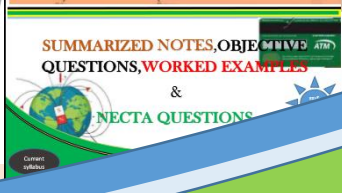


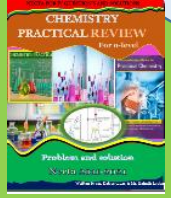














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KARIBUNI SAANA



PHYSICS SCENARIO ITEMS 2024

A. SPACE PHYSICS

Item 1.

In a certain country, a Television (TV) reporter was reporting live near the ocean about the high tides during night time. Viewers in another country were watching the live broadcast of the news bulletin during day time. The viewers wondered how it could be day and night at the same time, and how the event in one country could be watched live on TV in another country.

Task

Using your knowledge of physics, help the viewers to understand;

(a) the possibility of it being day in one place and night in another place.

(b) the occurrence of high ocean tides.

(c) how an event in one place can be broadcast live in another country.

Item 2

One of the most important components of our solar system is the sun. Another important component of our solar systems are the big masses called planets.

(a) Name all the planets found in our solar system.

(b) (i) Identify the planet that sustains life in our solar system.

(ii) How are the times and seasons of the year explained on the planet mentioned in (ii) above?

(c) Explain the statement "the sun has a life cycle".

Item 3

On November 7th 2022, Uganda launched its first satellite named PearlAfricaSat-I into space with the help of National Aeronautics and Space Administration (NASA). The purpose of the mission was to study weather patterns. Students of physics were availed with data collected over a certain of time and they noticed the following while some places were having day time. Other places were having night time. Various places were having different seasons.

Task:

As a learner of physics

(a) Explain why some places had daytime while it was night time at other places.

(b) Explain why different places had weather patterns and how world- wide communication is made possible through satellites.

B. LIGHT AND WAVES

Item 1.

During a science project, learners are given two mirrors; a concave mirror of focal length 20cm and a convex mirror of focal length 20cm.

Task:

As a learner of physics;

(a) help the students to determine which mirror forms a bigger image of a man of height 4cm standing 25 cm a way from each of the mirror.

(b) write a brief report about the nature of image formed by each mirror

(c) advise which mirror is suitable for use as driving mirror

Item 2.

A brass band was invited to play during a celebration near a tall building, a distance slightly more than 17 m away. Two friends standing in the same direction and in line with the playing band, heard the sound from the band at different intervals of time which attracted them to go and attend the celebration.

On arrival, the sound they heard was unclear, confused and indistinct. Later in the night during the cerebration, coloured lights flashing red, blue and green made the colours of their clothes look different from the original colours which puzzled them. The two friends heard sound after 4 s and 5 s, respectively and were originally wearing yellow clothes.

Task:

As a physics student, help the two friends to understand why;

(a) they heard the sound at different intervals.

(b) the sound they heard was unclear, confused and indistinct.

(c) the colour of their clothes kept changing when coloured lights flashed on them.

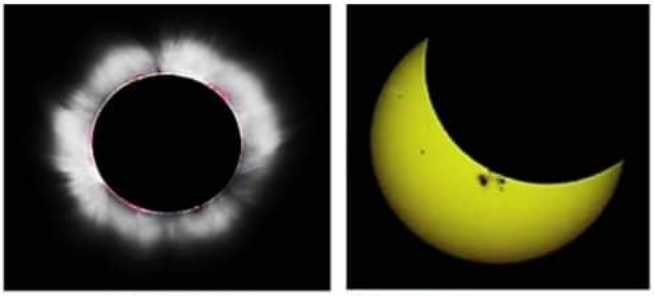
Speed of sound in air = 330 ms^{-1}

Item 3

Long time ago eclipses were considered as a message from the gods sine the people in that age dwelt so much in the spiritual realm than the scientific word. But with the development of science and technology, eclipses can now easily be explained scientifically instead of spiritually. Whenever eclipses occur many people gather out in open places to watch the beautiful view of the heavenly bodies as they align themselves in a beautiful display.

However, in most remote areas of Uganda some people still observe the eclipse directly using naked eyes not aware of the risk they are exposing their eyes to in the long run.

SUPPORT MATERIAL



(a) Total eclipse (b)Partial eclipse

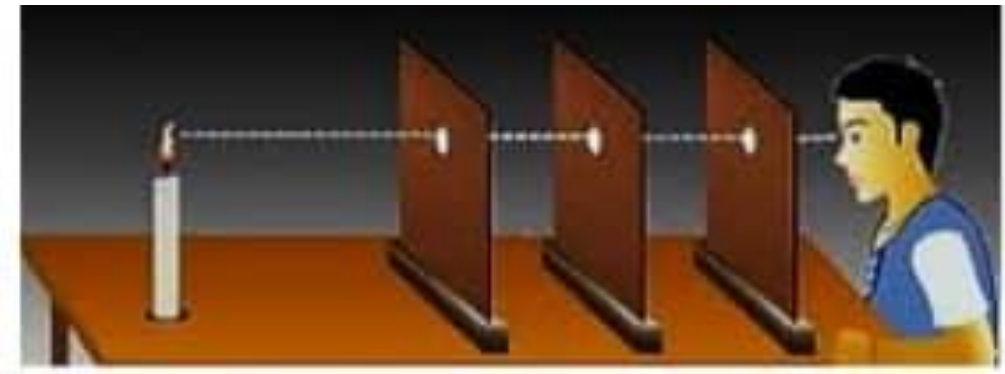
Task:

As a learner of physics;

(a) Explain the difference between total and partial eclipse.

(b) Using illustrations, explain the differences between solar eclipse and lunar eclipse.

(c) In a certain experiment to investigate nature of light, the set up below was arranged.

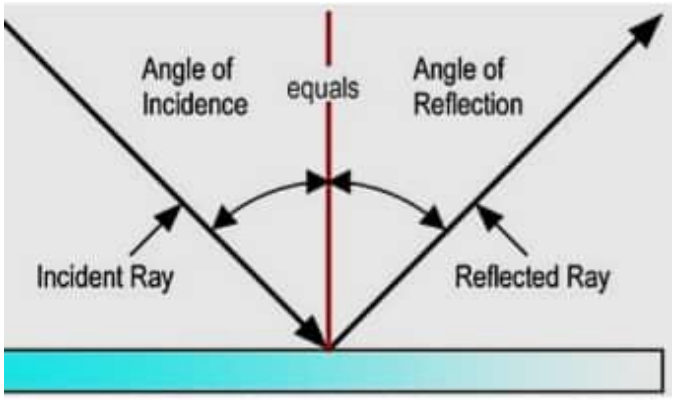


(i) State the property of light being investigated and explain its implications in daily life.

(ii) Explain what would happen when one of the cardboards is displaced slightly.

Item 4

We normally see the images of our faces when we look into the mirror. This is due to reflection of light.



Task:

As the learner of physics;

(a) State the laws of reflection of light and use them to find the glancing angle if the angle of reflection is 35^0.

(b)

(i) Describe the nature of the images formed by plane mirrors.

(ii) State the real-life applications of plane mirrors.

(c) With the aid ray diagrams, describe the differences between images formed by plane mirrors and a pin hole camera.

Item 5

While in your literature lesson, your teacher asks your friend to stand up and read for the class a book of Oliver Twist, however your friend always tells your literature teacher that she is unable to see the letters in the books and even when she sits near the board, she's unable to see but your teacher and other fellow literature students think she's bewitched. On the s.4 leavers party, a boy of height 120cm stands in front of a lens camera with a lens of focal length 40cm at a distance 160cm from camera.

Task

As a learner of physics,

(a) By scale drawing find the; nature size and position of the image of the boy on the camera

(b) explain to your fellow students and the literature teacher the cause of the problem and the would-be possible solution to the above problem

Item 6

A certain student was puzzled that the shallow end of the swimming pool at his school appeared to be about 1.5m deep when in the actual sense it was 2.0 m.

(a)

(i) Use a ray diagram to illustrate student's puzzle and explain why the swimming pool appeared shallower than it is actually is.

(ii) Determine the refractive index of the water in the swimming pool at school

(b) A barber was given a curved mirror of focal length 30 cm so that he could use it as a shaving mirror in his salon.

(i) Identify the type of curved mirror given to the barber and using a ray diagram explain how the selected curved mirror is used as a shaving mirror.

(ii) State the properties of the image formed above?

(c) Which type of curved mirror is suitable to be used as a side mirror and why?

Item 7

During a science project, learners are given two devices; a pin hole camera of length 50cm and a concave mirror of focal length 50cm.

As a learner of physics;

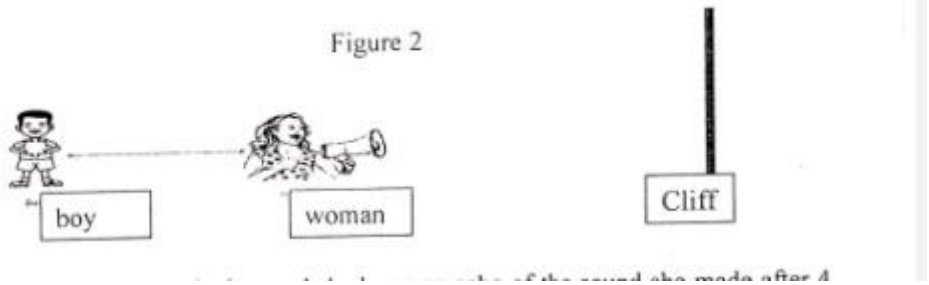
(a) Help the students to determine which instrument forms a bigger image of a man of height 1.8m standing 2m away from each of the instruments.

(b) Explain the difference in the properties of the images formed by the two instruments and identify the practical applications of the instruments.

Item 8

Two people stand in front of a cliff at an unknown distance between them as shown below.

Figure 2



The woman calls out the boy, she hears an echo of the sound she made after 4 seconds while the boy hears the same echo 3.5 seconds later.

Task:

As a learner of physics;

(a) Help these people to determine the distance between them.

(b)

(i) Write a report about the factors that increase the rate of movement of sound.

(ii) Explain why it would be easier for the sound to travel from the girl to the cliff at night than during the day.

C. ATOMIC AND NUCLEAR PHYSICS

Item 1

In a certain town, people are concerned about the waste disposal from the factory into nearby lake which is their source of water for home use. They raised this issue to the chairperson Local Council 1 (LC1) who directed the management of the factory to stop disposing waste into the lake. A scientist was contacted to investigate the presence of radioactive material in the water. The scientist found out that the water was indeed radioactive as shown in table 1.

Time/days	0	5	10	15	20	25	30
Activity/counts per minute	1200	740	440	260	160	90	60

Although the water from the lake remains radioactive for a long time, the scientist recommended that water will be safe for use again when the activity is less than 38 counts per minute.

Task:

As a student of physics;

(a) Advise the chairperson LC1 about the time the community will wait for the water to be safe for use again.

(b) Sensitise the members of the community about the risks associated with radioactive materials and how such materials should be handled.

D. MECHANICS AND HEAT

Item 1.

In certain town it's a must for drivers to be tested together with their vehicles for road worthiness. On certain day, a car started from rest and accelerated to 50m/s in ten seconds. The driver maintained that velocity for 20s and suddenly decelerated to rest in 2s making him to crash into the wind screen.

Task:

As a learner of physics,

(a) Draw a graph to show the relationship between velocity and time for the car.

(b) State whether the driver's average velocity does not exceed the town's speed limit of 8m/s.

(c) Find the rate at which the car's velocity reduces

(d) Explain why the driver crashed into the wind screen and how this can be prevented

Item 2

Zacharias is puzzled because his metallic doors are always very hard to close during day time when it is shining too much, and he says that the same doors are very easy to close in the evenings when the temperatures have lowered by considerable amounts.

Task:

As a Physics learner who understands better, the effect of temperature change on matter:

(a) Explain the cause and applications of Zacharias' puzzle in our daily life

(b) Basing on the kinetic theory, explain why liquids expand much more than solids for the same temperature change?

(c). Explain the Biological importance of the anomalous expansion of water in preserving aquatic life in countries like Switzerland where temperatures go below 0° C, relating to the diagram shown below.

Item 3

Some bottles of colourless liquids were being labelled when the technicians accidentally mixed them up and lost track of their contents. $\mathbf{15.0}\ \boldsymbol{ml}$ sample withdrawn from one bottle weighed 22.3 g. The technicians knew that the liquid was either acetone, benzene, chloroform, or carbon tetrachloride. He however has challenges identifying the right chemical to label.

SUPPORT MATERIAL (hint 1ml =1cm^3)

LIQUID	Acetone	Benzene	Chloroform	Water	Carbon tetrachloride
DENSITY ($\boldsymbol{g/cm3}$)	0.792	0.899	1.487	1.000	1.595

a) What was the identity of the liquid? (Clearly show each step of your work out)

b) Using the table above Name those liquids which can float on water and explain why they float on water

c) Using the table Name those liquids on which water floats on top and explain why water floats on those liquids named.

Item 4

In your trading Centre, empty mineral water bottles are scattered everywhere, thus causing blockage of trenches. A business man came to your trading Centre to buy empty mineral water bottles and pays according to the mass of each bottle. The businessman only buys bottles whose mass exceeds 30g. Your brother wants to sell his mineral water bottle but wants to know its mass before selling to the businessman and has no access to any instrument measuring mass.

Task:

You are given a metre rule, a knife edge, a 100g mass and two pieces of thread. As a student of physics describe how you will assist your brother to determine the mass of the bottle so that he is able to sell it. In your investigation you find that when a mass of 100g is placed 15.0cm from the knife edge placed at the Centre of gravity of the metre rule, the bottle should be placed 37.5cm for the metre rule to balance. Assist your brother to find out whether the bottle can be sold to the businessman.

Item 5

A certain home owner intends to put up a metallic tank of height 4 m with a maximum volume of 5000 l fitted with an electrical heater which supplies 20,000 kJ of heat energy as shown in figure 1.

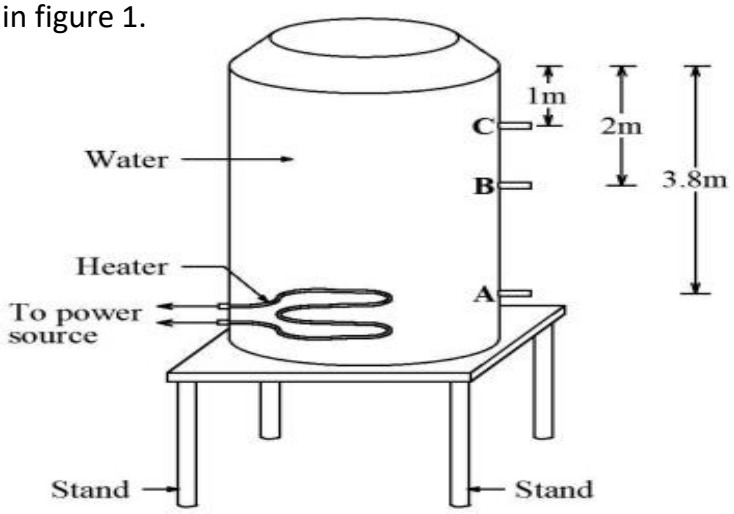


Fig. 1

The home owner found out that the heater was fitted at the lower part of the tank but he did not understand why it was done like that. Just before the hole for the outlet pipe was drilled at point A, the home owner told the person with the drill that the correct position was either B or C. Task: As a learner of Physics;

(a) Explain to the home owner why;

(i) the electrical heater was fitted at the lower part of the tank and how eventually all the water gets hot.

(ii) the outlet pipe was drilled at point A.

(b) If the initial temperature of the water in the tank is 20 ^{o}C, help the home owner to find out if the heater is working.

(c) Advise the home owner on measures that can be taken to ensure that the tank stand can withstand the weight of the tank and water for a long time.

Use: Density of water = 1000 kgm^{-3}. Specific heat capacity of water = 4200 J kg^{-1} K^{-1}. Acceleration due to gravity = 10 ms^{-2}

Item 6

A certain hotel has its bathrooms situated on the 3rd floor of a building. A customer of the hotel expects to bathe water at 32 ^{o}C. The hotel provides 10 litres of water at 20 ^{o}C to each customer. A boiler on ground floor heats water to 80 ^{o}C for the customers to use. The hotel management does not allow its workers to carry the hot water via the staircase.

Task:

Having studied physics;

(a) help the hotel management to determine the quantity of hot water to be given to a customer for bathing.

(b) advise the hotel management on how to keep the boiled water hot for a long period of time without keeping the boiler on.

(c) explain to the management how the water from the boiler can reach the third floor safely.

Use: Density of water = 1000 kgm^{-3}. Specific heat capacity of water = 4200 J kg^{-1} K^{-1}. Acceleration due to gravity = 10 ms^{-2}

Item 7

A jackfruit of mass 2500g is plucked off fruit the jackfruit tree from a height 4m above the ground and falls freely. The jackfruit accelerated to the ground and hit the ground.

Task.

As a learner of physics;

(a) State and calculate the form of mechanical energy stored in the jackfruit before falling.

(b) Determine the kinetic energy of the fruit as it hits the ground stating clearly the assumption and hence calculate the velocity with which it hits the ground.

(c) Explain why the jackfruit comes to rest after hitting the ground and does not bounce back to the original height hence state the law shown by the behaviour of the fruit.

(d) Determine the kinetic energy possessed by the fruit as it passes a point 1.5m above the ground.

Item 8

For man to earn a living, he has to do some work. A certain business man has to climb 20 stairs each of height 20cm to reach out his business store on the first floor of their business Arcade in Kampala city.



Stairs

Task:

As a physics scholar;

(a) Help a lay man to understand the meaning of the term "work" and state its appropriate S.I units.

(b) If the businessman has a mass of 73.5kg and is holding a bag of mass 1.5kg, determine the work done by the man when climbing the stairs and the power dissipated in 5minutes.

(c) Explain why it is easier for the man to move down stairs than climbing them.

Item 9

At a certain construction site in a given town casual labourers were required to raise construction materials to the 3rd level which was 2400m from the ground, they requested for a crane consisting of a pulley system of velocity ratio 7. The operator raised a total load of 40,000N using an effort of 8,000N.

Task:

As a learner of physics;

(a) Draw a diagram to illustrate the pulley system contained in the crane.

(b) Determine the efficiency of the pulley system.

(c) (i) Explain why the efficiency of the machines is always less than 100% and state how it can be improved.

(ii)State the applications of pulleys in our daily life.

Item 10

A heap of weed of mass 3 tonnes is moving towards the turbines at the Jinja power station. A group of engineers needs to use a machine operating at 20 kW for five minutes, to remove the weed from the river as shown in Figure and place it at the bank, which is 15 m above the river.



Figure 1

(a) Determine the efficiency of the machine and explain its value.

(b) Explain how the machine is capable of floating in the water yet it is denser than water.

Item 11

The figure below shows a uniform metallic rod of length 4.0m pivoted at its centre that is used at a certain children's play resort.

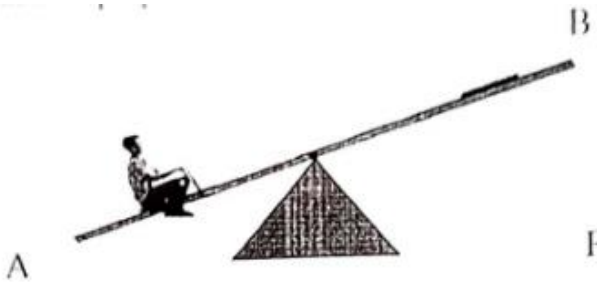


Figure 1

Task:

As a physics scholar;

(a) Given that a boy of mass 48kg sits 1.5m from end A. Help the guide at play resort to determine if another boy of mass 40kg will restore equilibrium in the beam if he sits at a distance of 0.6m from the centre.

(b) Identify two other instances in which the knowledge in this scenario would be applicable in real life.

(c) With the boys off the rod, explain what would happen to the beam if the end B was heated by a considered hot flame.

E. ELECTRICITY AND MAGNETISM

Item 1

Small pieces of metal which are unsafe to be eaten by chicken were found in feeds that had just been bought from a milling company by a poultry farmer. The small pieces of metal were later identified as iron. The farmer thought of disposing off the feeds but remembered that the pieces of metals could be sorted with a magnet which he did not have.

Hint:

A nail connecting wires of resistance 0.5Ω, two dry cells each of 1.5V were available to the farmer.

Task:

As a student of physics;

(a) Help the farmer to remove the pieces of iron from the feeds.

(b) Comment on the effectiveness of what you have designed, given that current of 4A is enough to create a strong magnet.

Item 2

In a certain place, electricity is transmitted at 120V. A business person intends to connect 4 bulbs in a house rated 240V, 60w each and other domestic electrical appliances such that there is minimum power wastage. The business person has been advised to purchase a transformer of suitable specifications to achieve the objectives. The business person does not know what a transformer is, how and is bothered by the type of transformer that should be purchased.

Task:

As a student of physics, help the business person to solve the problems he/she is faced with.

S.4 PHYSICS SEMINAR AT SEETA HIGH SCHOOL GREEN CAMPUS ON 15TH JUNE 2024.

MODERN PHYSICS

1. The government has discovered a precious and rare mineral in a certain part of the country. A team of men picked samples and kept them in a store of one of the hospitals where photographic plates are also stored. The mineral was checked on regularly and they made the following observations;

- All photographic plates had darkened.
- Its mass reduced spontaneously with time as shown below

Mass (g)	200	150	70	35	25
Time (days)	0	4	16	28	30

As a physics learner,

(a) Support the view that the mineral is radioactive.
(b) Use the graph to estimate its half-life
(c) Explain the best way of storing this rare mineral.
(d) What are the dangers of exposing this mineral to the public

SATTELLITES AND COMMUNICATION

2. An article in the newspaper gave information that on 2nd December 2022, Ugandan engineers with the help of Japanese engineers launched a satellite. The literature teacher who picked interest in the article found new words like artificial and natural satellites. He developed a number of unanswered questions which could be answered by a physics learner like you.

(a) Explain the difference between the two types of satellites in the article.
(b) With reasons, justify why Uganda should spend all that much money to launch its own satellite.
(c) Incase Uganda is to develop a super rocket capable of reaching different planets. List with reasons the planets it can land on and planets it cannot land on.

LIGHT AND WAVES

3. The students in a particular class visited a laboratory with a white bulb and a red one, to observe a glass tank filled with water with a white base at the bottom. Modifications were made to create a shallow end on one side of the tank using glass material. To their surprise, when they struck the water's surface at the shallow end with a long rectangular rod at a frequency of 80 Hz, they noticed that the spacing between successive crests changed from 2.5cm to 5cm. Additionally, they were disturbed by the distortion of ripples as they struck the tank walls. They were also surprised to see the base turning black when it was replaced with a yellow sheet and the red lights switched on.

Hint; the glass tank would break if the velocity of the waves that hit it is greater than 20 ms^{-1}

Use your knowledge of physics to:

a. Determine if the ripple tank will break.
b. Explain the reason for the change in the distance between the ripples and its impact on the velocity of the ripples.
c. Explain what distorted the waves and how it could have been reduced.
d. Explain why the yellow sheet changed color when the red lights were switched on.

4. During the construction of a multipurpose hall of size 70m by 40m in a school, the students have been asked to raise challenges that could arise after the hall's construction. They are listed below;

- There could be a distortion of sound as a result of two sounds being heard.
- The hall could be dimly lit because of the paint color used to paint the walls.
- There could be disturbance of the neighbors in the community. During the day, the neighbors that would be disturbed wouldn't be very far but at night, even those outside the school would be disturbed.

- Complaints could arise from the wrong type of mirrors installed in the bathrooms
- Complaints would have arisen from fears due to insecurity from not checking under cars.

Use your knowledge of Physics to;

a) Identify the cause of the distortion of sound and structural adjustments that can be made to ensure the distortion is minimized.
b) Identify the paint color to use to increase the amount of light in the room.
c) Establish how the sound would reach the community, how it can be reduced, and the difference in the distance that the sound from the hall reaches.
d) Identify the type of mirrors that should be installed in the bathrooms and those that should be used to check under the cars.

MECHANICS AND HEAT

5. Workers at a construction site are meant to raise pieces of scrap of mass 6 kg through a height of 15m. Their boss always complains that the workers who carry the pieces of metal do the work slowly, especially in the afternoon when the temperatures are high and in the morning when it is cold. In response, the workers claim their hands are burnt by the hot metals which slows them down. One of the workers suggested they use a pulley of velocity ratio 4 and an efficiency of 80%.

Use your knowledge of physics to;

a. Explain why the metals are very cold in the morning and hot in the afternoon.
b. Draw a design of the required pulley and explain how it can be used to solve their problem.
c. Determine the minimum force required to ensure an 80% is achieved.

The string they used had a mass of 120g and a specific heat capacity of 2510 $JKg^{-1}K^{-1}$, and the work done to lift the load would be converted to heat energy in the string at the contact point of the pulley.

Hint; The string would break if its temperature reaches by 28°C.

d. Determine if the string suggested above would be suitable for the purpose.
e. Suggest ways in which the efficiency of the pulley system can be improved.

6. During a party, 2 liters of water at 24 ^{o}C were served to a man and a woman. They complained that it was warm and were given 50g of ice at -10 ^{o}C blocks. They mixed the water and blocks in a wooden container with a negligible specific heat capacity. They were surprised by the ice cubes disappearing in the water. The man put his mixture in a plastic container **(shc = 2800 $JKg^{-1}K^{-1}$)** while the woman put her mixture in a metallic container **(shc = 800 $JKg^{-1}K^{-1}$)**. They were surprised to find their water at different temperatures after some time.
Specific Heat capacity of water = 4200 $JKg^{-1}K^{-1}$
Latent heat of fusion of ice = 340000 JKg^{-1}
Use your knowledge of Physics to;

a. Determine if the water cooled when mixed with ice.
b. Why do the ice cubes disappear when mixed with water?
c. Explain why there was a difference in temperatures in the water kept in the plastic and the metallic container.

ELECTRICITY AND MAGNETISM.

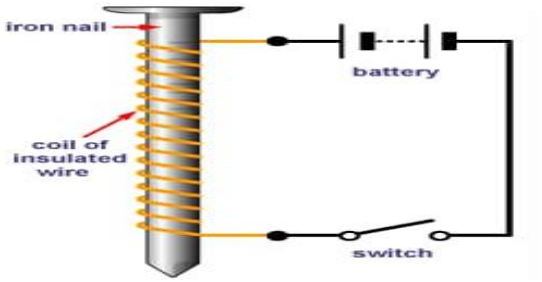
7. During a science project, learners are told that electricity at a substation is transmitted at 13 kV with a current of 0.05A using thick aluminum wires for use inside a house at a voltage of 240 V. The house has two television sets (TVs) that operate on direct current but should be connected such that they receive maximum current and function properly.

The learners, however, couldn't get an explanation of the issues mentioned.

Use your knowledge of Physics to;

a. Understand how the voltage is changed from 13 kV to 240 V.
b. Why thick aluminium wires are used during power transmission.
c. Determine the current in the house if 20% of the electrical energy is lost during voltage change.
d. Account for the energy losses as the voltage changes and how those losses can be reduced.
e. Understand how the current used in the TV is changed from alternating current (AC) to direct current (DC).
f. How the Television Sets should be connected to ensure they receive maximum current and function properly.

8. An electromagnet as shown in Figure below is constructed by winding a wire around an iron nail of resistance 0.5Ω, connecting it to a battery of four cells of EMF 1.5V each, and then placing it above a tin containing iron fillings, some of which are attracted to the nail. Upon disconnecting the battery, most iron fillings fall off. However, when the iron nail is replaced with an identical steel nail of the same size, the pins are attracted slower. Surprisingly, when the EMF source is disconnected, just a few of the iron fillings fall off.



Use your physics knowledge to:

a. Explain how the electromagnet operates.
b. Use domain theory to explain how the nail becomes a magnet.
c. Elaborate on the difference in the time taken before the steel and iron nails start attracting small pins.
d. Explain what would happen if a battery of 2 cells of the same EMF was used instead of one of 4 cells.
e. Identify other factors that could contribute to an increase in the number of nails being attracted.
f. Suggest ways in which the magnetized nails can be made to lose their magnetism.

9. A certain household has a set of appliances as listed in the table below.

Appliance	**Power rating**	**Time of use**
4 bulbs	20 W each	13 hours every day
Cooker	2500 W	4 hours every day
Flat iron	1500 W	5 hours each week
Electric fence of low resistance wire	2200 W	10 hours every day

The owner of the household while making a budget for how much money would be required every week to cater for the electricity bill. He also wondered how the sockets for those appliances should be connected to ensure high current flows and why low resistance instead of high resistance wire is used.

Hint; The owner only intends to spend sh.50000 on electricity every week.

Use your knowledge of Physics to;

a. Determine if sh. 50000 would be enough to cater for the electricity bill for a week.
b. Explain how the sockets of the appliances should be connected to ensure maximum current flows
c. Explain why low-resistance wires are used for the electric fence.
d. Suggest measures on how to reduce the electricity bill.

END

Candidate's Name: …….Signature: ……..…

553/1

BIOLOGY

Paper 1

2024

$2^{1}/_{2}$ hours

B.PETER'S ACADEMIC PLATFORM

UGANDA LOWER SECONDARY CERTIFICATE OF EDUCATION

ASSESSMENTS TO CANDIDATES

BIOLOGY PAPER 1

THEORY SENIOR

FOUR

INSTRUCTIONS TO CANDIDATES:

This paper consists of **several** examination items.
Answer **all items for your good academic performance** all.



SECTION A

Answer **all** the items in this booklet.

Item 1.

While in a Biology lesson, Mr. Mutyaba informed all learners that the biological hierarchy relates with the different political administration levels in Uganda. In this scenario, he used man as an example. Kyomuhendo Peter, one of the students in Mr. Mutyaba's class has found a challenge in relating the concept.

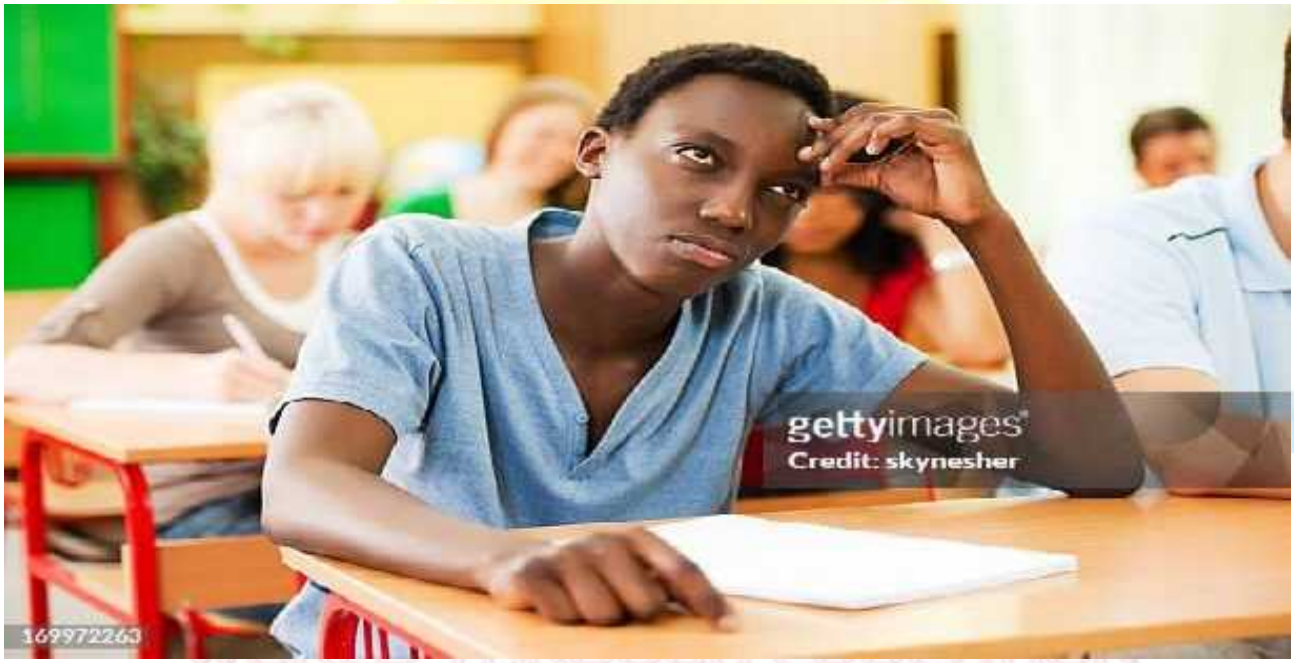


Fig.1 shows Peter confused in the Biology lesson.

Task

(a). As a wise Biology student, help Peter to identify both the biological hierarchies and the political administrative levels that Mr. Mutyaba was talking about. (04 scores)

(b). Further help Peter to outline the biological hierarchy for classification of man. (04 scores

(c). Explain to Peter why it would be important to classify man. (02 scores)

Item 2.

Racheal and John, a couple in Kyengera town has in most of the cases suffered from unplanned births that have made them go into unplanned expenses. The couple plans to have another pregnancy and has decided to visit Nsangi Referral Hospital.Dr.Sennyonga, a medical doctor at Nsangi Referral Hospital informs the couple that their challenge has always come in due to their failure to understand and interpret the dynamics of the Oestral cycle. He informs them that it is incorporated by the changes in the hormonal levels in blood.Dr.Sennyonga receives an emergency call that invites him to attend to an important ceremony on which he is the Guest of Honor. This leaves the couple in suspense.



Fig.2 shows Racheal and John consulting Dr.Sennyonga.

Task

As a Biology learner;

(a). Help Racheal and John understand the events that occur during the Oestral cycle. (05 scores)

(b). Explain to the couple the hormones involved in the Oestral cycle and their effects. (05 scores)

Item 3.

Mr.Kyabaggu,a PhD Biology student at Mbarara University of Science and Technology was instructed to carry out a research thesis on the impact of drought on plant growth, a case study of Karamoja Grass land Ecosystem in Karamoja. He considered the resistance to drought of the tree species in relationship with the number of tree species. He was able to plot the graph below but he has found a problem with interpreting the graph.

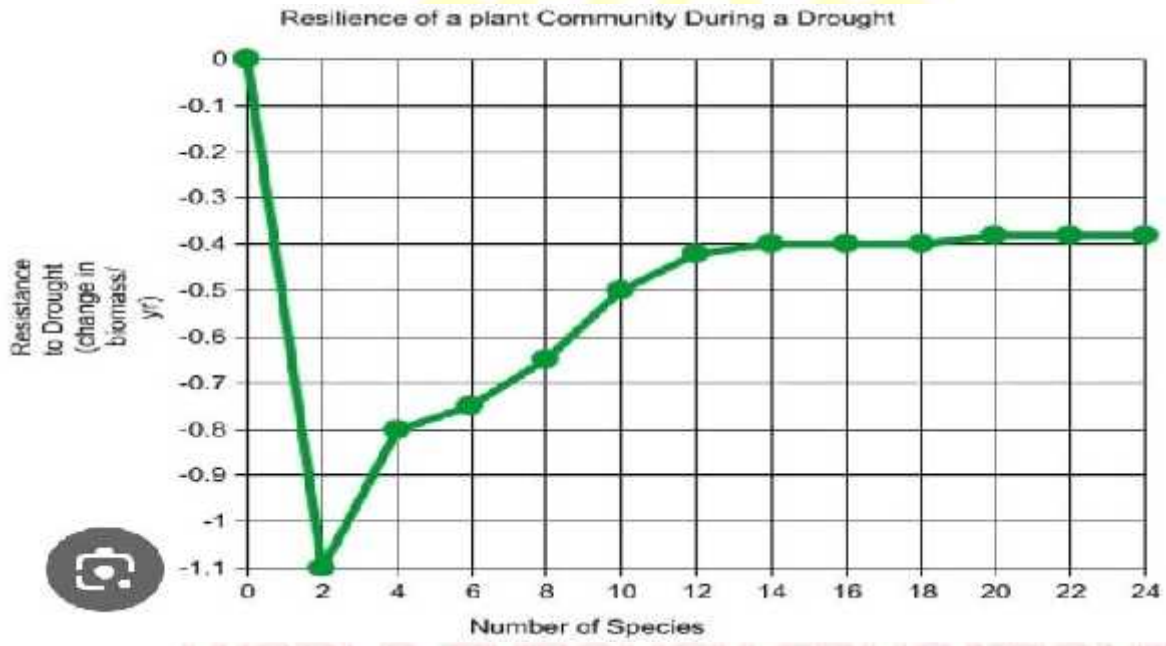


Fig.3 shows Mr.Kyabaggu's graph.

Task

As a Biology literate;

(a). Identify both the dependent and independent variable Mr.Kyabaggu could have considered in his thesis.(02 scores)

(b). Help Mr.Kyabaggu to come up with the description of the shape of his graph.(04 scores)

Item 4.

In Jinja town council, many mothers have failed to understand how sex linkage occurs in humans. On one of the talk shows on BaBa FM, Dr.Nabeeta,a gynecologist from Jinja Main Hospital tried to explain how the phenomenon occurs. On a sad note, Mutesi, a resident in the same town only heard the conclusive statement "sex chromosomes also carry genes and these control characters that can be inherited along with sex. These are known as sex linked characters."

Task

Explain to Mutesi how this phenomenon occurs in humans. (25 scores)

Item 5

As a pre-requisite for joining Harris International Food processing Factory in Kawempe, a suburb in Kampala Metropolitan area, the job applicants are tested and in most of the cases some of them have shown symptoms of respiratory disorders. Other organisms like fish, insects, plants and amphibians in the same area also show signs and symptoms of respiratory disorders. The Public Health officials from Mulago Hospital suspect that the high concentration of factories in Kampala Metropolitan area could be responsible for the increased respiratory disorders faced by people in Kawempe.

Task

Explain to the residents of Kawempe how the high concentration of factories in Kampala Metropolitan area might be affecting gaseous exchange of all organisms present in Kawempe region. (25 scores

Item 6.

Amulen and Lukwago, both visited Nakasero blood bank to know their blood types. On reaching there, Dr.Achen showed them a chart that beared both the blood types and antibodies shown below

Blood Type	Antigens on rbcs	*Antibodies* in blood	Safe transfusions	
			To	From
A	A	*B'*	A , AB	A , O
B	B	*A'*	B , AB	B , O
AB	A , B	-	AB	A , B , AB , O
O	-	*A' , B'*	A , B , AB , O	O

(Extracted from www.mun.ca)

She further explained to them that when two individuals with non-complementary blood groups share blood, it has about 85% chances of agglutinating. She added that this challenge can be overcome by drafting a cross match table before any transfusion of blood can take place which she never drafted for them.

Task

Construct a well referenced cross match table that would be considered in any hospital to enlighten Amulen and Lukwago about the matter. (25 scores)

Item 7.

Annually, Uganda's Ministry of Education and Sports sends sports representatives to International Game competitions. Whereas the most popular sports like athletics, kick boxing, weight lifting among others are always represented by many Ugandan participants such as Kiprotich and Chiprimo, Uganda wins extremely very few medals. Majority of the Ugandan participants blame their failure to bring victory back home on different factors such as Limited training time and changes in the weather patterns. It has been observed that those who win medals have a good training plan and a commendable stable weather pattern. Of recent, the medal winners in the last competitions had previously failed to win due to muscle issues until when they beefed up their training. In a bid to improve sports performance in Uganda, the National Council of Sports is intending to roll out a programme of educating the sports people on the muscle-bone interactions.

Task

Write a letter to the Chairperson of The National Council of Sports, explaining why sports

people should pay much emphasis to muscular fitness, to improve muscle-bone interactions for better results. (25 scores)

Item 8

During leisure time on Sunday, students of St. Elizabeth Nkoowe watch programs on wild life T.V channel. On day, they saw a lion chasing a giraffe and they were very much excited. The lion took two minutes to capture the giraffe. As a student of biology, attempt the following questions;
(a) Explain any four-life processes that were expressed in the above scenario. (08marks)
(b)Giving a reason, identify which organism is a predator. (02marks)

Item 9

Botanists and zoologists claim that plants and animals depend on each other. Zoologists noted that animals depend on food made by plants but botanists did not explain how plants depend on animals. As a senior three student; explain briefly how;

(i) Plants obtain energy for making their own food. (02marks)
(ii) Plants depend on animals for their survival. (02marks)

(b)Apart from the food which animals obtain from plants, describe different ways how the process by which plants make their own food is important in nature.(02marks)

item 10

In preparation for an inter-house competition, Chesang, a 40 kg female athlete ate a meal containing 470 g of carbohydrates in the morning. She believes the meal will help her perform better during the competition. However, her young brother does not seem to understand how the meal will contribute to Chesang's success.
Chesang finally won the competition but experienced muscle cramps. She rested for 20 minutes; returned home walking but the brother wondered how she still had the strength to walk home after the competition.
[*The recommended daily carbohydrate intake of a 40* kg *female athlete is* (*280 – 480* g)]
Task
Explain to Chesang's brother the processes that the meal she ate went through to enable her win the race, be able to come back home and how her body regained the normal state (20 scores)

Item 11

Otim a S.2 student ate a meal consisting of an egg and cooked cassava during breakfast. After eating his breakfast, Otim went back to class for his mid-morning lessons. As a student who has acquired knowledge about how animals obtain their food, ingest it ,digest it and final products of digestion absorbed help Otim understand how the meal he ate was broken down in the body until when the final products of digestion were absorbed. (20 scores)

item 12

Organisms are grouped according to similarities and differences in
Their characteristics. Use characteristics of skins, eggs and methods of
Temperature regulation only. Classify Rat, Tilapia, Lizard, Hen and Toad into
classes of phylum Chordata.

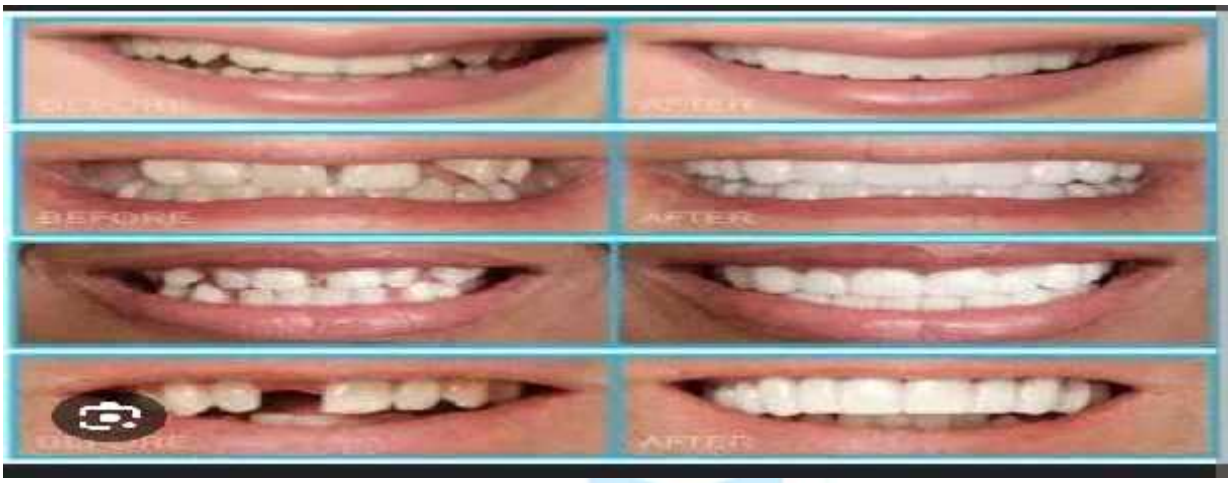






Item 12

Kirabo Irene a young Senior one girl who lives in Kyabugahya and goes to Kagadi Progessive S.S in Kagadi. She usually denied her mum on visitation day because of her appearance and always claimed that she is a worker at their home and warned her before her friends at school on a certain Visitation Day, never to visit her again lest she face something she would never regret. On her death bed, mum wrote to her a note that in brief Read, "my daughter, your dad raped me and caused me to leave school. He Fought had to force me abort the pregnancy and I refused over and over again. He one day go to pair of pliers and plucked out my teeth one by one and warned to finish the mall and after to kill me had I resisted to abort. I ran from him and finally gave birth to a nice looking daughter which is you. Brenda is now studying to be adentist. She has a photo of her mum before and after the loss of her teeth and amodel for a complete set of teeth in the normal adult, together with the dental formula showing the number of teeth in the upper and lower half of the jaw.



Task
As a learner who is more knowledge able in dental care,
Write a letter to Kirabo addressing each of the following concepts she would
Want to understand better.

i) Simple advice on how one can care for the teeth to prevent stigma like that mum Lucy was going through including the type of food that mum Kirabo was no longer Comfortable of eating after loss of some of her teeth

ii) How to identify the different types of teeth in the human oral Cavity basing on their features and the function of each teeth type

iii) Using the dental formula given to calculate the total number of teeth in the lower and upper jaw of the mouth and after calculate the total number of teeth in the human mouth.

Item 13
A learner put a spatula end full of soil in a clean test tube, and then
Added water to just cover the soil, The student then added 5 drops of universal indicator and had to shake thoroughly and filtered the mixture into test tube.
The procedure was repeated with other more two soil samples.



a) Identify the property of the soil being investigated?
b) Suggest how the student used the filtrates to determine the property of the soil mentioned in (a) above
c) What is the importance of testing the property of the soil to a farmer?

Item 14

At breakfast and evening tea, your school provides milk and cooked Cassava to the learners as suggested by the government of Uganda.



a) Name the food nutrients that the school mess provides to its learners at breakfast

b) Some learners after eating this kind of food, they complain of overdo sing and end up missing lessons due to sleeping in class. Explain why do learners dose after having some meals.

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B.PETER'S ACADEMIC PLATFORM

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456/1

MATHAMATICS

Paper 1

2024

$2^{1}/_{2}$ hours

B.PETER'S ACADEMIC PLATFORM

UGANDA LOWER SECONDARY CERTIFICATE OF EDUCATION

ASSESSMENTS TO CANDIDATES

MATHEMATICS PAPER 1

SENIOR FOUR

INSTRUCTIONS TO CANDIDATES:

This paper consists of **several** examination items.
Answer **all items for your good academic performance** all.



Item 1

Mr. Karim the head of mathematics department organized a mathematics study trip to Namanve where assembling of Toyota vehicle and manufacturing of Coca-Cola products are done, and in his report to the members of mathematics department shows the cost of hiring a school bus is constant for any a bus and other varies as the distance covered by the bus. He later reviled that if a bus covers 100km then charged kshs.4500 and kshs.4000 for a distance of 60km. The distance between the school and Namanve is 480km and they expected to live the school at 8:00am at an average speed of $100 km/hr$ according to the school's study trip rules and procedures and after the trip they students would rest for forty-five minutes and then proceed back to school.

Tasks:

a) As the treasure of the mathematics department help Mr. Karim to know total expenses for the total journey.

b) By representing the journeys on a suitable graph explain the motion of the bus to the bus to the school administrators.

ITEM 2

At Elijah's enterprise, a company that makes books. A machine produces the least number of books per turn, that enable packing in boxes in equal numbers of 24, 30 and 32 without any book being left out. On a given day, a school made an order of 1440 books. Determine the least number of turns the machine has to make in order to supply the school.

ITEM 3

Mutebi had UGX.750,000 on his account and he wanted to buy a Washing Machine. He went at the shop and the price of the machine was UGX.960,000. He went home and waited. One month later, the price was decreased by 15% and then 9% in the second month. Was Mutebi able to buy the Machine after the decreases? If yes, was he able to remain with any balance.

ITEM 3

The population of Uganda is estimated to be the fastest growing population in Africa. It is estimated to be increasing by over 1,340,000 people every year Since 2020 whose population was estimated to be 49,718,000 people. The research team finds it difficult to present such big population values in 2020 and 2022 on a chart. Advise the search team on some other way they can present these big population values in a reduced way without changing the meaning.

ITEM 4

Kevin's goal is to find a job that provides an income of at least 40 million a year. A glass mart company offers Her a job paying a basic salary of 12 million a year plus a commission of 6% of her sales. Determine what Kevin's total sales will need to be for her to have a yearly income greater than or equal to 40 million.

ITEM 5

An engineer standing on a ramp at (400ft, 300ft). the ramp rises 195 feet over a horizontal distance of 3000 feet to reach the top car parking yard.



Determine the equation that would help the engineer know the displacement for any other

position on the ramp.

ITEM 6

In the press release by the Uganda bureau of Statistics, presented all Items Index and related Annual Inflation rates for 3 major components, between February 2015 – February 2016. The Annual Food Inflation decreased to 10.1 per cent for the year ending February 2016 compared to 12.8 per cent recorded for the year ended January 2016. On the other hand, the Annual Non- Food Inflation increased to 6.7 per cent for the year ending February 2016, compared to the 5.8 per cent recorded for the year ended January 2016.

Key Drivers for higher Non-Food inflation were Transport (10.7 per cent), Clothing and Footwear (13.1 percent) and Miscellaneous Goods and Services (6.3 per cent).

ITEM 7

The small individual farmers in a certain village are being cheated by the traders from towns by offering them low prices for their produce. These farmers decided to form groups and sell their produce through them at better prices.

So far, they have two groups, Kamukamu and Tweziimbe. In the current season, they are selling milk, maize grain and beans. Last month, Kamukamu group had sales of 2,520 litres of milk, 35 bags of maize grain and 10 bags beans. Meanwhile the Tweziimbe group had sales of 2,314 litres of milk, 41 bags of maize and 9 bags of beans.

This month, the Kamuka group had sales of 3,254 litres of milk, 42 bags of maize and 8 bags of beans while the Tweziimbe group managed to sell 2,719 litres of milk, 32 bags of maize and 11 bags of beans. The price for 1litre of milk, 1kg of maize and 1kg of beans is UGX. 700, UGX.1,000 and UGX.3,500 respectively. A bag of maize and beans is estimated to have 120kg each.

Organize the information for the two periods and use it to determine the total sales of both groups. (15)

ITEM 8

On a certain village of 40 families, it was found out that 12 families keep a dog (D), 18 families keep a cat(C), 10 families keep a hen (H), 5 families keep D and, 7 keep C and H and 4 keep D and H. 3 families keep neither of the three dogs, cats or hens. This data was collected by learners, by use of a venn – diagram, help them to find the number of families that keep all the three animals and birds. If you are tasked to share 1600kgs of feeds to families
depending on the number of how much animals in that group, show each section on the venn – diagram will get.

ITEM 8

Ben and Musa went to borrow money from the same Bank. Ben opted for simple interest of 8% per annum for two years while Musa opted for compound interest of 5% per annum for two years. If each borrowed 600,000/=. Help them to know who paid more money and by how much so they can know the cheapest alternative in case they are to borrow money for the second time.

"Get yourself a Boda – boda cycle on loan term. Pay 600,000/= cash as deposit and 100,000/= per week for 80 weeks. One of the boda- boda ridder has asked you to help him compute the total cost of the Boda- boda cycle at the end of 80 weeks. Show how you can help him.

ITEM 8

A farmer has a metal sheet of length 12m which must be used to form a right angle. The hypotenuse of the triangle must be 5m. Help the farmer to get the measurements of the other two sides of the cage.

(b)In a certain factory the production of product T depends on the amount used of product X. the system of production is related by the equation $f(x) = x^2 + 1$. If during

a certain week variables of x where (3, 4, 5, 6, 7, 8, 9), Help the farmer of the factory to determine the expected range of product T.

ITEM 9

A census enumerator has been sent to count people in your village. He has been given an i-pad that is fully charged for the exercise. Unfortunately, there is a small note of the PIN to help you access the software for the exercise. The note indicates that the pin number is a two digit number in base ten. This number is equal to five times the sum of the digit. It is also nine less than the number formed by interchanging the digits. The enumerator comes to your home and seeks assistance to to help him find the PIN for the i-pad.

The census in Uganda is held every after 10 years. It was last held in 2014 and then previously 2004. The census in 2024 has revealed that there are $\mathbf{14, 400}$ people in your village. This has increased by $\mathbf{60}\%$ as revealed by the census in 2014 having been previously increased by by $\mathbf{80}\%$ earlier in 2004.

The enumerator claims for transport refund every after four days, for the 4-day journey made in the exercise. He travels a certain amount on the first day, then half of that on the second day, third of that the third day and finally a quarter of that on the fourth day.

The enumerator travelled a total distance of 50km during the four-day exercise. Each kilometer travelled is paid UGX28,000

Task:

(a) Help the enumerator encrypt the **PIN.**

(b) How many people were in the village in 2004.

(c) How much did she receive on each day.

ITENM 10

Your family is designing a parking lot for day and night parking of motorcycles using the piece of land that has been just been bought in the middle of the city centre. The land is rectangular in shape with a length of 3m longer than the width and the area of this portion is $\mathbf{108}\boldsymbol{m}^2$. The other portion of the land is a car park that will have only taxi and bus. Taxis are allowed $\mathbf{100}\boldsymbol{n}^2$ and buses are allowed $\mathbf{200}\boldsymbol{n}^2$ and there is only $\mathbf{500}\boldsymbol{n}$ of parking space available. Not more than 40 vehicles are allowed at a time. There are always both types of vehicles and at most 15 taxis are allowed at a time. The parking fee for taxis is $\mathbf{UGX5, 000}$ and that of a bus is $\mathbf{UGX8, 000}$.

Each bus carries **78** passengers when full. The bus has a total of **30** seats, some of the
seats are for **3** passengers and others are for **2** passengers.

Task:

(a) Find the dimensions of the portion of the parking space for the motorcycles.
(b) How many vehicles of each type should be parked in the parking lot to maximize income?
(c) Determine the number of seats for the three passengers and for the two passengers.
(d) In your view what precautions should be taken when putting in place the parking lot.

Item 11

Your father has decided to explore other options for your A-level education since the expenses at the previous school were beyond the budget. After some research, he has found another school that offers a more affordable option. He drove 30km east and 40km north to reach the school and found out that the details of the new school were as follows:

The school fees are Shs 750,000 per term, an admission fee of Shs 80,000 and the uniformcost is Shs 300,000. The school offers a 60% bursary on the school fees for students who scored a first grade in their O-level exams, and you qualify for this bursary.

Your father is considering the following two payment plans offered by the new school:

Paying the full amount (school fees, admission, and uniform) at the beginning of the term.

Paying the school fees in three equal instalments at the beginning of the term, on visitation day, and at the end of the term, while paying the admission and uniform fees upfront.

Tasks:

(a) Calculate the total cost of attending the new school, considering that you qualify for the bursary.
(b) Determine which payment plan would be more suitable for your father's budget and explain your reasoning.
(c) If your father chooses the three-installment plan, calculate the amount to be paid in each installment.
(d) How far is it from your home to school if you travel through the direct route?

Item 12

Basoga Bainho (BABA) FM is hosting a highly anticipated concert, Ekituudha, at Kyabazinga Stadium Bugembe. The concert is expected to attract a large audience and the organizers have set two different ticket prices to cater for different income levels. The concert tickets are being sold at two different prices:

- Tickets for the VIP seating area are priced at Sh. 10,000 each.
- Tickets for the general seating area are priced at Sh. 5,000 each.

The organisers have a total of 30 tickets available for the concert. After the initial sales period, the total amount raised from the ticket sales is Sh. 800,000.

Task;

As the finance manager for the Ekituudha, determine how many tickets were sold at the price of Sh. 5,000 and Sh. 10,000.

Item 13



Walugosi is a middle-class employee working in a private company in Uganda. He earns a gross monthly income of UGX 1,200,000. Walugosi is married and has four children - two aged 6 and 8, one aged 15, and one aged 19. Walugosi receives various allowances from his employer, including:

- Insurance and relief: UGX 222,000 per annum
- Water and electricity: UGX 21,000 per month
- Medical: UGX 318,000 per annum
- Housing allowance: UGX 55,000 per month
- Transport allowance: UGX 42,000 per month
- Family allowance for the three children under 18 years old.

Walugosi is concerned about the amount of income tax he has to pay each month and wants to understand how it is calculated based on the tax structure below;

Taxable income(UGX) per month			Tax rate (%)
1	-	40,000	8.0
40,0001	-	100,000	16.5
100,001	-	200,000	24.0
200,001	-	350,000	32.5
350,001	-	510,000	43.0
Above 510,000			48.5

Task;

Walugosi approaches you, an expert in tax calculations to help him determine, i)The income tax he has to pay monthly.

ii) His net income

iii) What percentage of his gross monthly income goes to tax?

iv) With the help of two relevant example(s), help Walugosi understand why it is important to pay tax.

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SCENARIO

St. Kizito Senior secondary school is located in Kaberamaido, it has stayed for long in the field of Secondary Education since it's establishment in 1970, for all this long it has been known for its disciplined staff and Students in addition to it's academic excellence, however, following the covid-19 pandemic, some members of staff emerged out very rich while the rest of staff got so poor, the rich class distanced from the poor while the poor ones hated the rich, this has caused a crisis to the extent that the Student's too are now showing sides, and they are getting divided up, along side their teachers, as per now no one knows the fate of the mighty school, the community too is worried.

SUPPORT MATERIAL



The above staff of St.Kizito S.S.S has ever been united, but now torn into pieces

TASK

Using your knowledge on christian and contemporary approaches,

How best can these teachers involved in the scenario resolve their misunderstandings so that the school maintains it’s glory for better academic performance?

Kizito Deograceous

Competency Based CRE

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CHRISTIAN RELI
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ON Paper 1
2024
2 Hours

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UNIOUS ASSEMENT

SENIOR FOUR

PAPER 1

Time: 2 Hrs.

INSTRUCTIONS TO CANDIDATES:

- ✓ This paper consists of **several** examination items.
  Answer **all items for your good academic performance** all.



SECTION A

Respond to all items in this section

Item 1

Jack is a committed Christian who always takes readings in church and helps in usherin g during the time the priest conducts Holy Communion. Jack also runs a business of selli ng food stuff .However his business is not doing well like that of a neighbor, he has f ew customers , one of his friends is advising him to go to a witch doctor for a charm for success in her business, which idea jack isn't comfortable with.

Task:

Help Jack to remain faithful to God despite the challenge he is facing. (20 Scor es)

Item 2

Submit to one another out of reverence for Christ, wives submit yourselves to your own husbands as you do to the lord, for the husband is the head of the wife as Christ is the head of the church, his body of which he is the savior. Now as the church submits to Christ so also wives should submit to their husbands in everything. Husbands love y our wives as Christ loved the church and gave himself up for he..... (Ephesians 5: 21-25)

Task

(a)Use the message in the bible text to strengthen marriages to day.

(b)Relate the African traditional ways of strengthening families with the teachings in the bible text above.

Item 3

Karungi Esther a senior one learner, she is a Muganda by tribe who loves and respects her tradition and custom so much. Every Tuesday and Friday evening after school, she normally helps out her mother in the garden.one Friday after garden work she returned home and found her aunties dressed in clan clothes. They were all happy to see her. She then asked her mum what was going on. Mother told her,

"Karungi your aunties are here for you, whenever they come dressed in clan.

clothes, they are here for a special ceremony". When I was pregnant with you, they came for prayers of a healthy mother and baby was made to our ancestors. what an exciting day when the baby came, your aunties were here dressed like this to hear the cry of a baby and the voice of the mother, they performed some rituals ,they again came dressed like that ,that's why your name is Karungi. They are now here to initiate you into an adult, responsible mother and a great wife. They will again come back to hand you over to your future right man when the time comes.



Tasks

a) With the knowledge you have attained about Christian rituals and celebrations, explain the meaning of rituals and its importance. (10scores)
b) Mention the rituals Karungi has gone through. (05 scores)
c) How do people today celebrate their stages of life? (05 scores)
d) Identify some challenges associated with some African rituals. (05 scores)

Item 4

Go to the ant, you sluggard, consider its ways and be wise. It has no commander, no ov er seer or ruler yet it stores its provisions in summer and gathers its food at harvest .Ho w long will you lie there you sluggard? When will you get up from your sleep? A little sle ep, a little slumber, a little folding of the hands to rest and poverty will come on you like a thief as scarcity like an armed man (proverbs 6:6)

Task

(a) Use the above biblical text to promote hard work so as to dominate the world (13 scor es) (b) How can the above biblical scenario be related to traditional African practices which

promoted development.

Item 5

In Akaka village is a polygamous family of two wives who all have children .the family ha d had a piece of land which he distributed equally to the two wives and their children b efore his death. However one wife and her children are not happy, they claim that they were allocated land which is infertile, this has left the two wives not talking to each other freely, they keep abusing each other and threatening to kill one another.

Task

(a) As a student of Christian religious education, help to settle the family in the scenar io.

(b) Using the African traditional society ways and values, help the family above to live in pe ace

Item 6

Do not take revenge my dear friends but leave room for God " wrath for it is written " it is mine to avenge." I will repay says the lord one the contrary. If your enemy is hungry, fe ed him, if he is thirsty, give him something to drink. In doing this you will help burning coals on his head, " do not be overcome by evil but overcome evil with go. (Romans 12:19-21)

Task

Use the above biblical text to promote harmonious living society

Item 7

Mr. Oketch Jeremiah a business man is married to Mrs Oketch Jackie for 5 years now. They have 2 children and they live in Kasana village with a maid called Juliet Ajok. Mrs Oketch is a staunch Christians who loves praying for her family. Because she is a hospital nurse at Kasana general hospital, she spares time for prayers on Friday evenings at 9pm and comes back home in the morning at 6am on Saturday to prepare her family and she reports back to work .



a) As a Christian, what kind of prayer does Mrs Oketech practice every Friday ? What does it mean? (02 scores)

b) Mention the kind of activities involved in Mrs Oketch kind of prayer. (8 scores)

c) In your opinion, why do most Christians today support such prayers and suggest problems associated with such prayers? (10 scores)

d) With the help of a bible. Give two examples of people who prayed such prayers.

Item 8

In one village, their lived a wedded pastor. He could preach and all the people knew he w as righteous but his wife and children knew him better. One he was adulterous, He lied to his wife even with evidence. This made His children to do the opposite of his preaching. T hey disrespected him and even could steal the neighbours property. This made the pastor s family to have a bad reputation.

Task.

a) What things should a Christian avoid to do in order to worship God with all their might.

b) As a Christian who has been attending prayers every Sunday. Write down the"Lord's prayer"

Item 9

Okello operates his business but has always been putting God first. He was successful in h is business but time came when He involved himself into adultery. He spent his money on women and even become weak in faith. This made his business collapse and trouble came to his family. He became poor and failed to manage His family. His wife divorced him and he remained suffering with his children.

Task.

a) Basing on the scenario, advise Okello on different ways of praying as an expression of respect to God in order to renew his faith.

b) Explain the consequences of neglecting prayers as a family.

Item 10

Opede used to school in a far school from his home, one evening as he was coming back home, he met bad boys who beat him up and he lost his consciousness. They left him in a hidden dark place, lucky enough, a christian was grazing and chanced to see him, carried him and took him to his home, cared for him by giving him food, treatment among others. S o when he became fine they became good friends up to now.

Task

a) Basing on the scenario above, explain the importance of charity as a from of worship.

b) What does the bible teach on charity as a form of worship.

Item 11

Grace is a God fearing woman, she is short tempered but even when she gets annoyed sh e can easily forgive and forget. Whenever she could get annoyed, she worshiped God thro ugh singing so as to calm herself. This has worked for her and always becomes relieved af ter worship.

Task.

a) Discuss the reasons why its important to forgive when you pray.

b) Identify the importance of worshiping God through singing.

Item 12

Nadongo lived a staunch village life in Katikamu village. At her age of 19, she attracted various men around her village to include those who were willing to marry her. The concerned village people who got to know about Nadongo's misconducts became so touched and decided to inform her parents who were always too busy with garden work. Nadongo's parents were very shocked by this information since they always tried to guide and counsel their daughter about the conduct of the village men, and they were always very strict to ensure that she undergoes the rightful procedures of marriage that would earn their family respect in the society.





Task

i) As a Christain Religious Education learner, what advice would you give to Nadongo on the qualities she should consider to identify the rightful marriage partner?

ii) Using the knowledge obtained from Christian Religious Education lessons, describe the rightful procedures that Nadongo can follow in preparation for her marriage.

Item 13

canary and Peter are twins who posses same likes and interests but have differences in f orms of prayer. Canary prefers private prayers to congregational prayers while Peter is th e opposite of canary

a) Compare and contrast between private and congregational prayers.

b) Explain the importance of the private prayers to you as an individual.

Item 14

In one village live polygamous men who had four (4) wives but had never fulfilled his marita l obligations of paying bride price for any of them. He had at least five (5) and above childre n from each woman. He never at any point supported them; He lived to punish them if they failed to perform to his expectations. However his children never loved him and were alway s against his actions.

Task

a) Share situations where women and children are not treated in the am way in your comm unity.

b) How did Jesus promote the dignity of children in Mark 10; 13-16

Item 15

Sharon is an orphan who lost her parents when she was just born. She grew up under the care of her grand mother who also passed on when she was a5 years old. Other relatives took over but instead mistreated her. She was always beaten even with out a serious mist ake but always prayed privately whenever she faced challenges. She has found her life m oving on meaning that God comforts her in those hard times.

Task

Basing on the scenario, how are private prayers important to an individual and also list the challenges faced when conducting private prayer.

Item 16

"The world has been experiencing the Covid 19 Pandemic. in the affected countries, people were bed ridden others died, mass graves were dug to bury the dead gatherings in church like Sunday service and night prayers were put on hold and the whole country was confused.



TASK

a) You are the minister of health of Uganda; write a report to the church leaders about how Christians should conduct congregational worship. (10 scores)
b) Compose a prayer that can be used under such circumstances. (05 scores)

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TIPS OF PASSING C.R.E

What is required in the items to be responded to?

Scenario; A scenario is a set of information that a learner needs to mobilize various skills learnt during classroom environment, attitude, values to solve a task at hand.

NATURE OF THE C.R.E PAPER

- **TIME: 2 HOURS AND 30 MINUTES**
- **ELEMNTS OF A SCENARIO**

SECTION A

THEME: MAN'S RELATIONSHIP WITH GOD (BOOK ONE)

a. Worship.

b. Christian rituals and celebrations.

c. Christian values.

THEME: MAN'S SOCIAL RELATIONS (BOOK TWO)

a. Human dignity (the creation of human beings in God's image).

b. Marriage.

c. Family.

Note:

- In this section two compulsory items are set.
- The scenarios are based on Bible text and contemporary (modern) society.

SECTION B

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PART ONE

THEME: MAN'S DOMINION OVER THE WORLD (BOOK THREE)

a. Work.

b. Wealth and development.

c. Leisure.

Note:

- In this part, two items are set.
- The learner is to respond to only one item.
- The scenarios are based on Bible text and contemporary (modern) society.

PART TWO

THEME: MAN'S HARMONIOUS CO-EXISTANCE (BOOK FOUR)

a. Peace.

b. Justice.

c. Conflict resolution.

Note:

- In this part, two items are set.
- The learner is to respond to only one item.
- The scenarios are based on Bible text and contemporary (modern) society.

THE DIMENSIONS OF CRE

- There are basically three (3) dimensions which have been grouped into two

  a. Christian/ Bible dimension

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b. Secular.

(i) Present/ modern/ contemporary society or issues or views.

(ii) Traditional African views.

Note:

- For scenarios that require Christian/ Bible views, if the student is not sure of the bible verse, he/ she should not give but rather give;

  (i) the teaching and the book,

  (ii) the teaching and the testament or

  (iii) only the teaching

- For scenarios that require African traditional views;

  (i) the concept knowledge (CK) should be in past tense.

  (ii) the concept understanding (CU) should be in past tense.

  (iii) then application present (AP) should be in present.

EXAMPLE

ITEM 1: A brilliant young graduate remained unemployed for ten years because of despising available jobs. He eventually got a well-paying job as an accountant. Out of excitement, he got into alcoholism, spending most of his night time in bars. Fifteen years in employment, he failed to develop himself in anyway.

Tasks

(a) Using Christian views, how does the scenario inform the youth in Uganda to be productive.

Response:

The Christian view teaches the youth in Uganda to respect and do the work that God

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avails to them. In the creation story God worked for six days without rest. According to the scenario the young graduate remained unemployed due to despising available jobs.

(b) Explain the African Traditional views in which the scenario informs the youth in Uganda to be reproductive.

Response:

The African Traditional view teaches the youth in Uganda to embrace hard work. In Traditional African society, laziness was discouraged. People were proud with their work whether they were farmers or fishermen. Staying unemployed for ten years without work is a sign of laziness and lack of creativity on the side of the young graduate.

NB;

- The bible text scenarios are directly picked from the bible and they the easiest to respond to
- The approach to all tasks from all dimensions should be;
  - (i) have knowledge from the text (CK)
  - (ii) concept understanding/ Explanation (CU)
  - (iii) Application Present (AP), should be referred to text.

HOW THE RESPONSES ARE CODED

a. Introduction Present (IP)
   - Involves, concept of definition and background of the main words or scenario.
   - Any valid idea about the scenario.

b. Concept knowledge (CK)

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- When the learner identifies the point

c. Concept understanding (CU)

- If the learner explains the concept so that it is understood depending on the dimension i.e Christian, ATS or contemporary/ modern.

d. Application present (AP)

- If the learner applies the knowledge to the contemporary world
- It is the most important in the paragraph.
- Should be in line with the task and scenario.

e. Conclusion present (CP)

- It should be in line with the responses.

Note:

- After introducing,
- Each of the student's paragraph should have.
  - (i) Concept of knowledge,
  - (ii) Concept of understanding and
  - (iii) Concept of application
- At the end a student should conclude and the conclusion should;
  - (i) Be in line with the responses,
  - (ii) Positive ie negative conclusions should be avoided.

SAMPLE ITEMS

Item 1. The Lord God said, "It is not for the man to be alone. I will make a companion for him who corresponds to him". So the Lord God caused the man to fall into a deep sleep,

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and while he was sleeping, He took part of the man's side and closed up the place with flesh. Then the Lord God made a woman from the part he had taken out of the man, and He brought her to the man. Then the man said, "This one at last is bone of my bones and flesh of my flesh; this one will be called woman, for she was taken out of man". That is why a man leaves his father and mother and unites with his wife, and they become a new family. Genesis 2:18, 21-24 (NIV)

Tasks;

(a) How can the message in the scripture above strengthen marriage among Ugandans today?

Responses;

Marriage is the legal union of a man and a woman as husband and wife.

According to the bible text, marriage in Uganda today can be strengthened in the following ways;

- Husband and wife should treat each as equals. The bible text says that this one at last is bone of my bones and flesh of my flesh which means that man and woman were created equal and should hence respect each other. If Ugandans today respect themselves in marriage, their marriages will be strengthened hence making them long lasting.
- Husbands and wives should love one another. The bible text says that God will make a companion for man which means that husbands and wives should care for one another's needs as a sign of love. If Ugandans today look after the needs of their marriage partners and love each other, their marriages will be strengthened.
- Wives should be submissive to their husbands. The bible text teaches that God would make a companion for man who would correspond to him which means that wives should submit to the will of their husbands as the heads of the family. If Ugandan wives in marriage today submit to their husbands, their marriages will

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be strengthened.

- Husbands and wives should be faithful to one another. The bible text says that that is why a man leaves his father and mother and unites with his wife, which means that one man should get married to one woman as a husband and wife. If Ugandans in marriage are faithful to each other they will be monogamous which will strengthen their marriages.

- Husbands and wives should have children in marriage. The bible text says that a man leaves his father and mother and unites with his wife and they become a new family which means that a husband and wife should have children to start their new family. If Ugandans have children in their marriages, their marriage will be strengthened.

- Husbands and wives should offer companionship to one another. The bible text says that God would make a companion for him which means that husbands and wives should be present for each other at it is their God given responsibility. If married Ugandans offer companionship instead of abandonment to each other, their marriages will be strengthened.

In conclusion, as it is mentioned in the Bible text provided, it is through submissiveness, respect, love, faithfulness and companionship that Ugandans today can strengthen their own marriages.

SPECIFIC CHRISTIAN/ BIBLE VIEWS/ TEACHINGS

THEME: MAN'S RELATIONSHIP WITH GOD (BOOK ONE)

A. WORSHIP

a. Old Testament.

- Singing

- Praising

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- Giving thanks
- Honoring the Lord God as the creator
- Observing the Sabbath
- Sacrificing.
- Conducting pilgrimages
- Repenting the sins
- Forgiving people's sins
- Giving offertories
- Giving tithe
- Celebrating the Passover.
- Fasting
- Dancing with might honor to God

b. New Testament.

- Forgiving people's sins.
- Repenting sins
- Praying to God
- Helping those in need.
- Having confidence in God
- Consulting one another
- Having faith in God
- Seeking guidance of the Holy spirit

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- Trying to live a holy life
- Honoring God

B. CRISTIAN RITUALS AND CELEBRATIONS

a. Christian Rituals

- Baptism
- Confirmation
- Penance.
- Eucharist
- Matrimony
- Holy orders (ordination)
- Holly action (anointing of the sick)

b. Christian celebrations

- Easter
- Christmas
- Pentecost
- Palm Sunday
- The assumption of marry into heaven
- Ash Wednesday
- Martyrs day
- Ascension day
- All saints day

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C. CHRISTIAN VALUES

- Prayer
- Forgiveness
- Love
- Patience and endurance
- Hope
- Kindness
- Honest
- Goodness
- Promoting peace
- Sharing
- Respect
- Marriage
- Exercising justice
- Working hard

THEME: MAN'S SOCIAL RELATIONS (BOOK TWO)

A. HUMAN DIGNITY

- Respect of human life
- Respect of the parents
- Respect of people's property
- Payment of the workers by the employers

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- Respect of the disabled
- Love of one another
- Being honest when making decisions
- Fulfilling the promises
- Forgiveness of one another
- Promoting justice
- Having pity for those who suffer
- Praying for the sick
- Obeying of the masters

B. MARRIAGE

- Monogamy
- Love
- There should producing of children
- There should be happiness
- Marriage is supposed to be between a man and woman
- Sex in marriage is divine
- Permanent
- companionship
- submissiveness
- Equality of husband and wife
- Free gift from God

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- Divine gift from God
- Unity in marriage
- Harmony in marriage
- Glorifies the name of God

C. FAMILY

a. Old Testament

- Hard work among the family members
- Permanent
- Love
- Proper upbringing of children
- Satisfying of each other's sexual desires among husband and wife
- Tolerance
- Wives should submit to their husbands
- Husbands to care for their wives
- Husbands should fulfill their duties as family heads
- Respect of each other

b. New Testament

- Permanence
- Love
- Respect of one another
- Submissiveness of the wives

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- Parents to care for their children
- Pray together as a family
- Respect.

THEME: MAN'S DOMINION OVER THE WORLD (BOOK THREE)

A. WORK

a. Old Testament

- God worked
- Work is a gift from God
- Command from God
- Man should work hard
- Blessing from God
- Fair treatment of the workers
- Pay the workers
- Equal sharing of the fruits of work
- Respect of individual's work
- Promotions at work
- Leisure after work

b. New Testament

- Jesus worked as a preacher
- Work is normal
- Should be aimed at expanding God's kingdom

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- Serve each other
- Develop the talents
- Equality
- Hard work
- Unity at work
- Leisure after work
- Work brings happiness

B. WEALTH AND DEVELOPMENT

- God is the source of wealth
- Wealth is a source of blessings
- Wealth is a reward from God
- Wealth is God for the search of God
- Wealth is a sign of Jesus' second coming
- Wealth is got from hard work
- Wealth is good
- Leaders should enhance prosperity among the subjects
- Wealth causes worries among people
- Wealth gives man power over fellow man
- People should work hard to become wealth

C. LEISURE

- God rested

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- Observance of the Sabbath
- Fellowship
- Pilgrimages
- Praying
- Respect
- Celebration of the Passover
- Helping those in need
- Preaching
- Bible study
- Choir practice
- Praising
- Guidance and counseling

THEME: MAN'S HARMONIOUS CO-EXISTANCE (BOOK FOUR)

A. PEACE

- Forgiveness and reconciliation
- Discourages revenge
- Do good to the enemies
- Praying for the enemies
- Jesus brings peace
- Love of the enemies
- Discourage violence

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- Self-sacrifice
- Peace is a gift
- Sharing brings peace
- Following God's commandments brings peace.
- Respect of one another
- Tolerance
- Fair judgment
- Being submissive brings peace
- Loyalty brings peace

B. JUSTICE

a. Old Testament

- God gave laws to protect the weak
- The fall of man is a result of injustice
- Discourage covering of injustices
- Encourage justice
- Discourage denial of justice
- Discourage bribes
- Adultery and divorce are condemned
- Employers to pay their workers
- Fair treatment of strangers

b. New Testament

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- Forgiveness
- Love
- Discourage violence
- Discourage exploitation and oppression
- Equal treatment of people
- Discourage divorce
- Discourage abuse of children's rights
- Encourage proper use of the father's house

C. CONFLICT RESOLUTION

Conflict should be resolved by;

- Fairness and justice
- Respect
- Forgiveness
- Love
- Care
- Concern
- Reconciliation
- Compassionate
- Full control of the tongue
- Turn away from evil
- Seek for peace

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- Doing good
- Tolerance
- Leave the duty of judging for God

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BUDDO SECONDARY SCHOOL

ORDINARY LEVEL BIOLOGY SEMINAR 2024

553/1 BIOLOGY PAPER 1

Biology paper 1 consists of **7 examination items**. It has two sections; **A** and **B**.

SECTION A

Section A has <u>three</u> compulsory items.

<u>ITEM 1</u> SAMPLE QUESTIONS

1.1 Peter discovered strange moth species in his maize garden which was just beginning to flower. He observed that the moths were laying eggs inside the enclosed flowers and beneath the leaves. The larvae of these moths were found to feed on many parts of the plants, including boring through the stem. Peter was advised to consider changing crops grown, nonetheless, his maize managed to give some yields.

Task

a) Identify the plant structures affected by the moths in Peter's garden (03 scores)

b) How did the activities of the moths affect the normal functioning of peter's maize? (06 scores)

c) Explain how peter's maize finally managed to give some yields. (03 scores)

1.2 Mr. Waiswa, a farmer in Buyende, planted beans and maize in his garden, alongside mature banana plants. Just before the beans and maize could mature, a severe hailstorm hit the garden, destroying all his crops. A month later, Mr. Kaggwa was surprised to see that new young banana shoots were growing, but there were no signs of new beans or maize growth.

Task

a) Identify the plant structures that were affected by hailstorm. (03 scores

b) Explain how the hailstorm affected the normal functioning of the crops? (06 scores)

c) Explain why Mr. Kaggwa did not have to worry about his banana but instead got worried about beans. (03 scores)

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ITEM 2 SAMPLE QUESTIONS

2.1 A house maid was cooking milk for the baby and suddenly the boiling milk raised and spilled out of the sauce pan into the fire. The maid heard the hissing sound from the cooking place. She got scared, her heartbeat and breathing rate increased and she strongly rushed to remove the sauce pan from the stove. On touching the pan, she immediately released it.

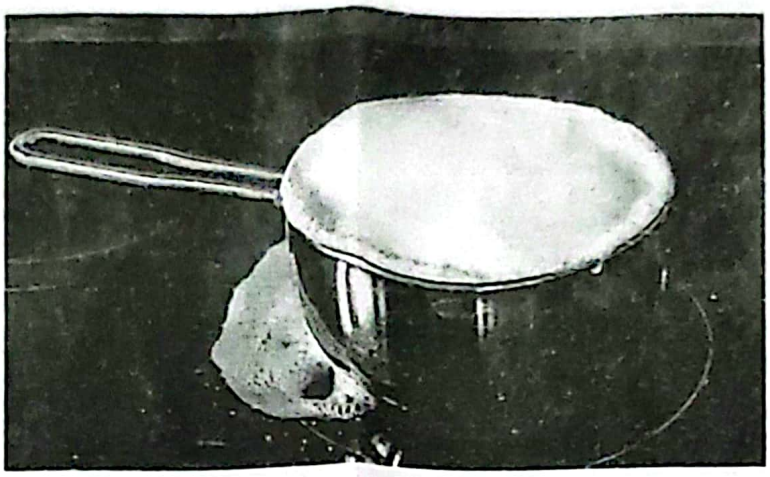


Fig. 1 shows the boiling milk

Task

a) What physiological responses occurred in maid's body? (03 marks)

b) Describe how maid's body coordinated to bring about her reactions from the time the milk spilled out of the sauce pan up to when she started to rushed towards the cooking place. (06 scores)

c) Explain what happened in the maid's body so as to withdraw her hands. (03 scores)

2.2 In a small village in Buganda, a young mother named Nalongo is an alcohol addict. One day, while drunk, she attempted to prepare lunch for her family but accidentally left the cooking fire unattended to. The fire quickly spread, engulfing the kitchen and threatening to burn down the main house. Fortunately, her neighbor, Sarah noticed the thick smoke and rushed to her aid, extinguishing the fire just in time.

Task

several parts of Sarah's body enabled her ich

a) Describe how Sarah's body coordinated to bring about her reactions from the time she noticed the smoke until she reached to Nalongo's kitchen. (06 scores)

b) What are the likely effects of Nalongo's lifestyle? (03 scores)

c) Explain how Nalongo can recover from her lifestyle to live a productive life. (03 marks)

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2.3 During his holiday visit, Opio noticed that his family members were struggling with various health issues. His elder brother would feel thirsty, hungry and urinates frequently. Their grandmother had a noticeable swelling on her neck, and their father was having trouble of seeing close objects. Concerned about their health, Opio took it upon himself to ensure his relatives received the appropriate medical attention and support necessary to restore their well-being.

Task

a) Identify the health conditions of Opio's relatives. (03 scores)
b) Explain how the conditions arise. (06 scores)
c) How can the conditions be managed. (03 scores)

2.4 In Kampala, Uganda, a group of health researchers conducted a study on the impact of urbanization and modern lifestyle on the health of the population. Through the study, the results indicated a rise in chronic diseases, such as diabetes, hypertension, and obesity, among the urban population of Kampala. The factors contributing to the above were identified as:

- The sedentary lifestyle, for example, lack of physical exercise and sitting for long hours.
- Feeding on a lot of junk foods.
- Stressors of city (much noise and air pollution)

All those lead to a decline in the overall health and well-being of the people.

Task

a) Explain how the identified factors contribute to the chronic diseases among the urban population as pointed by the Researchers. (09 scores)
b) Point out the symptoms of any one Chronic disease as indicated in the Research Report among the urban population of Kampala. (03 scores)
c) Advice the urban dwellers on how to manage the health conditions and live a better life. (03 scores)

ITEM 3 SAMPLE QUESTIONS

3.1 John and Sarah, married for 15 years, have three children - Michael, Olivia, and Sophia. Michael has sickle cell anaemia. Olivia shows strong resistance to diseases; however, Sophia is oftenly disturbed by malaria. John, without any illness, doubts the children's paternity. This tension has resulted into a family misunderstanding between John and Sarah.

Task

a) Using scientific facts, prove to John that they are both responsible for the health conditions present in their children. (06 scores)

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b) Mention the symptoms present in Michael due to his health condition. (03 scores)

c) Suggest to the couple how they can manage the health conditions in their children to live a happy life. (03 scores)

3.2 In a certain family, a paternity dispute has arisen between a man, Mr. Kabuye, and a woman, Ms. Ndagire, over their 2-year-old child. Mr. Kabuye denies being the biological father of the child since they have different blood groups, while Ms. Ndagire claims he is the right father. The child's blood type is AB, while Ms. Ndagire's blood type is O. Mr. Kabuye's blood type is A. Recently, the child was diagnosed with a bleeders' disease after an injury, where he even needed blood transfusion.

Task

a) Clearly show to Mr. Kabuye the possibility of being the father of their 2-yearl-old child basing on the scientific facts of blood groups. (06 scores)

b) What are the likely effects of the disease discovered in the 2-year-old? (03 scores)

c) Advise the couple on how a successful blood transfusion of their child can be done. (03 scores)

3.3 Mary conceived at 13 years while in P.5 and was expelled from home, she was forced to stay with her boy-friend in the nearby village. She had a lot of difficulties during pregnancy and did not attend antenatal care. Mary gave birth to an albino child. Her boy-friend denied being the father, citing the fact that he's dark-skinned.

a) Scientifically convince Mary's husband that he is the father of their child. (06 scores)

b) Point out the consequences of Mary's actions to her life. (03 scores).

c) Advise Mary on how she can improve her life and also ensure survival of her child. (03 scores)

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SECTION B

Section B has two Parts; I and II. Answer one item from each part.

Part I

Answer only one item from this part. Answers should be written in the answer booklet(s) provided.

Part I Sample Questions

4.1 The residents of Kigezi cultivate their crops on hillsides. A recent heavy rainfall caused damage to several life forms. Stagnant water pools formed in the valleys, and the water spread to people's homes. Different ailments have been reported among the people. The district environmental officer holds the residents responsible for the damage and they seek to understand their role in order to address the issues without leaving their ancestral land.

Task

Explain to the residents how the challenges they face came about, give them advise on how they can sustainably use the natural resources in area and why it is good to do so. (15 scores)

4.2 The Uganda Wildlife Authority (UWA) has noted an increase in poaching near game parks, encroachment on park boundaries for agriculture, and a rise in wildlife attacks on humans and livestock. Furthermore, the nearby industries on Lake Victoria have been releasing untreated sewage into the water body leading to reduced aquatic wildlife diversity and impacting the country's economy.

Task

Explain the effects of these human activities and provide solutions to the challenges experienced by the affected communities. How important is maintaining such natural environments? (15 scores)

5.1 The public health officer in Hoima, has observed significant water pollution in Lake Albert and nearby water sources due to oil refinery and industrial activities. In addition, the local community has been experiencing an outbreak of malaria and bilharzia, with many cases reported among children and fishermen.

Task

What are the effects of the activities being done around the Lake? Suggest control measures to mitigate these effects and disease outbreak. (15 scores)

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5.2 OilTech Corporation has discovered significant oil reserves in Murchison Falls National Park, near Lake Albert in western Uganda. The company plans to extract the oil and construct a refinery nearby, generating employment opportunities and revenue for the government. However, environmentalists and local communities are concerned about the potential risks to the ecosystems in the area.

Task

Explain the problems associated with oil exploration activities in the area. Suggest possible solutions and show the value of leaving the ecosystems in the area undisturbed. (15 scores)

Part II

Answer only one item from this part. Answers should be written in the answer booklet(s) provided.

Part II Sample Questions

6.1 Peter and Paul, both considered strong contenders as athletes, were expected to lead their respective classes to victory in the inter-class competitions. However, on the day of the event, Paul consumed a heavy carbohydrate meal while Peter abstained from eating. Despite this, Paul won all his races while Peter struggled and eventually collapsed during one of the races. Peter had to be carried off on a stretcher, breathing rapidly and heavily and was able to recover after giving him glucose and enough resting time.

Task

Explain the physiological role of nutrition in athletic performance, identify the problems faced by Peter, and propose solutions to optimize performance and prevent adverse outcomes in similar situations. (15 scores)

6.2 John, a 13-year-old was experiencing general body weakness and was scared that he may not participate in the school interhouse athletic competitions. He was advised to first eat before engaging in any sports activities which he did take a meal of posho and beans. After resting for about an hour, he felt stronger and managed to even win his race. However, after the competition john experienced deep breathing and muscle pain causing him to walk with a lot of difficulty.

Task

Describe the process that led to the success of John and why he experienced some challenges thereafter and explain how he was able to recover

(15 scores)

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7.1 Tom's 3-year-old son was attacked by fever that resulted in the breathing difficulties, vomiting and diarrhea The baby was rushed to the hospital and immediately some injections was given and breathing normalized. Further tests revealed that the boy did not have enough blood. Compatible blood was added to the body and the doctor advised him to feed the boy on foods rich in proteins and iron. After one month in hospital the boy recovered completely from the disease.

Task

Explain how the body of Tom's son responded to the actions of the doctors and how the boy's body regained its normal functions. (15 scores)

7.2 In many schools in Uganda, students are served a staple meal of unfried beans and posho for lunch and supper, throughout the term. While this diet provides essential nutrients for growth and energy, some students at Kabale Primary School are unaware of the nutritional benefits of this food. The school's nutrition club wants to educate their peers about the importance of beans and posho in their diet.

Task

What scientific explanations can the nutrition club provide to their fellow students to help them understand how beans and posho contribute to their energy levels and overall growth?

553/2/3 BIOLOGY Paper 2 or Paper 3 (Practical)

Biology paper 2 or paper 3 consists of <u>two</u> compulsory examination items.

<u>ITEM 1</u> SAMPLE QUESTIONS

1.1 Teddy makes bread to earn a living. Her customers have started demanding that they want sweeter bread. Teddy is worried of the cost of buying more sugar which is very expensive. Mark, Teddy's friend has suggested a biological enzyme that Teddy can use to make her bread sweeter even without adding any sugar. Teddy mixed the product with wheat flour and added hot water at 60^0C for 30 minutes and went ahead to add other ingredients. On baking her bread, the customers complained that the bread is still not sweet. Teddy is worried of losing her customers. You have been provided with the following; Solution **K** which is a sample of the biological enzyme and solution **R** which is a sample of the wheat flour Teddy used.

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Task

Design and carryout a scientific investigation(s) on the samples provided and advise Teddy on what she can do to make her bread sweet using the biological enzyme.

1.2 In most communities of Uganda, weaning is commonly abrupt and unplanned. This is because most parents are unaware of the dietary needs of their children, and this leads to nutritional deficiencies. However, some few parents plan for weaning and their children are always healthy. You are provided with two solutions prepared from two different foods for weaning children: solution A_1 given to a child in a family that planned for weaning and solution A_2 given to a child in a family that did not plan for weaning.

Task:

Carry out investigations on solutions A_1 and A_2 and give appropriate guidelines to parents in the affected family.

ITEM 2 SAMPLE QUESTION

2.1 Jenifer grows hibiscus plants in her compound that put on many healthy structures. In the nearby bush her neighbor keeps some animals that regularly visit the plants. One day a bush fire killed and chased away all the neighbor's animals. After sometime, Jenifer noticed that her plants put on very few of some structures. She's is wondering what could be wrong with her plants.

Tasks

You are provided with specimen **D** one of structures affected on the plant and **E** a sample of the neighbor's animals.

a) Using observable features, identify the plant part **D** and specimen **E**.
b) Explain how specimen **D** were able to cause the animals to always come to them.
c) Draw and label parts of specimen **D** after removing all the petals.

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Everything..

END

'Sending you all our best wishes for a future marked by success, discovery, and excitement in the field of Biology!'

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VISION FOR AFRICA HIGH SCHOOL-NAKIFUMA

Born To Win, Our Father Is The King

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highschool@visionforafrica-intl.org

The Head of Biology Department

29th April, 2024

.....

Through;
The Head Teacher,
VISION FOR AFRICA H/S

Forwarded for consideration

VISION FOR AFRICA HIGH SCHOOL
HEAD TEACHER
P. BOX 675, MUKONO

Dear Sir / Madam,

RE: **INVITATION TO ATTEND LSC-BIOLOGY SEMINAR 2024**

The Biology department of Vision For Africa High School Nakifuma- Mukono invites you and your **S.4 candidates** for the annual biology seminar scheduled to take place on **Saturday 6th July 2024** at the school Mega Main Hall starting from **8:00 am to 4:30 pm.**

The purpose of this seminar is to prepare learners for the forth coming end of cycle UNEB exams, build learners confidence, and to unite facilitators. The session will be learner-centered well guided by trained facilitators. Discussions shall be in **553/1** and **553/2**.

Each participant learner will be to pay facilitation fee of **Shs. 7,000/= (Seven thousand shillings only)**. Learners should come with **packed lunch** whereas accompanying teachers will be catered for by the organizers. For effective planning, confirm your attendance and participation by contacting the following coordinators:

Mr. Naime John Baptist - **0740 007006 / 0772 035591**

Mr. Ainamani Holest - **0700 915700**

Mdm. Khwaka Phiona - **0786 755246 / 0753 949447**

Yours faithfully

.....

NIWAMPIIRE HILLARY
HEAD OF BIOLOGY DEPARTMENT
0701-252551/0786-252551

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MATIGO EDUCATION CONSULTANCY LIMITED
MATIGO EXAMINATIONS BOARD
O'LEVEL BIOLOGY SEMINAR BOOKLET
HELD ON 10TH JUNE 2023 AT MBOGO MIXED SS

Students Name: …….

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INTRODUCTION

Seminars is the exchange of ideas and networking. They play a vital role in all the academic endeavors. Being exposed to the thinking and the work of our facilitators, can be a catalytic thing for all of us as we seek to understand the context and advances of our own areas of work. The Q/A in seminars, and the person-to-person meetings we have (especially under 'normal conditions'), are thus key activities as we work to excel as individual biologists and as a department.
To ensure an inclusive and supportive atmosphere for scientific dialogues, please follow the following guidelines when you ask questions.

- All are encouraged to ask questions during the Q/A session during and after facilitation, please keep asking interesting scientific questions.
- We ask that questions be restricted to the content and context of the seminar and our visitor's professional expertise whereas personal and political questions should be avoided.
- Be open about the area of work encompassed by the seminar, and the conceptual and broader context for the Examiner's presentation.
- Focus on the key terms and scoring points presented on its own grounds so that you can maximize the understanding of the Examiner's work and engage with that work.
- Think about areas you might want to engage in with the work presented during the presentation.

Many thanks for attending our seminar.

BIOLOGY O LEVEL TIPS AND TRICKS

Biology is a content heavy, but interesting subject. With this article, we hope to share with you how to study better for it, and be ready to excel your MOCK and UNEB examinations!

- Content revision is key, as biology questions usually involve recalling and explaining different structures and processes. Therefore make sure your content knowledge is clear.

- Have effective notes. Given the content-heavy nature of the subject, it is difficult to ace the subject without using some form of notes.

- Search up study methods such as active recall, the Cornell note taking method or even the mind map, and figure out what works for you. Know what you are writing, and never blindly copy from the textbook, and keep it short and brief.

- Remember keywords, Get at least the gist of it and choose keywords that are really important to answering the questions, else you might be wasting your time writing it exactly.

- Clarify doubts about, graphs, Experiments, concepts, definitions and processes with your teachers. Whenever you're in doubt, do not let your questions snowball. Immediately consult your teacher about your queries to quickly get a better grasp on the concept and your foundation is clear.

- Use past papers to revise your answering technique and knowledge of content.

- Look at why your teacher marked your answers wrong, note the correct answer and learn from these mistakes.

- Look through the syllabus document. It has the outline of content tested and marking points within the syllabus, practical requirements, definitions of key terms you should include in your answers, as well as command words used in questions.

SEMINAR QUESTIONS

1. An investigation was carried out into the concentration of lactic acid in the blood of ma man before, during and after a vigorous exercise. The results are summarized below.

Time (minutes)	Concentration of lactic acid (mg/100cm^3)
0	14
10	80
15	95
20	70
40	35
60	22
80	18

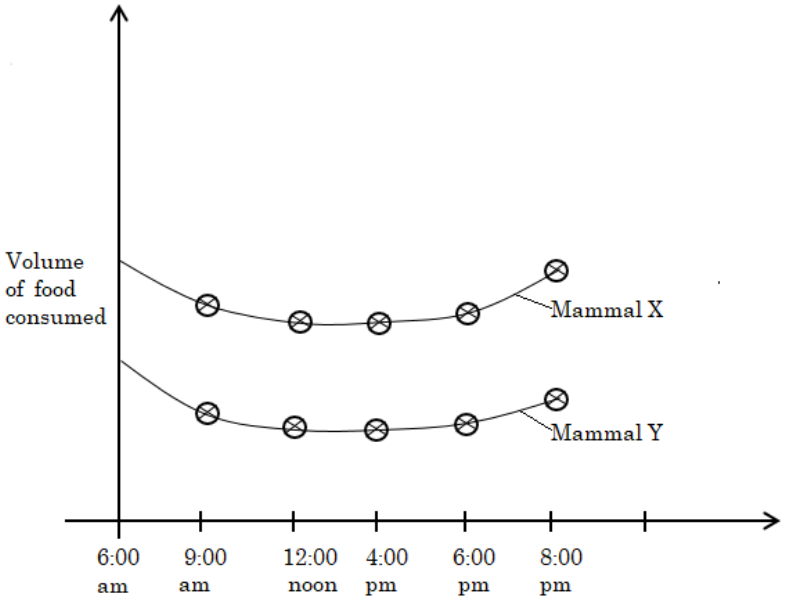
(a) Represent the above information on a suitable graph.
(b) Where in the human body is lactic acid produced during the exercise?
(c) (i) Describe the graph obtained.
(ii) Give reasons for the observed changes in concentration of lactic acid in blood.

2. The table below shows the number of breaths taken per minute of three people living in the same area and climbing 50 steps.

Number of steps	Number of breaths taken per minute		
	Person A	Person B	Person C
10	25	17	22
20	29	21	25
40	37	27	31
50	42	30	34

(a) (i) Plot a graph to show the results.
(ii) Suggest the number of breaths taken per minute at rest by person A.
(b) With a reason, suggest the person who is
(i) Fittest.
Reason
(ii) Least fit
Reason
(c) Explain why the number of breaths taken per minute increase as a person climbs the steps.
(d) Explain the changes in insulin level as a person climbs the steps.

3. The graph below shows results of an investigation of feeding habits of two different sized mammals X and Y of the same species. The study was conducted every 15 hours of the day for four months.



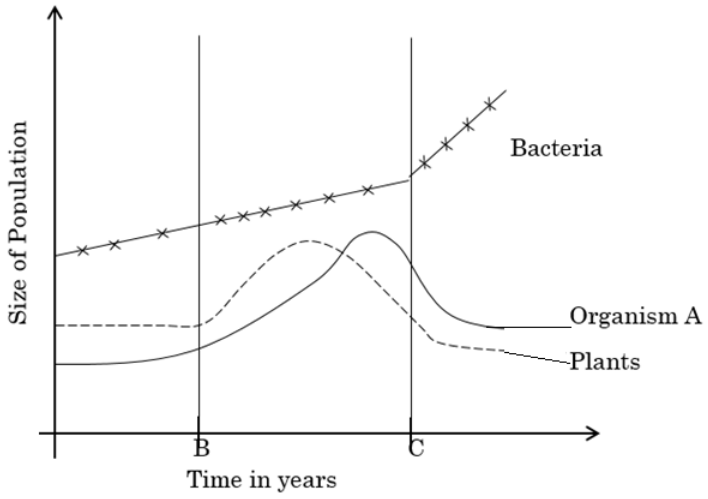
(a) State the time of the day when both animals had consumed
(i) the least amount of food. (ii) highest amount of food.
(b) Suggest reasons for your answer in (a) above.
(i) Least food (ii) Highest food.
(c) Suggest why there was a difference in food consumed by the two animals at all the time.
(d) State the effect of increasing the environmental temperature on the food uptake by mammal Y. Give reasons.
(e) (i) What would be the behavior of mammal X at 8:00pm when food supply is inadequate.

(ii) State two structural adaptations mammal X may use to overcome the problem in (e) above with time.
(f) Suggest two ways in which a lizard responds to changing environmental temperature.
4. The data below shows the number of bubbles produced per minute at $15^{O}C$ and $37^{O}C$ from an aquatic plant when it was exposed to light from a 100 W electric bulb at several distances from the setup of the plant in water. The oxygen bubbles produced are taken as the rate of photosynthesis. Study it carefully and use it to answer questions that follow.

Distance of the bulb from the plant / cm	5	10	20	30	40	50	55	60	65
No. of bubbles produced at $15^{O}C$	400	360	290	220	160	100	70	50	30
No. of bubbles produced at $37^{O}C$	810	750	630	500	390	310	270	200	175

(a) What was the aim of the experiment?
(b) What is the relationship between?
(i) Distance of the bulb from the set up and light intensity received by the plant.
(ii) Distance of the bulb from the set up and number of oxygen bubbles evolved per minute.
(iii) Number of oxygen bubbles evolved by the plant and rate of photosynthesis.
(c) Plot a graph of number of bubbles produced and the distance of bulb from the plant using the same axes.
(d) Describe the shape of the graph at 37°C from your results.
(e)Explain the difference in number of bubbles by the same plant at 15°C and 37°C.
(f)(i) Apart from the factors given state other factors that would affect the rate of photosynthesis in the aquatic plant.
(ii) State **three** importance of photosynthesis.

5. Three different populations in a small lake near an industrial town in Uganda are linked in a food chain. The figure below shows the changes in the size of their population over a period of time. Study the graph carefully and answer the following questions.



(a) (i) Identify the producer
(ii) Name the trophic level of organism A in the food chain?
(b) (i) Suggest what might have entered the lake at time B by referring only to the plant population. Explain your answer.
(iii) Suggest the other effect the substance named above would cause to the water ecosystem of the lake.
(c) Explain the relationship in the variation of the population sizes in the plants and organism A after time B.
(d) Explain how the changes in the size of the population of bacteria after time C is related to the size of the plant population.
(e) On the graph above sketch the curve to show how the oxygen concentration would change over time. Explain.

6. (a) The table below shows the average total energy expenditure requirements for people of different weights.

Total body weight (kg)	**Total energy requirements (kj)**	**Energy requirements per body weight ($Kjkg^{-1}$)**
7	3150	
14	5880	
21	7350	
32	9600	
45	11250	
60	12000	
65	12350	

(i) Complete the third column in the table above.
(ii) Draw a graph of energy requirements per kg of body weight against total body weight.
(ii) Explain the shape of the graph.
(b) Explain why mammals require more energy intake than reptiles of the same size.

7. (a) Define **osmosis**
(b). (i) Explain how osmosis can cause problems for an Amoeba in fresh water?
(ii) What mechanism may protozoans living in fresh water develop so as to deal with the problem mentioned in (b) (i) in above?
(c) Thirsty sailors at the sea cannot drink sea water to quench thirst, if they do, they only become thirstier .Explain why it is so?

8. (a) How is urea formed?
(b) Describe the path followed by urea from the point of formation until it's eliminated from the body.

9. (a) State the difference between **excretion** and **egestion.**
(b) Describe the process of excretion in the kidney.
(c) State **four** adaptations of the kidney to its functions.
10. Discuss the role of hormones in the reproduction of human beings.

11. (a) Describe the term irritability.
(b) How are auxins and adrenaline?
(i) Similar (ii) Different
(c) Describe how
(i) Auxins are important in plants.
(ii) Adrenaline affects a scared human being.

12. How are the following structures in the female reproductive system are adapted to their functions?
(i) Placenta (ii) Fallopian tube (iii) Uterus
(b) State the roles of the following
(i) Prostate gland (ii) Epididymis (iii) Testes
(c) Outline **three** differences between a sperm and an egg.

13. (a) Explain the changes that occur in the following rates when a person climbs a high mountain.
(i) Breathing rate. (ii) Heart beat rate.
(b) Explain how these changes affect the working of the leg muscles during the climb.

14. (a)What is meant by the term **saprophytism**?
(b) Outline the differences between saprophytic feeding and feeding in humans.
(c) Explain the different ways in which saprophytes are economically important in nature.

15. (a)What is **homeostasis**?
(b) Name any **three** factors that must be maintained constant in mammalian

(c) Explain how endotherms respond to heat and cold conditions in their environment.

16.(a) Define the term *biological control method.*
(b) (i) Give examples of biological control methods.
(ii) State the importance of biological control method.
(c) Describe how preys are adapted to escaping from predators.

17. (a) Describe any **four** adaptations of a good respiratory surface to suit its function.
(b) Give **two** reasons why,
(i) Unicellular organisms lack a specialized respiratory system.
(ii) Multicellular organisms like man have a specialized respiratory system.
(c) Describe the mechanism of gaseous exchange in an amoeba.

18. (a) How are the leaves of higher plants adapted to their functions?
(b) Discuss the mechanism of opening and closing of stomata.

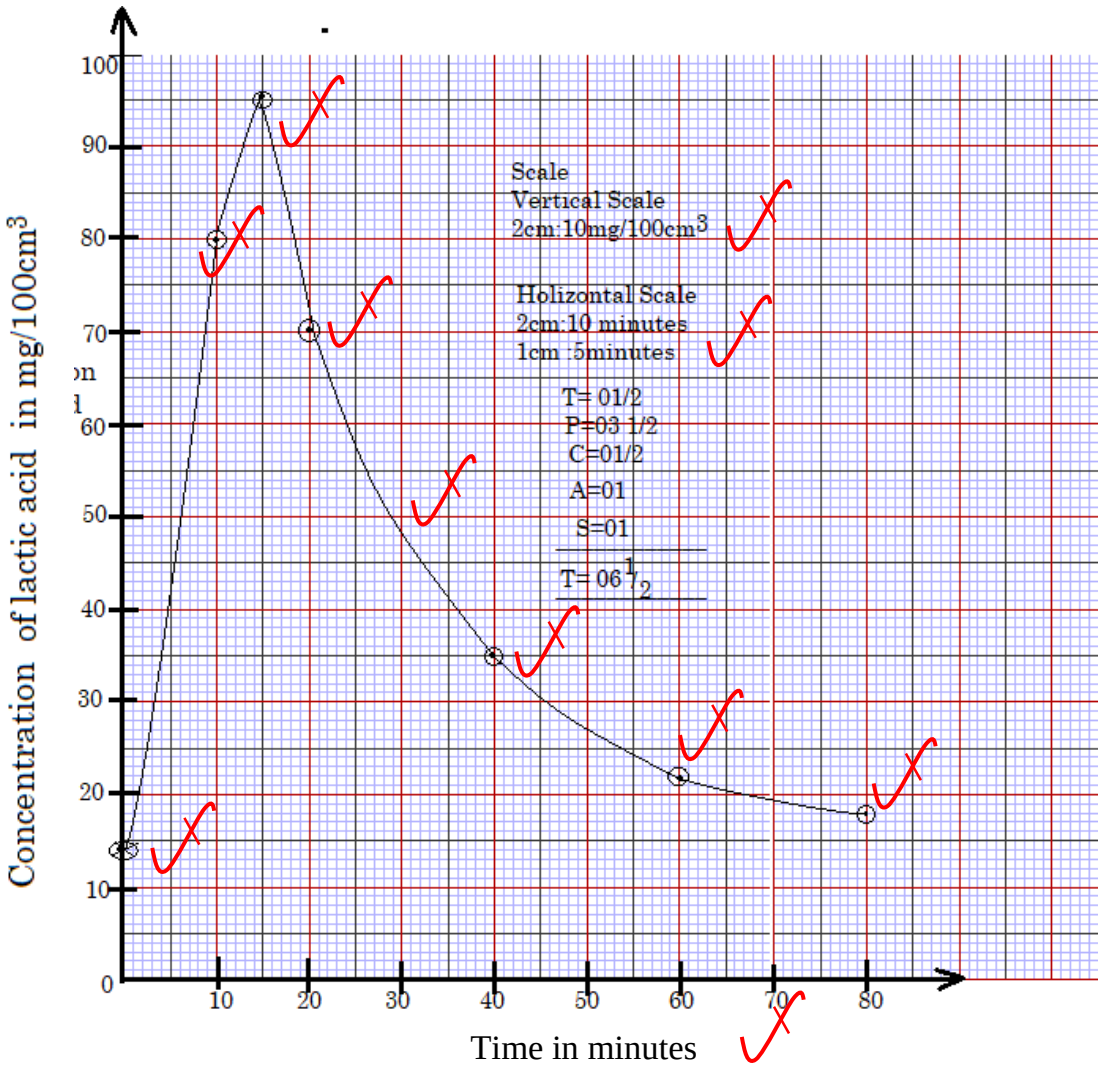
19. (a)Describe the structure and functions of the various parts of the mammalian ear.
(b).Discuss how the various tropisms adapt plants to their habitats.

20. (a) Distinguish between **sex limited traits** and **sex linked traits**.
(b) Haemophilia is a recessive sex linked trait. Using suitable symbols carry out a genetic cross to determine the genotypes and phenotypes of the offsprings when a haemophillic man married a carrier woman for haemophillia.
(i) State the genotypic and phenotypic ratios of the off springs.
(ii) Calculate the probability of producing a haemophillic girl.
(iii) Calculate the percentage of producing a normal boy.

END

SEMINAR ANSWERS

1. (a) A graph showing the variation of lactic acid with time in the blood of a man before, during and after a vigorous exercise.



(b) In the skeletal muscles.

(c) (i) -From 0 to 15 minutes, the concentration of lactic acid increases rapidly, and reaches a maximum /peak of 95 mg/100cm^3.

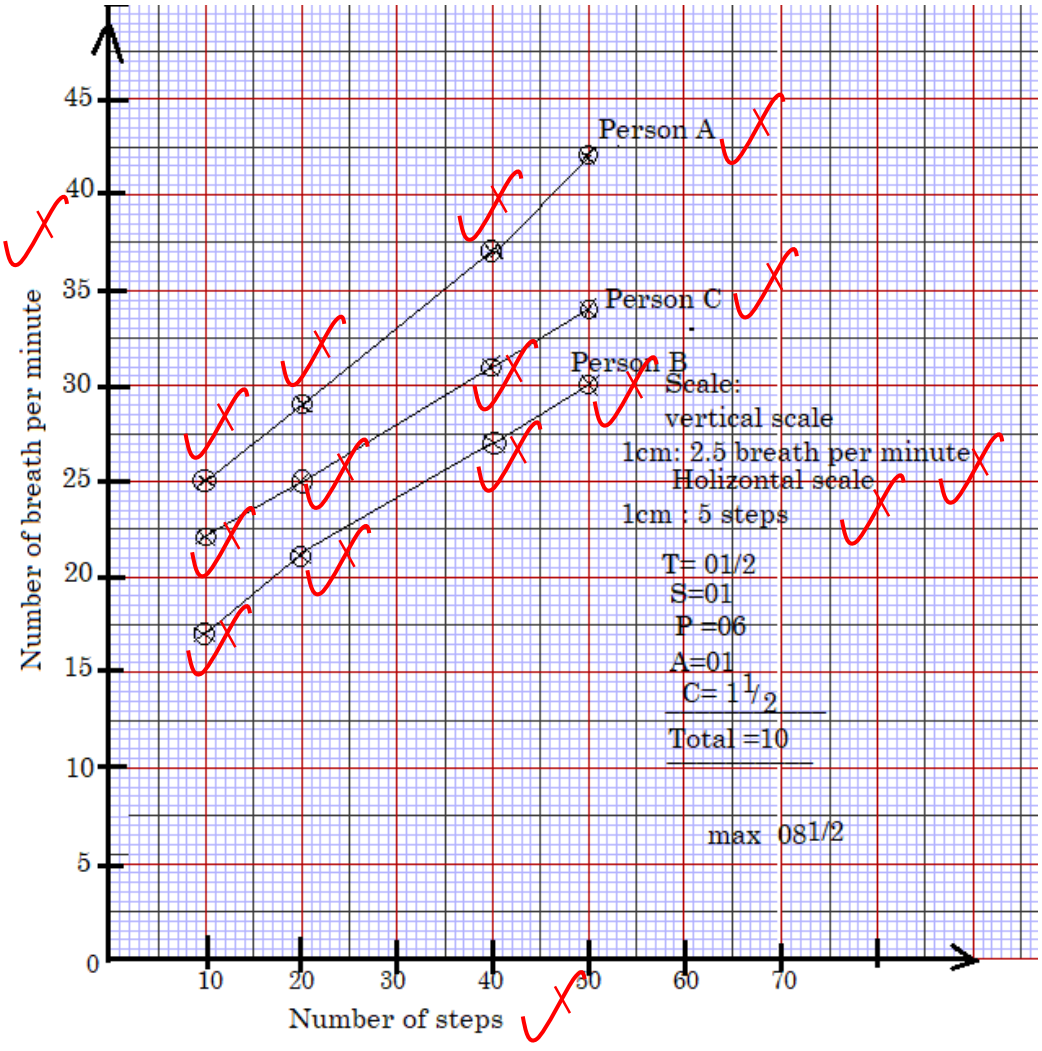
- From 15 to 60 minutes, the concentration of lactic acid decreases rapidly from 95mg/100cm^3 to 22mg/100cm^3.
- From 60 to 80 minutes, the concentration of lactic acid decreases gradually from 22mg/100cm^3 to 18mg/100cm^3.

(ii)- From 0 to 15 minutes, anaerobic respiration occurs rapidly because the rate of breathing is too low to supply enough oxygen, to produce the required energy, lactic acid is produced rapidly.

- From 15 to 60 minutes, vigorous exercises has ended, rapid breathing continues, to pay off the oxygen debt, used to oxidize the lactic acid.
- From 60-80 minutes, most of the lactic acid has been broken down.

2. (a) (i) Plot a graph to show the results.

A graph showing the variation of number of breaths per minute of three people in the same area with number of steps.



(ii) 21 breaths per minute.

(b) (i) Person B.

Reason

The person has less/low number of breath per minute to climb 50 steps.

(ii) Person A

Reason

The person has more /high number of breaths per minute to climb 50 steps.

(c) The number of breaths increases to take in more oxygen used in respiration and release energy used to climb.
(d) Amount of insulin lowers to allow the conversion of glycogen to glucose which is oxidized to release energy used to climb the steps.

3. (i) Between $12:00-4:00\ pm$
(ii) Between $7:30-8:00pm$
(b)(i) Between $12:00-4:00pm$, environmental temperature is high and less food is consumed, as there is less need to generate heat for maintain a constant body temperature.
(ii) Between $7:30-8:00pm$.
The environmental temperature is low and so more food is consumed in order to generate more heat to maintain a constant body temperature.

(c) The mammal X is small and has a large surface area to volume ratio, it loses more heat per unit surface area hence it consumes more food to maintain a constant body temperature, while Y is large with a small surface area to volume ratio and so loses less heat hence it needs less amount of food to maintain a constant body temperature.

(d) Its food uptake will decrease, since its metabolic rate decreases, and less energy is needed/spent to maintain a constant body temperature.

(e) (i) Mammal X becomes less active
(ii) -Having a thick fur.
-Having a thick subcutaneous fat under the skin.

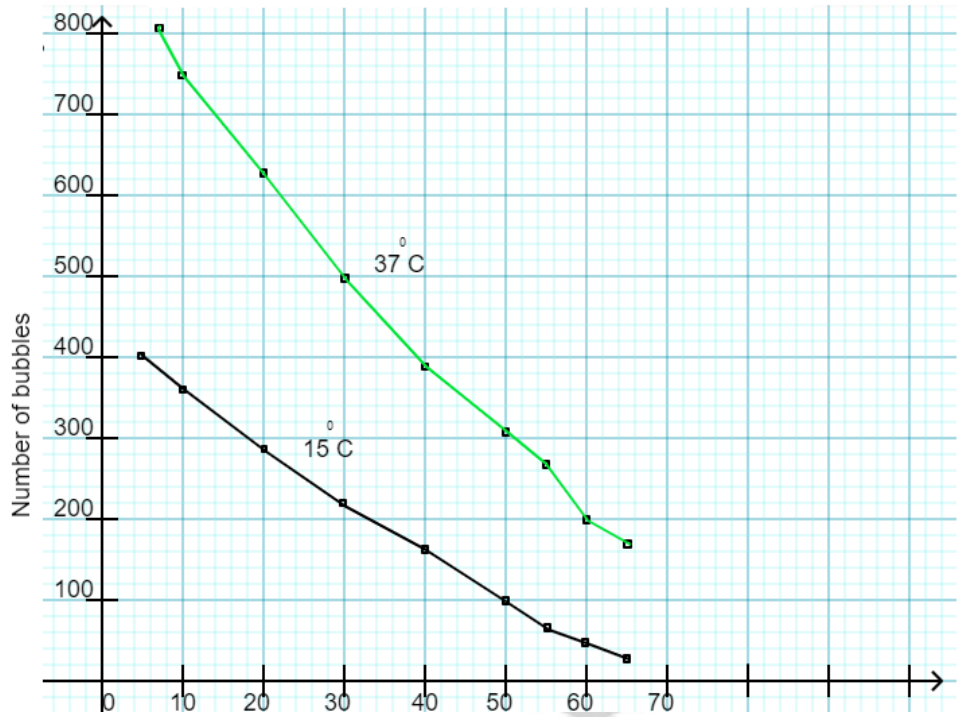
(f) -At low environmental temperature, they bask under the sun or lie on warm rocks/objects to gain heat by conduction.
-At high environmental temperature, they move or hide under shade or enter into burrow where temperature is low.

4. (a)
To investigate the effect of varying light intensity on the rate of photosynthesis at different temperatures.
(b) (i) As the distance of the bulb from the setup increases, the light intensity received by the plant decreases.

(ii) As the distance of the bulb from the set up increases, the number of oxygen bubbles evolved per minute decreases.

(iii) As the rate of photosynthesis increases, the number of oxygen bubbles evolved by the plant per minute increases.

(c) A graph showing the variation of number of bubbles produced with the distance of bulb from the plant



(d) At a distance of 5 cm from the setup, the number of oxygen bubbles produced per minute is high at 800, increase in distance of the bulb from the setup from 5cm to 65cm, the number of oxygen bubbles produced per minute decreases gradually from 800 to 180.

(e)

The number of oxygen bubbles produced per minute at 37ºC is higher than the number of oxygen bubbles produced per minute at 15ºC, because 37ºC is the optimum temperature for the maximum activity of photosynthetic enzymes hence a higher rate of photosynthesis while 15ºC is a low temperature below the optimum temperature thus the rate of photosynthetic enzymes is low due to the them being inactive hence a low rate of photosynthesis.

(f)(i)

- Amount of chlorophyll/chlorophyll concentration.

- Amount of carbon dioxide /Carbon dioxide concentration.
- pH of the medium.

(ii)

- Produced oxygen used by aerobic animals for aerobic respiration.
- Produces food inform of carbohydrates for heterotrophs.
- Reduces the concentration of carbon dioxide in the atmosphere thus preventing global warming.

5. (a)(i) Plants.

(ii) Primary consumer/herbivore

(b) (i) Sewage/fertilizers/manure.

Because of the nutrients such as nitrates and other ions present in the substance, rapid growth of plants occurred, as plant proteins are formed using the nitrates which are needed for growth.

(iii)

- Reduces oxygen content due to decomposition.
- Making water smelling not fit for consumption.
- Causes algal bloom/eutrophication.
- Reduces light penetration/visibility.
- Causes diseases.

(c) After time B, both population of plants and animal A increased, then the population of plants reached a maximum before that of organism A. The population of both then decreased.

Population of plants increased initially because they were fewer organism A grazing on them.

The population of organism A increased due to the availability/plenty of food/plants for them.

The population of plants started decreasing later due to over grazing by organism A.

The population of organism A later decreased due to shortage of plants to feed on.

(d) As plants population decreases,the population of bacteria increase.

Bacteria decomposed dead plants. As the plant population decreases, the organic matter is rapidly used by bacteria resulting in rapid growth of bacterial population.

(e) *Hint*. Curve for oxygen should have the same shape as that for organism A/plant Explanation.

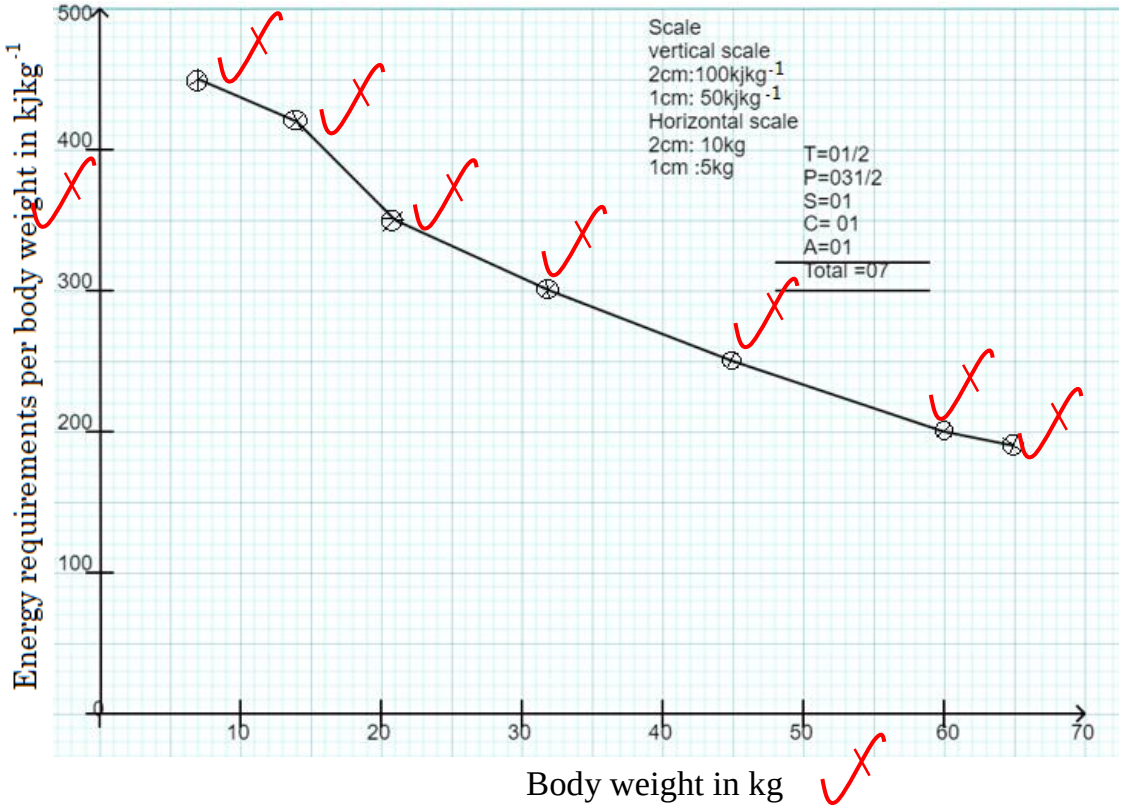
As the plants release oxygen due to photosynthesis, the level of dissolved oxygen increased initially after point B. When the plants die and are decomposed, oxygen is utilized by bacteria which increase their population.

Consumer also utilize oxygen for respiration hence the amount of oxygen decreases.

6. (a)

Total body weight (kg)	***Total energy requirements*** (kj)	***Energy requirements per body weight*** $(Kjkg^{-1})$
7	3150	450
14	5880	420
21	7350	350
32	9600	300
45	11250	250
60	12000	200
65	12350	190

(ii) **A graph of variation of energy requirements per body weight with total body weight.**



(iii)

The curve shows that small people require more energy per unit mass than large people. This is because a small person has a larger surface area to volume ratio and therefore loses heat much faster than a large person. In order to maintain their body temperature constant, small people have to metabolize much faster than large ones. Hence the higher energy requirement per unit mass shown by smaller people.

(b) Mammals are endothermic and are able to generate heat by increasing their metabolic rate. The heat generated is used to maintain a constant body temperature. Reptiles are exothermic and rely on external environment to regulate their body temperature. Thus mammals will require more food intake to sustain their higher metabolic rates.

7. (a) Osmosis is the movement of water molecules from a dilute solution to a concentrated solution across a semi permeable membrane.

(b) The fresh water in which amoeba lives is a less concentrated solution compared to its cell content. Since the amoeba cell membrane is semi permeable, water molecules move in the cell by osmosis. This causes swelling and bursting of the cell.

(ii) Amoeba possesses one or more contractile vacuoles .These collect and eliminate excess water that enters .When they are full, they migrate to the cell membrane, fuse with it and contract to squeeze the water out of the cell.

(c) Sea water is a solution of salts which is a bit more concentrated than the body fluids. When sea water reaches the intestine, it draws water through the membrane of the intestinal wall by osmosis. This withdraw of water from the body is what makes a person more thirsty than before.

8. (a) Excess amino acid are not stored in the body, they are deaminated. Excess amino acids are broken down in the liver into amino group and a carboxyl group. The amino group (enters the ornithine cycle where it) combines with hydrogen to form ammonia. The ammonia immediately combines with carbon dioxide to form urea. The carboxyl group is converted to glucose for respiration or glycogen which is stored.

(b) Urea, formed in the liver, moves through the hepatic vein to the vena cava then to the heart .From the heart, blood is pumped to the lungs through the pulmonary artery, then back to the heart through the pulmonary vein. Blood with urea is pumped through the aorta to the renal artery then to the kidneys.

Ultrafiltration of blood occurs at the Bowman's capsule of the kidney tubules to form the glomerular filtrate. The filtrate moves into the kidney tubules where selective reabsorption occurs. Urea is not reabsorbed hence it passes into the pelvis as urine. Urea passes through the ureter to the urinary bladder and it is passed out of the body through the urethra.

9. (a) Excretion is the elimination of waste products that arise as a result of metabolic reactions in an organism while egestion is the removal of undigested and indigestible materials from the gut through the anus.

(b) Ultra filtration

- Takes place at the Bowman's capsule in the glomerulus.
- The efferent vessel is narrower than the afferent vessel making pressure at the glomerulus high. This high pressure causes ultrafiltration to occur within the glomerulus to form the glomerular filtrate.
- The filtrate consists of materials with small molecules such as urea, glucose, amino acids, vitamins and water that can filter through the walls of the glomerular capillaries and Bowman's capsule.
- substances with large molecules such as plasma proteins and blood cells do not filter through hence are not part of the filtrate.

Selective reabsorption.

- At the proximal convoluted tubule, useful substances such as glucose, amino acids, some water, active hormones and vitamins are selectively reabsorbed into the blood vessels.
- At the loop of Henle, some water and some salts are reabsorbed by osmosis.
- In the distal convoluted tubules, some water and some salts are reabsorbed.
- Selective reabsorption uses energy provided by the mitochondria found in the cells lining the tubules.
- The remaining filtrate, now called urine, containing high amounts of urea passes into the collecting duct (where some water is reabsorbed by osmosis) which leads to the pelvis then ureter to the bladder.

(c)

- Glomerular capillaries have numerous pores, large enough just to let through urea, water, amino acids, glucose ,vitamins hormones but not plasma proteins and blood cells.
- The kidney has numerous nephrons, for efficient excretion.
- Proximal and distal convoluted tubules are folded, to increase the surface area for reabsorption.
- Cells lining the tubules contain numerous mitochondria, to provide energy for active transport and selective reabsorption.
- The inner surfaces of the epithelium cells of the kidney tubules have microvilli, increasing the surface area for reabsorption.
- The inner epithelium of the kidney tubules is thin, for easy passage of substances.
- The kidney tubule is well supplied with blood capillaries, for transport of reabsorbed substances.
- The tubules are coiled, to reduce on the speed of the flow of the filtrate, giving more time for the efficient reabsorption.

10. **Follicle stimulating hormone (FSH)**

- Produced by the anterior pituitary gland.
- Stimulates the development of graafian follicles.
- Stimulates the follicle cells to start secreting oestrogen.

Leutenising hormone (LH)

- Brings about ovulation
- Induces the remains of the Graafian follicle to form corpus luteum which produces progesterone.

Oestrogen

- Produced by the ovary.
- Stimulates the repair and healing of the uterine wall following menstruation.
- Stimulates the production of LH by the anterior pituitary gland.

Progesterone

- Produced by the corpus luteum.
- Slows down the production of LH and FSH
- Causes increased thickening of uterine wall.
- Stimulates the preparation of the uterine wall for implantation.
- Maintains pregnancy/ prevents miscarriage.

Testosterone

- Produced by the testis.
- Stimulates the development of sperms and male secondary sexual characteristics.

Prolactin.

- Produced by the anterior pituitary gland.
- Stimulates the secretion of milk by the mammary glands.

Oxytocin

- Secreted by the posterior pituitary gland.
- Causes the contraction of the muscles of the uterus during child birth.

11. (a) Irritability is the ability of an organism to detect and react to changes in its environment/stimulus.

(b) (i)

- Both are chemical in nature.
- Both are produced in one part of the body (of an organism) and achieve their effect elsewhere.
- Both cause response in the organism where they are produced.

(ii)

Auxins	**Adrenaline**
Produced in plants.	Produced in mammals.
Produced by root and shoot apical meristem.	Produced by adrenal glands.
Control growth responses of plant shoot and root.	Prepares the body of mammals for an emergency.
Move to their target tissues by diffusion.	Is carried by blood to its target tissues.

(iii)

- They control/influence positive phototropism of plant shoots.
- They control/influence positive geotropism of plant roots.
- They promote formation of adventitious roots in stem cuttings.

- They inhibit /stop formation of branches (growth of lateral or axillary -buds) in the presence of the terminal buds.
- They stop/inhibit abscission (leaf fall) of the young leaves.
- They stimulate flowering in plants.
- They promote growth and enlargement of plant leaves.
- They stop/inhibit fruit fall of young fruits.

Effects of adrenaline.

- Stimulates faster rate of heart beat, for quick supply of food (glucose) and oxygen to respiring cells.
- Stimulates faster breathing rate for quick uptake of oxygen into blood and removal of carbon dioxide from the body.
- Causes widening of pupils for more light to enter the eye for better vision.
- Increases the rate of metabolism in the body for generation of more energy required for flight/fight.
- Increases the conversion of glycogen to glucose in the liver for break down during respiration to produce energy.
- Causes dilation of blood vessels supplying muscles for more food and oxygen to reach them for use in respiration.

12. (a)(i) Placenta.

- Thick and fibrous, to protect the foetus from mechanical damage.
- Well supplied with chorionic villi, to increase the surface area for absorption of substances.
- Thin walled, for easy exchange of materials between the mother and the foetus.
- Supplied with many blood vessels, to ensure easy transport of substances between to and from the mother.
- Has a Protective barrier, to ensure that blood cells, blood pressure, bacteria and toxic substances from the mother do not harm the foetus.
- Permeable, to antibodies to allow them diffuse from the mother to the foetus to allow it achieve some immunity.

(ii) **Fallopian tube**.

- Has smooth muscles in its inner walls, which contract rhythmically pushing the egg toward the uterus.
- It is tubular, which provides a passage way for the egg from the oviduct funnel to the uterus.
- Has a narrow lumen, which ensures that the egg moves very slowly to allow for enough time for fertilization to take place.
- It is lined on the inside with ciliated epithelium, whose cilia enable to push the egg towards the uterus as they beat.

(ii) **Uterus**

- It is tubular and wide, providing enough space for the ever increasing size of the developing embryo.
- Has strong muscular walls, that support the increasing weight of the developing embryo and also pushes the embryo out at birth

- It is highly vascularized (dense blood capillaries supply) ,quickly bring food and oxygen and carry away waste products of metabolism.
- It is extensible, to accommodate the ever increasing weight of the developing embryo.

(b) (i) **Prostate gland.**

- It adds alkaline secretion to the fluid which is essential to neutralize the acidic secretions present in the vagina.

(ii) **Epididymis.**

- To store the manufactured sperms.

(iii) **Testes.**

- They produce the male gametes or sex cells called sperms.
- They produce the male sex hormone called testosterone.

(c)

Egg.	**Sperm**
Has no tail	Has a tail.
Contains a York	Does not contain a York.
Has no acrosome	Has an acrosome.
Does not contain mitochondria	Contains a lot of mitochondria.
Large in size.	Small in size.

13. (a) (i) Breathing rate.

The rate of heart beat becomes faster and deeper, due to increased activity, he needs more energy, rate of respiration increases to provide more energy. Respiration requires more oxygen but at high altitudes less oxygen is available. Lactic acid accumulates in his blood due to anaerobic respiration. Due to faster respiration, more carbon dioxide is produced which causes the heavy breathing.

(ii) Heart beat rate.

The rate increases more rapidly resulting in faster circulation of blood, hence faster intake and supply of oxygen and nutrients to tissues which require them, and removal of waste products from sites of production.

(b) Muscles receive increased supply of glucose and oxygen and contract faster. Rate of respiration increases to provide more energy for muscle contraction. Supply of more oxygen allows faster respiration and increased removal of carbon dioxide. It also delays onset of anaerobic respiration in which lactic acid is produced which makes muscles to become fatigue.

14.(a) Type of feeding where organisms secrete enzymes on dead decaying organic matter, digesting it externally, then soluble products are absorbed into their body.

(b)

Humans	**Saprophytes**
There is egestion.	No egestion.
There is ingestion.	No ingestion.
Has digestive system.	Lacks digestive system.
Digestion is both physical and chemical.	Digestion is only chemical /enzymatic.
Digestion occurs within the body.	Digestion occurs outside the body.

(c)

- Prevents excessive accumulation of wastes/garbage since it decomposes organic matter.
- Lead to formation of humus/recycling of nutrients since it decomposes organic matter.
- Spoil food and fabrics due to enzymes they secrete.
- Used in brewing /fermentation due to anaerobic respiration.
- Used in the production of antibiotics due to their poisonous nature.
- Used as food/palatable/edible because they contain nutrients.
- Cause death/diseases because they are poisonous.
- Used in sewage treatment because they decompose organic matter.
- Used in baking due to anaerobic respiration.

15. (a)

It is a mechanism of control and maintenance of a constant internal environment regardless of the external conditions.
(b)

Temperature; Water; Salt or ion content; Carbon dioxide; Glucose, amino acids etc.

(c) How endotherms respond to heat and cold conditions in their environment
Heat/hot conditions:

- Increased sweating, to lose heat through latent heat of vaporization.
- Vasodilation (dilation of arterioles) under the skin, to bring more blood to the skin surface to lose heat to the atmosphere.
- Decreased body metabolism, to reduce heat generation.
- Erector pili muscles relax, making hair follicles to relax hence hair lies flat on skin, no air is trapped, to lose heat.
- Slow/reduced muscular activity due to slow metabolism, to reduce heat production.
- Increased panting to expose tongue and mouth, to release heat.

- Moving to shades to avoid direct heat.
- Aestivation, to escape the extreme heat.
- Flapping of ears to create currents to carry away heat.

Cold conditions

- Stamping of feet, to generate heat.
- Basking in the sun to gain heat directly.
- Less production of sweat, to reduce heat loss through latent heat of vaporization.
- Vasoconstriction of arterioles, hence less blood flow to the skin surface to reduce heat loss.
- Increased rate of metabolism through release of more thyroxine hormone, to generate heat.
- Erector pili muscles contract, pulling hair follicles hence hair is raised, to trap a layer of moist air, to prevent heat loss.
- Shivering/rapid contraction of muscle, to yield heat to warm body.

16. This is the use of a control agent to regulate the population of another organism. The control agent can be the organism's predator, competitor or parasite etc.

(b) (i)

- Introduction of a cat to eat rats.
- Introduction of fish in a pond to feed on the mosquito larvae.
- Introduction of beetles to feed on the water hyacinth.

(ii)

- It is environmental friendly .i.e. it does not pollute or degrade the environment.
- It reduces the pest's population to minimal levels which can be economically - managed.
- It does not kill or harm the untargeted organisms unlike the chemical method.
- It does not lead to extinction of the pest's species since it does not completely wipe out the pest's population.

(c)

- They have developed skeletal muscles for running faster and escaping away from their predators.
- Some camouflage .i.e. their skin colour blends with that of the environment such that they cannot easily be seen by their predators.
- Some do mimicry. i.e. They try to closely resemble or look like another species which is unpalatable or harmful to the predators.
- Some live in groups to increase the powers of defense and protection in case of attack by their predators .e.g. wild beasts and buffaloes
- Some prey have a high sense of smell and keen eye sight for seeing the predator at a distance and run away as early as possible.
- Some make /employ alarm sounds, signals and calls to inform other fellow organisms in the same species about danger. i.e. In case of a predator attack.eg small birds.
- Some prey are capable of stinging their predators. E.g. bees and wasps.

- Electric fish are capable of producing high voltage current to discharge their predators away.
- Some prey have the ability to out run, out swim and out fly their predators.
- Some prey possesses protective shells. E.g. Turtles, tortoises, and snails.
- Some like the lizards break off their tail when attacked giving the animal enough opportunity to escape.
- Some prey discharge away the predators with chemicals that are poisonous, irritating bad smell.
- Some prey scare their predators by puffing up.eg. Blow fish or spreading their wings. E.g. pea cock and turkeys.
- large eyes on both sides of the head give animals such as zebra a wide field of vision, enabling them to keep track of their enemies from far, and take precautions.

17. (a)

- Has a thin membrane to reduce diffusion distance for respiratory gases.
- It is moist to dissolve the respiratory gases before diffusion.
- It has a dense network of blood capillaries to maintain a steep concentration gradient by draining away oxygen and bringing carbon dioxide.
- Has permeable membrane to allow diffusion of the respiratory gases into and out of the respiratory surface.
- Has a highly folded epithelial membrane to increase the surface area for maximum diffusion of gases.
- It is well ventilated to maintain a high concentration gradient that favours diffusion of more gases.

(b) (i)Unicellular organisms are small in size, so they have a larger surface area to volume ratio thus can easily exchange the respiratory gases by simple diffusion via their cell surface membrane.

(ii) Multicellular organisms are large in size, so they have a smaller surface area to volume ratio thus a need for a respiratory system to transport the respiratory gases between the environment and the respiring tissues.

They also have a relatively high metabolic rate whose needs can only be sufficiently catered for by a specialized respiratory system.

(c) There is a higher concentration of oxygen in the surrounding water than in the cell. Oxygen diffuses across the cell membrane from the surrounding water into the cell. The carbon dioxide in the cell is in higher concentration than in the surrounding water thus carbon dioxide diffuses out across the cell membrane into the surrounding.

18.(a) How leaves of higher plants a adapted to their functions.

- Broad and flattened lamina, to increase surface area; for absorption of light.
- Thin blade, to reduce distance for diffusion of gases and penetration of light waves.
- Transparent epidermis and cuticle, to allow light to penetrate to tissues.

- Thin or no cuticle on stomata, to allow for gaseous exchange.
- One-cell thick epidermal layer, to reduce the distance over which sunlight penetrates.
- Palisade cells have numerous chloroplasts containing chlorophyll, to trap maximum amount of light energy.
- Have stomata on the lower epidermis, to allow for gaseous exchange and control of water loss through transpiration.
- Palisade layer have elongated cells located at right angles to the leaf surface, for maximum absorption of light energy.
- Spongy mesophyll layer consists of spherical and loosely-packed cells, to create air spaces, which communicate with the atmosphere through stomata, for purposes of gaseous exchange and control of water loss.
- Veins have conducting tissues: xylem; for movement of water and dissolved mineral salts; phloem; for translocation of manufactured food.

(b) The mechanism of opening and closing of stomata.

The Photosynthetic theory.

During the day, guard cells carry out photosynthesis manufacturing glucose. This increases the osmotic pressure of the sap vacuole, which becomes higher than that of the neighboring epidermal cells, guard cells therefore take in water by osmosis from the neighbouring cells, and become turgid and expanded. The outer thin wall stretches easily, pulling the thicker inner wall outwards, thus the stomata open.

- At night, there is no light hence no photosynthesis takes place. Plant cells respire using up more glucose, the osmotic pressure of the sap vacuole of the guard cells reduces becoming lower than the neighboring epidermal cells. The guard cells lose water by osmosis, to adjacent epidermal cells, they then become flaccid, and pulling together the thick inner walls and stomata closes.

19. (a) The structure and functions of the various parts of the mammalian ear.

- **Pinna:** Is wide/funnel-shaped to collect/gather sound waves, and directs them to the auditory canal into the ear.
- **Eardrum/tympanic membrane:** Is thin and tight, to convert sound waves into vibrations.
- **Ear ossicles:** (maleus, incus and stapes) are of high density, to magnify/amplify sound waves.
- **Oval window** is smaller than eardrum, to magnify the sound waves, and direct them to the inner ear.
- **Cochlea**: is long and coiled, to increase surface area for attachment of receptor cells/sensory hairs. Cochlea has many sensory hairs, which receive sound vibrations and generate impulses.
- **Liquid or fluid/endolymph in cochlea:** transmits sound vibrations.
- **Auditory nerve:** transmits impulses to the brain for interpretation.
- **Eustachian tube:** links the mouth and middle ear to equalize pressure between middle and outer ear to prevent damage to delicate eardrum.

- **Oval window;** Carries sound vibrations from the middle ear to the inner ear.
- **Semicircular canals;** contain receptors for body balance and posture.
- **External auditory canal cells**: produce/secrete wax, to trap dust particles/solid/micro-organisms that can damage eardrum.

(b)How the various tropisms adapt plants to their habitats.

- **Phototropism:** growth curvature in response to direction of light enables plant shoots to grow and get light for maximum photosynthesis.
- **Thigmotropism (haptotropism):** growth curvature in response to contact/hard surface makes plants with weak stems to get support on large plant/trees. This makes them to reach and get light for maximum photosynthesis.

- **Geotropism:** growth curvature in response to gravity enables plant roots to grow deep into the soil for maximum support/anchorage.
- **Hydrotropism**: growth curvature in response to moisture/water, water is the used as a raw material for photosynthesis.
- **Chemotropism:** growth curvature in response to chemical concentration gradient enables pollen tubes to grow down the style into the embryo sac for fertilization to occur in plant flowers.

20. (a)

Sex linked traits are traits controlled by genes on sex chromosomes while sex limited traits are determined by genes located on autosomes (other chromosomes in the body apart from the sex chromosomes) and are expressed only in one particular sex.

(b)

Let H represent the allele for Normal blood clotting

Let h represent the allele for haemophiliac

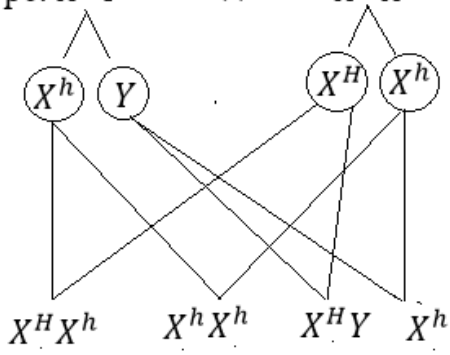
Parental phenotype: Haemophiliac × Carrier

Man women

Parental genotype: X^hY × X^HX^h

Meiosis :

Gametes : X^h Y X^H X^h



Random Fertilization :

Offspring genotype : X^HX^h X^hX^h X^HY X^hY

Offspring phenotype : Normal but carrier female | Haemophiliac female | Normal male | Haemophiliac male

Phenotypic ratio : Normal carrier female : Haemophiliac female : Normal male : Haemophiliac male

Genotypic ratio : $= 1 : 1 : 1 : 1$

$= X^HX^h : X^hX^h : X^HY : X^hY$

$= 1 : 1 : 1 : 1$

(ii) Probability of producing a Haemophiliac girl = $^1/_4$

(iii) Percentage of reducing a Normal boy = $^1/_4 \times 100\%$

$= 25\%$

MULTIPLE CHOICE QUESTIONS

These multiple choice test questions should be used to test factual recall, levels of understanding, and ability to apply learning (analyzing and evaluating). Therefore use them to revise your subject notes.

1. Which of the following changes occurs in the eye when a person moves from bright sun shine into dark room?

A. The pupil becomes large

B. The ciliary muscles relax

C. The eye become blind

D. cannot see

2. The small bones in the ear named hammer, anvil and stirrup are part of the

A. Outer ear

B. Middle ear
C. Inner ear
D. In front part of the ear

3. Which of the following joints allows movement in one plane only?
A. Ball and socket
B. Gliding
C. Hinge
D. Immovable

4. The part of the brain responsible for reasoning and imagination is?
A. Spinal cord
B. Medulla oblongata
C. Cerebrum
D. Cerebellum

5. A strong structure that holds muscles to bone at a joint is called

A. ligament
B. cartilage
C. connective tissue
D. tendon

6. Which of the following represents nervous pathway for impulse that causes knee – jerk reflex?
A. Receptor _ sensory neurone _ relay neurone _ motor neurone _ effectors
B. Receptor_motor neurone _relay neurone _ sensory neurone _ effectors
C. Sensory neurone _ receptor _ relay neurone _ motor neuron _ effectors
D. Receptors _ relay neurone _ motor neurone _sensory neurone _ effectors

7. Which one of the following is involved in osmoregulation in the mammalian body?

A. Thyroxin hormone
B. Testosterone hormone
C. Spinal cord
D. Anti-diuretic hormone (ADH)

8. When a nerve impulse jumps from one nerve fibre to another, it crosses;

A. Receptor
B. Ganglia
C. Myelin sheath
D. Synapse

9. The area of greatest visual accuracy within the eye, containing an enormous number of cone cells is called?

A. Yellow spot

B. Choroid
C. Blind spot
D. Retina

10. Which of the following has both cytoplasm and cell wall
A. liver cells
B. red blood cells
C. root hair cells
D. xylem vessels

11. Which of the following will be a sequence to follow in a scientific procedure after experimentation?

A. Observation and data recording
B. Hypothesis formulation
C. Conclusion
D. Problem identification

12. The term "first aid" is best defined as.

A. Giving medicine to a patient
B. Service rendered by a nurse to a sick person in hospital
C. Service rendered to an accident victim or a sick person before being taken to hospital
D. A first visit to a sick person.

13. Which of the following sets include characteristics which is not exclusive to living organisms

A. Feeding, Irritability and Growth.
B. Reproduction, Death and Definite shape.
C. Excretion, Locomotion and Feeding
D. Growth, Movement and Respiration.

14. Which of the following causes gonorrhea?
A. *Neisseria gonorrhea*
B. *Treponema pallidum*
C. *Vibrio cholerae*
D. *Clostridum tetani*

15. A biologist discovered a new cell in a culture. The new cell had a distinct cell wall but not have a definite nucleus. The cell is most likely to be
A. Protozoa

B. Plant

C. Bacterium

D. Virus

16. Which of the following is common to both plants and animals

A. Cellulose cell wall
B. A digestive system
C. An excretory system
D. Protoplasm

17. The following are reasons why waste disposal is a problem except?

A. In adequate waste bins
B. Excessive packaging of items
C. Enforcing punishment to discharge littering
D. Failure of the cleaners to collect wastes from public places

18. The main purpose of vaccination is

A. To eliminate toxins from the body.
B. To protect the body against side effects of antibiotics
C. To expose the body to synthetic antigens
D. To stimulate antibody production in the body.

19. HIV/AIDS can result from one of the following behavior

A. Hugging and shaking hands
B. Sharing personal items such as towels and swimsuits
C. Being Faithfull to one uninfected sexual partner after marriage.
D. Using sterilized surgical or skin piercing instrument

20. Which of the following refers to a liquid containing either weak or dead micro organisms

A. Steriliser.
B. Preservative.
C. Tranquiliser.
D. Vaccine.

21. Which of the following organisms belong to phylum Ascomycota

A. Bread mould
B. Yeast
C. Mushroom
D. Toad stool

22. By which process does carbon dioxide pass from blood to alveoli of the lungs

A. Osmosis

C. Diffusion
B. Transpiration
D. Respiration

23. In which category as the malpighian layer of mammalian skin is plastic?

A. System
C. Cell
B. Tissue
D. Organ

24. After period of vigorous activity you would except blood leaving a muscle to have

A. More carbon dioxide, more oxygen and more glucose
B. Less carbon dioxide, less oxygen and less glucose
C. More carbon dioxide, less oxygen and less glucose
D. More carbon dioxide, less oxygen and more glucose

25. Predict what will happen if a plant lacks nitrogen
A. Leaves will turn to yellow
B. Leaves will turn to blue
C. Leaves will turn to purple
D. Leaves will turn to brown

26. A part of microscope which allow the observer to move the microscope tube up and down by tiny amounts to change the focus and see specimen clearly

A. Rotating nosepiece
B. Focusing knobs
C. Eye piece lens
D. Objective lens

27. Calculate the date of ovulation in a menstrual cycle of 28 days if menstruation occurs on day 9 to day 13 of a month.

A. 18th

B. 28th

C. 20th

D. 22nd

28. A term which best described a condition of a plant cell that has lost too much water is

A. Haemolysis

B. Crenation

C. Turgidity

D. Plasmolysis

29. The branch of science which deals with the study of living things is known as
A. Biology
B. Ecology
C. Botany
D. Zoology

30. Which of the following structure controls the movements of materials in and out of the cell

A. Nucleus
B. Chloroplast
C. Cell membrane
D. Cell wall

31. Example of diseases caused by virus are

A. Common cold, rabies and cancer
B. Corona, measles, and chicken pox
C. Tuberculosis, typhoid and corona
D. HIV, bilharzias and elephantiasis.

32. Example of diseases caused by virus are

A. Common cold, rabies and cancer
B. Tuberculosis, typhoid and corona
C. Corona, measles, and chicken pox
D. HIV, bilharzias and elephantiasis.

33. The part of the brain responsible for involuntary activities such as water balance and
carbon dioxide level in the blood.

A. Medulla oblongata
B. Hypothalamus
C. Cerebrum
D. Cerebellum
E. Pituitary

34. Which of the following statement is true about blood vessels,

A. All arteries carry oxygenated blood
B. All veins carry deoxygenated blood

C. Pulmonary vein carry oxygenated blood
D. Aorta carries blood away from the right ventricle
E. Vein has narrow lumen than arteries

35. A term used to describe animal which feeds only on plants

A. Carnivores
B. Onivores
C. Decomposers
D. Herbivores

36. The following are the major parts of the alimentary canal except.
A. Oral cavity
B. Transport passage
C. Anal cavity
D. Digestive tract

37. Which body mass index of an Individual can express one who is obese?
A. 35 – 40
B. 20 – 25
C. 25 – 30
D. 30 – 35

38. Bleeding gums is the symptom which can be shown by a person suffering from
A. Rickets
B. Pellagra
C. Beriberi
D. Scurvy

39. If the eye value of a microscope is X5 and the total magnification is X200. Then the objective value is
A. X1000
B. X195
C. X40
D. X20

40. The car uses petrol and give out smoke, in living things this is equivalent to:
A. Movement and respiration
B. Locomotion and nutrition
C. Nutrition and respiration
D. Nutrition and excretion

41. The following are the products of anaerobic respiration process in animals except:
A. Lactic acid
B. Carbon dioxide
C. Alcohol
D. Water

42. The ability of a human body to resist infection by disease causing micro-organisms is known as:
A. Vaccination
B. Inoculation

C. Vaccine
D. Immunity

43. The part of alimentary canal which rolls the chewed food into bolus is called
A. Pharynx
B. Tongue
C. Oesophagus
D. Epiglottis.

44. Viruses are:
A. Eukaryotes
B. Prokaryotes
C. Both eukaryotes and prokaryotes
D. Neither eukaryote nor prokaryotes.

45. Cardiac muscle can be found in which part of the animal body?
A. Skull
B. Heart
C. Small intestine
D. Limbs

46. The kidney in animals is mainly responsible for
A. excretion
B. digestion
C. transportation
D. respiration

47. A term used to identify an individual animal with both male and female sex organs is:
A. unisexual
B. hermaphrodite
C. asexual
D. dioecious

48. The structure found in bacteria are
A. Plasmid, flagella and cilia
B. cytoplasm, cilia and plastids
C. cell wall, plasmid and flagella
D. cell membrane, flagella and hairs

49. Which of the following is a seed bearing plant
A. liverwort
B. fern
C. sisal
D. mosses

50. A part of an onion bulb which is important for vegetative propagation is:
A. scale leaves
B. foliage leaves
C. terminal buds
D. roots

51. Rise of body temperature in the human body is corrected mainly by:
A. dilating the skin arteries and sweating
B. constricting the skin arteries and shivering

C. dilating the skin veins and shivering
D. constricting the skin veins and shivering

52. The stamen of a flower consist of:
A. stigma and ovary
B. anther and stamen
C. filament and ovary
D. anther and filament

53. Which of the following series of activities take place together when focusing distant object?
A. Ciliary muscles relax and the lens becomes thin
B. Ciliary muscles contract and the lens becomes thin
C. Ciliary muscles contract and the lens becomes thick
D. Ciliary muscles relax and the lens becomes thick

54. People with blood group …… are called universal recipients.
A. AB
B. B^+
C. O
D. A

55. Which of the following is not a type of underground storage organ?
A. Bulb
B. Stoma
C. Corm
D. Rhizome

56. In which of the following are the largest amount of nitrogen excreted from the mammalian body?
A. Faeces
B. Sweat
C. Urine
D. Oxygen

57. A group of animals that maintain the body temperature at more or less constant is;
A. Cold blooded animals.
B. Homiotherm .
C. Regulators
D. Poikilotherm

58. A phylum chordata includes all animals that have…….
A. Mammary glands
B. Post anal tail
C. Back bone
D. Scales

59. If a parent cell has twelve chromosomes, how many chromosomes will be in the daughter cells formed after meiosis.
A. Six(6)
B. Twelve (12)

C. Eight (8)
D. Twenty four (24)

60. Night blindness in human body is avoided by eating……
A. Oranges
B. Carrots
C. Red meat
D. green vegetables

61. Which part of a gill of a fish is involved in gaseous exchange?
A. gill slits B. gill bars C. gill filaments D. gill scale

62. The movement of diaphragm is characteristic of gaseous exchange in
A. insect B. fish C. mammal D. amoeba

63. Which of the following will happen when the volume of the thoracic decreases.
A. Air circulates well in the lungs
B. The lungs expand
C. The ribs move upwards
D. The pressure within the lungs increases

64. Floating microscopic plants are called …….
A. Zooplankton
B. Newton
C. Phytoplankton
D. Benthos

65. The unique habitat created by mixing a fresh and salt water is.
A. Brackish
B. river
C. lake
D. ocean

66. If the gall bladder of a man is removed by surgical operation. Which of the following processes will be most seriously affected.
A. Digestion of lipids
B. Formation of urine
C. Digestion of starch
D. Digestion of protein.

67. Which of these is not a function of mammalian blood?
A. Engulfing bacteria
B. Production of hormones
C. Transporting urea
D. Transport of glucose.

68. Conjugation as a method of reproduction occurs in…….
A. Hydra
B. Spirogyra
C. Mucor
D. Rhizopus

69. The cell division responsible for growth is called…….
A. Mitosis
B. Binary fusion

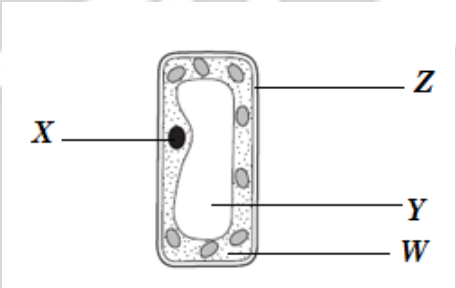
C. Meiosis
D. Conjugation

70. Which of the following is the accessory organ of the digestive system?
A. Kidney
B. Spleen
C. liver
D. lungs

71. Which of these is not an excretory product of plants?
A. Tanin
B. Gum
C. Alkaloid
D. sweat

72. Which two structures are found in all plant epidermal cells?
A. Cell wall and chloroplasts
B. Cell wall and nucleus
C. Chloroplasts and starch grains
D. Nucleus and sap vacuole

73. The diagram below shows a plant cell.

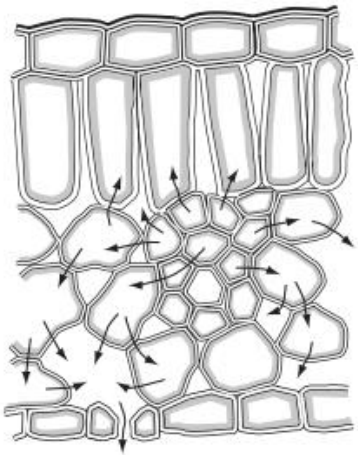


Which structure identifies this as a plant cell rather than an animal cell?

A. W
B. X
C. Y
D. Z

74. The cell of a plant cell is removed using an enzyme, what would happen if this cell is then placed in distilled water.
A. It would take longer for the cell to become turgid.
B. Proteins in the cytoplasm would leave through the cell membrane
C. The cell would become smaller as water passes out
D. The cell would burst as water moves into it

75. The diagram below shows a section through a green leaf.



The arrows represent the movement of;

A. Carbon dioxide during respiration
B. Oxygen during photosynthesis
C. Sugars during translocation
D. Water during transpiration

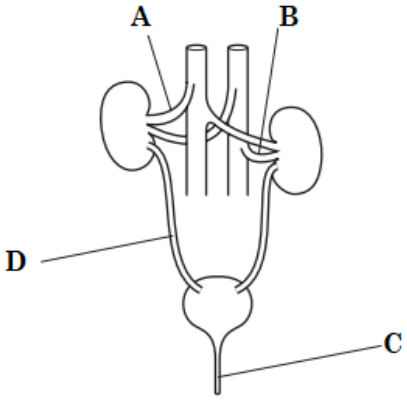
76. What is the enzyme that controls a reaction in which both the enzyme and the substrate can denature at high temperature?

A. Amylase
B. Insulin
C. Lipase
D. Protease

77. Which chemical test shows the presence of an enzyme in a biological washing powder?

A. Benedicts
B. Biuret
C. Ethanol emulsion
D. Iodine solution

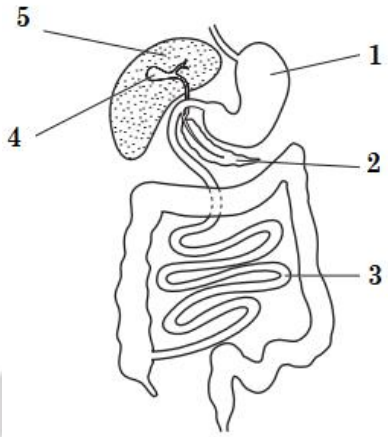
78. The diagram shows the human urinary system which labelled structure is the ureter?



79. Where are most nitrogen compounds excreted from human?

A. Kidney
B. Liver
C. Rectum
D. Skin

80. The diagram shows part of the alimentary canal and associated organs.



Which row correctly describes the function of parts shown in the diagram?

	Part	Function	Part	Function
A	1	Digestion of proteins	3	Absorption of products of digestion
B	2	Emulsifying fats	3	Absorption of amino acids
C	4	Production of bile	5	Making digestive enzymes
D	4	Storing digestive enzymes	2	Making digestive enzymes

81. Which process involves the use of nutrients inside cells?

A. absorption
B. assimilation.
C. digestion
D. ingestion

82. Under which set of conditions will the transpiration rate of a well-watered plant be fastest?

A. a cool, dry, windless day
B. a cool, rainy, windy day
C. a hot, dry, windy day
D. a hot, rainy windy day

83. When a complete ring of bark is removed from the trunk of a tree, it will eventually die because this action cuts off the supply of?

A. Mineral salts to the leaves
B. Nutrients to the roots
C. Oxygen to the leaves
D. Water to the leaves

84. Which word equation shows anaerobic respiration in yeast?

A. Glucose →ethanol
B. Glucose → ethanol + carbon dioxide
C. Glucose → lactic acid
D. Glucose → lactic acid + carbon dioxide

85. Which of the following processes doesn't require energy?

A. Focusing of eye
B. growth of hair
C. secretion of sweat
D. tissue respiration

86. What structure covers the pupil of a human eye?

A. Conjunctiva and cornea
B. Conjunction and sclera
C. Cornea and retina
D. Retina and sclera

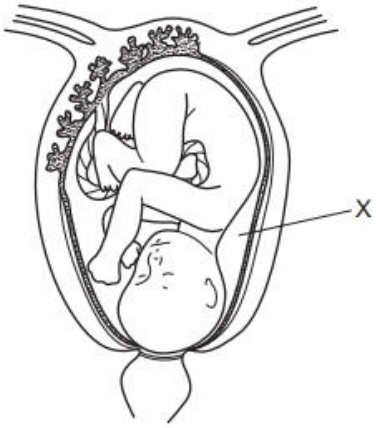
87. Which of the following is always essential for seeds to begin germinating?

A. Carbondioxide
B. Light
C. Mineral salts
D. Oxygen

88. Which substance are present in breast milk but not in bottled milk made from powder.

A. Antibodies
B. Carbohydrates
C. Proteins
D. Vitamins

89. The figure below show a developing fetus in the uterus. Name the liquid found at X



A. Amniotic fluid
B. Blood
C. Urine
D. Water

90. What would be the result of cutting the sperm ducts of the right and left sides in a man.

A. He would become sterile
B. He would be unable to develop sperms
C. He would be unable to pass urine
D. Male sex hormones would no longer circulate in the blood.

91. Which of the following may be heterozygous?

A. A haploid cell
B. An allele of a gene
C. An organism with dominant phenotype
D. An organism with a recessive genotype

92. A human cell contains all of the following. Which is the smallest size,.

A. Gene
B. Nucleus
C. X- chromosome
D. Y- chromosome

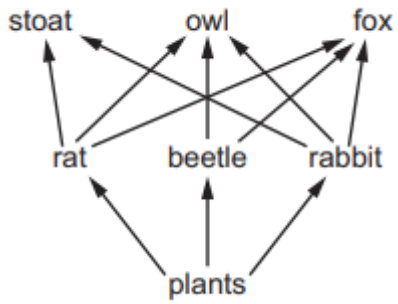
93. What is a result of a natural selection?

A. Dogs that are friendly to humans
B. Grapes that contain seeds
C. Mosquitoes that are resistant to insecticides
D. Onion crops that have a pleasant taste

94. Which sequence describes the flow of energy in an ecosystem?

A. carnivore → herbivore →plant → sun
B. plant →herbivore →carnivore →sun
C. Sun →plant →herbivore →carnivore
D. Sun →plant→herbivore →canivore

95. The diagram shows a food web.



What is likely to happen to the owl population if foxes die out.

A. It will decrease because there will be more competition with stoats for food
B. It will increase because there will be more rats, beetles and rabbits for them to eat
C. It will stay the same because owls do not eat foxes.
D. It will stay the same because stoats will eat less food

96. The diagram below shows a food chain.
Mahogany tree → caterpillar→ song bird →hawk
Identify the type of organism with the largest number in this food chain.

A. Carnivores
B. Consumers
C. Herbivores
D. Produces

97. Which of these is a sign of diabetes mellitus?

A. Lack of haemoglobin
B. Raised blood glucose
C. Reduced urine production
D. Too much insulin

98. Which bones form a joint at the shoulder?
A. humerus and scapular
B. humerus and ulna
C. radius and ulna
D. radius and scapular

99. Which disease is first recognized by painless ulcers which can be anywhere on the body.

A. Anaemia
B. Rickets
C. Scurvy
D. Syphilis

100. During the production of alcohol, why must air be kept out of the fermenter?

A. To allow production of carbon dioxide
B. To inhabit the growth of yeast
C. To prevent complete combustion
D. To allow complete combustion

END OF MCQ

COMMON TERMS AND THEIR MEANING

Key word	Meaning
Nutrition	Taking in nutrients which are organic substances and mineral ions, containing raw materials and energy for growth and tissue repair, absorbing and assimilating them.
Excretion	Removal from organisms of toxic materials, the waste products of metabolism and substances in excess.
Respiration	Chemical reactions that break down nutrient molecules in living cells to release energy.
Sensitivity	The ability to detect or sense changes in the environment and to make responses.
Reproduction	Progresses that make more of the same kind of organism.
Growth	The permanent increase in size and dry mass by an increase in number of cells, cell size, or both.
Movement	An action by an organism or part of an organism that changes position or place.
Elements	Elements are substances that consist of only one kind of atoms and cannot be broken down into simpler substances by chemical means.
Solute	This is a substance that dissolves in a solvent forming a solution
Solvent	This is a substance in which a solute dissolves forming a solution
Solution	A uniform mixture which is formed when a solute is dissolved in a solvent.
Saturated Solution	A very concentrated solution with the maximum amount of solute that dissolve in it already dissolved in it.
Solubility	The maximum amount of solute that can dissolve in 100g of water at a particular temperature.
Chromatography	Chromatography is a process used to separate and identify two or more substances from a mixture.
A cell	Is the smallest unit that can carry on all the processes of life.

Diffusion	The net movement of particles from a region of their higher concentration to a region of their lower concentration down a concentration gradient, as a result of random movement
Osmosis	The diffusion of water molecules from a region of their higher concentration (dilute solution) to a region of their lower concentration (concentrated solution) through a partially permeable membrane.
Active Transport	The movement of ions, in and out of a cell, through a cell membrane, from a region of their lower concentration to a region of their higher concentration,
Enzymes	Are proteins that function as a biological catalyst.
A catalyst	A substance that speeds up a chemical reaction but isn't changed by the reaction.
Nutrition	Taking in nutrients which are organic substances and mineral ions, containing raw materials and energy for growth and tissue repair, absorbing and assimilating them. Nutrition is one of the characteristics of living organisms.
Ingestion	Taking in pieces of food into the mouth
Digestion	The breakdown of large, insoluble food molecules into smaller more soluble ones by chemical and mechanical means.
Absorption	Taking the digested food molecules into the cells
Assimilation	Making use of the digested food molecules for example to release energy or grow etc.
Egestion	The elimination of undigested food materials through the anus
The Pulmonary vein	it transports oxygenated blood from the lungs to the right atrium.
The Aorta	the biggest artery in the body, it transports oxygenated blood from the heart to the rest of the body.
The Vena Cava	the biggest vein in the body, it transports deoxygenated blood from the whole body to the heart.
The pulmonary artery	it transports deoxygenated blood from the heart to the lungs.
Photosynthesis	It is the process by which plants make useful glucose out of the raw materials water and carbon dioxide, using light energy from the sun.
Capillarity	is a factor that helps in the movement of water in the xylem vessels. The water molecules are attracted to

	each other, as one moves upwards it pulls its neighboring molecule with it.
Translocation	This is the transport of organic food such as sucrose and amino acids in the plant through the phloem vessels.
Wilting	Occurs when the transpiration rate is faster than the rate of water absorption.
Rusting	Rusting is the corrosion of iron as a result of reaction with oxygen from air and water.
Respiration	is a chemical reaction that breaks down food molecules in living cells to release energy.
Aerobic Respiration	A chemical, metabolic reaction that burns down glucose with oxygen producing carbon dioxide, water vapour and lots of energy
Aerobic Respiration	the release of relatively large amounts of energy in cells by the breakdown of food substances in the presence of oxygen.
Anaerobic Respiration:	Some organisms are able to respire and release energy when oxygen is lacking. This is anaerobic respiration. These are like yeast, bacteria and other organisms. Humans can also respire anaerobically for a short period of time. The amount of energy produce is much smaller than that produced during aerobic respiration though
Anaerobic respiration	The release of relatively small amount of energy by the breakdown of food substances in the absence of oxygen.
Excretion	Is the removal of toxic materials, the waste products of metabolism and substance in excess of requirements from organisms.
Homeostasis	Ability to maintain a constant internal environment so that every organ and cell is provided the perfect conditions to perform its functions.
Vasoconstriction	This causes the blood vessels to become narrower to reduce heat loss. They also sink deep into the skin to increase the distance heat has to travel to escape thus reducing heat loss.
Reproduction	Is a characteristic of all living organisms. It is the process that makes more of the same kind of organism. Reproduction is essential in all species to ensure that the species does not extinct
Asexual Reproduction	Asexual means not sexual. This means that this kind of reproduction does not involve sex. Asexual

	reproduction is the production of genetically identical offspring from one parent.
Asexual Reproduction in Bacteria	Bacteria are tiny single-celled organisms. They reproduce by a process called binary fission. In binary fission, one bacterium grows and exact copy of it's DNA coil which carries its genetic information.
Sexual Reproduction	Sexual reproduction is the process involving the fusion of haploid nuclei to form a diploid zygote and the production of genetically dissimilar offspring.
Pollination	Is the transfer of pollen grains from the male part of a flower to the female part of a flower.
Self-pollination	The transfer of a pollen grain from the anther to the stigma of the same flower or the stigma of a flower of the same plant.
Cross Pollination	The transfer of a pollen grain from the anther to the stigma of a flower of another plant of the same species.
Seed dispersal	Is the scattering of the seeds all over the place to colonise the area.
Ejaculation	The ejection of semen out of the body
Birth Control	Birth control is controlling the number of children and the time to have them.

S4 JOINT MOCK EXAMINATIONS
TIME TABLE 2023 (UCE)

DAY& DATE	PERIOD	SUBJECT	DURATION
Friday 21st/07/2023.	Afternoon	Briefing Candidates	2 h
Monday 24th/07/2023.	Morning	456/1 Mathematics	2 h 30min
	Afternoon	456/2 Mathematics	2 h 30min
Tuesday 25th/07/2023.	Morning	273/1 Geography	2 h 30min
	Afternoon	273/2 Geography	2 h 30min
Wednesday 26th/07/2023.	Morning	112/1 English Language	2 h
	Afternoon	112/2 English Language	2 h
Thursday 27th/07/2023	Morning	241/1 History: East Africa	2 h
	Afternoon	241/2 History: West Africa 241/3 History: Central Africa 241/4 History: South Africa	2 h 2 h 2 h
Friday 28th/07/2023	Morning	545/1 Chemistry	1 h 30min
	Afternoon	545/2 Chemistry	2 h
Monday 31st/07/2023	Morning	545/3 Chemistry (Practical)	2 h
	Afternoon	208/1 Literature in English	2 h 30min
Tuesday 01st/08/2023	Morning	553/1 Biology	2 h 30min
	Afternoon	527/1 Agriculture	2 h 30min
Wednesday 02nd/08/2023	Morning	535/1 Physics	2 h 15min
	Afternoon	535/2 Physics	2 h 15min
Thursday 03rd/08/2023	Morning	535/3 Physics (practical)	2 h 15min
	Afternoon	840/2 Computer studies	2 h 30min
Friday 04th/08/2023	Morning	223/1 CRE: Christian living today 224/1 CRE: St. Luke's Gospel 225/1 Islamic religious education	2 h 30min 2 h 2 h
	Afternoon	840/1 Computer studies	2 h 30min
Monday 07th/08/2023	Morning	314/3 French: Writing expression/composition 336/1 Lugha Ya Kiswahili 337/1 Arabic: Grammar, Reading, comp& Trans 335/1 Luganda 345/1 Runyankore/Rukiga 355/1 Lusoga 385/1Runyoro/Rutoro 395/1 Lumasaaba 315/1 Leb Lango	1 h 30min 2 h 30min 2 h 2 h 2 h 30min 2 h 30min 2 h 30min 2 h 30min 2 h 30min
	Afternoon	314/2 French: Grammar & Reading 337/2 Arabic: composition & summary 335/2 Luganda 355/2 Lusoga 345/2 Runyankore/Rukiga 385/2Runyoro/Rutoro 395/2 Lumasaaba 315/2 Leb Lango	1h 30min 1h 30min 2h 30min 2 h 30min 2 h 30min 2 h 30min 2 h 30min 2 h 30min

Tuesday 08th/08/2023	**Morning**	**612/2 IPS Art: Still Life/Nature**	**2 h 30min**
	Afternoon	**800/1 Commerce** **810/1 Principle of accounts**	**2 h 30min** **2 h 30min**
Wednesday 09th/08/2023	**Morning**	**553/2 Biology (Practical)**	**2 h**
	Afternoon	**612/3 IPS Art: Living person**	**2 h**
Thursday 10th/08/2023	**Morning**	**527/2 Agriculture (practical)**	**2 h 15min**
	Afternoon	**224/5 CRE: African Religious Heritage** **225/2 Islamic religious education**	**2 h** **2 h**
Friday 11th/08/2023	**Morning**	**845/1 Entrepreneurship Education.**	**2 h 30min**
	Afternoon	**845/2Entrepreneurship** **535/4 Physics (Practical)**	**2 h 30min** **2 h 15min**
Monday 14th/08/2023	**Morning**	**612/1 IPS Art: Studio Technology**	**2 h**
	Afternoon	**545/4 chemistry (Practical)**	**2 h**
Tuesday 15th/08/2023	**Morning**	**612/5 IPS Art: Craft A (Planning)**	**2 h 15min**
	Afternoon	**612/5 IPS Art: Craft A (Test)**	**3 h**
Wednesday 16th/08/2023	**Morning**	**612/4 IPS Art: Imaginative comp.(sketching session)**	**2 h**

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You can contact us on
+256780413120 or +256702048636

S.4 GEOGRAPY SEMINAR ON 6/7/24 AT HOLY CROSS LAKE VIEW ORGANISED BY BUSOGA REGIONAL GEOGRAPHY ASSOCIATION AND GEOGRAPHY DEPARTMENT HOLY CROSS LAKE VIEW S.S.

SET ONE

SECTION A

ITEM 1. MAP SKILLS

Mr Mark is a businessman and he lives in one of the areas shown on the map extract of Lukaya series Y732,sheet 79/2 edition 3-USD in the area South of Northing 87 and between Easting 74 and 83.He has an interest to put up an investment East of Lukaya around lake Victoria. He has gone ahead to seek for permission from Lukaya Sub-county local government who have turned down his request saying this will result to long drought, reduction in water levels ,destruction of animal habitat among others. The sub-county officials have organized a meeting with Mark and they have invited you to make a presentation at the meeting.

SUPPORT MATERIAL: Map extract of Lukaya

(a) The sub-county officials, are in Kamuwungu Canoe landing site at 825864 and would want to meet with mark to inform him about the meeting at the sub-county and mark is at LUKAYA(750843).At what angle will they be moving at to meet with mark at his home?
(b) In not more than 300 words, give an advice to mark about his plan of investment in the eastern part of Lukaya

ITEM 2. PHOTOGRAPH SKILLS.

Uganda is one of those countries in Africa blessed with a variety of natural resources such as Minerals, trees, water, soils among others. Of recent, there are many foreigners coming into invest in the mining sector as seen in the photograph. Many Ugandans have welcomed this saying it would result to employment opportunities, high incomes to the people among others. Government is worried of the foreign domination in the sector. They have organized a meeting with the key stake holders to discuss the matter. You have been invited to make a presentation.

Support material



TASK.

(a) Use a relevant illustration to show the key features shown on the photograph.

(b) In not more than 300 words, prepare a speech that you would present at the meeting.

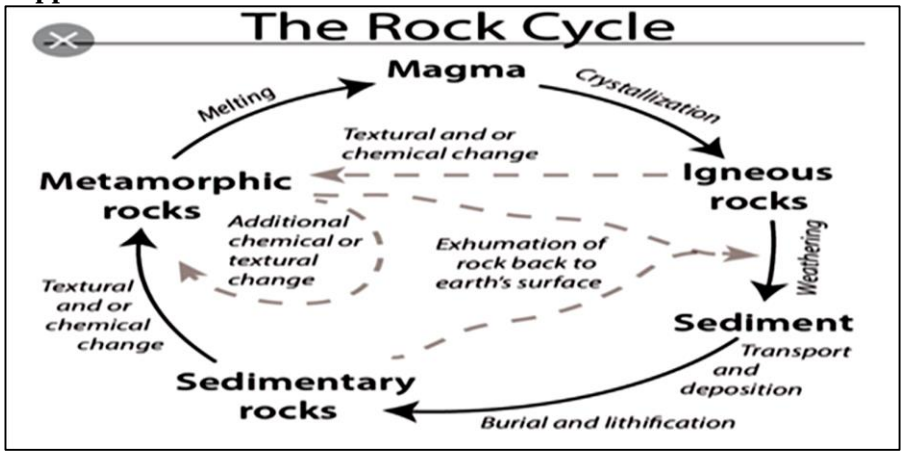
SECTION B

PART I

ITEM 3

Mr. Smith is a student of Florida University in the United States of America. He wants to study about the major rock types of East Africa, but he has no information on the geography of East Africa. He has tasked you to give him the necessary information and send to him through email before coming to east Africa.

Support material



Task

Make a write of about 200-300 words giving Mr. Smith the information he wants.

ITEM 4

In Uganda, there are many high lands which include mountains like Mt. Elgon, Mt. Moroto, and Mt. Rwenzori among others. Many people have lived along the slopes of these high lands for years with different activities. There have been heavy rains of recent throughout the country. Landslides have kept on occurring and people's property destroyed, crops have not been spared and even lives have been lost. People of such areas have been left wondering why such is happening. Ministry of disaster preparedness officials are to come to one of the badly affected areas to put away fears from the people and you are to attend.

Support material



TASK

Write an essay of about 300 wards that can help address the situation

PART II

ITEM 5

The used to be small towns in Uganda have developed over the years. Most of them have turned to become big cities. The used to be small trading centres have turned to become very big towns and urbanized. In big cities, buildings have been extended to wetland areas, high crime rates, high cost of living, and high spread of diseases among others have resulted. Experts have warmed that if something is not done, more urban centres will even create higher problems. You have been conducted to present a paper to address the situation.

Support

Year	Urban population Uganda
2022	12,360,019
2021	11,717,016
2020	11080,727
2019	10,462,825
2018	9,643,452

Task

(a) Use a relevant illustration to show the information above.
(b) Prepare a paper of not more than 300 words to address the situation

ITEM 6

Today in Uganda, there are a number of systems of communications including telephone and mobile networks, new vision and magazines, Radio and television, internet, social media email, mobile money among others. Of recent the use of mobile networks, internet, and social media have greatly increased. The many communication services have left many Ugandans wondering. Some see them as a benefit while others see it as a problem. The Uganda communication commission have organized a sensitization meeting with your community members. They have tasked u to prepare some information to present at the meeting

SUPPORT MATERIAL

TASK:

In not more than 300 words, write an essay on what you would present at the meeting.

SET TWO

SECTION A

MAP SKILLS

ITEM 1

The people living in the area shown on the map extract of Lukaya sheet 79/2, series Y732and edition 3-USD between easting 80 and 88 and northing 82 and 99 have stayed in this area for years. Of recent the water in the drainage feature south west of the area kept reducing, swamps in the north kept on drying among others. People are worried as this may lead to death of animals, drying of crops and death of human beings. The people have no information on what is happening. NEMA officials would want to meet the members of this community to address the situation.

Support – Map extract of Lukaya.

Task

(a) Use relevant illustrations for proper guide to NEMA officials visiting the area.

(b) The water body in the SW of the area has greatly reduced from the original size. What could be the current size of the water body?

(c) Write an essay of not more than 400 words to show the information the community members would get.

ITEM 2

PHOTOGRAPHY SKILLS

Study the photograph below and the text and respond to the tasks that follow.



Uganda is a region which is blessed with many drainage features such as lakes, swamps, and rivers. Many people living around lakes, rivers and swamps are engaged in the activity of fishing as seen in the photograph. Many people have been attracted to the activity and it is now a source of livelihood to many. If this is to continue over time, fisheries officials say it will be disastrous, but people have continued with the activity. The fisheries officials have tasked you to convene a meeting with your community.

(a) Use relevant illustration to show some of the physical features in the photographs.

(b) Write an essay of about 300 words to give the people of your community the necessary information.

SECTION B
PART 1

ITEM 3

Uganda is a home of many physical features which has made it to be more richer than it would have been without. A group of students from one of the countries in East Africa have planned to visit Uganda to study about some of the major physical features. They have no information on these. They have asked you as one of the Ugandan natives to prepare for them any necessary information before their coming.



Task

Write an essay of about 250 – 300 words to give the students the information they need.

ITEM 4

There are many rivers in Uganda of which most of them originate from the mountainous areas. The government of Uganda has kept on advising people to use these very important natural resources to change their lives for better. It is unfortunate that most people have seen these rivers flowing from mountains down to lakes without using them.

In your community, a meeting has been organized to sensitize the communities on these and you are to take part.

Support material



Task

Prepare a speech of about 400 words to present at the meeting.

PART II

ITEM 5

According to the population statistics of Africa 2022 revised by United Nations, Africa's population was estimated to be 1.4 billion by 2023 and growing at a rate of 3% per year. At this rate, Africa's population is expected to be 2.5 billion people by 2050. Experts have learned that this will drain resources it nothing is done. The African Union communities have organized an urgent conference to address the concerns of the experts. You have been invited to attend the conference and give an urgent.

Table showing population from statistics of Africa 2019 to 2023 in billions.

Year	Population
2023	1,460,481,772
2022	1,426,736,305
2021	1,393,676,444
2020	1,360,677,231
2019	1,327,701,163

Source: World diameter – 2022 revised by new vision

Task

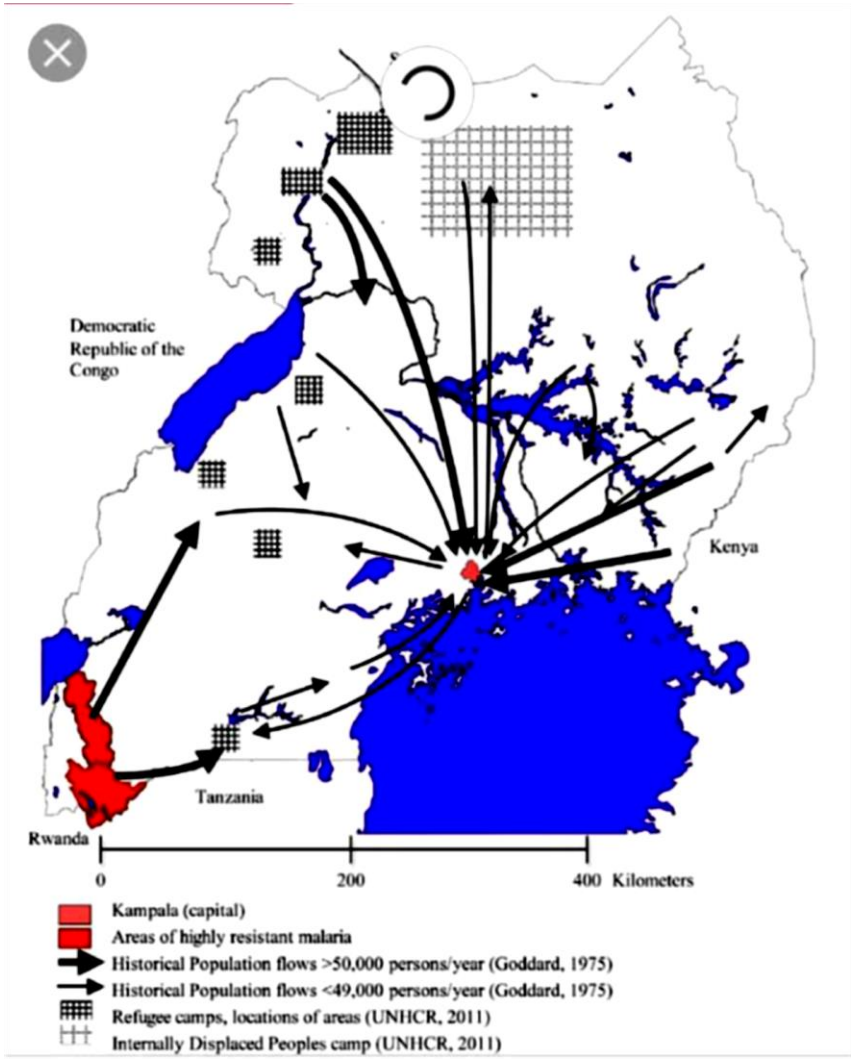
a) Use a relevant illustration to show the information.

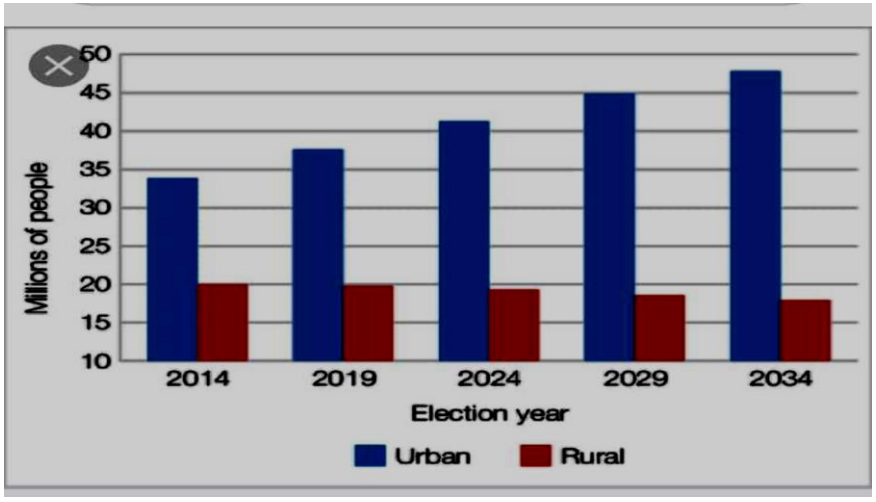
b) Prepare a speech of absent 250 – 300 words to present at the conference to address the situation.

ITEM 6

Most towns in Uganda have developed over the years and some of them have been turned into big cities. Most people have left their villagers for these towns. The people left behind in villages are wondering why such a high number is leaving their villages. You are a member of one of the villages and you have been conducted to give them the necessary information.

Support material





Task

Write an essay of about 300 words to show the information you would give to the people.

END

Thank you

BUDDO SECONDARY SCHOOL

ANNUAL GEOGRAPHY SEMINAR, SATURDAY 6TH JULY, 2024

SEMINAR QUESTIONS

P250/1

1. Study the 1:50000 Uganda map extract of Kampala, part of sheet 71/1 series Y732, Edition 3-U.S.D and sheet answer the questions that follow.

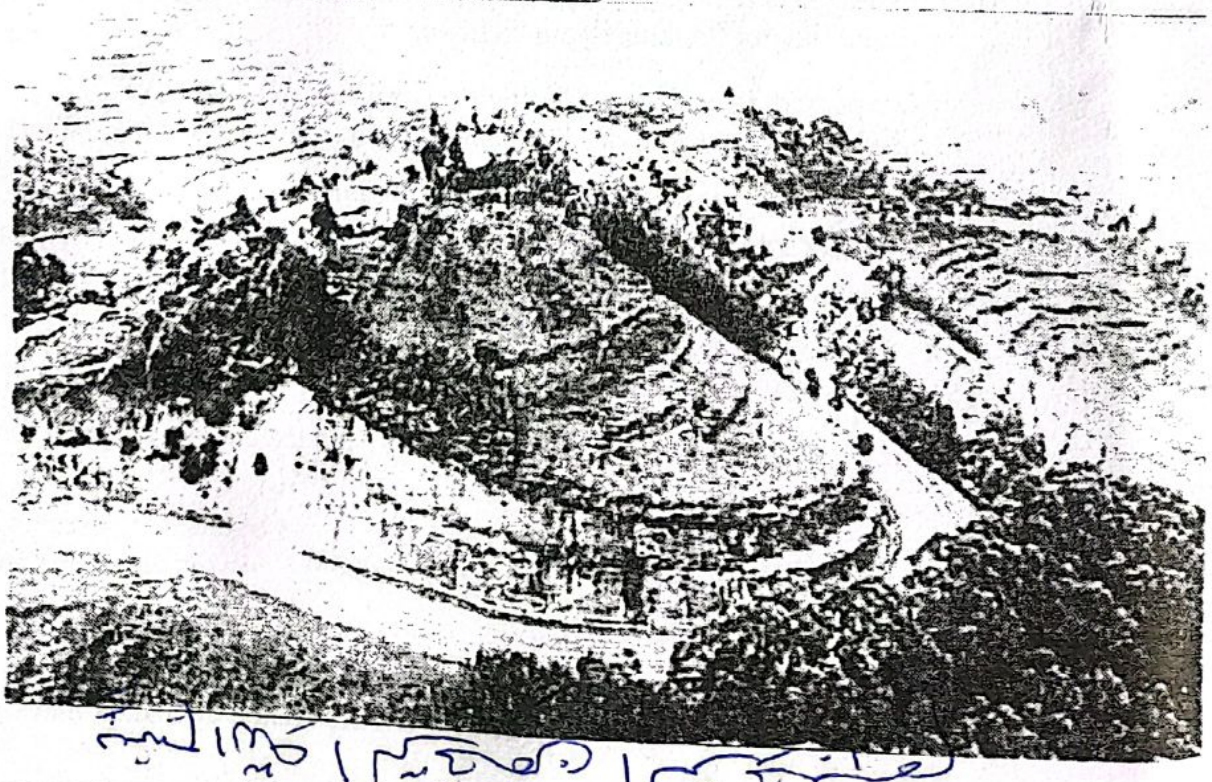
   a) i) Measure the distance of the loose surface road from the road junction at Nsimbiziwoome **(568397)** to grid reference **542450**.
   ii) Measure the distance by air of the road identified in a(i) above.
   iii) Calculate the detour index of the road identified in a(i) above.

   b) i) Describe the latitudinal and longitudinal location of Kampala.
   ii) With evidence, what makes Kampala a habitable city?

   c) Draw a relief section of the area between 520290 and 580340, on it mark and name;
   i) Forests,
   ii) Plantation,
   iii) Permanent swamp,
   iv) Physiographic features
   v) Nakivubo channel
   vi) Two road types.

   d) Describe the;
   i) relief.
   ii) relationship between drainage and vegetation shown on the map extract.

2. Study the photograph provided and answer the questions that follow.



(a) Draw a landscape sketch of the area shown on the photograph. on it mark and name;
   (i) winding road and road cliff
   (ii) terraced land,
   (iii) settled area
   (iv) major denudational processes.
   (v) vegetation types
   (vi) uplands and lowlands.

(b) Account for the occurrence of the denudational processes identified in (a)(i) above.

(c) How has man adapted to the landscape shown on the photograph?

(d) i) Of what value are the features shown on the photograph to the people living in the area?
   ii) Giving reasons for your answer. suggest an area in East Africa where the photograph could have been taken from.

3.(a) Distinguish between Viscous & fluid lava.

(b) Examine the role of the materials ejected on the formation of volcanic landforms in East Africa.

4. Explain the role of rock structure on land form development in East Africa.

5.(a) Distinguish between exfoliation domes and granitic tors.

(b) Describe the formation of the landforms in the limestone areas in East Africa.

6. Explain the role of denudation in the formation of lakes in East Africa.

7.(a) With the help of diagrams. distinguish between a cross profile and a long profile of a river.

(b) Explain the importance of the landform features found along the different stages of a river.

8. Account for the differences in rainfall patterns in East Africa.

9. (a) Distinguish between local and prevailing winds.

(b) Examine the influence of local winds on the climate of the areas where they occur.

10. To what extent has altitude influence the existence of miombo woodland type of vegetation in East Africa.

11. Examine the influence of climate on the formation of soil types in East Africa.

1. Study the table below showing the total population in millions for selected African countries in 2015 and 2020 and answer the questions that follow.

Country	Total population 2015	Total population 2020
Angola	13,900,000	25,000,000
Botswana	1,600,000	2,300,000
Namibia	1,800,000	2,500,000
Zambia	10,900,000	16,200,000
Zimbabwe	13,100,000	15,600,000
Republic of South Africa	44,200,000	55,000,000

Adapted: World Development Indicators; 2017, The World Bank (Page 10-14)

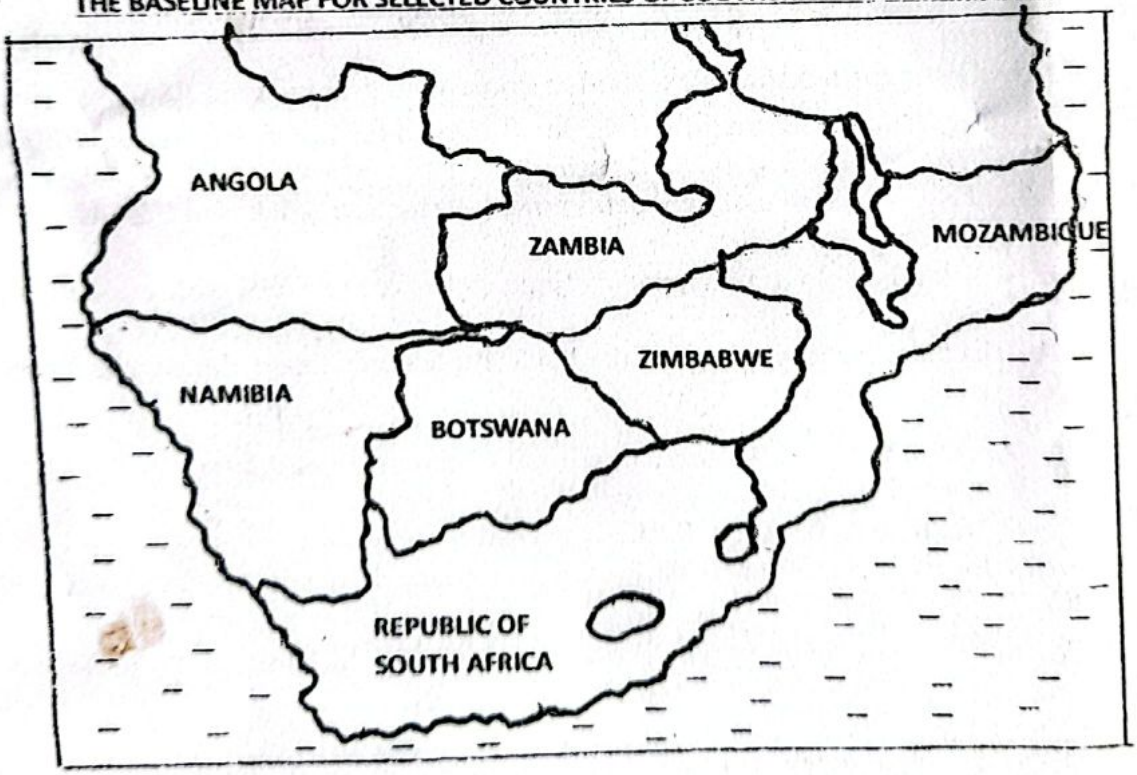
(a) Using the base map provided, draw super imposed proportional divided squares to represent the information given in the table.

(b) Outline the merits and demerits of using the statistical method in (b) above.

(c) Explain the conditions which have led to high population density in the region shown on the map.

(d) Examine the implications of small population size in any one country given in the table.

THE BASELINE MAP FOR SELECTED COUNTRIES OF SOUTHERN REGION OF AFRICA



2. Describe the factors for the development of commercial intensive farming in either Netherlands or California.

3.(a) Account for the rapid destruction of forests in either the Congo Basin or the Amazon Basin.

(b) Explain the effects of deforestation on the environment in the area chosen in (a) above.

4. Examine the impact of rapid industrial development on the environment in either the Ruhr region of Germany or China.

5.(a) Describe the commercial methods of marine fishing.
(b) Explain the problems facing fishing industry in either Peru or Norway.

6. Assess the factors which favoured the establishment of the Multi-Purpose River Project in either Ghana or USA.

7. (a) Discuss the factors for the growth and expansion of conurbations with reference to either South Africa or Japan.
(b) Explain the problems resulting from the growth of conurbations in the region chosen above.

8.(a) Describe the characteristics of trade in low developed countries.
(b) Examine the factors hindering the development of trade and their future prospects with reference to either COMESA trade bloc or ECOWAS trade bloc.

9. Account for the increased development of the tourism industry in either Kenya or Switzerland.

10.(a) To what extent have physical factors contributed to the food crisis in Africa?
(b) What steps are being taken to increase food production in Africa?

P250/3:

1. For any fieldwork study carried out as a group or an individual;
   (a) (i) State the topic of study.
   (ii) Outline the objectives of the study.
   (b) Draw an annotated / Sketch map / Landscape sketch / line transect of the area studied and on it mark and name;
   (i) Physical features
   (ii) Human features
   (c) Describe any three methods you used to collect information from the field.
   (d) How did you organise the fieldwork?
   (e) Explain the challenges faced during data collection.
   (f) To what extent was your fieldwork geographical?
   (g) How did you conclude your fieldwork?

2. (a) Explain the influence of faulting on drainage in Uganda.
   (b) Assess the contribution of drainage features to the development of Uganda.

3. Examine the causes and effects of rural- urban migration.

4. Assess the contribution of internal and external trade to the development of Uganda.

5. To what extent is wildlife a basis for the development of the tourism industry in Uganda?

6. (a) Describe the characteristics of livestock farming in Uganda.
   (b) Assess the contribution of livestock farming to the development of Uganda.

7. To what extent has the low level of technology hindered exploitation of forest resources in Uganda?

8. (a) Outline the challenges facing the development of the energy sector in Uganda.
   (b) Explain the measures being taken to solve the crisis in the power and energy sector.

9. Assess the contribution of irrigation farming in Uganda.

10. What measures are being taken to control environmental degradation in Uganda?

GRAND O'LEVEL CHEMISTRY SEMINAR AT ST. JOSEPH'S S.S.S NAGGALAMA

28TH SEPTEMBER 2024

Contacts: 0782-679542 / 0700-800305 / 0775-805462

CHEMISTRY; PAPER 1; 545/1

SAMPLE TEST ITEMS

SECTION A

1. APPLICATION OF CHEMISTRY IN DAILY LIFE

(Food additives, Drugs and medicines, Nuclear processes, Soapy and soapless detergents)

ITEM 1 (i)

On a wedding party guests were wondering and excited by the aroma and taste of the food served, that it so delicious.





The Master of Ceremony (MC) kept on notifying the people that the food had been prepared with knowledge of chemistry and some of the guests wanted to know what the Master of Ceremony meant

Task

As a chemistry learner, basing on the MC's communication advise the guests on:
(a) The variety of the ingredients used.
(b) The suitability of the ingredients
(c) The possible problems associated with, and choice of the ingredients used.

ITEM 1 (ii)

In one of the societies in Kampala, there is an outbreak of bacterial diseases such as typhoid. The society members rely on each other for medical advice. Recently, a resident complained about persistent stomach ache followed by diarrhoea, but there was no one to advise on proper medication the society members should use.

Task:

As a learner of chemistry;

(a) Advise society members on the possible types of products to use?
(b) Carefully educate them on what the products exactly do.
(c) Advise them on the challenges associated with the product use and consequently how to select the products to use

ITEM 1 (iii)

In one of the towns in Uganda, residents are facing an unexpected challenge of water wasting detergents. The locals are frustrated and do not know what to do. They have been advised to try other alternatives on the market to overcome the challenge but they need more advice on this



As a concerned chemistry student in the town,

Task:

Help the residents,

(a) understand the variety and mode of action of the detergents
(b) on the consequences of the detergent

ITEM 1 (iv):

Due to increasing demand of power in Uganda, the government wants to adopt use of nuclear power.

However, there is little knowledge among the natives about how nuclear energy works. The ministry of energy and mineral development is interested in a knowledgeable person to sensitize the natives about the matter.

Task;

As a chemistry learner,

(a) advise the natives on the types of processes that can be used by the government.
(b) educate them on how the energy can be produced and **caution** them on the possible dangers associated with the process.
(c) suggest to the residents on the most efficient process.

2. DIVERSITY AND INTERACTIONS OF SUBSTANCES AND THEIR IMPORTANCE IN LIFE

(Trends in the periodic table, polymers, periodic table, structure and bonds)

ITEM 2 (i):

A shop attendant wants to use environmentally friendly and sustainable packing materials. He is not having enough information about which packaging materials to use.



He has decided to seek for advice from a person with good knowledge of chemistry.

TASK

a) help him appreciate that the packing materials are of different types
b) advise him on the suitability of the materials

ITEM 2 (ii):

A group of Learners were faced with a unique solid substance, X, which they suspected to be an element. 0.3g of the element could burn in air to form 0.5g of the solid product. One of them picked interest in what could be the chemical formula of the oxide of the element. However, he did not know how to determine the formula. When they contacted the laboratory technician he gave them the atomic number and mass number of X as 12 and 24 respectively, and the symbolic representation of oxygen as $^{16}_{8}O$

As a student of chemistry help the learners to;

(a) understand the nature of substance X
(b) determine the formula of the oxide of X
(c) know the environmental consequences of the element

ITEM 2 (iii):

Charcoal is a common fuel used in many homes in Uganda. During its combustion in excess oxygen supply, it produces carbon dioxide. Your friend is using 80.5g of charcoal to cook food in a busy evening for guests. It burns completely as shown in the equation below.

$C(s) + O_2(g) \longrightarrow CO_2(g)$



Task

As a learner of chemistry

a) Assess the product formed
b) Advise the friend on the appropriateness of the product formed.
c) Calculate the volume of the gas produced every busy evening.
(1 mole of a gas occupies 22.4*l* at s.t.p, C = 12)

Help the friend understand the impact of the product in the environment

ITEM 2 (iv)

A businessman was selling salt mixed with particles of sand, tricking people who couldn't notice the difference between the salt and its mixture with sand. This made it difficult for residents to use the salt. They need your help to prevent future problems and avoid any chemical dangers





They trust your chemistry knowledge to clarify the situation and prevent further suffering.

Task.

Help the residents:

(a) Know the behavior of the substances in the mixture.
(b) Evaluate the problems associated with the use of one of the component in the mixture

ITEM 2 (v):

A group of s.3 learners came across data on melting points of elements whose identities they forgot to capture. They brought it to s.4 learners to help them analyze and interpret the data for them.

Element	X	Y	Z	W	A	Q	M
Atomic number	11	12	13	14	15	16	17
M.P/^{o}C	98	650	660	1410	44	119	-101

As a senior four learner with good knowledge about periodic trends,

(a) help them
  (i) understand the classes of the elements (ii) on how to interpret the data.
(b) suggest to them the possible uses and environmental impact of the elements

SECTION B

PART I: CONTRIBUTION OF CHEMISTRY TO OUR ECONOMY

(Extraction of Copper, iron, aluminium, manufacture of nitric acid, sulphuric acid, fertilizers, ethanol, detergents, sodium hydroxide, chlorine gas, oxygen gas and cement)

ITEM 1 (Cement)

The price of cement in Uganda is so high. However, the people in authority are attributing this to the limited amount of cement in the country because of the few manufacturing industries. A resolution was made to set up another cement factory in your village in Tororo District. The village members are wondering how this will be done. But the chairman has called for a meeting and has requested you to give a talk to the members.
As a chemistry learner,

TASK

Make a write up of your communication to the village members.

ITEM 2 (copper)

Uganda electrical engineer's forum has raised a concern of reduced copper wires in the country.
In response, the government has contracted an investor to set up a new copper extraction plant in Kasese, a copper ore rich district.
Unfortunately, the investor has some doubts on his scientific knowledge on the production process and the likely impact on the environment.





As a chemistry learner,

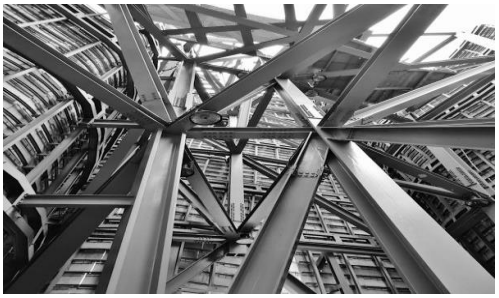
Task

Write a message to the investor to settle his doubts before his final interaction with residents.

ITEM 3 (iron)

Rushekye hills in Kisoro district Uganda are found to contain significant iron deposits. An investor wants to set up an iron and steel rolling factory to tap into the opportunity. The local leaders are debating about the project. However, they seem not to understand how iron can be obtained from its raw materials and consequently its benefits.





As a SENIOR FOUR candidate with the knowledge of chemistry, the residents are confident that you can provide the necessary information.

TASK

Prepare a presentation which you will use upon invitation.

ITEM 4 (fertilizers)

In Kabarole district most of the citizens survive on farming that involves growing of crops every season. For the last three seasons, farmers are registering a great decrease in the amount of the harvest they are making. The government has cleared a local investor to startup a fertilizer production plant in the district. However, the citizens are very much worried about the effects of the plant to the environment.
The chairperson LC5 of the district has appointed you to sensitize the citizens of the area.

Task

Prepare a presentation you will make during the meeting.

ITEM 5 (chlorine and sodium hydroxide)

At Lake Katwe in Kasese District, Uganda, there are significant rock salt deposits. Discussions are underway in your class regarding the operations of a proposed chlorine plant. Students are unclear about how chlorine is manufactured from raw materials and its advantages.



They need guidance on the production process, emphasizing safety and environmental concerns.

Task

Write down your presentation in the discussion.

ITEM 6(oxygen)

There is high demand of oxygen in referral hospitals in Uganda. An investor was contacted by government to set up an oxygen manufacturing plant at Namanve, one of the swamps near Kampala to tap into the opportunity. However, the residents seem not to understand how the process will occur plus its consequences and are resisting the project.

As a **senior four** candidate with the knowledge of chemistry, you are required to create awareness to the members and provide the necessary information.

TASK

Write a presentation you will use upon meeting them.

Item 7(soapy detergents)

A parent of a senior four candidate in one of the villages in Kaberamaido District belongs to a "women's development group". The members of the group have come up with a project idea of making soap which they think they can sell to the nearby shops and obtain revenue. However, none of the members has knowledge about soap making. But the parent suggested a name of an s.4 candidate to the executive committee of the group as a rescuer and the committee has approached him/her for guidance.

As a chemistry learner,

TASK

Write a brief message that candidate will deliver to the group members.

Item 8 (soapless detergents)

People in Kisinza village only have access to borehole water which is not effective in cleaning clothes when soap is used. A local investor has been cleared by government to set up an industry that makes soapless detergents in the area however he is facing resistance from the community members about the issue of starting up the factory and he is equally lacking knowledge about the manufacturing process.

The head teacher has appointed you to go and represent the school in the meeting organized by the chairperson of the area to settle the wrangles between the investor and the citizens of the area.

TASK

Write a message you would deliver in this meeting.

ITEM 8 (ethanol)

Many people in villages make a living by manufacturing local waragi (ethanol). However, the government is against the business due to associated challenges. The area Member of Parliament wants to sensitize the community about the large-scale production process and its impact to enable them understand the government position.

The area Member of Parliament has contacted you as a student with the knowledge of chemistry

in your village to provide relevant information.





Task:

Make a write-up to use upon meeting the community.

PART II: EXISTENCE OF NATURAL RESOURCES IN THE ENVIRONMENT AND THEIR IMPORTANCE IN EVERY DAY LIFE

ITEM 1 (Oil)

Recently, oil deposits were discovered in Western Uganda. A Chinese investor has been contracted by the government to extract the oil but the people around are scared of the outcomes. You have been invited by the LC chairman of that area to attend one of their meetings, and you are the only person who has some knowledge about natural resources, so the chairman has requested you to give a talk about the issue.





As a chemistry learner,

Task

Make a write up of your speech

ITEM 2 (rocks and minerals)

In Uganda, there are many mineral reserves and rocks. Due to the rapid population growth, their exploitation is causing proportional environmental degradation. The government through media houses wants to make public awareness on the matter.

Your school has been chosen to lead the environmental conservation campaign in your district. You have been chosen to present on one of the radio talk shows trusting your chemistry knowledge on natural resources.

TASK

Write down the information that can be conveyed

ITEM 3: (water)

Urbanization and industrialization have caused freshwater bodies to suffer from severe pollution. The Ugandan government aims to create public awareness regarding the natural resource through various initiatives.




One of the initiatives is to involve students with good knowledge of chemistry in radio talk shows.
TASK: Write the presentation you can use.

ITEM 4(air)

"Residents of Kampala are facing severe health risks due to poor air quality," was a headline in one of the recent editions of the New Vision newspaper. With the city's reputation tarnished and residents' health hanging in the balance, urgent action to raise awareness and clean the natural resource is needed, the paper continued to state.
The Kampala Capital City Authority (KCCA) is getting ready to improve the situation following the alarming revelation.
As a student of Chemistry who has learned about air as a natural resources

TASK

Write an article KCCA would use in response to the paper to sensitize the community of Kampala.

ITEM 5 (trees)
Uganda's forests are under pressure from illegal logging, agricultural expansion, and urban growth. Despite government attempts to advocate for sustainable forest management, these efforts have failed due to citizens' lack of awareness regarding the benefits and consequences.




Use your chemistry knowledge to create awareness on the matter.

TASK.
Make a write-up you can use upon meeting the citizens.

Item 6 (carbon based fuels)
In Uganda, people are voicing concerns about prolonged drought and unpredictable rain seasons, leading to difficulties in farming planning. The officer in charge of agriculture attributes these issues to the overuse of charcoal and kerosene for cooking, citing their environmental implications. However, many natives seem to struggle to grasp the connection between their energy consumption habits and the broader environmental impact.





You are expected to close a gap in understanding between the officer's perspective and the community's perception of the situation

TASK

Help the natives understand this connection better.

PRACTICAL ITEMS

Sample Item 1

A company is investigating an appropriate chemical method to generate heat for portable stoves. The idea involves using iron scrap to displace copper (II) ions in a chemical reaction, offering an eco-friendly alternative to fossil fuel stoves. The company aims to determine how much heat is produced by the reaction for every 25cm^3 of copper II sulphate solution used, so that they make it a viable option for outdoor cooking.

$$Fe(s) + Cu^{2+}(aq) \longrightarrow Cu(s) + Fe^{2+}(aq) + \text{Heat}$$

You are provided with:

- Solid P which is sample of Iron fillings from scrap
- BA1 which is Copper (II) sulphate solution
- Some apparatus

TASKS

(a) Design an experiment that can be used to determine the amount of heat evolved
(b) Carry out the experiment and determine the amount of heat involved
(c) Analyze the results and draw the conclusion

Sample Item 2

When baking cookies the process involves mixing baking soda with vinegar to create a chemical reaction that generates carbon dioxide gas. The gas makes the cookies rise and become fluffy

$$NaHCO_3(s) + CH_3COOH(aq) \longrightarrow CH_3COONa(aq) + CO_2(g) + H_2O(l)$$

One of the workers asked the manager why they use the powdered form not the granular form of the baking soda. The manager tried to explain the effect of particle size on the reaction but it still remained unclear to the worker. He took the worker to a laboratory and demonstrated using the reaction of magnesium with hydrochloric acid whose reaction rate also depends on particle size.

$$Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$$

You are provided with;

- Magnesium powder
- Magnesium granules
- Hydrochloric acid
- Some apparatus

TASK

(a) Design an experiment you would carry out to help the worker understand the manager's explanation
(b) Carry out the experiment and record you findings
(c) Analyze your results and draw a conclusion

Sample item 3

A chemical manufacturing company is testing a new lubricant for heavy machinery. It must have a freezing point above 60 to ensure it remains effective in extreme hot environments. The operations manager needs to verify whether the newly acquired lubricant meets this criteria to ensure its suitability for use.
You have been given a sample of solid **P** whose suitability as a raw material depends on its melting point.

TASK

(a) Design an experiment the factory can use.
(b) Carry out the experiment and record your findings
(c) Analyze the data and draw your conclusion

Sample item 4

A company is planning to use metal X and hydrochloric acid to produce hydrogen gas to be used in fuel cells for generating electricity. Heat generated or absorbed influences both the reaction speed and hydrogen quality. The company wants to determine the heat change for a reaction between the metal (X) and dilute hydrochloric acid to be able to make a decision on whether to use it or not.
Metal **X** reacts with hydrochloric acid according to the following equations;

$X(s) + 2HCl(aq) \longrightarrow XCl_2(aq) + H_2(g)$ + Heat

You are provided with:

- Solid P which is sample of metal X
- BA1 which is a dilute solution of hydrochloric acid
- Some apparatus

TASKS

(a) Design an experiment that can be used to determine the amount of heat involved during the reaction
(b) Carry out the experiment and obtain data to determine the amount of heat involved during the reaction.
(c) Analyze the data and draw your conclusion

Sample item 5

A healthcare company is developing a new chewable antacid tablet and is evaluating the potential use of a specific alkali, represented as $X(OH)_n$, as the active ingredient. The company wants to confirm if heat produced varies with the volume of acid added to the alkali and how much heat is produced by the reaction, so that they are able to work on dosage.

The alkali reacts with hydrochloric acid according to the following equation.

$$X(OH)_{n(aq)} + nHCl_{(aq)} \longrightarrow XCl_{n(aq)} + nH_2O_{(l)} + Heat$$

You are provided with:

- BA1 which is a sample solution of the alkali
- BA2 which is dilute hydrochloric acid

TASK:

(a) As a learner of chemistry;

(i) Design an experiment to determine the heat produced for every $20cm^3$ of BA1 used

(ii) Carry out the experiment and record your results appropriately

(b) (i) Obtain the maximum heat produced for the volume of BA1 used

(ii) What recommendation is useful to the company?

Sample item 6

A laundry service provider in one of the urban centers in Uganda has to choose the best water for effective washing with soap. He requested the men who supply to bring him samples from the two different water sources. He would want to discover which type of water minimizes soap wastage hence more effective in cleaning.

You are provided with:

BA1: which a soap solution
BA2: which is water sample from supplier A
BA3: which water sample from supplier B

Task:

(a)As a learner of chemistry;

(i) Design an experiment a laundry service provider can use

(ii) Carry out the experiment and record your findings.

(b) Show from your findings how the laundry service provider can make choice on the type of water to be used

INSTRUCTIONS TO THE TEACHER ON THE PRACTICAL ITEMS

Sample item 1

$50cm^3$ of BA1(1M copper (II) sulphate solution), 2g of iron powder, Plastic beakers, Thermometer, Measuring cylinder, Burette

Sample item 2

2M hydrochloric acid, Magnesium powder and magnesium granules, stop clock, thermometer

Sample item 3

P = Stearic acid or Naphthalene

Sample item 4

2 plastic beakers, 1 thermometer, 1 measuring cylinder of $50cm^3$ or $100\ cm^3$, 1 stop clock, weighing scale.
2M hydrochloric acid , solid P is Magnesium granules

Sample item 5

$50cm^3$ of BA1 (2M sodium hydroxide solution), $50cm^3$ of BA2, 1M hydrochloric acid), Plastic beakers, Thermometer, Measuring cylinder, Burette Pipette

Sample item 6

BA1 is a soap solution made by dissolving 6g of white star soap per litre of solution,
BA2 is water sample from supplier A made by dissolving 1.2 g of magnesium sulphate per litre of solution
BA3 is water sample from supplier B made by dissolving 0.5g of magnesium sulphate per litre of solution

SOLUTIONS

SECTION A

Food additives, Drugs and medicines, Nuclear processes, Soap

ITEM 1 (i)

(a) The ingredients used are **food additives** which are either: **Natural or Artificial/synthetic**,

(b) The food additives maintain or improve flavour, safety, freshness, texture and appearance of food.

(c)Excessive use of Artificial/synthetic food additives increases risk of high blood pressure and other communicable diseases, causing illness

Mitigation; Controlled amounts of artificial food additives should be used.

Both natural and artificial food additives have chemical compounds that are useful and some of which are harmful to the body but natural food additives have them in lower concentrations.
It is, therefore, advisable to use more of the natural ones than the synthetic additives.

ITEM 1 (ii)

(a) The product to use is **antibiotics,** which are **herbal**, or **modern**

(b) Inhibits growth of bacteria / kills bacteria

(c) Excessive use of the antibiotics causes **dizziness, headache, hearing loss, body organ damage hence health complications.**
Mitigated by: controlled use or following doctor's prescription

Evaluation: Both herbal and modern medicines are used to kill bacteria, but modern medicines are needed in smaller amounts and take a shorter time to cure the disease

ITEM 1 (iii)

(a) The product is **detergents**, which are either **soapy** or **soapless**

Mode of action: The detergents facilitate the emulsification and removal of grease /oil / dirt.

Alternatively

Detergents facilitate breakdown of fats into small parts.

A soap molecule contains two parts; namely; the water-soluble /polar carboxylate head / hydrophilic end and non-polar tail/fat soluble part / hydrophobic part.
-During washing, soap acts by lowering the surface tension between water and oil/grease/other water insoluble materials and also emulsifies them. The hydro-carbon tail becomes attached to dirt /oil /fat while the polar head dissolves in water. With constant agitation, the dirt is pulled off the cloth and gets dispersed in water as tiny droplets which are then poured away. The cloth is then rinsed several times and dried.

(b) Soapy detergents contain chemicals that can cause:
- Skin burns / blisters / skin irritation and hence pain or cancer mitigated by thoroughly washing the affected areas or by use of gloves during washing
- Eye redness and pain; hence loss of vision mitigated by thoroughly washing the affected areas
- Soapless detergents contain phosphates which cause algae bloom and hence polluting water that kills the aquatic organisms

Evaluation of the products

Similarities:

- Both soapy detergents and soapless detergents are salts of Organic acids of long carbon chain.
- Both soapy detergents and soapless detergents are effective cleansing agents in soft water / rain water.

Differences;

Soapy detergents	**Soapless detergents**
• Form scum with hard water	• Do not form scum with any form of water
• Gentle on skin during cleansing	• Not gentle on skin during washing
• Sodium salts of carboxylic acid of long chains and cannot be used in strongly acidic solutions	• Sodium salts of long chain benzene sulphonic acids and can be used in strongly acidic solutions
• Are biodegradable	• Are non-biodegradable

ITEM 1 (iv):

(a) The process is **nuclear reactions**, categorized into: **Nuclear fission** and **nuclear fusion**

(b) When uranium is bombarded with fast moving neutrons its atomic mass increases and the nucleus becomes unstable. Therefore it spontaneously splits into two lighter nuclei, three neutrons and energy. The three neutrons cause more successive disintegration, amplifying the energy given out. This can be used to boil water to steam which can eventually drive turbines and produce electricity.

Equation

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3{}^{1}_{0}n + \text{energy}$$

However, the process has the following challenges

- The energy emitted can cause **mutations**, i.e. the emissions can cause sudden change in the arrangement of DNA/the genetic composition of the cells, hence **altering characteristics of organism.** This can be **mitigated** by wearing protective gears such as lead coats.
- The energy emitted can cause **cancer** resulting into **death, mitigated** by wearing protective gears such as lead coats or by posting warning information in the working area

(c) - **Both produce energy**, **but nuclear fission produces more energy than nuclear fusion**
- **Both are initiated by energy**, **but nuclear fusion requires a lot of energy to start** while nuclear fission requires little energy to start

TRENDS, POLYMERS, QUANTITY OF MATTER, PERIODIC TABLE, STRUCTURES AND BONDS

ITEM 2 (i):

a) He should realize that packaging materials may be;
Synthetic/artificial because they are man- made e.g. polyethene bags or **Natural** because they are God made e.g. cellulose in paper bags.

b) - Polyethene is tough

- It is insoluble in water
- Water proof
- Durable
  Suitable for making packing bags for wet products.

Alternatively,

- Paper can easily be decomposed by fungi and bacteria (biodegradable),
- it is foldable
- absorbs moisture
- it is stiff
- strong
  Suitable for making packing boxes for dry products.

Impact to the environment

- Polyethene is non- biodegradable, hence pollutes the soil environment, limiting free circulation of water and air in the soil

Mitigation; Reduce on its use, dispose it off properly, reuse or recycle.

- Paper easily catches fires, so can lead to fire outbreaks and damage

Mitigation; not using it near fire

ITEM 2 (ii):

(a) X is a **metal**, since it forms ions by loss of electrons, for example Calcium.

(b) Mass of oxygen in the oxide = 0.5 – 0.3 = 0.2g

Symbols of elements in the oxide	X	O
Composition by mass	0.3	0.2
Number of moles	$\frac{0.3}{24}$ = 0.0125	$\frac{0.2}{16}$ = 0.0125
Simplest ratio (mole ratio)	$\frac{0.0125}{0.0125}$	$\frac{0.0125}{0.0125}$
	1	1

Hence the formula of the oxide is **XO**

(c) - When in contact with drinking water, especially in large amounts can cause **cancer** leading to death,**mitigated** by purifying the water
- Their accumulation in soil can be absorbed by plants which are consumed by humans causing **cancer** and then**death**, **mitigated** by consuming plant materials with the right amount of mineral content
- When contaminated in air can be **inhaled**, hence **causing respiratory diseases**
  Mitigated by purifying the air

ITEM 2 (iii)

(a) Salt is **an ionic compound** because it is formed by complete transfer of electrons from a metal to a non-metal atom, e.g. sodium chloride
It has the following characteristics

- dissolves readily in water
- it is a crystalline solid at room temperature
- conduct electricity in molten and aqueous state
- has a high melting and boiling point
- its composed of particles called ions

Alternatively

Sand is a covalent compound because it is formed as a result of sharing electrons between non-metal atoms
It has the following characteristics
- does not dissolves in water
- does not conduct electricity
- has a giant covalent structure
- exists as a molecule
- is not made up of ions

Uses

Salt is used as a flavour enhancer, used as a preservative.

Sand is used during construction, used as an electrical insulator

(b) - Over use of the salt can lead to **high blood pressure** that may result into **death**, **mitigated** by using it in regulated amounts
- lead to **kidney disorders** causing **illness**, **mitigated** by using it in regulated amounts

ITEM 2 (iv):

(a) (i) X, Y and Z are metals, since they form ions by loss of electrons, for example calcium and potassium
A, Q and M are nonmetals, since they forms ions by gain of electrons, for example oxygen, sulphur
W is a metalloid because it has both metallic and non-metallic properties, for example silicon
(ii) There is a sharp increase in melting points from X to Y because of the decrease in atomic radius and increase in the number of electrons each metal atom contributes towards metallic bond formation resulting into stronger metallic bonds
Melting point increases slightly from Y to Z because of the slight increase in the strength of the metallic bond due to the decrease in the atomic radius
W has the highest melting point because it adopts a giant atomic structure with many strong covalent bonds that require a lot of heat energy to break.
A, Q and M are non-metals which exist as molecules with simple molecular structures and the melting point decreases with decrease in the strength of the Van derWaals forces due to decreasing molecular mass.

(b) **Uses**

Metals are used in electronic devices, in construction, manufacture of aeroplanes
Non-metals are used as electrical insulators, manufacture of drugs,fertilizers
Metalloids, used in production of alloys, as flame retardants, as semiconductors in the manufacture of dry cells and batteries

Environmental impacts

Metals

- when in contact with drinking water, especially in large amounts can cause cancer leading to death **mitigated** by purifying the water
- their accumulation in soil can be absorbed by plants which are consumed by humans causing cancer leading to death, **mitigated** by consuming plants with the right amount of mineral content
- when contaminated in air can be inhaled, hence causing respiratory diseases, **mitigated** by purifying the air

Nonmetals

When burnt in air produce acidic gases which pollute the atmosphere causing respiratory diseases, **mitigated** by burning them cautiously

Metalloids

During mining, smelting and industrial processes, they can **get in contact with water and soil**, polluting them and **causing harm to organisms**, **mitigated** by handling them carefully during the above named processes

SECTION B

PART I:

Contribution of chemistry to our economy

Copper, iron, aluminium, nitric acid, sulphuric acid, fertilizers, ethanol, detergents, sodium hydroxide, chlorine gas, bio gas, oxygen gas, cement

Item 1 (cement)

Raw materials; lime stone, sand and clay

Process of production;
The lime stone obtained from the quarry is mixed with sand and clay in the correct proportions and crushed into a fine powder.
The powder is then mixed with water and allowed to flow down a **rotating tank** (**or cylinder or cement kiln**) where it is strongly heated at about 1500°C
Limestone decomposes into calcium oxide and carbon dioxide
$CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$
Calcium oxide reacts with sand forming calcium silicate and also reacts with aluminium oxide forming calcium aluminate.
$2CaO(s) + SiO_2 \longrightarrow Ca_2SiO_3$
$3CaO(s) + Al_2O_3 \longrightarrow Ca_3Al_2O_6$
Calcium silicate and calcium aluminate form a mixture called clinker
Gypsum is added to clinker to moderate the setting of the cement and the lumps are then crushed by machine to obtain the fine cement powder
$Clinker + CaSO_4.2H_2O \longrightarrow Cement$

Side effects of the process of production

- **Effluent discharge** from the cement plant can **contaminate water bodies**, affecting aquatic life and quality of water, **mitigated** by treatment of waste water through sedimentation and filtration before discharge / recycling the water with in the plant.
- **Carbon dioxide emissions** to the atmosphere can **cause global warming**, this is **mitigated** by recycling of carbon dioxide
- **Inhalation of air contaminated** with cement dust **causes respiratory diseases**, **mitigated** by wearing personal protective equipments

Social benefits

- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** through taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**

- **Production of cement for use** during **construction** by the community members, **hence acquiring better houses**

ITEM 2 (copper)
Raw materials used; Copper pyrites ($CuFeS_2$)

Process of production;

The ore (copper pyrites) is crushed into powder and mixed with water containing special oils called frothing agents.

Air is brown into the mixture and a froth forms. Earthly impurities in the ore are wetted with water and sink to the bottom of the **flotation tank** while the copper pyrites floats on the surface in the froth.

The froth is skimmed off, and an acid added to it to break it.
The ore is filtered off, dried and roasted to convert it to copper(I) sulphide, sulphur dioxide and iron (II) oxide

$$2CuFeS_2(s) + 4O_2(g) \longrightarrow Cu_2S(s) + 2FeO(s) + 3SO_2(g)$$

Sand is then added and the mixture heated in absence of air to convert iron(II) oxide to iron (II) silicate liquid.

$$FeO(s) + SiO_2 \longrightarrow FeSiO_3(l)$$

The ore is then heated in a controlled amount of air to produce impure copper and sulphur dioxide;

$$Cu_2S(s) + O_2(g) \longrightarrow 2Cu(s) + SO_2(g)$$

Or, $2Cu_2S(s) + 3O_2(g) \longrightarrow 2Cu_2O(s) + 2SO_2(g)$
Then; $Cu_2S(s) + 2Cu_2O(s) \longrightarrow 6Cu(s) + SO_2(g)$
The copper produced is then **purified by electrolysis of copper (II) sulphate** using this produced impure copper as the anode and a pure copper as the cathode
The impure copper anode dissolves in the electrolyte producing copper (II) ions which move to the cathode where they are discharged to form pure copper.
Anode: $Cu(s) \longrightarrow Cu^{2+}(aq) + 2e$
Cathode: $Cu^{2+}(aq) + 2e \longrightarrow Cu(s)$
Side effects of the process of extraction of copper

- **Release of sulphur dioxide** causes **air pollution resulting into acid rains that affect plant growth** and also causes **global warming**, **mitigated** by treatment of the gas or installing catalytic converters in the exhaust pipes
- **Exposure to copper fumes** or **dust** can cause **poisoning leading to cancer and even death**, **mitigated** by personal protective equipments

Social benefits
- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** through taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society** improving standards of living
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**

ITEM 3 (iron)

Raw materials: Iron ore e.g. Haematite, Coke, Lime stone and air
Process of production;
Iron is extracted from its ores using a **blast furnace**

Haematite, coke and limestone are mixed together and introduced into the **blastfurnace** from the top up where hot air is forced

As the hot air rises up the furnace it reacts with the coke to form carbon dioxide.

i.e. $C(s) + O_2(g) \longrightarrow CO_2(g)$

As the carbon dioxide formed rises up the furnace it is reduced by the unburnt coke to carbon monoxide

i.e. $C\ O_2(g) + C(s) \longrightarrow 2CO(g)$

The carbon monoxide then reduces the haematite to molten iron;

$2Fe_2O_3(s) + 3CO(g) \longrightarrow 4Fe(s) + 3CO_2(g)$

The molten iron then sinks to the bottom of the furnace where it is topped off

The lime stone decomposes into calcium oxide which reacts with the sand, a major impurity in haematite to form slag which drops to the bottom of the furnace and floats on top of the molten iron.

$CaCO_3(s) \longrightarrow CaO(s) + CO(g)$

$CaO(s) + SiO_2(g) \longrightarrow CaSiO_3(l)$

The iron obtained is impure and can be **purified by converting it onto wrought iron, by oxidizing the impurities**

Side effects of the process of extraction

- **Emission of poisonous gases** leading to **air pollution that may cause suffocation** hence illness or death, **mitigated** by treatment of these gases before emission to the atmosphere
- The **un reacted carbon dioxide can escape** into the atmosphere causing **global warming**, **mitigated** by recycling the carbon dioxide
- **Emission of heat** from the furnace causing **rise of temperature of the surrounding environment, which affects the people**, **mitigated** by installing heat absorbers around the furnace

Social benefits of process of extraction of iron

- Source of employment opportunities in the factory, hence improved income and therefore better standards of living
- Increased government revenue through taxes hence improvement of infrastructure such as roads, schools, health facilities leading development of the society and better lives
- **Provision of market** for local goods of the community members, hence **generating income**, leading to **better lives**

ITEM 4 (fertilizers)

The local investor will produce ammonium sulphate or ammonium nitrate fertilizer and the production will be as follows

For ammonium sulphate,

Raw materials; Nitrogen from the air, Hydrogen from water gas, sulphur and air

Process of production;

First is the production of ammonia

Nitrogen and hydrogen gases are purified, dried and mixed in a volume ratio of 1:3 respectively in a **reactor vessel**.

The mixture is passed over finely divided iron catalyst, at a low temperature of 400 -500^oC under high pressure of 200 atm, hence forming ammonia, through the Haber process.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

Then, sulphuric acid is manufactured by the contact process

Sulphur is burnt in air to produce sulphur dioxide

$S(s) + O_2(g) \longrightarrow SO_2(g)$

Sulphur dioxide, is purified and dried to prevent poisoning of the catalyst. It is then heated with dry pure oxygen gas at a low temperature of 400 – 500^oC under high pressure of about 1 – 3 atm in the presence of vanadium (v) oxide forming sulphur tri oxide.

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

Sulphur trioxide is then dissolved in a little concentrated sulphuric acid to produce a fuming liquid called oleum.

$SO_3(g) + H_2SO_4(l) \longrightarrow H_2S_2O_7(l)$

The oleum is diluted with a known amount of water to give 98% concentrated sulphuric acid.

$H_2S_2O_7(l) + H_2O(l) \longrightarrow 2H_2SO_4(aq)$

Ammonium sulphate is then formed by reacting ammonia gas with concentrated sulphuric acid

$2NH_3(g) + H_2SO_4(l) \longrightarrow (NH_4)_2SO_4(s)$

The fertilizer is then **concentrated by crystallization**

For ammonium nitrate fertilizer nitric acid will be manufactured as follows

Ammonia gas from the Haber process is burnt in dry pure oxygen of the air, in the presence of platinum catalyst, to form nitrogen monoxide gas with in a **reaction vessel**

$4NH_3(g) + 5O_2(g) \longrightarrow 4NO(g) + 6H_2O(l)$

Nitrogen monoxide formed is then reacted with oxygen to form nitrogen dioxide gas;

$2NO(g) + O_2(g) \longrightarrow 2NO_2(g)$

Nitrogen dioxide gas is then mixed with oxygen and the mixture absorbed in water to form nitric acid

$4NO_2(g) + O_2(g) + 2H_2O(l) \longrightarrow 4HNO_3(aq)$

The nitric acid formed is then reacted with ammonia to form ammonium nitrate fertilizer which is concentrated by crystallization

$NH_3(g) + HNO_3(aq) \longrightarrow NH_4NO_3(s)$

Side effects of the process of production of fertilizers

Emission of ammonia, nitrogen oxides and sulphur oxides **can pollute the air, causing respiratory problems** and **environmental issues**, **mitigated** by installing catalytic converters to convert them to less toxic substances.

Social benefits

- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** through taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Development of small scale businesses**, hence generating income, leading to **better lives**
- **Availability of fertilizers**, hence **better plant growth** in the community **leading increased crop yields**.

ITEM 5 (chlorine and sodium hydroxide)

NOTE: This item requires manufacture of chlorine, but the solution also gives room for manufacture of sodium hydroxide

Raw materials used; Brine (concentrated sodium chloride solution)

Process of production;

Sodium hydroxide and chlorine are manufactured by electrolysis of brine

Brine which mainly contains sodium ions, chloride ions, is placed in a **diaphragm cell** that consists of a graphite anode and a steel cathode.

Brine ionizes according to the equation;

$NaCl(aq) \longrightarrow Na^{+}(aq) + Cl^{-}(aq)$

The sodium ions migrate to the cathode where they are preferentially discharged to form sodium which reacts with water to form **sodium hydroxide** solution that can be **purified by evaporation to dryness** to form solid sodium hydroxide,

$Na^{+}(aq) + e \longrightarrow Na(s)$
$2Na(s) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g)$

Chloride ions migrate to the anode where they are preferentially discharged to form chlorine gas which is then packed in strong cylinders.

i.e. $2Cl^{-}(aq) \longrightarrow Cl_2(g) + 2e$

Side effects of the process of production;

- **Contact with sodium hydroxide** causes **severe burns to the eyes, skin, digestive system resulting into permanent damage of the body organs and even death**, **mitigated** by wearing personal protective gears
- **Repeated inhalation of sodium hydroxide vapor** causes **lung damage**, **mitigated** by wearing protective gears
- **Inhalation of chlorine** can **cause death** as it is a poisonous gas, **mitigated** by wearing protective gears
- **Escape of chlorine into the surrounding atmosphere** can **pollute the resulting into acid rain which leads to crumbling of buildings**, **lowering soil pH** and **corrosion of roofs made of iron**, **mitigated** by regular maintenance of the plant.

Social benefits

- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** from taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**
- **Provision of sodium hydroxide** which is **used as a raw material in the manufacture of soap**, hence the **community members can easily wash their clothes and be clean**
- **Provision of chlorine** which is used **to treat water**, hence **killing germs and minimizing infections among the community members**

ITEM 6 (oxygen)

Raw material; liquid air / air.

Process of production;

Air is passed through **air filters** to remove dust and smoke particles. It is then passed through concentrated sodium hydroxide solution to remove carbon dioxide,

$2NaOH(aq) + CO_2(g) \longrightarrow Na_2CO_3(aq) + H_2O(l)$.

Air free from carbon dioxide is now passed through Silicon(IV) oxide to absorb water vapour. Carbon dioxide and water vapour are removed from air before it is liquefied because they would solidify and block the apparatus.
The air is then compressed at 200 atmospheres and allowed to cool by making it escape into a large space through a jet.
The process of cooling is repeated several times to obtain liquid air at about –200°C. The liquid air is **fractionally distilled** using a **fractionating column / tower**.
Nitrogen boils off first because it has a lower boiling point (–196°C) leaving behind oxygen with a higher boiling point (-183°C). . Pure oxygen is then stored under pressure in steel cylinders.

Side effects of the process of production
- Explosion of oxygen cylinders due to high pressure **causing injuries and fire outbreaks** also **resulting into damage to equipment**, **mitigated** by;
* regular maintenance and monitoring of cylinders.
* keeping cylinders in cool areas to avoid exposure to heat.

- Exposure to liquid oxygen can **cause severe skin and eye irritations and burns, loss of vision and cancer**, m**itigated by**:
* Posting hazard and warning information in the working area.
* Communicating all information on the health and safety hazards of oxygen to potentially exposed workers; for example; submerging the affected body parts in warm water.

Social benefits
- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** from taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Development of small scale businesses**, hence **generating income**, leading to **better life**
- **Availability of oxygen for patients**, hence **saving lives of the people in the area** and living a **better health**

Item 7 (soapy detergents)
Raw materials; vegetable oil, concentrated sodium hydroxide, concentrated sodium chloride

Process of production;

Vegetable is mixed with concentrated sodium hydroxide solution (or potassium hydroxide solution) in a **non aluminium tank** and the mixture boiled while stirring until no further change occurs, and allowed to cool.

Concentrated sodium chloride solution is added into the mixture to precipitate (salt out) soap from the solution. Solid soap is skimmed off, washed and dried.

Side effects of the process of production
- **Discharge of wastewater containing surfactants solvents, phosphates and other chemicals into water bodies** can cause **contamination** or **pollution**, **harming aquatic life and affecting water quality**, **mitigated** by treatment of the wastes
- **Accidental spills or leaks of raw materials and finished products** can lead to **contamination** or **pollution**, affecting soil fertility and hence plant growth, **mitigated** by use of proper storage and handling procedures for raw materials and chemicals.

Social benefits

- Source of revenue to the government through taxes, hence, improved infrastructures for example; health facilities, roads etc hence improvement in the other sectors such as health and transport resulting into living a better life.
- Source of **employment** resulting into **improved income** hence, **better standards of living**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**
- **Provision of soap for use by the community members** to be used for **washing and bathing hence maintaining maintain cleanliness**

Item 8 (soapless detergents)
Raw materials: concentrated sulphuric acid, long chain of alkyl benzene, sodium hydroxide
Process of production
A long chain of alkyl benzene is heated with concentrated sulphuric acid in a **reactor vessel** to form alkyl benzene sulphonate, which is then cooled and then reacted with sodium hydroxide solution to form alkyl benzene sodium sulphonate which is then **purified by evaporation**, **evaporated** and cooled to obtain the soapless detergent.

Side effects
When the non-biodegradable soapless detergents **leak to water, they pollute it causing death of aquatic organisms, mitigated by**, not pouring water containing soapless detergents near water bodies.

Social benefits, same as above

ITEM 9 (ethanol)
Raw material: bananas, sorghum, water

Process of production
The bananas are covered after harvesting for about a week to ripen. The carbohydrates are converted into maltose by means of enzymes diastase
The ripe bananas are put in a **wooden trough** and then squeezed between spear grass to extract the juice from them while adding water.
The mixture is filtered to obtain juice
Sorghum which has been roasted is added to the filtered juice and the mixture is stored.
The mixture is then covered in a warm place to cut off oxygen supply to allow fermentation to occur.
Yeast from sorghum provides maltase enzyme which catalyses hydrolysis of maltose to glucose
Zymase enzyme from yeast catalyses the decomposition of glucose to ethanol which is crude
The crude ethanol is **purified by fractional distillation** to obtain pure ethanol.
Side effects
Bursting of distilling tanks, causing **wounds and even death to the workers**, **mitigated** by regular inspection and maintenance of the distilling tank

Social benefits
- Source of **employment** resulting into **improved income** hence, **better standards of living**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**
- **Provision of ethanol to the community members** or **use as a sanitizer and disinfector** hence **living a better health**

PART II
Natural resources

ITEM 1 (Oil)

Category of the natural resource: Oil is a **non renewable natural resource** because it cannot be replenished / replaced by natural processes in man's life time or it gets used up.

Composition: alkanes, alkynes, paraffin, petrol and diesel.

Impact of the human activities on the natural resource

- **combustion of oil, releases** carbon dioxide **which can results into acid rain that interferes with the soil pH**, hence affecting plant growth, also leads to **global warming**
  Mitigated by increased afforestation such that the trees absorb carbon dioxide
- **Oil spills by humans** can **reach water bodies cutting off oxygen supply causing suffocation of aquatic animals**.
  Mitigated by proper waste management routines

Importance of the natural resource

When purified it produces various chemicals like motor fuels, lubricants, paints, detergents, drugs, etc.

ITEM 2 (rocks and minerals)

Category of the natural resource

Rocks and minerals are **non-renewable natural resources** because they cannot be replenished / replaced by natural processes in man's life time. **Or** they get used up.

They are categorized as: **Igneous rocks, Sedimentary rocks** and **Metamorphic rocks**

- **Igneous rocks** , comprising of minerals like **Quartz**, **Feldspar**, and **Olivine**
- **Sedimentary rocks**, composed of minerals like **Calcite**, **Quartz**, **Clay materials**, **Gypsum**
- **Metamorphic rocks**, composed of minerals like **Garnet**, **Mica(biotite** and **muscovite)**,**Quartz** and **Feldspar** (**Marble** or **Gneiss**)

Impact of the human activities on the natural resource

- **Stone quarrying produces dust particles** which **erode into water bodies, hence reducing on its quality**
  Mitigation extracting carefully and use of personal protective equipments
- **Stone quarrying and mineral extraction removes top soil and ditches** which **degrades the soil environment**, **hence affecting growth of plants, hence destruction of vegetation cover**
- **Mineral extraction** results into **breaking of rocks into smaller stones and gravels** which **depreciates the rocks**
  Mitigation, careful extraction

Importance of the natural resource

- Rocks are broken into hard core, gravel or panels used as materials for construction of roads, bridges, houses
- They are usefully in formation of soil by a process of weathering

ITEM 3: (water)

Category: Water is a renewable natural resource because it can be replaced/replenished by natural processes in man's life time.

Composition: Dissolved oxygen, mineral salts, aquatic plants and big animals as well as microorganisms and pollutants from man's activities.

Impact

Release of hot water as an effluent from industries into the water bodies, **increase the temperature of the water** bodies killing aquatic organisms. **Mitigated by** cooling the water before discharge and use of hot water reservoirs

Excessive use of fertilizers during crop farming, which infiltrate into water bodies, hence **polluting water**, **resulting into eutrophication** of nearby water bodies

Mitigated by use of organic fertilizers e.g. manure from both animal and plant waste which are biodegradable and reduce on use of synthetic fertilizers

Importance
Water bodies are very useful in rain formation which is useful for proper plant growth

ITEM 4 (air)
Category: Air is a renewable natural resource because it can be replaced/replenished in man's life time.

Composition: Nitrogen gas, oxygen gas, carbon dioxide gas, rare gases, water vapour and dust.

Impact
Burning of fossil fuels, increases amount of carbon dioxide gas thus **trapping a lot of heat in the atmosphere thereby causing global warming** and **consequently desertification**.
Mitigated by increased afforestation to absorb carbon dioxide from the atmosphere as quickly as it is formed

Importance
Air contains oxygen which is used for respiration and carbon dioxide which is used for photosynthesis

ITEM 5 (trees)
Category: Trees and natural vegetation are renewable natural resources because they can be replaced/replenished by natural processes in man's life time.

Composition Trees and natural vegetation are made up of cellulose which is a carbohydrate (made up of important elements like carbon, hydrogen and oxygen), and other minerals such as magnesium, nitrogen, etc.

Impacts
Charcoal burning involves **cutting down of trees which leads to deforestation** and **loss of habitat for wild animals**. **Mitigation:** use of charcoal briquettes made from waste organic materials, afforestation

Massive cutting down of tress leads to **increased amount of carbon dioxide** in the atmosphere resulting into **increasing temperatures of the earth**
Mitigation: Planting more trees

Importance
Trees provide herbal medicine, provide food, and purify air by adding oxygen and removing carbondioxide

END

GRAND O'LEVEL CHEMISTRY SEMINAR AT ST. JOSEPH'S S.S.S NAGGALAMA

28TH SEPTEMBER 2024

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CHEMISTRY; PAPER 1; 545/1

SOLUTIONS

SECTION A

Food additives, Drugs and medicines, Nuclear processes, Soap

ITEM 1 (i)

(a) The ingredients used are **food additives** which are either: **Natural or Artificial/synthetic**,

(b) The food additives maintain or improve flavour, safety, freshness, texture and appearance of food.

(c)Excessive use of Artificial/synthetic food additives increases risk of high blood pressure and other communicable diseases, causing illness

Mitigation; Controlled amounts of artificial food additives should be used.

Both natural and artificial food additives have chemical compounds that are useful and some of which are harmful to the body but natural food additives have them in lower concentrations.
It is, therefore, advisable to use more of the natural ones than the synthetic additives.

ITEM 1 (ii)

(a) The product to use is **antibiotics,** which are **herbal**, or **modern**

(b) Inhibits growth of bacteria / kills bacteria

(c) Excessive use of the antibiotics causes **dizziness, headache, hearing loss, body organ damage hence health complications.**
Mitigated by: controlled use or following doctor's prescription

Evaluation: Both herbal and modern medicines are used to kill bacteria, but modern medicines are needed in smaller amounts and take a shorter time to cure the disease

ITEM 1 (iii)

(a) The product is **detergents**, which are either **soapy** or **soapless**

Mode of action: The detergents facilitate the emulsification and removal of grease /oil / dirt.

Alternatively

Detergents facilitate breakdown of fats into small parts.

A soap molecule contains two parts; namely; the water-soluble /polar carboxylate head / hydrophilic end and non-polar tail/fat soluble part / hydrophobic part.

-During washing, soap acts by lowering the surface tension between water and oil/grease/other water insoluble materials and also emulsifies them. The hydro-carbon tail becomes attached to dirt /oil /fat while the polar head dissolves in water. With constant agitation, the dirt is pulled off the cloth and gets dispersed in water as tiny droplets which are then poured away. The cloth is then rinsed several times and dried.

(b) Soapy detergents contain chemicals that can cause:

- Skin burns / blisters / skin irritation and hence pain or cancer mitigated by thoroughly washing the affected areas or by use of gloves during washing
- Eye redness and pain; hence loss of vision mitigated by thoroughly washing the affected areas
- Soapless detergents contain phosphates which cause algae bloom and hence polluting water that kills the aquatic organisms

Evaluation of the products

Similarities:

- Both soapy detergents and soapless detergents are salts of Organic acids of long carbon chain.
- Both soapy detergents and soapless detergents are effective cleansing agents in soft water / rain water.

Differences;

Soapy detergents	**Soapless detergents**
• Form scum with hard water	• Do not form scum with any form of water
• Gentle on skin during cleansing	• Not gentle on skin during washing
• Sodium salts of carboxylic acid of long chains and cannot be used in strongly acidic solutions	• Sodium salts of long chain benzene sulphonic acids and can be used in strongly acidic solutions
• Are biodegradable hence do not pollute the environment	• Are non-biodegradable hence pollute the environment

ITEM 1 (iv):

(a) The process is **nuclear reactions**, categorized into: **Nuclear fission** and **nuclear fusion**

(b) When uranium is bombarded with fast moving neutrons its atomic mass increases and the nucleus becomes unstable. Therefore it spontaneously splits into two lighter nuclei, three neutrons and energy. The three neutrons cause more successive disintegration, amplifying the energy given out. This can be used to boil water to steam which can eventually drive turbines and produce electricity.

Equation

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3{}^{1}_{0}n + \text{energy}$$

However, the process has the following challenges

- The energy emitted can cause **mutations**, i.e. the emissions can cause sudden change in the arrangement of DNA/the genetic composition of the cells, hence **altering characteristics of organism.** This can be **mitigated** by wearing protective gears such as lead coats.
- The energy emitted can cause **cancer** resulting into **death, mitigated** by wearing protective gears such as lead coats or by posting warning information in the working area

(c) - **Both produce energy**, **but nuclear fission produces more energy than nuclear fusion**
- **Both are initiated by energy**, **but nuclear fusion requires a lot of energy to start** while nuclear fission requires little energy to start

TRENDS, POLYMERS, QUANTITY OF MATTER, PERIODIC TABLE, STRUCTURES AND BONDS

ITEM 2 (i):

a) He should realize that packaging materials may be;
Synthetic/artificial because they are man- made e.g. polyethene bags or **Natural** because they are God made e.g. cellulose in paper bags.

b) - Polyethene is tough
- It is insoluble in water
- Water proof
- Durable
Suitable for making packing bags for wet products.

Alternatively,
- Paper can easily be decomposed by fungi and bacteria (biodegradable),
- it is foldable
- absorbs moisture
- it is stiff
- strong
Suitable for making packing boxes for dry products.

Impact to the environment

- Polyethene is non- biodegradable, hence pollutes the soil environment, limiting free circulation of water and air in the soil
Mitigation; Reduce on its use, dispose it off properly, reuse or recycle.
- Paper easily catches fires, so can lead to fire outbreaks and damage
Mitigation; not using it near fire

ITEM 2 (ii):

(a) X is a **metal**, since it forms ions by loss of electrons, for example Calcium.

(b) Mass of oxygen in the oxide = 0.5 – 0.3 = 0.2g

Symbols of elements in the oxide	X	O
Composition by mass	0.3	0.2
Number of moles	$\frac{0.3}{24} = 0.0125$	$\frac{0.2}{16} = 0.0125$
Simplest ratio (mole ratio)	$\frac{0.0125}{0.0125}$	$\frac{0.0125}{0.0125}$
	1	1

Hence the formula of the oxide is **XO**

(c) - When in contact with drinking water, especially in large amounts can cause **cancer** leading to death, **mitigated** by purifying the water
- Their accumulation in soil can be absorbed by plants which are consumed by humans causing **cancer** and then **death**, **mitigated** by consuming plant materials with the right amount of mineral content
- When contaminated in air can be **inhaled**, hence **causing respiratory diseases**
Mitigated by purifying the air

ITEM 2 (iii)

(a) The product is a **covalent compound**, because **it is formed by sharing of electron between non-metal atoms**, examples include sulphur dioxide , ammonia, etc

(b) It has the following properties
- does not dissolves in water
- does not conduct electricity
- has a giant covalent structure
- exists as a molecule
- is not made up of ions

The product is used in;
- fire extinguishers to put out fire
- the manufacture of fizzy drink to improve on the taste and to preserve them

(c) **From the equation**,
12 g of charcoal produces 24*l* of the product at s.t.p

Then,
The 80.5 g of used will produce $\frac{80.5 \times 22.4}{12}$ *l* of the product
= 150.3 *l* of the product at s.t.p

The product has the following dangers:
Its **accumulation in the atmosphere**, causes an **increase in the temperature of the earth** that **causes discomfort to people and other animals**, **death of plants due to increased transpiration**.
This is mitigated **by planting trees** to absorb it.

Its accumulation in the atmosphere causes acid rains that cause crumbling of buildings and change in soil pH. Mitigated **by planting trees** to absorb it.

ITEM 2 (iv)

(a) Salt is **an ionic compound** because it is formed by complete transfer of electrons from a metal to a non-metal atom, e.g. sodium chloride
It has the following characteristics
- dissolves readily in water
- it is a crystalline solid at room temperature
- conduct electricity in molten and aqueous state
- has a high melting and boiling point
- its composed of particles called ions

Alternatively

Sand is a covalent compound because it is formed as a result of sharing electrons between non-metal atoms
It has the following properties
- does not dissolves in water
- does not conduct electricity
- has a giant covalent structure
- exists as a molecule
- is not made up of ions

Uses

Sand is used during construction, used as an electrical insulator

(b) - Over use of the salt can lead to **high blood pressure** that may result into **death**, **mitigated** by using it in regulated amounts
- lead to **kidney disorders** causing **illness**, **mitigated** by using it in regulated amounts

ITEM 2 (v):

(a) (i) X, Y and Z are metals, since they form ions by loss of electrons, for example calcium and potassium
A, Q and M are nonmetals, since they forms ions by gain of electrons, for example oxygen, sulphur
W is a metalloid because it has both metallic and non-metallic properties, for example silicon

(ii) There is a sharp increase in melting points from X to Y because of the decrease in atomic radius and increase in the number of electrons each metal atom contributes towards metallic bond formation resulting into stronger metallic bonds
Melting point increases slightly from Y to Z because of the slight increase in the strength of the metallic bond due to the decrease in the atomic radius
W has the highest melting point because it adopts a giant atomic structure with many strong covalent bonds that require a lot of heat energy to break.
A, Q and M are non-metals which exist as molecules with simple molecular structures and the melting point decreases with decrease in the strength of the Van derWaals forces due to decreasing molecular mass.

(b) **Uses**

Metals are used in electronic devices, in construction, manufacture of aeroplanes
Non-metals are used as electrical insulators, manufacture of drugs,fertilizers
Metalloids, used in production of alloys, as flame retardants, as semiconductors in the manufacture of dry cells and batteries

Environmental impacts
Metals

- when in contact with drinking water, especially in large amounts can cause cancer leading to death **mitigated** by purifying the water
- their accumulation in soil can be absorbed by plants which are consumed by humans causing cancer leading to death, **mitigated** by consuming plants with the right amount of mineral content
- when contaminated in air can be inhaled, hence causing respiratory diseases, **mitigated** by purifying the air

Nonmetals

When burnt in air produce acidic gases which pollute the atmosphere causing respiratory diseases, **mitigated** by burning them cautiously

Metalloids

During mining, smelting and industrial processes, they can **get in contact with water and soil**, polluting them and **causing harm to organisms**, **mitigated** by handling them carefully during the above named processes

SECTION B

PART I:

Contribution of chemistry to our economy

Copper, iron, aluminium, nitric acid, sulphuric acid, fertilizers, ethanol, detergents, sodium hydroxide, chlorine gas, bio gas, oxygen gas, cement

Item 1 (cement)

Raw materials; lime stone, sand and clay

Process of production;

The lime stone obtained from the quarry is mixed with sand and clay in the correct proportions and crushed into a fine powder.

The powder is then mixed with water and allowed to flow down a **rotating tank** (**or cylinder or cement kiln**) where it is strongly heated at about 1500°C

Limestone decomposes into calcium oxide and carbon dioxide

$CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$

Calcium oxide reacts with sand forming calcium silicate and also reacts with aluminium oxide forming calcium aluminate.

$2CaO(s) + SiO_2 \longrightarrow Ca_2SiO_3$

$3CaO(s) + Al_2O_3 \longrightarrow Ca_3Al_2O_6$

Calcium silicate and calcium aluminate form a mixture called clinker

Gypsum is added to clinker to moderate the setting of the cement and the lumps are then crushed by machine to obtain the fine cement powder

Clinker + $CaSO_4.2H_2O \longrightarrow$ Cement

Side effects of the process of production

- **Effluent discharge** from the cement plant can **contaminate water bodies**, affecting aquatic life and quality of water, **mitigated** by treatment of waste water through sedimentation and filtration before discharge / recycling the water with in the plant.
- **Carbon dioxide emissions** to the atmosphere can **cause global warming**, this is **mitigated** by recycling of carbon dioxide
- **Inhalation of air contaminated** with cement dust **causes respiratory diseases**, **mitigated** by wearing personal protective equipments

Social benefits

- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** through taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**
- **Production of cement for use** during **construction** by the community members, **hence acquiring better houses**

ITEM 2 (copper)
Raw materials used; Copper pyrites ($CuFeS_2$)

Process of production;

The ore (copper pyrites) is crushed into powder and mixed with water containing special oils called frothing agents.

Air is brown into the mixture and a froth forms. Earthly impurities in the ore are wetted with water and sink to the bottom of the **flotation tank** while the copper pyrites floats on the surface in the froth.

The froth is skimmed off, and an acid added to it to break it.
The ore is filtered off, dried and roasted to convert it to copper(I) sulphide, sulphur dioxide and iron (II) oxide

$$2CuFeS_2(s) + 4O_2(g) \longrightarrow Cu_2S(s) + 2FeO(s) + 3SO_2(g)$$

Sand is then added and the mixture heated in absence of air to convert iron(II) oxide to iron (II) silicate liquid.

$$FeO(s) + SiO_2 \longrightarrow FeSiO_3(l)$$

The ore is then heated in a controlled amount of air to produce impure copper and sulphur dioxide;

$$Cu_2S(s) + O_2(g) \longrightarrow 2Cu(s) + SO_2(g)$$

Or, $2Cu_2S(s) + 3O_2(g) \longrightarrow 2Cu_2O(s) + 2SO_2(g)$
Then; $Cu_2S(s) + 2Cu_2O(s) \longrightarrow 6Cu(s) + SO_2(g)$

The copper produced is then **purified by electrolysis of copper (II) sulphate** using this produced impure copper as the anode and a pure copper as the cathode
The impure copper anode dissolves in the electrolyte producing copper (II) ions which move to the cathode where they are discharged to form pure copper.

Anode: $Cu(s) \longrightarrow Cu^{2+}(aq) + 2e$
Cathode: $Cu^{2+}(aq) + 2e \longrightarrow Cu(s)$

Side effects of the process of extraction of copper
- **Release of sulphur dioxide** causes **air pollution resulting into acid rains that affect plant growth** and also causes **global warming**, **mitigated** by treatment of the gas or installing catalytic converters in the exhaust pipes
- **Exposure to copper fumes** or **dust** can cause **poisoning leading to cancer and even death**, **mitigated** by personal protective equipments

Social benefits
- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** through taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society** improving standards of living
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**

ITEM 3 (iron)

Raw materials: Iron ore e.g. Haematite, Coke, Lime stone and air
Process of production;
Iron is extracted from its ores using a **blast furnace**
Haematite, coke and limestone are mixed together and introduced into the **blast furnace** from the top up where hot air is forced
As the hot air rises up the furnace it reacts with the coke to form carbon dioxide.
i.e. $C(s) + O_2(g) \longrightarrow CO_2(g)$

As the carbon dioxide formed rises up the furnace it is reduced by the unburnt coke to carbon monoxide

i.e. $CO_2(g) + C(s) \longrightarrow 2CO(g)$

The carbon monoxide then reduces the haematite to molten iron;

$2Fe_2O_3(s) + 3CO(g) \longrightarrow 4Fe(s) + 3CO_2(g)$

The molten iron then sinks to the bottom of the furnace where it is topped off

The lime stone decomposes into calcium oxide which reacts with the sand, a major impurity in haematite to form slag which drops to the bottom of the furnace and floats on top of the molten iron.

$CaCO_3(s) \longrightarrow CaO(s) + CO(g)$

$CaO(s) + SiO_2(g) \longrightarrow CaSiO_3(l)$

The iron obtained is impure and can be **purified by converting it onto wrought iron, by oxidizing the impurities**

Side effects of the process of extraction

- **Emission of poisonous gases** leading to **air pollution that may cause suffocation** hence illness or death, **mitigated** by treatment of these gases before emission to the atmosphere
- The **un reacted carbon dioxide can escape** into the atmosphere causing **global warming**, **mitigated** by recycling the carbon dioxide
- **Emission of heat** from the furnace causing **rise of temperature of the surrounding environment, which affects the people**, **mitigated** by installing heat absorbers around the furnace

Social benefits of process of extraction of iron

- Source of employment opportunities in the factory, hence improved income and therefore better standards of living
- Increased government revenue through taxes hence improvement of infrastructure such as roads, schools, health facilities leading development of the society and better lives
- **Provision of market** for local goods of the community members, hence **generating income**, leading to **better lives**

ITEM 4 (fertilizers)

The local investor will produce ammonium sulphate or ammonium nitrate fertilizer and the production will be as follows

For ammonium sulphate,

Raw materials; Nitrogen from the air, Hydrogen from water gas, sulphur and air

Process of production;

First is the production of ammonia

Nitrogen and hydrogen gases are purified, dried and mixed in a volume ratio of 1:3 respectively in a **reactor vessel**.

The mixture is passed over finely divided iron catalyst, at a low temperature of 400 -500^oC under high pressure of 200 atm, hence forming ammonia, through the Haber process.

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

Then, sulphuric acid is manufactured by the contact process

Sulphur is burnt in air to produce sulphur dioxide

$S(s) + O_2(g) \longrightarrow SO_2(g)$

Sulphur dioxide, is purified and dried to prevent poisoning of the catalyst. It is then heated with dry pure oxygen gas at a low temperature of 400 – 500^oC under high pressure of about 1 – 3 atm in the presence of vanadium (v) oxide forming sulphur tri oxide.

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

Sulphur trioxide is then dissolved in a little concentrated sulphuric acid to produce a fuming liquid called oleum.

$SO_3(g) + H_2SO_4(l) \longrightarrow H_2S_2O_7(l)$

The oleum is diluted with a known amount of water to give 98% concentrated sulphuric acid.

$H_2S_2O_7(l) + H_2O(l) \longrightarrow 2H_2SO_4(aq)$

Ammonium sulphate is then formed by reacting ammonia gas with concentrated sulphuric acid

$2NH_3(g) + H_2SO_4(l) \longrightarrow (NH_4)_2SO_4(s)$

The fertilizer is then **concentrated by crystallization**

For ammonium nitrate fertilizer nitric acid will be manufactured as follows

Ammonia gas from the Haber process is burnt in dry pure oxygen of the air, in the presence of platinum catalyst, to form nitrogen monoxide gas with in a **reaction vessel**

$4NH_3(g) + 5O_2(g) \longrightarrow 4NO(g) + 6H_2O(l)$

Nitrogen monoxide formed is then reacted with oxygen to form nitrogen dioxide gas;

$2NO(g) + O_2(g) \longrightarrow 2NO_2(g)$

Nitrogen dioxide gas is then mixed with oxygen and the mixture absorbed in water to form nitric acid

$4NO_2(g) + O_2(g) + 2H_2O(l) \longrightarrow 4HNO_3(aq)$

The nitric acid formed is then reacted with ammonia to form ammonium nitrate fertilizer which is concentrated by crystallization

$NH_3(g) + HNO_3(aq) \longrightarrow NH_4NO_3(s)$

Side effects of the process of production of fertilizers

Emission of ammonia, nitrogen oxides and sulphur oxides **can pollute the air, causing respiratory problems** and **environmental issues**, **mitigated** by installing catalytic converters to convert them to less toxic substances.

Social benefits

- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** through taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Development of small scale businesses**, hence generating income, leading to **better lives**
- **Availability of fertilizers**, hence **better plant growth** in the community **leading increased crop yields**.

ITEM 5 (chlorine and sodium hydroxide)

NOTE: This item requires manufacture of chlorine, but the solution also gives room for manufacture of sodium hydroxide

Raw materials used; Brine (concentrated sodium chloride solution)

Process of production;

Sodium hydroxide and chlorine are manufactured by electrolysis of brine

Brine which mainly contains sodium ions, chloride ions, is placed in a **diaphragm cell** that consists of a graphite anode and a steel cathode.

Brine ionizes according to the equation;

$NaCl(aq) \longrightarrow Na^+(aq) + Cl^-(aq)$

The sodium ions migrate to the cathode where they are preferentially discharged to form sodium which reacts with water to form **sodium hydroxide** solution that can be **purified by evaporation to dryness** to form solid sodium hydroxide,

$Na^+(aq) + e \longrightarrow Na(s)$
$2Na(s) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g)$

Chloride ions migrate to the anode where they are preferentially discharged to form chlorine gas which is then packed in strong cylinders.

i.e. $2Cl^-(aq) \longrightarrow Cl_2(g) + 2e$

Side effects of the process of production;

- **Contact with sodium hydroxide** causes **severe burns to the eyes, skin, digestive system resulting into permanent damage of the body organs and even death**, **mitigated** by wearing personal protective gears
- **Repeated inhalation of sodium hydroxide vapor** causes **lung damage**, **mitigated** by wearing protective gears
- **Inhalation of chlorine** can **cause death** as it is a poisonous gas, **mitigated** by wearing protective gears
- **Escape of chlorine into the surrounding atmosphere** can **pollute the resulting into acid rain which leads to crumbling of buildings**, **lowering soil pH** and **corrosion of roofs made of iron**, **mitigated** by regular maintenance of the plant.

Social benefits

- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** from taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**

ITEM 6 (oxygen)

Raw material; liquid air / air.

Process of production;

Air is passed through **air filters** to remove dust and smoke particles. It is then passed through concentrated sodium hydroxide solution to remove carbon dioxide,
$2NaOH(aq) + CO_2(g) \longrightarrow Na_2CO_3(aq) + H_2O(l)$.

Air free from carbon dioxide is now passed through Silicon(IV) oxide to absorb water vapour. Carbon dioxide and water vapour are removed from air before it is liquefied because they would solidify and block the apparatus.
The air is then compressed at 200 atmospheres and allowed to cool by making it escape into a large space through a jet.
The process of cooling is repeated several times to obtain liquid air at about –200°C. The liquid air is **fractionally distilled** using a **fractionating column / tower**.

Nitrogen boils off first because it has a lower boiling point (–196ºC) leaving behind oxygen with a higher boiling point (-183ºC). . Pure oxygen is then stored under pressure in steel cylinders.

Side effects of the process of production

- Explosion of oxygen cylinders due to high pressure **causing injuries and fire outbreaks** also **resulting into damage to equipment**, **mitigated** by;

* regular maintenance and monitoring of cylinders.
* keeping cylinders in cool areas to avoid exposure to heat.

- Exposure to liquid oxygen can **cause severe skin and eye irritations and burns, loss of vision and cancer**, m**itigated by**:

* Posting hazard and warning information in the working area.
* Communicating all information on the health and safety hazards of oxygen to potentially exposed workers; for example; submerging the affected body parts in warm water.

Social benefits

- **Source of employment opportunities**, hence **improved income** and therefore **better standards of living**
- **Increased government revenue** from taxes hence **improvement of infrastructure** such as roads, schools, health facilities leading **development of the society**.
- **Development of small scale businesses**, hence **generating income**, leading to **better life**

Item 7 (soapy detergents)

Raw materials; vegetable oil, concentrated sodium hydroxide, concentrated sodium chloride

Process of production;

Vegetable is mixed with concentrated sodium hydroxide solution (or potassium hydroxide solution) in a **non aluminium tank** and the mixture boiled while stirring until no further change occurs, and allowed to cool.

Concentrated sodium chloride solution is added into the mixture to precipitate (salt out) soap from the solution. Solid soap is skimmed off, washed and dried.

Side effects of the process of production

- **Discharge of wastewater containing surfactants solvents, phosphates and other chemicals into water bodies** can cause **contamination** or **pollution**, **harming aquatic life and affecting water quality**, **mitigated** by treatment of the wastes
- **Accidental spills or leaks of raw materials and finished products** can lead to **contamination** or **pollution**, affecting soil fertility and hence plant growth, **mitigated** by use of proper storage and handling procedures for raw materials and chemicals.

Social benefits

- Source of revenue to the government through taxes, hence, improved infrastructures for example; health facilities, roads etc hence improvement in the other sectors such as health and transport resulting into living a better life.
- Source of **employment** resulting into **improved income** hence, **better standards of living**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**

Item 8 (soapless detergents)

Raw materials: concentrated sulphuric acid, long chain of alkyl benzene, sodium hydroxide

Process of production

A long chain of alkyl benzene is heated with concentrated sulphuric acid in a **reactor vessel** to form alkyl benzene sulphonate, which is then cooled and then reacted with sodium hydroxide solution to form alkyl benzene sodium sulphonate which is then **purified by evaporation**, **evaporated** and cooled to obtain the soapless detergent.

Side effects

When the non-biodegradable soapless detergents **leak to water, they pollute it causing death of aquatic organisms, mitigated by**, not pouring water containing soapless detergents near water bodies.

Social benefits, same as above

ITEM 9(ethanol)

Raw material: bananas, sorghum, water

Process of production

The bananas are covered after harvesting for about a week to ripen. The carbohydrates are converted into maltose by means of enzymes diastase

The ripe bananas are put in a **wooden trough** and then squeezed between spear grass to extract the juice from them while adding water.

The mixture is filtered to obtain juice

Sorghum which has been roasted is added to the filtered juice and the mixture is stored.

The mixture is then covered in a warm place to cut off oxygen supply to allow fermentation to occur.

Yeast from sorghum provides maltase enzyme which catalyses hydrolysis of maltose to glucose

Zymase enzyme from yeast catalyses the decomposition of glucose to ethanol which is crude

The crude ethanol is **purified by fractional distillation** to obtain pure ethanol.

Side effects

Bursting of distilling tanks, causing **wounds and even death to the workers**, **mitigated** by regular inspection and maintenance of the distilling tank

Social benefits

- Source of **employment** resulting into **improved income** hence, **better standards of living**.
- **Provision of market** for goods of the community members, hence **generating income**, leading to **better lives**
- **Provision of ethanol to the community members** or **use as a sanitizer and disinfector** hence **living a better health**

PART II
Natural resources

ITEM 1 (Oil)

Category of the natural resource: Oil is a **non renewable natural resource** because it cannot be replenished / replaced by natural processes in man's life time orit gets used up.

Composition: alkanes, alkynes, paraffin, petrol and diesel.

Impact of the human activities on the natural resource

- **combustion of oil, releases** carbon dioxide **which can results into acid rain that interferes with the soil pH**, hence affecting plant growth, also leads to **global warming**
  Mitigated by increased afforestation such that the trees absorb carbon dioxide
- **Oil spills by humans** can **reach water bodies cutting off oxygen supply causing suffocation of aquatic animals**.
  Mitigated by proper waste management routines

Importance of the natural resource

When purified it produces various chemicals like motor fuels, lubricants, paints, detergents, drugs, etc.

ITEM 2 (rocks and minerals)

Category of the natural resource

Rocks and minerals are **non-renewable natural resources** because they cannot be replenished / replaced by natural processes in man's life time. **Or** they get used up.

They are categorized as: **Igneous rocks, Sedimentary rocks** and **Metamorphic rocks**

- **Igneous rocks**, comprising of minerals like **Quartz**, **Feldspar**, and **Olivine**
- **Sedimentary rocks**, composed of minerals like **Calcite**, **Quartz**, **Clay materials**, **Gypsum**
- **Metamorphic rocks**, composed of minerals like **Garnet**, **Mica(biotite** and **muscovite)**,**Quartz** and **Feldspar** (**Marble** or **Gneiss**)

Impact of the human activities on the natural resource

- **Stone quarrying produces dust particles** which **erode into water bodies, hence reducing on its quality**
  Mitigation extracting carefully and use of personal protective equipments
- **Stone quarrying and mineral extraction removes top soil and ditches** which **degrades the soil environment**, **hence affecting growth of plants, hence destruction of vegetation cover**
- **Mineral extraction** results into **breaking of rocks into smaller stones and gravels** which **depreciates the rocks**
  Mitigation, careful extraction

Importance of the natural resource

- Rocks are broken into hard core, gravel or panels used as materials for construction of roads, bridges, houses
- They are usefully in formation of soil by a process of weathering

ITEM 3: (water)

Category: Water is a renewable natural resource because it can be replaced/replenished by natural processes in man's life time.

Composition: Dissolved oxygen, mineral salts, aquatic plants and big animals as well as microorganisms and pollutants from man's activities.

Impact

Release of hot water as an effluent from industries into the water bodies, **increase the temperature of the water** bodies killing aquatic organisms. **Mitigated by** cooling the water before discharge and use of hot water reservoirs

Excessive use of fertilizers during crop farming, which infiltrate into water bodies, hence **polluting water**, **resulting into eutrophication** of nearby water bodies

Mitigated by use of organic fertilizers e.g. manure from both animal and plant waste which are biodegradable and reduce on use of synthetic fertilizers

Importance

Water bodies are very useful in rain formation which is useful for proper plant growth

ITEM 4 (air)
Category: Air is a renewable natural resource because it can be replaced/replenished in man's life time.

Composition: Nitrogen gas, oxygen gas, carbon dioxide gas, rare gases, water vapour and dust.

Impact
Burning of fossil fuels, increases amount of carbon dioxide gas thus **trapping a lot of heat in the atmosphere thereby causing global warming** and **consequently desertification**.
Mitigated by increased afforestation to absorb carbon dioxide from the atmosphere as quickly as it is formed

Importance
Air contains oxygen which is used for respiration and carbon dioxide which is used for photosynthesis

ITEM 5 (trees)
Category: Trees and natural vegetation are renewable natural resources because they can be replaced/replenished by natural processes in man's life time.

Composition Trees and natural vegetation are made up of cellulose which is a carbohydrate (made up of important elements like carbon, hydrogen and oxygen), and other minerals such as magnesium, nitrogen, etc.

Impacts
Charcoal burning involves **cutting down of trees which leads to deforestation** and **loss of habitat for wild animals**. **Mitigation:** use of charcoal briquettes made from waste organic materials, afforestation

Massive cutting down of tress leads to **increased amount of carbon dioxide** in the atmosphere resulting into **increasing temperatures of the earth**
Mitigation: Planting more trees

Importance
Trees provide herbal medicine, provide food, and purify air by adding oxygen and removing carbon dioxide

PRACTICALS

Practical item 4

(a)

Aim of the experiment	To determine the heat change of the reaction between metal X and hydrochloric acid
Hypothesis	The reaction between metal X and hydrochloric acid liberates heat energy
Variables	Dependent variable – temperatures Independent variable – time Controlled variable – volume of hydrochloric acid
Risk and mitigation	- Breaking of the thermometer hence causing injuries to the body. **Mitigated by** putting the thermometer in its casing immediately after use - Acid pouring on the skin hence causing burns. **Mitigated by** wearing a laboratory coat, gloves and closed shoes
Procedure	(a) Using a measuring cylinder, 30 cm^3 of hydrochloric acid are measured and transferred into a plastic beaker. (b) The initial temperature of the solution is read using a thermometer and recorded (c) 0.5g of metal X is weighed using a digital scale and added at once to the acid in the plastic beaker and the stop watch is simultaneously stated. (d) The mixture is stirred using a thermometer and the temperature of the solution mixture is read and recorded every after 30 seconds for 3 minutes (e) The results are entered in the table.

(b) Volume of BA1 used = 30.0cm^3

Time(s)	0.0	30.0	60.0	90.0	120.0	150.0	180.0
Temperature of mixture of BA1 and metal X(^oC)	25.0	40.0	51.0	57.0	60.0	59.0	58.0

(c) From the graph;

Maximum temperature attained by the mixture = 64^oC

Temperature change of the mixture = 64 – 25

= 39^oC

Heat change of reaction = $mc\Delta t$

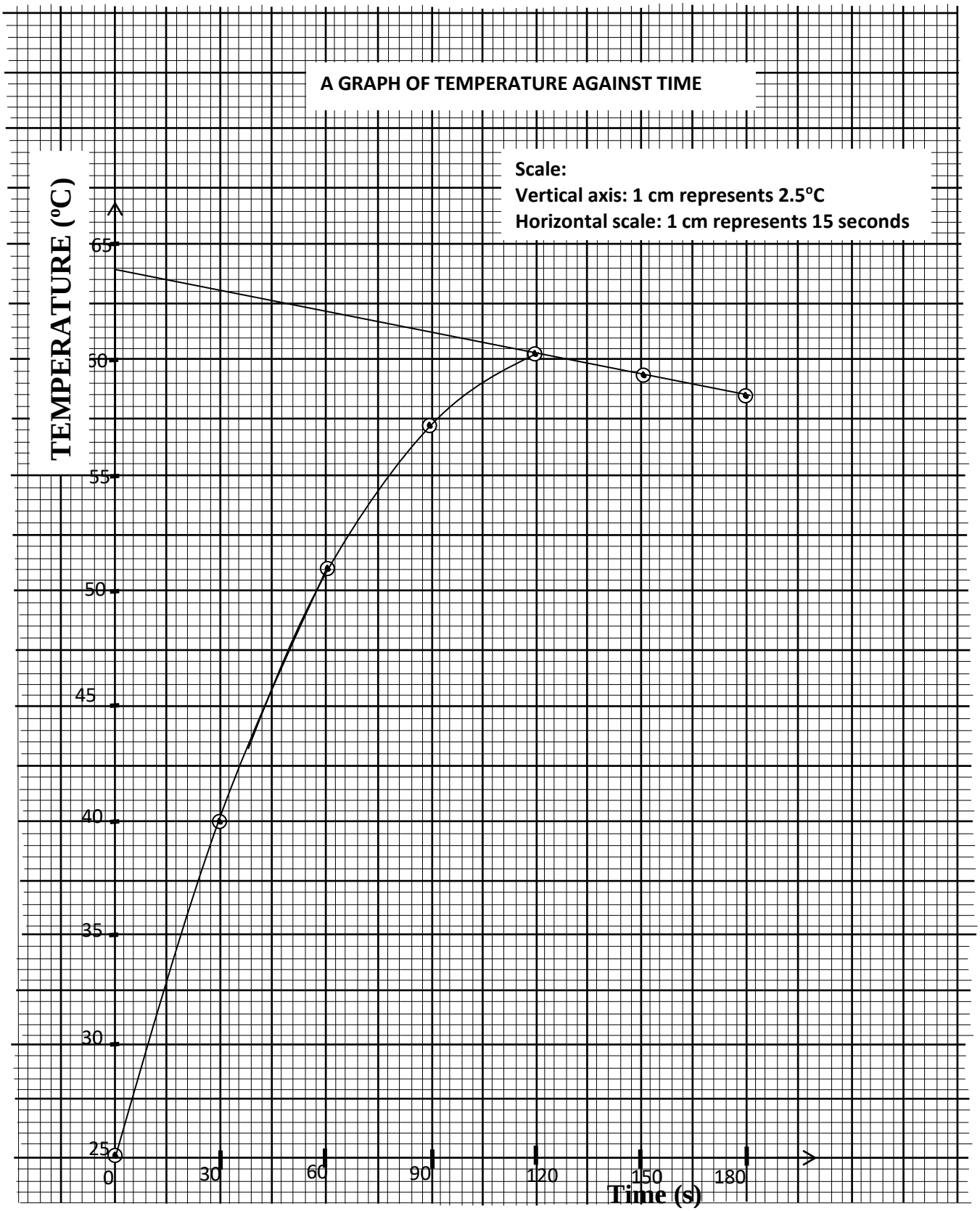
$= 30 \times 4.2 \times 39$

$= -4{,}914J$

Or; $-4.914KJ$

Conclusion;

The reaction between metal X and hydrochloric acid liberates = 4.914KJ of heat energy.


A GRAPH OF TEMPERATURE AGAINST TIME
Scale:
Vertical axis: 1 cm represents 2.5°C
Horizontal scale: 1 cm represents 15 seconds
TEMPERATURE (°C)
65
60
55
50
45
40
35
30
25
0
30
60
90
120
150
180
Time (s)

Practical item 5

(a) (i)

Aim of the experiment	To discover which type of water is more effective in cleaning and minimizing soap wastage
Hypothesis	Water sample BA3 or BA2 is more effective in cleaning and minimizing soap wastage
Variables	Dependent variable – volume of soap solution used Independent variable – type of water sample Controlled variable – volume of water sample used
Risk and mitigation	Soap solution pouring on the skin causing irritations and burns **Mitigated by** wearing gloves.
Procedure	(a) 25.0cm^3 of water sample BA2 is pipetted into a clean conical flask. (b) Soap solution is poured into a burette and initial burette reading recorded. (c) BA2 in the conical flask is then titrated with BA1 until a permanent lather is formed. (d) The final burette reading is recorded. (e) The titration is repeated two more times to obtain consistent results. (f) The results are then entered in a suitable table (g) The procedures (a) to (f) are repeated with water sample BA3.

(ii) Results for BA2

Experiment number	1	2	3
Final burette reading (cm^3)	25.10	25.00	25.00
Initial burette reading (cm^3)	0.00	0.00	0.00
Volume of BA2 used (cm^3)	25.10	25.00	25.00

Results for BA3

Experiment number	1	2	3
Final burette reading (cm^3)	10.20	10.00	10.00
Initial burette reading (cm^3)	0.00	0.00	0.00
Volume of BA3 used (cm^3)	10.20	10.00	10.00

(b) Average volume of soap required to form permanent lather with;

(i) Water sample BA2 $= \frac{25.10+25.00+25.00}{3}$

$= \underline{25.03\ cm^3}$

(ii) Water sample BA3 $= \frac{10.20+10.00+10.00}{3}$

$= \underline{10.07\ cm^3}$

Water sample; BA3 required less soap solution to form permanent lather than water sample BA2. Hence, BA3 is the effective water sample the laundry service provider should use.

E N D

GRADED TOPICAL APPROACH

TO

"O" LEVEL MATHEMATICS

A competence based curriculum

Revision items with solutions

S.1 – S.4

With current updates



$$c^2 = \sqrt{a^2 + b^2}$$



2ND EDITION, 2024.

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Together we can influence the Universe

SOME SAMPLE ITEMS IN THIS BOOK

SECTION A: (40 SCORES)

Answer **all** *items in this section.*

Item.1 ***(20 scores)***

Denis wants to start a cake project but he has no idea about this project. He wants to make many cakes and realise a profit. He decided to visit a friend with an idea about the project who guided him as follows:

- The cost of Oven, marketing and other expenses is shs 60,000.
- The total cost of all expenses on each cake made is shs 500 plus the number of cakes made.



He realizes that he has to ride 4km east from home and then 3km south at an average speed of $10kmh^{-1}$ to reach the market, however, the friend informed him that there was a direct route that connects Denis's home to the market. The customers in the market always need these cakes at 8:00 AM.

Task;

(a) Help Denis to find the number of cakes he should make and the amount he should sell each cake so that he does not make a loss.

(b) What distance does he have to cover by the direct route?

(c) Basing on calculations, advise Denis on the time he should set off from home in order to reach the market on time.

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Item.2 **(*20 scores*)**

Twakowa tukole self– help group of civil servants has a membership of ten people. Altogether they save £ 400 per month. The group lends to the members basing on their net monthly income after the income tax deductions.
Income tax is deducted according to the schedule in the table below:

INCOME (SHS)	RATE (%)
000000 – 235000	0
235001 – 335000	10
335001 – 410000	20
Above 410000	30

An application for a loan from Akello who earns a gross income of Shs 850,000 has been approved for processing. If Twakowa tukole self–help group lends 5 times the net income of a worker which is recovered in;

Either;

12 equal monthly installments at an interest rate of 5% per annum compounded for years.

Or;

Making a deposit followed by 5 equal monthly installments of Shs 524032.5 per month.

Task;

(a) Establish Akello's net income, hence determine the amount to be approved for processing.

(b) How much money does one who pays by the;

(i) First option pay per installment?

(ii) Second option pay as deposit?

(c) Giving a reason for your answer, which option of loan repayment do you advise Akello to opt for?

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SECTION: B (40 SCORES)

This section consists of **two** *parts;* **I** *and* **II**.

Part I

Answer **one** *item from each part.*

Item.3 **(*20 scores*)**

A school head teacher is thinking of how he can boost the mathematics department of your school. He can either add another teacher or buy more books or both. He has decided that he will do both if the average performance for this year's performance for the 40 students is lower than that of the previous which was **47**. He asked the department to give a test and these were the student's marks.

50	71	40	48	61	70	30	62
44	63	60	51	55	25	32	65
54	45	65	50	45	40	25	45
48	45	30	38	30	28	24	48
30	48	28	35	50	48	50	60

He also visited the library and found out that the previous candidates used three books for their revision. Longhorn, Baroque or Math Clinic. From the librarian's records it is clear that all the candidates that did not use any book failed the subject greatly.
Out of the **35** candidates this year **13** used Longhorn, **20** used Baroque and **17** used Math Clinic. **9** used Longhorn and Math Clinic, **3** used Longhorn and Baroque while **8** used Baroque and Math Clinic only. The records show that **2** used all the three books.
He observed that he should replace one book type of the three with Fountain publisher since no student read it only alone.

Task:

(a) (i) Help the head teacher group the marks to make an informed decision on the fate of the department and defend it.

(ii) Display the students' marks in groups on a simple statistics diagram.

(b) (i) Help the head teacher identify the book he should replace and explain why?

(ii) Find the probability that a student selected from the class failed.

Item.4 **(*20 scores*)**

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Three schools from a Gayaza region want to participate in the National Schools Football Sports Gala to be held in Lyantonde district playground. Unfortunately, none of the schools has a school bus and they want to hire a bus for the one day for the activity. The bus charges Shs 25,000 per km moved. The three schools through there Sports master agreed to share the cost of the bus equally amongst themselves. One that day they hired a bus from your school in Gayaza and they set off at **4**: **30*am*** and increased the speed gradually to **90*km*/*hr*** reaching Mpigi at **6**: **45*am***. From there the bus driver maintained this same speed for **2¼** hours reaching Masaka.
From Masaka the he reduced slowly in speed reaching Lyantonde at **9**: **30*am***.
The games started at **10**: **00*am*** sharp and each team played six games.
School A won **3** games, drew **2** and lost **1** game. School B won **4** games and lost **2** games. School C won **2** games and drew **4** games. The organizers award three points for a win, one point for a draw and no point for a loss. They declared these schools the first three schools in order of their points they obtained from the games. They were to receive the prize money of sixteen millions five hundred thousand shillings.

Task:

(a) Find how much each school paid for the bus.
(b) Decide the cash prize for each school.

Part II;

Answer **one** *item from each part.*

Item.5 **(*20 scores*)**

Traffic Jam is a major problem along the roads leading to Kampala city centre, especially during the rash early morning hours of the day. A private hospital in the city centre has only two of the key workers in their emergency unit staying within the hospital facility.
Four stay at Mukono while another two stay at Gayaza and have to beat the traffic jam to get to work early every morning.
A chance that one is delayed due to the jam along Gayaza or Mukono road is 0.25.
The supervisor of the emergency unit is to recommend to management, a change of the accommodation policy for the emergency unit staff, if less than four of those who stay outside the facility arrive early any morning.

Task:

(a) What is the chance of a worker arriving early any morning?
(b) Help the emergency unit supervisor to make a recommendation to the management of the hospital.

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Item.6 **(*20 scores*)**

You are experiencing water shortages in your area. The area Member of Parliament has been approached by the local council for help.

Below are two similar tanks the Government has decided to give to each village through the office of the member of parliament and 72 villages are to benefit from the Government program.





The smaller tank has a capacity of 20000 litres and costs shs 100,000. It is also observed that the cost is directly proportional to the capacity and the dimensions are doubled.

Task;

(a) Determine the capacity of the bigger tank.

(b) Help the area member of parliament to estimate the cost of this project.

END.

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ANSWERS TO SAMPLE ITEMS

Item.1

(a) Let x = number of cakes made.

Cost per cake = 500 + number of cakes.

$500 + x$

Thus, $x(500 + x) = 60000$.

$x^2 + 500x - 60000 = 0$.

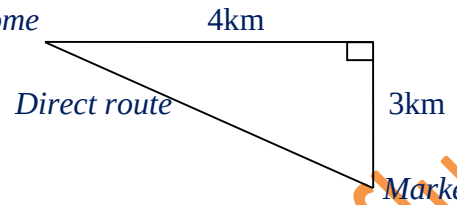
$x = 100$

or $x = -600$.(Disregard).

Take $x = 100$ cakes.

Denis should sell each cake **at least** Shs 500 + 100 = Shs 600.

(b)



Distance by direct route $= \sqrt{4^2 + 3^2}$

$= \sqrt{16 + 9}$

$= 5$km

Time taken $= \frac{distance}{speed}$

$= \frac{5}{10} \times 60$

$= 30$ minutes.

Set off time = 8:00 – 30 minutes

= **7:30AM**.

Item.2

(a) Net income = Shs 693000, Amount aproovd for processing = Shs 3465000

(b) (i) (Amount per installment = Shs 318346.875)

(ii) (Deposit = Shs 1200000)

(c) First option;

Reason: Amount per installment is easily affordable by a member of the group.

Second option:

Reason: It takes a shorter period to pay back the loan (5months).

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Item 3. (a) (i)

C.I	Tallies	f	x	fx	C.B
20 – 24	*I*	1	22	22	19.5 –24.5
25 – 29	*IIII*	4	27	108	24.5 – 29.5
30 – 34	~~*HH*~~	5	32	160	29.5 – 34.5
35 – 39	*II*	2	37	74	34.5 – 39.5
40 – 44	*III*	3	42	126	39.5 – 44.5
45 – 49	~~*HH*~~ *IIII*	9	47	423	44.4 – 49.5
50 – 54	~~*HH*~~ *I*	6	52	312	49.5 –54.5
55 – 59	*I*	1	57	57	54.5 – 59.5
60 –64	~~*HH*~~	5	62	310	59.5 – 64.5
65 – 69	*II*	2	67	134	64.5 – 69.5
70 –74	*II*	2	72	144	69.5 – 74.5
		$\Sigma f = 40$		**$\Sigma fx = 1870$**	

Average performance $= \frac{\Sigma fx}{\Sigma f}$

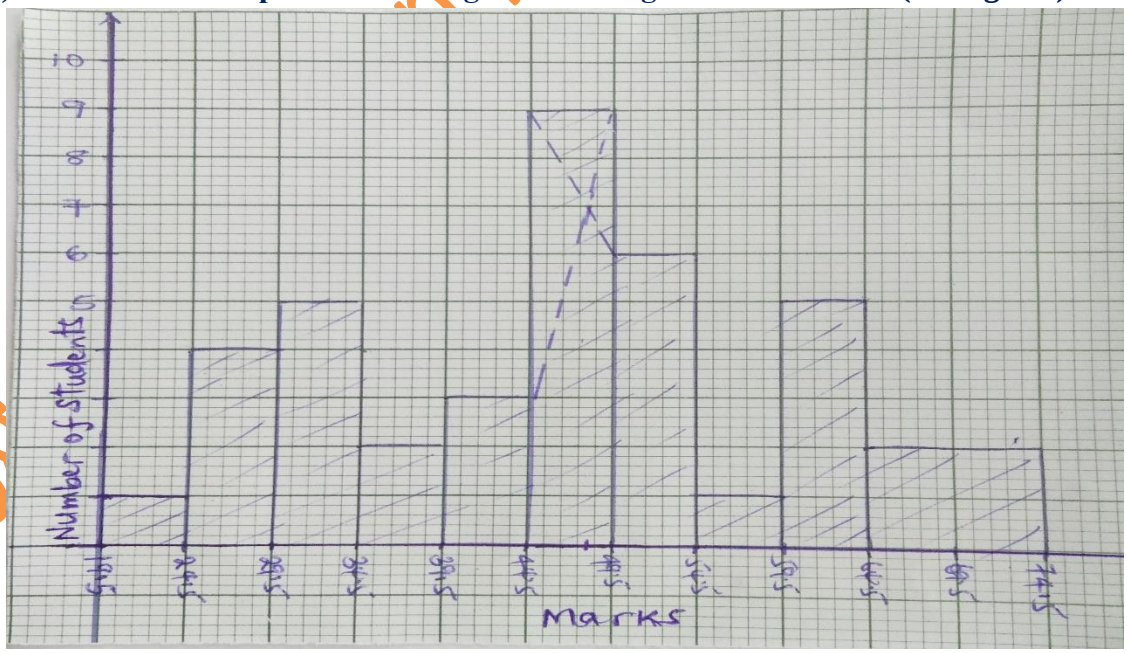
$= \frac{1870}{40}$

= 46.75

Since this years' average performance (46.75) is lower than that of last year (47), the head teacher needs to add another teacher and also buy more books.

Note: *This question requires a lot of care. The candidate's response may vary basing on the class* ***interval used****.*

(ii) **A simple statistic diagram showing students' marks. (Histogram)**



Note: *In 3(a)(ii) above, a student may either draw* ***a histogram*** *or* ***an Ogive.***

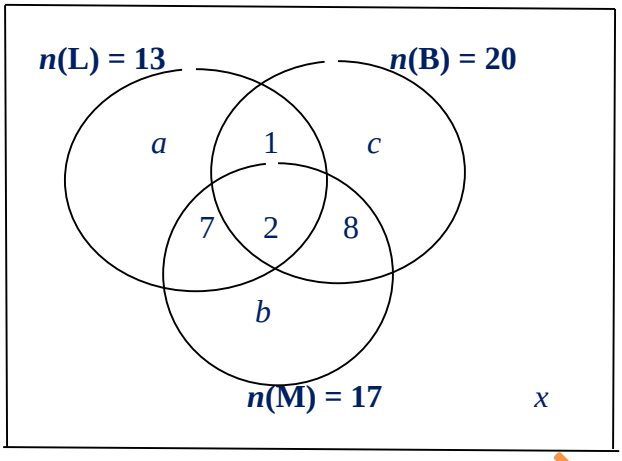
(b) (i) $n(\Sigma) = 35$, $n(L) = 13$, $n(B) = 20$, $n(M) = 17$.

Too ... influence the Universe

n(LnM) = 9, n(LnB) = 3, n(BnMn L') = 8. n(LnBnM) = 2.

Let n(LnBnM) = x.

n(Σ) =35.



a = 13– (7+2+1)

a = 3.

b = 17 – (7+2+8)

= 0.

c = 20 – (2+8+1)

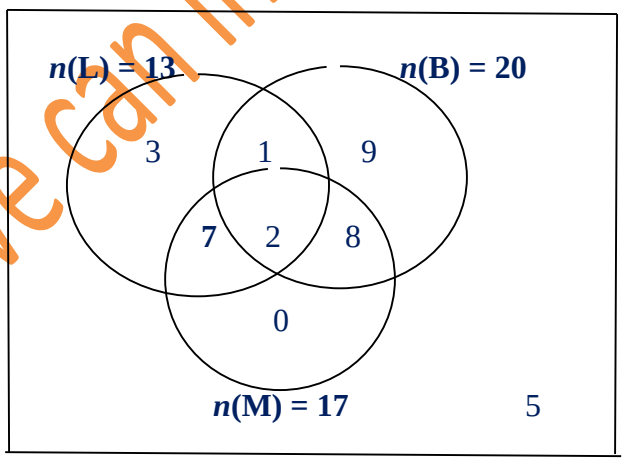
c = 9.

x = 35 – (13+0+8+9)

x = 5.

A neat Venn – diagram

n(Σ) =35.



The head teacher should replace Math clinic with Fountain publisher.

Because no student read it only alone. i.e n(MnL'nB') = 0.

(b) (ii) 5 students failed.

$$P(fail) = \frac{Number\ of\ failures}{Total\ number\ of\ sudents}$$

$$P(fail) = \frac{5}{35}$$

$$= \frac{1}{7}$$

Together we can influence the Universe

Item 4.

(b) Performance matrix $= \begin{bmatrix} 3 & 2 & 1 \\ 4 & 0 & 2 \\ 2 & 4 & 0 \end{bmatrix}$

3 x 3.

Award matrix $= \begin{bmatrix} 3 \\ 1 \\ 0 \end{bmatrix}$

3 x 1.

$$\text{Overall performance} = \begin{bmatrix} 3 & 2 & 1 \\ 4 & 0 & 2 \\ 2 & 4 & 0 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ 0 \end{bmatrix}$$

$$= \begin{bmatrix} 9+2+0 \\ 12+0+0 \\ 6+4+0 \end{bmatrix}$$

$$= \begin{bmatrix} 11 \\ 12 \\ 10 \end{bmatrix}$$

Teams *A*, *B* and *C* obtained 11 points, 12 points and 10 points respectively.
Team ***B*** won the Gala.
Total points = 11+12+10
= 33.

Team *A* received $\frac{11}{33}$ x 16500000 = **Shs 5500000**.

Team *B* received $\frac{12}{33}$ x 16500000 = **Shs 6000000**.

Team *C* received $\frac{10}{33}$ x 16500000 = **Shs 5000000**.

Note: *Accept any other method that leads to similar results.*

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Item.5

(a) Let M = a worker stays at Mukono

G = a worker stays at Gayaza.

B = a worker beats the traffic jam.

D = a worker is delayed by the traffic jam.

$P(M) = \frac{4}{6} = \frac{2}{3}$

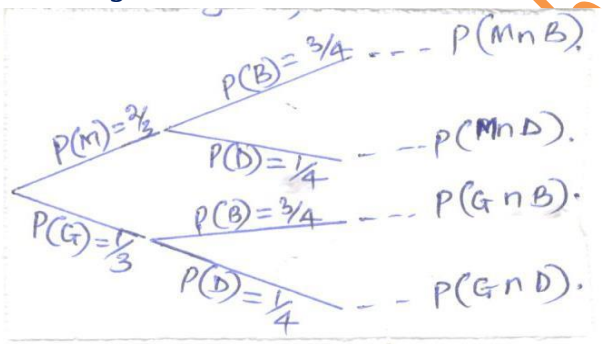
$P(G) = \frac{2}{6} = \frac{1}{4}$

$P(D) = 0.25 = \frac{1}{4}$

$P(B) + P(D) = 1.$

$P(B) = 1 - 0.25 = 0.75 = \frac{3}{4}$

A tree diagram;



If E represents a worker arriving early any morning:

Then; $P(E) = P(MnB) + P(G \cap B)$.

$= \left(\frac{2}{3} \times \frac{3}{4}\right) + \left(\frac{1}{3} \times \frac{3}{4}\right)$

$P(E) = ¾.$

(b) Let the number of people who came early morning be y,

$$\frac{y}{6} = \frac{3}{4}$$

$$4y = 18$$

$$y = \mathbf{4.5}$$

Since **4** *people are able to arrive early morning in any day, there is no need to change the accommodation policy for the emergency unit.*

Together we can in the Universe

Item.6

(a) L.S.F $= \frac{1}{2}$, (Because the dimensions are in the ratio 1:2)

$$\text{V.S.F} = \left[\frac{1}{2}\right]^3$$

Let the capacity bigger tank be V_B

$$\frac{20000}{V_B} = \frac{1}{8}$$

$$V_B = 20000 \times 8$$

$$\boldsymbol{V_B = 160000 \text{ litres.}}$$

(b) Cost is directly proportional to capacity.

$100000 = k \times 20000$, k is a constant of proportionality

$$\boldsymbol{k = 5.}$$

When $V_B = 160000$,

Cost of bigger tank $= 5 \times 160000$.

$= 800000$.

Cost per village $= 100000 + 800000$.

$=$ Shs 900000.

Total cost of the project $= 72 \times 900000$.

$=$ **Shs 64800000**. *END*

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(**0781190606 / 0786928811 watts-app numbers**).

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Senior one and two end of cycle sample questions

Number bases

Question 1

Karyn owns a bakery in Kampala. She uses a base eight system to display the prices of different prices of bread in dollars. In her display, each digit from 0 to 7 represents a specific price value as shown in the table below

Digit	Price value in dollars
0	2.5
1	3.0
2	3.5
3	4.0
4	4.5
5	5.0
6	5.5
7	6.0

She sells each loaf of bread at 256 base eight. Oscar is a business man who buys 100 loaves of bread daily from the bakery and sells each loaf at UGX 70000. He is given a discount of 5% on every loaf of bread.

Task

a) Determine the price of 1 loaf of bread in dollars
b) Given that $1\text{USD} = \text{UGX}3800$, Help Oscar to determine his percentage profit.

Question 2

Your mathematics teacher has promised to award his best three students Maria, Monica and Mariam with 126 counter books. Each counter book costs UGX12000 in the market. Maria will receive 42 counter books in base 6. Monica will receive 36 counter books in base 8. Mariam will receive the share of her counter books in base 10. To provide accountability to the school head teacher, the mathematics teacher intends to present the data on appropriate chart to the head teacher.

Task

a) Determine how much money was spent in buying Mariam's Counter books
b) Help the teacher to present the data to the school head teacher.

Question 3

Wilson and Ronald are students of the same school. They are working on a mathematics assignment that involves number bases. Wilson is working in base 6 while Ronald is working in base 8. Wilsons number is 24 written on a white cardboard while Ronald's number is 32 written on a blue cardboard. They are all aiming at find the least number that can divide all the two numbers. Wilson′s class has 5 streams with 15 students each while Ronald's class has 2 streams with 24 students each. The school wishes to determine the minimum number of students each stream should have so that they contain the same number of students.

Task

a) Help Wilson and Ronald to determine the least number that can divide all the two numbers
b) Help the school to determine the number of students each stream should have?

Question 4

Your school has received a new set of mathematics books for the lower secondary school curriculum from the ministry of education and sports. The school is arranging the books into boxes to hand them over to the school librarian. The school decides to arrange the books in rows on different number bases. The first box is arranged in base 2, the second box in base 3 and the third in base 5. Each box has equal number of books in each row. The first box contains rows of books. The second box contains 9 rows of books and the third box contains 8 rows of books. The librarian is creating selves and each self will contain equal number of books. Each book costs UGX25000

Task

a) Determine the total number of books that the school received from the ministry of education and sports.
b) How many books will the librarian arrange in each shelf?
c) Determine the amount of money spent in buying each box of books

Question 5

Scovia locks her phone with a password "MATH" after using it. Each letter in the password represents a number in base five. M represents 13, A represents 1, T represents 20 and 8 represents 8. Ruth wants to use the phone but needs to combine the numbers in base 10 to unlock the phone. Scovia bought the phone at UGX780000. She plans to sell the phone to Ruth at UGX1080000. Scovia plans to use part of the money to buy a crate of soda that has 24 bottles for her birthday and save the rest. Each bottle of soda costsUGX12000.

Task

a) What number should Ruth use to unlock the phone?
b) Determine Scovia's percentage profit
c) Express the amount of money that will be used to buy the crate of soda as a percentage of the amount of money that will be save.

Question 6

A telecommunication company in Uganda offers a special promotion to all customers having their brand smartphone. The promotion allows customers to convert their loyalty points to a specific amount of money in US dollars and finally to Ugandan shillings (UGX) basing on a unique number base system. In this system, the digit 3 in the loyalty points is equivalent to the digit 5 in the decimal system. Joshua accumulates 243 loyalty points every week. Each loyalty point can be converted to UGX 11400. The company sells each phone at a profit of 5%. They sell each phone at UGX585000.

Task

a) Determine the amount of money Joshua received for his loyalty points in US dollars for last week. Hence determine the total amount of money he will receive within 6 weeks.
b) Determine the cost price of each phone.

Question 7

James and Joan are students in the same school. James is holding a white card with numbers 24 and 45 written in base 6 on it. Joan is holding a blue card with the same numbers written in base 8 on it. They all want to find the least number that can divide the two numbers on their respective cards. James claims that he will be the first to obtain the correct answer since he is 5 years older than Joan.

Task

a) Determine the correct answer James will find
b) How old is Joan if the sum of the ages of the two students is 39.

Working with integers

Question 1

Your school plans to raise USD1100 that will be used in the construction of a new school library. The school organized a school carnival to raise money that will enable it achieve

the target. The table below shows the income generated and the expenses for in US dollars for the school carnival. The expenses are indicated in brackets

Games	Sports	Donations	Flyers (expenses)	Decorations (expenses)
650	530	52	28	75

The head teacher of the school plans to present the above data to the school management committee in one of the meetings this Saturday.

Task

a) Did the school reach its goal?
b) Using two different charts, help the head teacher to represent the data to the school management committee
c) Given that $1USD = 3800UGX$, determine the total amount of money the school remained with after expenses in UGX.

Question 2

A football team gains 3 points on the first tournament, loses 6 points on the second tournament, loses 3 points on the third tournament and gains 4 points on the fourth tournament. Each point gained is awarded UGX54500 and each point lost is deducted UGX12500. The team has 40 players who are either left footed or right footed. 28 players are right footed while 17 players are left footed. A player who is both left and right footed is awarded UGX 258000 by the football association.

Task

a) Determine the total amount of money the football team obtained from the four tournaments
b) How much money did the football management spend in awarding the players who are both right and left footed? (write your answer in words)

Question 3

You are playing a game on your computer using a spinner. You start with the spinner at blue and score 48, and spin the spinner four times to orange, spin the spinner three times again to green and finally spin the spinner 6 times to red. Each spin gives a score of 4.

Task

a) Write your total score in words
b) Using two different charts, display the scores at blue, orange, green and red

Question 4

James bought three bags at UGX 45000 each after being given a discount of 5% on the original price of each of the bags from a shop in Kampala. He bought oranges at UGX500 each and put in the bags. Each bag contained 8 oranges. James then decided to share them with his four friend Joshua, Jakin, Jack and Jadon by dividing them equally in to four groups. He bought 10 more oranges later on and added them to the total number of oranges he had. James realized that he had to multiply the sum of the oranges by 2 to determine the final count. Joshua being the oldest of the other four friends by 2 years claims that he should be given more oranges. The sum of the ages of the five people when pressed on a calculator was found to be 77.

Task

a) Determine the total amount of money of the final count.
b) What is total original cost of the three bags
c) Determine the ages of the five people.

Question 5

Your sports teacher is organizing a sports event this Saturday. He wants to buy sports equipment sets that include basketballs and footballs for their activities. He has three different sets to choose from: Set A includes 8 basketballs and 12 footballs, Set B includes 6 basketballs and 18 footballs and Set C includes 10 basketballs and 15 footballs. Each ball in set A costs UGX80000, each ball in set B costs UGX 8000 more than that in Set A and each ball in Set C costs UGX12000 more than that in Set B. The sports teacher wants to figure out the total number of each type of ball he needs to buy to ensure that each activity group has the required number of balls without shortage or wastage.

Task

a) Determine the total amount of money he must spend in buying to balls to achieve his target.
b) The sports teacher has UGX 7800000 for buying the balls, he wants to use 10% of the balance to purchase mineral water. Determine how much he has to spend on mineral water.

Question 6

Your high school friend spent UGX15000 in buying apples. He wants to distribute the apples equally among his other friends. If he gives each friend x apples , he will have 3 apples remaining. Each apple costs UGX1000. Emily, Michael and Sophia are among your best friends as well. Emily has 18 apples in her bag. Michael has 24 bags in his bag

while Sophia has 30 apples in her bag too. They want to find the highest equal number of apples that should be put in each bag and the least equal number of apples each bag can contain.

Task

a) Determine the number of apples (x) each friend will receive from your friend.
b) Help Emily, Michael and Sophia to address the challenge.

Question 7

Your brother went to school to do mathematics practice on the chalkboard. During his practice, he pressed a number on a calculator, added the square of 5 to the number. He later realized that when he divides the result by 4, he gets 5 times the number. After the practice, your brother left school and walked 5 kilometers to a trading centre to buy water, he then walked in the north east to his friend's home and rested there for some hours before walking 6 kilometers in the western direction to a supermarket to buy some scholastic materials for mathematics practice in the coming days. Your home is 5 kilometers due south of the supermarket.

Task

a) Help your brother to find out the number.
b) How far is your home from the school using the direct route?

Fractions, percentages and decimal

Question 1

Your uncle works as a sales agent in a cement manufacturing company. He is paid a basic monthly salary of UGX1800000. He is paid UGX400000 for every 25 bags of cement he sells. Your uncle sells 400 bags of cement in a month. He decides to save 20% of total salary every month and share the 10% of it among his four children in the ratio of 2:3:4:1 according to their ages. The eldest child receives the highest amount of money. His daily expenses are UGX 20000. The rest of the money is invested in to the family business.

Task

a) How much money is invested in to the family business every month?
b) Work out how much money the youngest child gets

Question 2

Annet bought fruits consisting of mangoes, guavas, oranges and passion fruits in the ratio of 2:4:4:2 from a fruit store. He ate $\frac{1}{4}$ of the fruits and gave away 40% of the remaining oranges to his friends. She sold the rest of the fruits to his neighbor at UGX1500 each. Each fruit in the fruit store costs a UGX800. She bought 14 passion fruits from the fruit store.

Task

a) Determine her percentage profit.
b) Display the information using an appropriate chart.

Question 3

A secondary school consists of 24 lower secondary school prefects. The prefects plan to hold a meeting this Saturday in one of the school hall. The school hall can accommodate many people as it has single seats arranged in 8 rows and 12 columns. The school has bought 48 bottles of mineral water, 120 bottles of soda and 84 cups of juice. 17 prefects drink soda, 12.5% of the prefects do not drink soda or juice and 9 prefects drink juice. Each bottle of the drinks costs UGX4000

Task

a) Using appropriate chart, display the categories of drinks bought
b) Work out how much money was used to buy bottles of drinks for people who drink both soda and juice if they will drink two bottles each.

Question 4

Oscar wants to design a triangular garden in her backyard. The base of the triangular garden is 12 metres long and the height is 8 metres. He plans to divide the garden in to three equal sections to plant different flowers. Oscar decides to allocate $\frac{1}{3}$ of the garden to roses, $\frac{1}{4}$ to tulips and the remaining section to sunflowers. Oscar realizes that the roses need 40% of their section to grow properly, the tulips need 25% and the sunflowers require 35%. Oscar decides to install a decorative border around the perimeter so that it just touches the edges of the garden and the border costs UGX50000 per metre.

Task

a) What is the total cost of installing the decorative border?
b) What is the area in square meters allocated to each type of flower?

c) Find out how many square metres of each flower bed should be allocated for optimal growth.

Question 5

The village hunters standing by the roadside need to navigate through the game park to find three different wild animals, cob, rhino and porcupine resting at three different places. The village hunters need to move northeast to find the cob and turn southward to find the rhino before turning southwest to find where the porcupine is resting. The distance from the road to the cob is 25% of the total distance and the distance to the rhino is 40% of the total distance. The remaining distance to the porcupine accounts for the remaining 35%. The distance to the cob from the village hunters is 500 metes

Task

a) Work out the total distance the village hunters need to cover.
b) What angle should the hunters turn through if they are to move from the road to the porcupine?

Question 6

Mr. Amara is a village farmer. He owns a triangular garden with sides measuring $(x + 2)$ metres, $x + 5)$ metres and $(x + 8)$ meters. Mr. Amara wants to build a circular fence around the garden in such a way that it just touches the corners of the garden without entering it to keep out animals. The fencing material costs UGX7800 per meter. He wants to fence $\frac{3}{4}$ of the perimeter of the garden and leave the remainder unfenced for an entrance. The perimeter of the garden is 45 metres. The garden will be used to grow trees and each tree will occupy $2m^2$ of space of the garden

Task

a) Determine the cost of fencing the garden
b) Work out the total number of trees that can be planted in the garden

Question 7

Your sister, Mercy works in one of the non-governmental organizations in Uganda. She is paid a monthly salary of UGX8800000. Your sister decides to invest a portion of her total savings in a fixed deposit account that offers a simple interest rate of 5% per month. She invests $\frac{1}{3}$ of her total savings which amounts to UGX1400000. Mercy saves 30% of her monthly salary and uses the remainder to pay school fees.

Task

a) Determine the amount of money she withdraws from the fixed deposit account after 4 years.
b) Work out her total savings in 2 years.

Coordinate plane

Question 1

You and your friend have tickets to watch a football match in Kampala in which only 12500 spectators are expected to attend. You sit inside the VIP section and your friend sits at $(-5,-3)$. The football pitch is located at positions $(-4,-3),(4,3),(-4,3)\ and\ (4,3)$. Each unit is equal to 20 metres. The football match has been organized by the football association to raise funds required to fence the football pitch where by each spectator will pay UGX1000. UGX 20000 will be used to fence every 2 meters of the perimeter of the pitch and 40% of the balance will be distributed equally by the football association to the 46 football players that will participate the football match and the remainder will be saved in a bank account that offers a 8% simple interest rate per month.

Task

a) Using a suitable graph, display the position of your friend and determine the area of the football pitch.
b) Workout the amount of money the football association will withdraw from the bank after 3 years

Question 2

Your school is located at $(2,-1)$, which is 2 blocks east and 1 block south of the centre of town. To get from your house to the school, you walk 5 blocks west and 2 blocks north. The school is near the houses of four of your friends Alex, Bernard, Cathy and Dalton. Alex's house is 600 meters north of the school, Bernard's house is 300 metres on 60° east of north of the school. Cath's house is half kilometer on south of east of the school while Dalton's house is south west of the school. Dalton's house is 400 metres from the school.

Task

a) Is your school or your school closer to the centre of town? use a suitable graph
b) Show accurately the position of the houses of the four friends and determine how far Dalton's house is from Alex's house

Question 3

Three people Amon, Anthony and Mark are village friends. They decided to go hunting for wild animals in a village forest. They left their bottle of water at point A(2,4) and their spears at point B(-1,1) and started tracing the wild animals from point C(5,3). While exploring the area the next day, they discovered a mysterious circular rock enclosing the area formed by three points just touching the tips of the three points

Task

a) Using a graph and suitable geometric instruments, show the design of the area covered by circular rock
b) Work out the area of the circular rock

Question 4

Jerome is a village farmer in Iganga district. He has rectangular farm land whose corners are at points $A(2,3), B(2,7), C(8,7), and\ (8,3)$. He bought the farm land from his neighbor 2 years ago at a total cost of UGX8400000. Jerome plans to sell the farm land to his friend Destiny. He wants to sell each square meter of the farm land at UGX120000 and save the profits obtained in a fixed deposit account that offers a 2% simple interest rate per month for 2 years. Each unit of the length or width of the farm land represents 5 metres of the actual size.

Task

a) Using a suitable graph, present the design of the farm land
b) How much money will Jerome withdraw from the bank after 2 years?

Question 5

Your school has designed a rectangular meal card whose corners are at points P(2,7), Q(6,7) R(6,-2) and S(2,-2) to help in school fees collection. The meal card is unique with a triangular design whose tips are at points (1,2),(3,4) and (5,6) inside it. A student in senior one has drawn a circular design that just touches the three edges of the triangular design.

Task

a) Present the design of the card on a suitable graph
b) Work out the area of the card covered by the circular design

Question 6

A new football coach of an English premier club is designing a new style of play for his team on a coordinate plane that represents a football pitch. The goalposts are located at points $A(2,4)$ and $B(2,-4)$. The football coach wants the team to practice running a play to facilitate counter attack against the opponent where the centre back starts the ball at point $Q(-3,1)$ and throws the ball in a straight line to the wide midfielder at point $(4,-2)$.The football club has a total of 40 players. 28 of the players can defend, 14 can attack while 2 of the players can neither attack nor defend. A player who can both defend and attack receives a weekly bonus

Task

a) The football coach would like to present his new style to the board of directors of the club, help him to address this challenge.
b) Write an equation that represents the path of the ball
c) How many players receive the weekly bonus?

Question 7

Your school has planted trees in a rectangular pattern to beautify the school compound. The design of the planted trees shows tree A at point (3,5), Tree B at point $(-2,4)$, Tree C at point $(1,-1)$ and Tree D at point $(-3,-2)$. The school wants to create a walking path that connects all the trees in the most efficient way possible and a straight road that passes diagonally from a tree at one corner to the tree in the other corner.

Task

a) Using a suitable graph show the design of the planted trees
b) Find the total distance of the walking path that connects all the four trees
c) Determine the length of the diagonal path and write its equation.

S.4 MATHEMATICS SCENARIO BASED DISCUSSION ITEMS
ALL ITEMS CARRY 20 SCORES
PLEASE ATTEMPT AS MANY ITEMS AS POSSIBLE

ITEM ONE:

A certain member of your family re-wrote each digit of his 4-digit **ATM** card pin from number system ten (base ten) to another number system less than four. He did this in fear of theft. Now he is sick in the hospital, he can neither talk nor write but the money on his account is needed to finance hospital bills. Here is how he wrote the pin: 12 20 22 10. Assuming that you have been able to encrypt the **ATM** pin for the family and funds are available to take care of him. The hospital has a nurse who takes checks on him after every two hours and a medical doctor who checks on him after every four and half hours. Both medical personnel last checked on him together at $\mathbf{9:30am}$. He was treated well and discharged and advised as follows. He was advised to spend three−eights of the day resting, one sixth of the day eating, two thirds of the remainder having a healthy diet and the rest of time of the day visiting the hospital for further checkup.

TASKS:

(a) (i) Which number system do you think he used to re-write the pin and why?

(ii) Use the identified number system to help your family members to regenerate the original pin.

(b) (i) At what time did will both the nurse and medical doctor check on him again at the same time.

(c) How many hours of the day in a week does he have spend on visiting the hospital.

ITEM TWO:

A produce wholesale dealer in Kalerwe Farmers Market has a broker who has been helping him order for his produce on his half. However he has been informed that his broker left for Saudi Arabia in quest for greener pastures, he is much troubled yet he wants to order for $\mathbf{1200\ bags}$ of produce. He visited his business books and noticed that in January, when he bought $\mathbf{300\ bags}$, the cost of transporting each bag was $\mathbf{UGX4500}$ and in February when he bought $\mathbf{700\ bags}$, the cost of transporting each bag was $\mathbf{UGX8500}$. He has resorted to do the ordering and buying by himself.

In preparation for Easter he went to Luuka Village to buy some produce with his lorry. Unfortunately his Lorry broke down and opted for two vehicles a Pickup and an Isuzu Diana. The pickup can transport $\mathbf{18\ bags}$ while the Isuzu Diana can transport $\mathbf{30\ bags}$. The number of bags to be transported must exceed $\mathbf{120}$. Each trip the Pickup and Isuzu Diana makes cost $\mathbf{UGX240,000}$ and $\mathbf{UGX300,000}$ respectively yet he has allocated $\mathbf{UGX2,400,000}$ to cater for transport.

The number of trips made by the pickups should not exceed those made by the Isuzu Diana by more than **2**.

TASKS:

(a) Determine the cost the whole sale dealer will pay for the **1200 bags**.

(b) Help the dear obtain how many trips each vehicle will make in order to minimize the cost of transport.

ITEM THREE:

There is a quarantine of all cattle and goats in some parts of Western Uganda especially Mbarara District. The area honorable Member of parliament (M.P) wants to throw for his constituents a celebration party for the success of the Parish Development Model (PDM) and he has invited a lot of guests. However due t the quarantine he can not buy any animals from Mbarara and he has been advised to go to Kayunga where cheap cattle and good Yoghurt can be found. He moves from Mbarara to Masaka which is **160km** North of Mbarara. From Masaka he moves west wards **150km** to Kampala. From Kampala he heads to Mukono which is in the direction $\boldsymbol{S75^{O}W}$ which is **90km** from Kampala. From Kampala he heads to Kayunga which is **148km** and south of Mukono.

When he reached Kayunga he bought **400** cows and each costs **UGX850,000** per cow. The farmer and owner of the cow first gives a **5**% discount on each cow plus an additional **10**% discount for any number of cows bought in excess of **250**.

In order to package the yoghurt, he bought two identical types of buckets. A smaller bucket with a base radius of **30cm** and a larger bucket with a base radius of **50cm**. He intends to use the buckets to keep the Yoghurt for his guests. The capacity of the smaller bucket is **45 litres** and he is to buy **4** smaller buckets and **2** larger buckets.

TASKS.

(a) Direct the honorable MP on the shortest route he should take and the shortest distance between Mbarara and Kayunga.

(b) Find the total cost he incurred in purchasing the cows.

(c) What is the maximum amount of Yoghurt be bought for his guests.

ITEM FOUR:

Holy Prayers Ministries International for a long time has been soliciting money to construct a church which can congregate all the church members. The Senior Pastor has a vision of a Hexagonal church which can fit exactly in the plot of land available. He wants to know the actual cost of constructing the church. He also has to buy a Sino Truck to transport all building materials and requirements. The contractor informs him that the area of each triangle that can be formed from the hexagonal church will cost him **UGX 128,000,000**.

He then proceeded to Nina Motors to buy the Sino truck. A brand new Sino Truck costs four hundred eighty millions on cash. It can also be bought by paying a deposit of a quarter of the cash price value and either pay **UGX7. 5 millions** weekly for **50 weeks** or pay **24. 5 millions** monthly for **15 months**. The pastor does not have the required money to obtain the Sino Truck on cash.

TASKS:

(a) Help the pastor determine the cost of the church.

(b) How much extra will he pay for the Sino Truck and explain why. *(25 scores)*

ITEM FIVE:

A school head teacher is thinking of how he can boost the mathematics department of your school. He can either add another teacher or buy more books or both. He has decided that he will do both if the average performance for this year's performance for the 40 students is lower than that of the previous which was **47**. He asked the department to give a test and the these were the student's marks.

50	71	40	48	61	70	30	62
44	63	60	51	55	25	32	65
54	45	65	50	45	40	25	45
48	45	30	38	30	28	24	48
30	48	28	35	50	48	50	60

He also visited the library and found out that the previous's candidates used three books for there revision. Longhorn, Baroque or Maths Clinic. From the librarian's records its is clear that all the candidates that did not use any book failed the subject greatly. Out of the **35** candidates this year **13** used Longhorn, **20** used Baroque and **17** used Maths Clinic. **9** used Longhorn and Maths Clinic, **3** used Longhorn and Baroque while **8** used Baroque and Maths Clinic only. The records show that **2** used all the three books. He observed that he should replace one book type of the three with Fountain publisher since no student read it only alone.

TASKS:

(a) (i) Help the head teacher group the marks to make an informed decision one the fate of the department and defend it.

(ii) Display the students marks in groups on a simple statistics diagram.

(b) (i) Help the head teacher identify the book he should replace and explain why?

(ii) Find the probability that a student selected from the class failed.

ITEM SIX:

Three schools from a Gayaza region want to participate in the National Schools Football Sports Gala to be held in Lyantonde district play ground. Unfortunately none of the schools has a school bus and they want to hire a bus for the one day for the activity. The bus charges 25,000km per km moved. The three schools through there Sports master agreed to share the cost of the bus equally amongst them selves. One that day they hired a bus from your school in Gayaza and they set off at $\mathbf{4}:\mathbf{30}\boldsymbol{am}$ and increased the speed gradually to $\mathbf{90}\boldsymbol{km/hr}$ reaching Mpigi at $\mathbf{6}:\mathbf{45}\boldsymbol{am}$. From there the bus driver maintained this same speed for $\mathbf{2}\frac{\mathbf{1}}{\mathbf{4}}$ hours reaching Masaka. From Masaka the he reduced slowly in speed reaching Lyantonde at $\mathbf{9}:\mathbf{30}\boldsymbol{am}$. The games started at $\mathbf{10}:\mathbf{00}\boldsymbol{am}$ sharp and each team played six games.

School A won $\mathbf{3}$ games, drew $\mathbf{2}$ and lost $\mathbf{1}$ game. School B won $\mathbf{4}$ games and lost $\mathbf{2}$ games. School C won $\mathbf{2}$ games and drew $\mathbf{4}$ games. The organizers award three points for a win, one point for a draw and no point for a loss. They declared these schools the first three schools in order of their points they obtained from the games. They were to receive the price money of sixteen millions five hundred thousand shillings.

TASKS:

(a) Find how much each school paid for the bus.

(b) Decide the cash prize for school.

ITEM SEVEN

A man intends to plant trees on the two sides of the road which leads to his land. On one side of the road, he is to plant a tree every after $\mathbf{5}\boldsymbol{m}$ yet on the other side he is to plant a tree every after $\mathbf{6}\boldsymbol{m}$. at the start of the road, two trees are to be planted directly opposite each other. In the first phase of planting trees, he will plant trees, until another pair of tress is again directly opposite. His land has an area of $\mathbf{500}\boldsymbol{m}^{\mathbf{2}}$. He plans to use $\mathbf{25}$% of the land to plant maize, one fifth of the land for beans and $\mathbf{205}\boldsymbol{m}^{\mathbf{2}}$ dor growing ground nuts.

Tasks:

(a) Help the man determine how many tree seedlings he needs to buy to just plant this first phase.

(b) Determine in $\boldsymbol{m}^{\mathbf{2}}$ the size of the land to be used for growing maize.

(c) Determine in $\boldsymbol{m}^{\mathbf{2}}$ the size of the land to be used for growing beans.

(d) Express the area to be used for growing ground nuts in standard form.

(e) Do you think he partitioned the entire land properly? Give a reason.

ITEM EIGHT

A mathematician gave your friend a carpenter a task of making a rectangular ground floor of a rabbit house. The length of the house is to be $(\boldsymbol{x}+\mathbf{3})\boldsymbol{m}$ and the width is to $\boldsymbol{ym}$. Its perimeter should be $\mathbf{25}\boldsymbol{m}$ and its area msut be $\mathbf{25}\boldsymbol{m}^{\mathbf{2}}$. The mathematician adds that he needs the work to be finished in one day but he has ever contracted $\mathbf{3}\ \boldsymbol{men}$ working at the

same rate and they only managed to work on $\mathbf{5}\boldsymbol{m}^{\mathbf{2}}$. To be given this contract, your friend is required to make a clear diagram showing the numerical sizes of the length and width but fails to do so and comes to you for help.

Tasks:

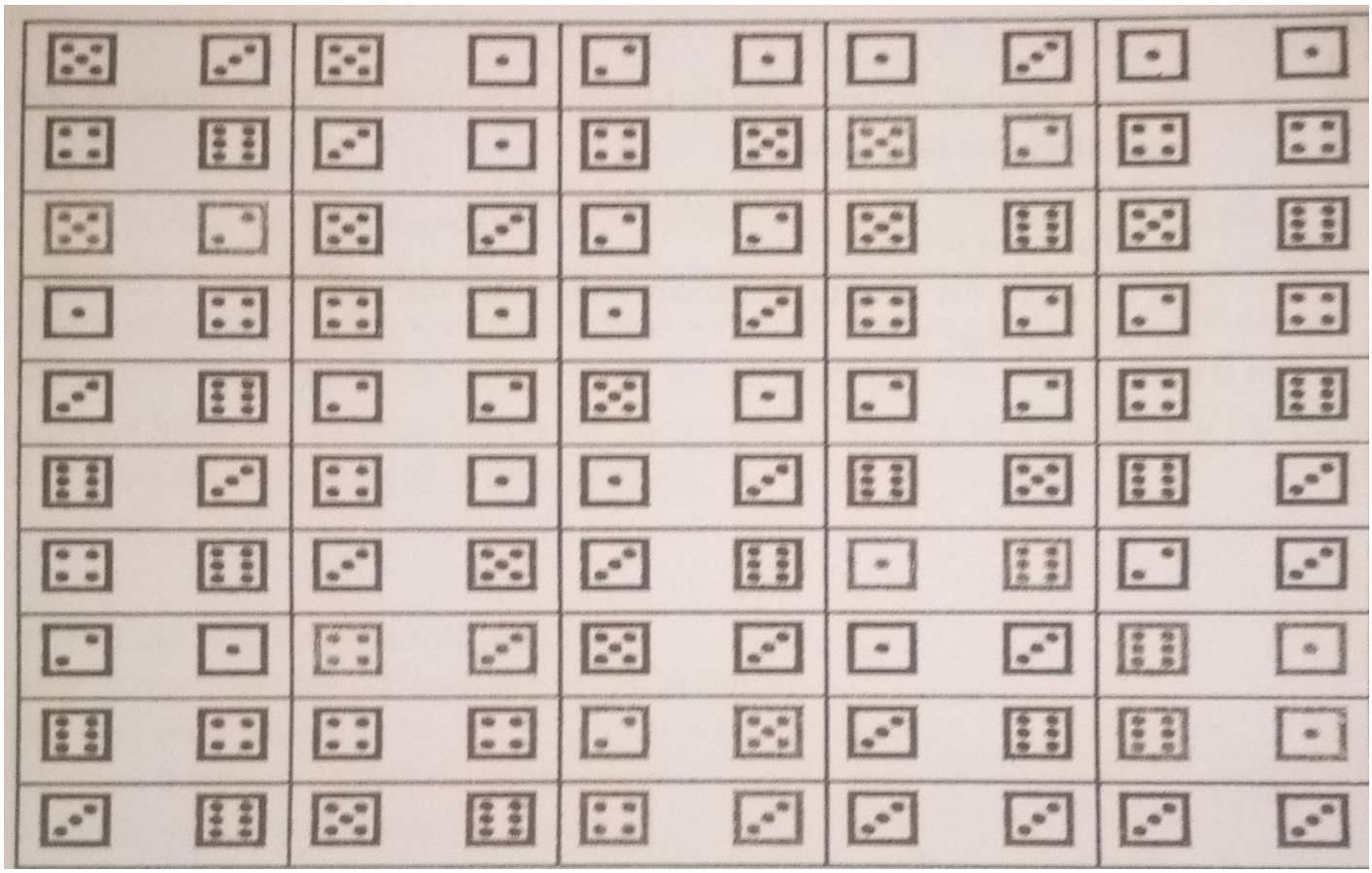
(a) (i) Determine the length and width of the floor to be occupied by the house.

(ii) Make a sketch of the floor your friend can present to the mathematician to get the contract.

(b) Determine the number of workers who are needed to complete the house if they all work at the same rate as the group the man has ever used.

ITEM NINE

A friend of yours wanted to participate in the National Ludo Champions competitions. During his practice, he rolled a die several times and kept on taking a picture of each occurrence. He needs to find out whether he will compete favorably but he is unable to do so. He gives you the diagram below showing his scores so that you can guide him.



Tasks:

(a) Use the information above and clearly show how to determine the score with the highest chance of occurring on top. Which score is it?

(b) Find the probability that an odd number occurred when the die was rolled.
(c) Present the information of the above scores on a statistical graph.
(d) Will your friend compete favorably in the competitions? Give a reason.

ITEM TEN

An organization wants to build a school in a certain community. Below were the reasons they identified as to why children were not schooling.

A =school is boring. **B** =no school fees. **C** =we want to work.

They carried out research on a sample of **50** children in that community to find out which reason has the highest probability amongst the above and hence base on that to either build the school or not. Children gave one reason, others gave two and the others gave three as shown below.

A	B,C	B	A,C	A	B,C	B	A,C	A,B,C	B
C,B	B	B,C	A,B,C	A,C	B	C	B	C	B
B	A,B,C	B,A	A	B	A	C,B	A,B	B,A	C
C	A,C	B,A	B	C,B	C	C	A	B	B,C
A,C	B	A	A	C	B,A	C	B	A	A,C

Tasks:

(a) Present the data in such a way that the total responses for each reasons **A**, **B** and **C** respectively are clearly shown

(b) (i) Which reason has the highest probability?
(ii) What is the probability?
(iii) Basing on the value of probability should they build the school or not? Give a reason for your answer.

ITEM ELEVEN

A carpenter is re-known for crafting traditional wooden doors with elaborate geometric patterns. The carpenter wishes to make a door with a circular design at its center. The carpenter needs to ensure the design fits perfectly within the rectangular frame of the door. The door frame available is rectangular with dimensions $\mathbf{2.5meters}$ in height and $\mathbf{1.5meters}$ in width. The circular design should be touching the two parallel sides of the door frame. Vanish is packed in tins of a litre and the cost of one litre of vanish is $\boldsymbol{UGX}\ \mathbf{9,000}$. It is known that one litre of vanish can be used to paint one square meter.

Tasks:

(a) (i) Help the carpenter determine how much of the door will be covered by the circular design so that it fits perfectly within the door frame.

(ii) Will one tin of vanish be enough for the circular design? Give a reason for your response.

(b) With a reason(s), help the carpenter determine how much will be spent to buy vanish that will paint the entire front face of the door.

ITEM TWELVE

You are an athlete and soon competing with someone. You wanted to test your chances of winning the race by testing your speed and time in relation to that of your competitor you started to run at $\mathbf{4}:\mathbf{50pm}$. From your home where you started from, you ran a distance of $\mathbf{5km}$ north−west to place **P**, then from **P**, you turned south and ran $\mathbf{4}\boldsymbol{km}$ until you were at place **Q** that is west of your home and then ran back and arrived at $\mathbf{5}:\mathbf{12pm}$. Your competitor ran the same distance during training at a speed of $\mathbf{10m/s}$.

Tasks:

(a) What is the total distance that you ran?

(b) What is the total time you took to run that distance?

(c) How fast were you?

(d) (i) Do you think you will win the race or not?

(ii) Why do you think that way?

ITEM THIRTEEN:

A school head teacher is thinking of how he can boost the mathematics department of your school. He can either add another teacher or buy more books or both. He has decided that he will do both if the average performance for this year's performance for the 50 students is lower than that of the previous which was $\mathbf{64}$. He asked the department to give a test and the these were the student's marks.

86	30	26	64	87	47	49	26	43	25
45	38	44	56	59	52	76	27	89	46
90	57	73	48	58	89	51	32	56	88
66	62	52	67	69	68	49	92	66	95
54	74	32	39	35	36	69	50	71	92

He also visited the library and found out that the previous's candidates used three books for there revision. Longhorn, Baroque or Maths Clinic. From the librarian's records its is clear that all the candidates that did not use any book failed the subject greatly. Out of the $\mathbf{35}$ candidates this year $\mathbf{13}$ used Longhorn, $\mathbf{20}$ used Baroque and $\mathbf{17}$ used Maths Clinic.

9 used Longhorn and Maths Clinic, **3** used Longhorn and Baroque while **8** used Baroque and Maths Clinic only. The records show that **2** used all the three books. He observed that he should replace one book type of the three with Fountain publisher since no student read it only alone.

TASKS:

(a) (i) Help the head teacher group the marks to make an informed decision one the fate of the department and defend it.

(ii) Display the students marks in groups on a simple statistics diagram.

(b) (i) Help the head teacher identify the book he should replace and explain why?

(ii) Find the probability that a student selected from the class failed.

ITEM FOUTRTEEN

St. JULIAN is to transport its S. 4 students for fieldwork in Kasenyi. All the 400 students are to be transported using either coasters or buses. Each coaster can carry 40 people while each bus can carry 80 people. The transport department of the school has only 8 drivers on duty and up to four coasters. If the cost of hiring a coaster is shs. 150,000 and that of hiring a bus is shs. 300,000.

While in Kasenyi their geography teacher Mr Kefa visited Mr Sembatya's shop from which he found that three shirts and two trousers cost shs. 105,000 at Mr. Sembatya's shop. Two shirts and five trousers cost shs. 180,000 at the same shop;

Task:

(a) (i) Write down the five inequalities representing the above information.

(ii) Represent the inequalities on a graph paper.

(iii) Find the possible number of coasters and buses that can be used and hence determine the minimum cost.

(b) Find the cost of;

(i) each shirt and each trouser.

(ii) three items of each type at the shop.

ITEM FIFTEEN:

Simon is the district inspector of schools in Butambala district found that his causal workers use one third of his farm for bananas, one quarter for coffee and two fifth of the remainder for mixed farming. She still has some six acres of unused land.

Buddo S.S has a student population of 1200 students. On a particular day Simon invited the entire for a , $^1/_5$ of the boys and $^1/_4$ of the girls went to **WAKISSHA** resource centre for a sports meeting. If 936 students were left behind.

The price of Simon's house was valued at 45 million shillings. It increased by 25% after the first year but in the second year, the value of the house depreciated by 10%.

Task:

(a) Find the size of his farm and clearly illustrate it on a diagram.

(b) Find how many more boys than girls attended the meeting.

(c) Find the value of her house at the end of the second (2nd) year.

ITEM SIXTEEN:

Kampala (K) and Arua (A) are about 450km apart. At 7:30 a.m, a bus starts from Arua and moves towards Kampala (K) at a steady speed of 100km/hr while a lorry starts from Kampala (K) an hour later moving at an average speed of 60km/hr to Arua (A). At 10.00 a.m, the bus is stopped at town C by police and ordered to reduce speed. After 30 minutes at C, it resumes its journey at a reduced average speed of 50km/hr until it reaches Kampala (K).

Task:

(a) State the difference in time when the two vehicles arrive at their destinations.

(b) Determine when and at what distance from Arua the two vehicles meet.

(c) Find the average speed of the bus.

ITEM SEVENTEEN:

You are only two children in the family and the chairperson of your village has come to your home to register the details of you and your sibling. Unfortunately both parents are not around and you he gives them a call to find your present ages. The mother informs him that the two ages differ by 4. the father informs him that the sum of the squares of your ages is 136.

Your neighbor makes a rectangular flower bed by taking two meters off its length and adding three meters to its breadth. By so doing, he increases the area by 20 square meters.
Moses is 1.5m tall and standing on top of a building 34m tall. In a straight line from where he is standing he can see a car and bicycle at angles of depressions of 50° and 65° respectively.
A magician on Easter day organized a presentation in your village to entertain the village. He had a bad that contains x red balls and (x - 8) white balls. If the probability of drawing a red ball is $\frac{2}{3}$.

Tasks:

(a) Help the chairperson get the right ages of you and your sibling.

(b) What is its final area of the flower bed?

(c) How far is the bicycle from the car?

(d) Find the number of balls in the bag.

ITEM EIGHTEEN

The cost of manufacturing Blue band in a factory is determined by the components milk x and flavor y**.** If the constraints for the production are $3y + 2x \le 15, 2x - 3y \le 5, x \ge 1$ and $y \ge 0$. The factory has only chicken and goats. When the manager counted the heads of the stock in the farm, the number totalled to 200. When the number of legs was counted, the number totalled to 540.

Task

(a) Given that the cost function for the production of blue band is $c = x + 2y$ find the;

(i) Minimum cost

(ii) Maximum cost

(b) How many chickens were there on the farm?

ITEM NINETEEN

Your parents are organizing to celebrate your 18th birthday and want ot to be a memeorable one. They went to Akamwesi mall which has a CINEMAX and it has two tickets.
Tickets to a play cost 9 *dollars* for adults and 5 *dollars* for children. If the show sold 180 tickets and earned 1380 dollars,
George your brother has neen planning for this birthday for three weeks. He buys the following items in three weeks. Week one he buys 2 packets of tea , 2 tins of margarine , 3 kg of sugar and 4 packets of biscuits. Week two he buys 2 tins of margarine , 3 kg

of sugar and 4 packets of biscuits . Week three he buys 2 packet of tea , 2 kg of sugar and 3 packets of biscuits. A packet of tea costs shs 1,000 , a tin of margarine costs shs 2,500, a kilogramme of sugar costs shs 3,500 and a packet of biscuits costs shs 2000. Your parents then demarcated the land they are to use for the party and plan to demarcate it. represented the plot of land he inherited using the following inequalities. $40x + 60y \geq 480$ …(i) $30{,}000x + 45{,}000y < 600{,}000$ …(ii) $x \leq 12$ …(iii) $y \geq 2x$ …(iv)

He wants to fence it using poles(x) and barbed wire (y) and the cost function is given by $C = 45000x + 30{,}000y$

Task;

(a) how many of each type of tickets were sold?

(b) Find his total expenditure in the three weeks.

(c) find the maximum cost.

ITEM TWENTY

The length of a rectangular plot of land exceeds the width by $7ft$ and its area is $60sq.ft$. Three business partners Wambusa, Aisha and Wekesa contributed Shs 300.000, 500.000 and 700.000 respectively to start a business. They decided that $\frac{1}{3}$of the profit was to be ploughed back to the business, $\frac{1}{5}$of the remainder would be kept for emergencies and the rest to be shared in the ratio of their capital contributions. In that year the profit realized was one and a quarter times that of capital.

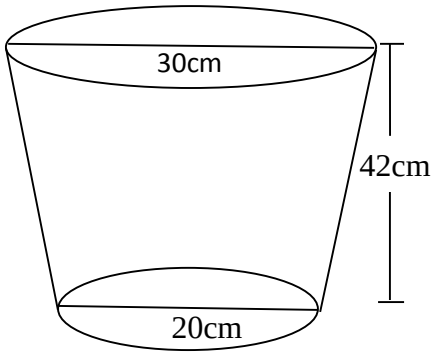
Task:

(a) Find the dimensions of the rectangle

(b) Determine the amount received by each partner that year.

ITEM TWENTY ONE

A bucket is in shape of a frustrum with an open end of diameter 30cm and a bottom diameter of 20cm. the bucket which is 42cm deep is used to fill an empty cylindrical tank of diameter 1.8m and Height 1.2m



Taking $\pi = 3.142$.

Three hundred and sixty litres of a homogeneous paint is made by mixing three paints **A**, B and C. The ratio by amount of point **A** to point **B** is 3:2 and that of **B** to C is 1:2. Paint A costs shs 1800 per litre paint **B** costs shs 2400 per litre and paint C shs 1,275 per litre

Task:

(a) (i) Determine the capacity of the bucket in litres correct to 3dp.

(ii) The capacity of the tank in litres correct to 2 dp.

(iii) The number of bucket that must be drawn to fill the tank.

(b) (i) The amount of each paint in the mixture

(ii) The amount of money need to make 1 litre of the mixture

(iii) The percentage profit made by selling the mixture at shs 2,210 per litre.

ITEM TWENTY TWO

There are very few teachers who have three teaching subjects. A survey was done in your school and it was found that the school has a teaching staff of 22 teachers 8 of them teach mathematics, 7 teach physics and 4 teach Chemistry. Three teach both mathematics and Physics and one teaches Mathematics and Chemistry. No teacher teaches all the three

subjects. The number of teachers who teach Physics and Chemistry is equal to that of those who teach Chemistry but not physics.

In the school staffroom there are two similar cans tha have different heights. One 6cm and the other one 9cm. If the surface area of the larger can is 840 cm^2.

Task

(a) Find the number of teachers who teach none of the three subjects.

(b) Find the probability that a teacher picked at random teaches only one subject.

(c) Find the surface area of the smaller can.

ITEM TWENTY THREE

The traffic police arrests all motorists travlelling along Kampala-Jinja highway with a speed greater than 80km/hr. A motorist travelled the first 90 km at an average speed of 60 km/hr and for the next $3\frac{1}{2}$ hours he travelled at an average speed of 80 km/hr.

On a certain day a car travelling at s km/hr can be stopped within a distance d metres where $\boldsymbol{d = \frac{s^2}{200} + \frac{s}{10}}$ The table below gives some values of $\boldsymbol{d}$ against $\boldsymbol{s}$.

s	0	10	20	30	40	50	60	70	80	90	100
d	0			7.5				31.5			60

(a) Find out if the motorist will be arrested.

(b) Find the stopping distance for a car moving at 46 km/hr and at 85 km/hr. Also find the speed at which a car is moving if its stopping distance is 35 metres.

ITEM TWENTY FOUR

In a survey 100 people were asked which form of transport they used. 46 people only used bicycles (M). 21 people only used buses (N). 11 people only used motor bikes (P). 5 people used buses and bicycles but not motor bikes. 3 people used buses and motor bikes. 6 people used bicycles and motor bikes. 9 people declined to respond.

Customs duty and purchase tax are levied on certain imported goods as

Customs duty = 35% of the value of the good.

Purchase tax= 15% of (value +duty)

Task

(a) Find the;

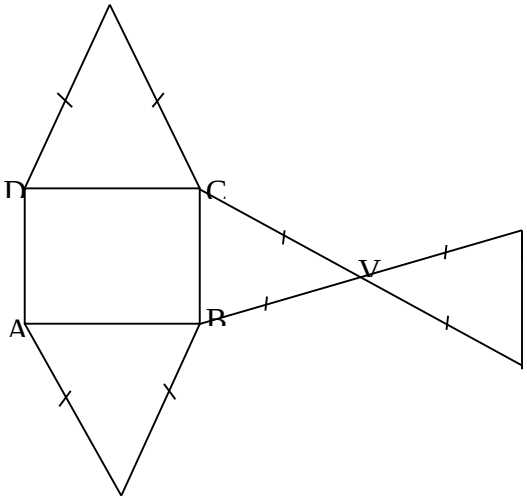
(i) number of people who used all the three forms of transport.

(ii) percentage of people who used only two forms of transport.

(b) Find the total amount levied on a disco deck valued at 1.7millions.

ITEM TWENTY FIVE

The figure below shows a net of a right pyramid with a rectangular base ABCD.

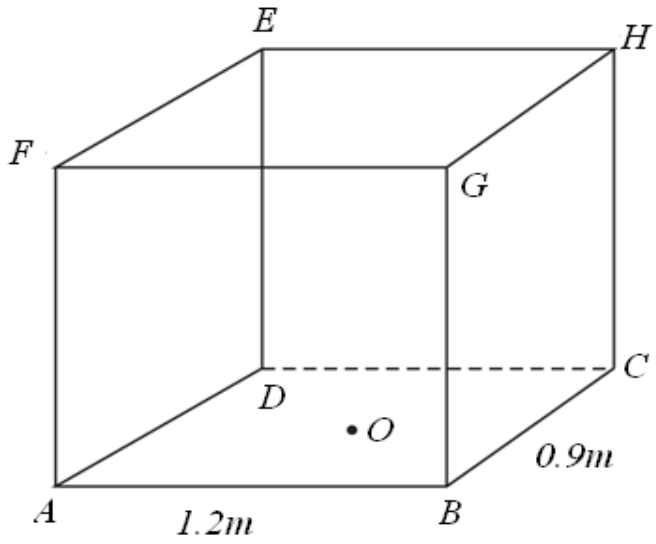


If **V** is the vertex of the pyramid **VABCD** above the base **ABCD**, $AB = 16cm$, $BC = 12cm$, and the slant sides of each triangle measure 26cm.

a) Draw the right pyramid showing clearly points VABCD,
b) Find the height of the pyramid.
c) Find the area of plane VAB
d) Find the angle between;
   (i) Edge VA and the base
   (ii) Face VAB and the base.

ITEM TWENTY SIX

Mr kyeswa is buying a conatiner to start a hardware in Kisooba Village to sell bags of cement. Each bag occupies an area of 0.8cubic meters. The container is $ABCDEFGH$ with $AB = 12m, BC = 9m, ADEF$ is a square and O is the point of intersection of AC and BD.



(a) Find the distances;
  (i) BE,
  (ii) OH.

(b) Determine the angle formed between;
  (i) line BE and the base,
  (ii) plane BDH and the base.

(c) Calculate the capacity of the cuboid above in litres and how many bags can be accommodated.

ITEM TWENTY SEVEN

Pamungu bought a car in January 2017 from his friend at shs. 12,500,000. If the car depreciates at a rate of 10% per annum. Calculate the value of Pamungu's car by January 2020.

A Ugandan tourist left Germany for Uganda through Switzerland. While in Switzerland he bought a watch worth 54 Deutsche Marks (Germany currency).

1 Swiss Franc = 1.28 Deutsche Marks

1 Swiss Franc = 1,350 Ugandan Shillings

A secondary school teacher as a requirement by the government pays PAYE every month according to the tax structure below.

Income (shs) per month	**Tax rate(%)**
01-50,000	5%
50,001 - 100,000	9.5%
100,001 - 180,000	15%
180,001 - 300,000	18%

300,001 - 400,000	23%
400,001 - 500,000	30%
Above 500,000	35%

The teacher earns Shs.760,000 and his allowances include

Marriage allowance - shs.50,000 per month

Water and electricity - shs.60,000 per month

Housing allowance - shs 150,000 per month

Medical allowance - shs.300,000 per annum

Transport allowance - shs.3,000 per day

Paying for insurance and relief - shs.180,000 per annum

Family allowance for only three children. For children in the age bracket

0 to 10 years, shs 12,000 per child,

Between 10-15 years shs. 9000 per child

15 years and above shs 5000.

Given that the employee has five children, two of whom are aged between 0 and 10, the other two aged between 10 and 15 while the other 18 years. (A month has 30 days

(a) Find the value of the watch in;
   (i) Swiss Francs
   (ii) Ugandan Shillings.

(a) Determine the teacher's Net-income

(b) Determine the percentage of his gross income that goes to tax.

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(PHANEROO-MAKE MANIFEST)

KINAAWA HIGH SCHOOL, KAWEMPE-2024
S.4 MATHEMATICS SCENARIO BASED DISCUSSION ITEMS
SCHEDULED FOR MONDAY 8/04/2024 (FOR MORE INFORMATION: +256758018891)

FORMAT 456/1:

Section A will comprise of two items and section B comprises of Part I and Part II each having two questions and a learner answers one question from part

Item	Area of construct	Topics covered	
SECTION A: compulsory			
Item one	Numbers	✔ Number bases	
		✔ Working with integers	
		✔ Fractions, percentages and decimals	
		✔ Numerical concept 1 and 2	
		✔ Ratios and proportions	
Item Two	Patterns and algebra	✔ Sequences and patterns	
		✔ Equations of line and curves	
		✔ Algebra 1 and 2	
		✔ Mapping and relations	
		✔ Inequalities and regions	
		✔ Equation of a straight line	
		✔ Rectangular Cartesian plane	
		✔ Simultaneous equations	
		✔ Linear programming	
		✔ Loci	
SECTION B			
PART I (choose one question)			
Item 3 and 4	DATA AND PROBABILITY	✔ Data collection and presentation	
		✔ Graphs	
		✔ Set theory	
		✔ Data collection and display	
		✔ Matrices	
		✔ Probability	
PART II (choose one question)			
Items 5 and 6	GEOMETRY AND MEASURES	✔ Geometrical construction	
		✔ Bearings	
		✔ General and angle properties of geometric figures	
		✔ Reflection	
		✔ Business arithmetic	
		✔ Time and tables	
		✔ Similarities and enlargement	
		✔ Circle	
		✔ Rotation	

		✔ Length and area properties of two dimensional geometrical figures	
		✔ Nets, areas and volumes of solids	
		✔ Trigonometry 1 and 2	
		✔ Vectors	
		✔ Business mathematics	
		✔ Matrix transformation	
		✔ Circle properties	
		✔ Lines and planes in three dimensions	

ITEM ONE

A certain member of your family re-wrote each digit of his 4-digit **A T M** card pin from number system ten (base ten) to another number system less than four. He did this in fear of theft. Now he is sick in the hospital, he can neither talk nor write but the money on his account is needed to finance hospital bills. Here is how he wrote the pin: 12 20 22 10. Assuming that you have been able to encrypt the **A T M** pin for the family and funds are available to take care of him. The hospital has a nurse who takes checks on him after every two hours and a medical doctor who checks on him after every four and half hours. Both medical personnel last checked on him together at **9 : 3 0 a m**. He was treated well and discharged and advised as follows. He was advised to spend three_eights of the day resting, one sixth of the day eating, two thirds of the remainder having a healthy diet and the rest of time of the day visiting the hospital for further checkup.

TASKS:

(a) (i) Which number system do you think he used to re-write the pin and why?

(ii) Use the identified number system to help your family members to regenerate the original pin.

(b) (i) At what time did will both the nurse and medical doctor check on him again at the same time.

(ii) How many hours of the day in a week does he have spend on visiting the hospital.

ITEM TWO:

A produce wholesale dealer in Kalerwe Farmers Market has a broker who has been helping him order for his produce on his half. However he has been informed that his broker left for Saudi Arabia in quest for greener pastures, he is much troubled yet he wants to order for **1 2 0 0 b a g s** of produce. He visited his business books and noticed that in January, when he bought **3 0 0 b a g s** , the cost of transporting each bag was **U G X 4 5 0 0** and in February when he bought **7 0 0 b a g s** , the cost of transporting each bag was **U G X 8 5 0 0** . He has resorted to do the ordering and buying by himself.

In preparation for Easter he went to Luuka Village to buy some produce with his lorry. Unfortunately his Lorry broke down and opted for two vehicles a Pickup and an Isuzu

Diana. The pickup can transport **1 8 b a g s** while the Isuzu Diana can transport **3 0 b a g s** .

The number of bags to be transported must exceed **1 2 0** . Each trip the Pickup and Isuzu Diana makes cost **U G X 2 4 0 , 0 0 0** and **U G X 3 0 0 ,0 0 0** respectively yet he has allocated **U G X 2 , 4 0 0 , 0 0 0** to cater for transport.

The number of trips made by the pickups should not exceed those made by the Isuzu Diana by more

than 2.

TASKS:

(a) Determine the cost the whole sale dealer will pay for the 1200 bags.

(b) Help the dear obtain how many trips each vehicle will make in order to minimize the cost of transport.

ITEM THREE:

There is a quarantine of all cattle and goats in some parts of Western Uganda especially Mbarara District. The area honorable Member of parliament (M.P) wants to throw for his constituents a celebration party for the success of the Parish Development Model (PDM) and he has invited a lot of guests. However due t the quarantine he can not buy any animals from Mbarara and he has been advised to go to Kayunga where cheap cattle and good Yoghurt can be found. He moves from Mbarara to Masaka which is 160 km North of Mbarara. From Masaka he moves west wards 150 km to Kampala. From Kampala he heads to Mukono which is in the direction $S\ 75^{o}W$ which is 90 km from Kampala. From Kampala he heads to Kayunga which is 148 km and south of Mukono.

When he reached Kayunga he bought 400 cows and each costs UGX 850,000 per cow. The farmer and owner of the cow first gives a 5 % discount on each cow plus an additional 10 % discount for any number of cows bought in excess of 250.

In order to package the yoghurt, he bought two identical types of buckets. A smaller bucket with a base radius of 30 cm and a larger bucket with a base radius of 50 cm. He intends to use the buckets to keep the Yoghurt for his guests. The capacity of the smaller bucket is 45 litres and he is to buy 4 smaller buckets and 2 larger buckets.

TASKS.

(a) Direct the honorable MP on the shortest route he should take and the shortest distance between Mbarara and Kayunga.

(b) Find the total cost he incurred in purchasing the cows.

(c) What is the maximum amount of Yoghurt be bought for his guests.

ITEM FOUR:

Holy Prayers Ministries International for a long time has been soliciting money to construct a church which can congregate all the church members. The Senior Pastor has a vision of a Hexagonal church which can fit exactly in the plot of land available. He wants to know the actual cost of constructing the church. He also has to buy a Sino Truck to transport all building materials and requirements. The contractor informs him that the area of each triangle that can be formed from the hexagonal church will cost him

UGX 128,000,000.

He then proceeded to Nina Motors to buy the Sino truck. A brand new Sino Truck costs four hundred eighty millions on cash. It can also be bought by paying a deposit of a quarter of the cash price value and either pay UGX 7.5 millions weekly for 50 weeks or pay 24.5 millions monthly for 15 months. The pastor does not have the required money to obtain the Sino Truck on cash.

TASKS:

(a) Help the pastor determine the cost of the church.

(b) How much extra will he pay for the Sino Truck and explain why. *(25 scores)*

ITEM FIVE:

A school head teacher is thinking of how he can boost the mathematics department of your school. He can either add another teacher or buy more books or both. He has decided that he will

do both if the average performance for this year's performance for the 40 students is lower than that of the previous which was 47. He asked the department to give a test and the these were the student's marks.

50	71	40	48	61	70	30	62
44	63	60	51	55	25	32	65
54	45	65	50	45	40	25	45
48	45	30	38	30	28	24	48
30	48	28	35	50	48	50	60

He also visited the library and found out that the previous's candidates used three books for there revision. Longhorn, Baroque or Maths Clinic. From the librarian's records its is clear that all the candidates that did not use any book failed the subject greatly. Out of the 35 candidates this year 13 used Longhorn, 20 used Baroque and 17 used Maths Clinic. 9 used Longhorn and Maths Clinic, 3 used Longhorn and Baroque while 8 used Baroque and Maths Clinic only. The records show that 2 used all the three books. He observed that he should replace one book type of the three with Fountain publisher since no student read it only alone.

TASKS:

(a) (i) Help the head teacher group the marks to make an informed decision one the fate of the department and defend it.

(ii) Display the students marks in groups on a simple statistics diagram. (b) (i) Help the head teacher identify the book he should replace and explain why?

(ii) Find the probability that a student selected from the class failed.

ITEM SIX:

Three schools from a Gayaza region want to participate in the National Schools Football Sports Gala to be held in Lyantonde district play ground. Unfortunately none of the schools has a school bus and they want to hire a bus for the one day for the activity. The bus charges 25,000km per km moved. The three schools through there Sports master agreed to share the cost of the bus equally amongst them selves. One that day they hired a bus from your school in Gayaza and they set off at $4:30\ am$ and increased the speed gradually to $90\ km/hr$ reaching Mpigi at $6:45\ am$. From there the bus driver maintained this same speed for $2\frac{1}{4}$ hours reaching Masaka. From Masaka the he reduced slowly in speed reaching Lyantonde at $9:30\ am$. The games started at $10:00\ am$ sharp and each team played six games.

School A won 3 games, drew 2 and lost 1 game. School B won 4 games and lost 2 games. School C won 2 games and drew 4 games. The organizers award three points for a win, one point for a draw and no point for a loss. They declared these schools the first three schools in order of their points they obtained from the games. They were to receive the price money of sixteen millions five hundred thousand shillings.

TASKS:

(a) Find how much each school paid for the bus.

(b) Decide the cash prize for school.

ITEM SEVEN

A man intends to plant trees on the two sides of the road which leads to his land. On one side of the road, he is to plant a tree every after $5\ m$ yet on the other side he is to plant a tree every after $6\ m$. at the start of the road, two trees are to be planted directly opposite each other. In the first

phase of planting trees, he will plant trees, until another pair of tress is again directly opposite. His land has an area of $500\ m^2$. He plans to use 25 % of the land to plant maize, one fifth of the land for beans and $205\ m^2$ dor growing ground nuts.



Tasks:

(a) Help the man determine how many tree seedlings he needs to buy to just plant this first phase.

(b) Determine in m^2 the size of the land to be used for growing maize.

(c) Determine in m^2 the size of the land to be used for growing beans.

(d) Express the area to be used for growing ground nuts in standard form.

(e) Do you think he partitioned the entire land properly? Give a reason.

ITEM EIGHT

A mathematician gave your friend a carpenter a task of making a rectangular ground floor of a rabbit house. The length of the house is to be $(x + 3)m$ and the width is to $y\ m$. Its perimeter should be $25\ m$ and its area msut be $25\ m^2$. The mathematician adds that he needs the work to be finished in one day but he has ever contracted $3\ men$ working at the same rate and they only managed to work on $5\ m^2$. To be given this contract, your friend is required to make a clear diagram showing the numerical sizes of the length and width but fails to do so and comes to you for help.



Tasks:

(a) (i) Determine the length and width of the floor to be occupied by the house.

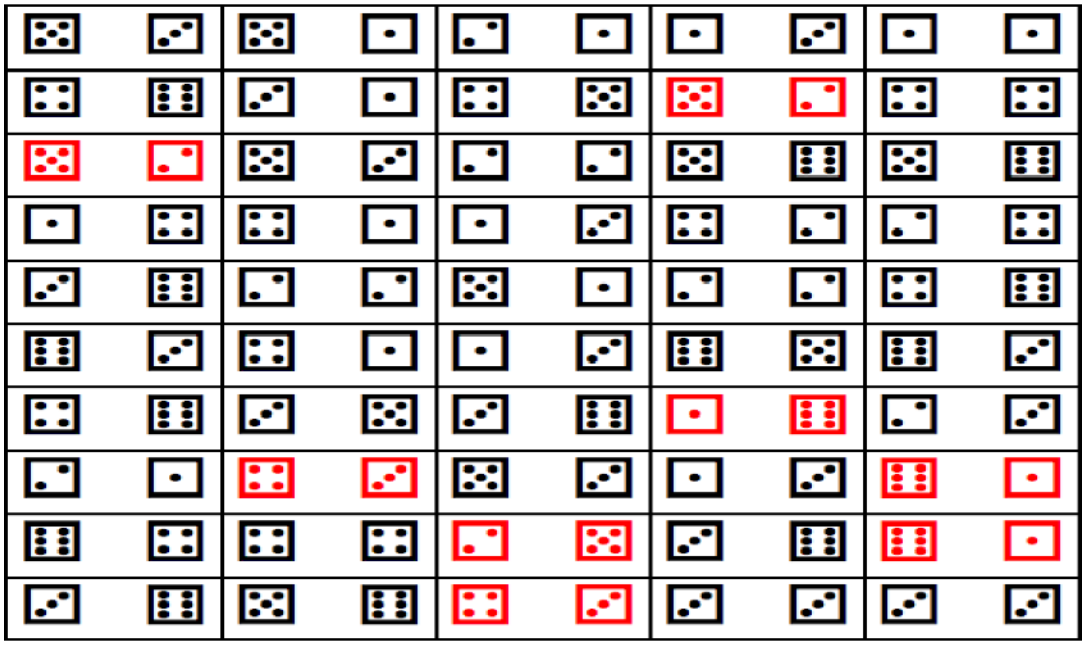
(ii) Make a sketch of the floor your friend can present to the mathematician to get the contract.

(b) Determine the number of workers who are needed to complete the house if they all

work at the same rate as the group the man has ever used.

ITEM NINE

A friend of yours wanted to participate in the National Ludo Champions competitions. During his practice, he rolled a die several times and kept on taking a picture of each occurrence. He needs to find out whether he will compete favorably but he is unable to do so. He gives you the diagram below showing his scores so that you can guide him.



Tasks:

(a) Use the information above and clearly show how to determine the score with the highest chance of occurring on top. Which score is it?

(b) Find the probability that an odd number occurred when the die was rolled.

(c) Present the information of the above scores on a statistical graph.

(d) Will your friend compete favorably in the competitions? Give a reason.

ITEM TEN

An organization wants to build a school in a certain community. Below were the reasons they identified as to why children were not schooling.

A =school is boring. **B** =no school fees. **C** =we want to work.

They carried out research on a sample of **5 0** children in that community to find out which reason has the highest probability amongst the above and hence base on that to either build the school or not. Children gave one reason, others gave two and the others gave three as shown below.

A	B,C	B	A,C	A	B,C	B	A,C	A,B,C	B
C,B	B	B,C	A,B,C	A,C	B	C	B	C	B
B	A,B,C	B,A	A	B	A	C,B	A,B	B,A	C
C	A,C	B,A	B	C,B	C	C	A	B	B,C
A,C	B	A	A	C	B,A	C	B	A	A,C

Tasks:

(a) Present the data in such a way that the total responses for each reasons **A** , **B** and **C** respectively are clearly shown

(b) (i) Which reason has the highest probability?

(ii) What is the probability?

(iii) Basing on the value of probability should they build the school or not? Give a reason for your answer.

ITEM ELEVEN

A carpenter is re-known for crafting traditional wooden doors with elaborate geometric patterns. The carpenter wishes to make a door with a circular design at its center. The carpenter needs to ensure the design fits perfectly within the rectangular frame of the door. The door frame available is rectangular with dimensions **2 . 5 m e t e r s** in height and **1 . 5 m e t e r s** in width. The circular design should be touching the two parallel sides of the door frame. Vanish is packed in tins of a litre and the cost of one litre of vanish is ***U G X*** **9 , 0 0 0** . It is known that one litre of vanish can be used to paint one square meter.



Tasks:

(a) (i) Help the carpenter determine how much of the door will be covered by the circular design so that it fits perfectly within the door frame.

(ii) Will one tin of vanish be enough for the circular design? Give a reason for your response.

(b) With a reason(s), help the carpenter determine how much will be spent to buy vanish that will paint the entire front face of the door.

ITEM TWELVE

You are an athlete and soon competing with someone. You wanted to test your chances of winning the race by testing your speed and time in relation to that of your competitor you started to run at **4 : 5 0 p m** . From your home where you started from, you ran a distance of **5 k m** north–west to place **P**, then from **P**, you turned south and ran **4 *k m*** until you were at place **Q** that is west of your home and then ran back and arrived at **5 : 1 2 p m** . Your competitor ran the same distance during training at a speed of **1 0 m / s** .

Tasks:

(a) What is the total distance that you ran?

(b) What is the total time you took to run that distance?

(c) How fast were you?

(d) (i) Do you think you will win the race or not?

(ii) Why do you think that way?

ITEM THIRTEEN:

A school head teacher is thinking of how he can boost the mathematics department of your school. He can either add another teacher or buy more books or both. He has decided that he will do both if the average performance for this year's performance for the 50 students is lower than that of the previous which was **6 4** . He asked the department to give a test and the these were the student's marks.

86	30	26	64	87	47	49	26	43	25
45	38	44	56	59	52	76	27	89	46
90	57	73	48	58	89	51	32	56	88
66	62	52	67	69	68	49	92	66	95
54	74	32	39	35	36	69	50	71	92

He also visited the library and found out that the previous's candidates used three books for there revision. Longhorn, Baroque or Maths Clinic. From the librarian's records its is clear that all the candidates that did not use any book failed the subject greatly. Out of the **35** candidates this year **13** used Longhorn, **20** used Baroque and **17** used Maths Clinic.

9 used Longhorn and Maths Clinic, **3** used Longhorn and Baroque while **8** used Baroque and Maths Clinic only. The records show that **2** used all the three books. He observed that he should replace one book type of the three with Fountain publisher since no student read it only alone.

TASKS:

(a) (i) Help the head teacher group the marks to make an informed decision one the fate of the department and defend it.

(ii) Display the students marks in groups on a simple statistics diagram.

(b) (i) Help the head teacher identify the book he should replace and explain why?

(ii) Find the probability that a student selected from the class failed.

ITEM FOUTRTEEN

St. JULIAN is to transport its S. 4 students for fieldwork in Kasenyi. All the 400 students are to be transported using either coasters or buses. Each coaster can carry 40 people while each bus can carry 80 people. The transport department of the school has only 8 drivers on duty and up to four coasters. If the cost of hiring a coaster is shs. 150,000 and that of hiring a bus is shs. 300,000.

While in Kasenyi their geography teacher Mr Kefa visited Mr Sembatya's shop from which he found that three shirts and two trousers cost shs. 105,000 at Mr. Sembatya's shop. Two shirts and five trousers cost shs. 180,000 at the same shop; **Task:**

(a) (i) Write down the five inequalities representing the above information.

(ii) Represent the inequalities on a graph paper.

(iii) Find the possible number of coasters and buses that can be used and hence determine the minimum cost.

(b) Find the cost of;

(i) each shirt and each trouser.

(ii) three items of each type at the shop.

ITEM FIFTEEN:

Simon is the district inspector of schools in Butambala district found that his causal workers use one third of his farm for bananas, one quarter for coffee and two fifth of the remainder for mixed farming. She still has some six acres of unused land.

Buddo S.S has a student population of 1200 students. On a particular day Simon invited the entire for a , $1/5$ of the boys and $1/4$ of the girls went to WAKISSHA resource centre for a sports meeting. If 936 students were left behind.

The price of Simon's house was valued at 45 million shillings. It increased by 25% after the first year but in the second year, the value of the house depreciated by 10%.

Task:

(a) Find the size of his farm and clearly illustrate it on a diagram.

(b) Find how many more boys than girls attended the meeting.

(c) Find the value of her house at the end of the second (2nd) year.

ITEM SIXTEEN:

Kampala (K) and Arua (A) are about 450km apart. At 7:30 a.m, a bus starts from Arua and moves towards Kampala (K) at a steady speed of 100km/hr while a lorry starts from Kampala (K) an hour later moving at an average speed of 60km/hr to Arua (A). At 10.00

a.m, the bus is stopped at town C by police and ordered to reduce speed. After 30 minutes at C, it resumes its journey at a reduced average speed of 50km/hr until it reaches Kampala (K).

Task:

(a) State the difference in time when the two vehicles arrive at their destinations.

(b) Determine when and at what distance from Arua the two vehicles meet.

(c) Find the average speed of the bus.

ITEM SEVENTEEN:

You are only two children in the family and the chairperson of your village has come to your home to register the details of you and your sibling. Unfortunately both parents are not around and you he gives them a call to find your present ages. The mother informs him that the two ages differ by 4. the father informs him that the sum of the squares of your ages is 136.

Your neighbor makes a rectangular flower bed by taking two meters off its length and adding three meters to its breadth. By so doing, he increases the area by 20 square meters. Moses is 1.5m tall and standing on top of a building 34m tall. In a straight line from where he is standing he can see a car and bicycle at angles of depressions of 50° and 65° respectively.

A magician on Easter day organized a presentation in your village to entertain the village. He had a

bad that contains x red balls and (x - 8) white balls. If the probability of drawing a red ball is $\frac{2}{3}$.

Tasks:

(a) Help the chairperson get the right ages of you and your sibling.

(b) What is its final area of the flower bed?

(c) How far is the bicycle from the car?

(d) Find the number of balls in the bag.

ITEM EIGHTEEN

The cost of manufacturing Blue band in a factory is determined by the components milk x and flavor y. If the constraints for the production are $3y+2x \leq 15, 2x-3y \leq 5, x \geq 1$ andy ≥ 0. The factory has only chicken and goats. When the manager counted the heads of the stock in the farm, the number totalled to 200. When the number of legs was counted, the number totalled to 540.

Task

(a) Given that the cost function for the production of blue band is $c = x + 2y$ find the;

(i) Minimum cost

(ii) Maximum cost

(b) How many chickens were there on the farm?

ITEM NINETEEN

Your parents are organizing to celebrate your 18th birthday and want ot to be a memeorable one. They went to Akamwesi mall which has a CINEMAX and it has two tickets.

Tickets to a play cost 9 $dollars$ for adults and 5 $dollars$ for children. If the show sold 180 tickets and earned 1380 dollars,

George your brother has neen planning for this birthday for three weeks. He buys the following items in three weeks. Week one he buys 2 packets of tea , 2 tins of margarine , 3 kg of sugar and 4 packets of biscuits. Week two he buys 2 tins of margarine , 3 kg

of sugar and 4 packets of biscuits . Week three he buys 2 packet of tea , 2 kg of sugar and 3 packets of biscuits. A packet of tea costs shs 1,000 , a tin of margarine costs shs 2,500, a kilogramme of sugar costs shs 3,500 and a packet of biscuits costs shs 2000. Your parents then demarcated the land they are to use for the party and plan to demarcate it. represented the plot of land he inherited using the following inequalities. $40x+60y \geq 480$

...(i) $30,000x+45,000y < 600,000$...(ii) $x \leq 12$ ...(iii) $y \geq 2x$...(iv)

He wants to fence it using poles(x) and barbed wire (y) and the cost function is given by

$C = 45000x + 30,000y$

Task;

(a) how many of each type of tickets were sold?

(b) Find his total expenditure in the three weeks.

(c) find the maximum cost.

ITEM TWENTY

The length of a rectangular plot of land exceeds the width by 7$f\ \ t$ and its area is 60$s\ \ q\ .f\ \ t\ \ .$ Three business partners Wambusa, Aisha and Wekesa contributed Shs 300.000, 500.000 and 700.000 respectively to start a business. They decided that $\frac{1}{3}$of the profit was to be ploughed back to the business, $\frac{1}{5}$of the remainder would be kept for emergencies and the rest to be shared in the ratio of their capital contributions. In that year the profit realized was one and a quarter times that of capital.

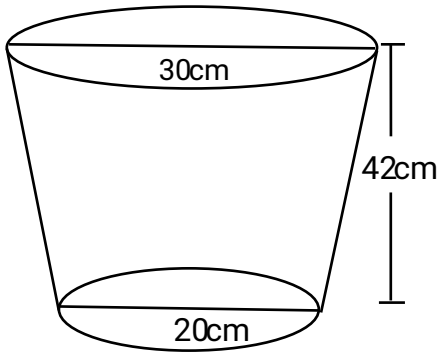
Task:

(a) Find the dimensions of the rectangle

(b) Determine the amount received by each partner that year.

ITEM TWENTY ONE

A bucket is in shape of a frustrum with an open end of diameter 30cm and a bottom diameter of 20cm. the bucket which is 42cm deep is used to fill an empty cylindrical tank of diameter 1.8m and Height 1.2m



Taking π =3.142.

Three hundred and sixty litres of a homogeneous paint is made by mixing three paints A, B and C. The ratio by amount of point A to point B is 3:2 and that of B to C is 1:2. Paint A costs shs 1800 per litre paint B costs shs 2400 per litre and paint C shs 1,275 per litre

Task:

(a) (i) Determine the capacity of the bucket in litres correct to 3dp.

(ii) The capacity of the tank in litres correct to 2 dp.

(iii) The number of bucket that must be drawn to fill the tank.

(b) (i) The amount of each paint in the mixture

(ii) The amount of money need to make 1 litre of the mixture

(iii) The percentage profit made by selling the mixture at shs 2,210 per litre.

ITEM TWENTY TWO

There are very few teachers who have three teaching subjects. A survey was done in your school and it was found that the school has a teaching staff of 22 teachers 8 of them teach mathematics, 7 teach physics and 4 teach Chemistry. Three teach both mathematics and Physics and one teaches Mathematics and Chemistry. No teacher teaches all the three subjects. The number of teachers who teach Physics and Chemistry is equal to that of those who teach Chemistry but not physics.

In the school staffroom there are two similar cans tha have different heights. One 6cm and the other one 9cm. If the surface area of the larger can is 840 cm^2.

Task

(a) Find the number of teachers who teach none of the three subjects.

(b) Find the probability that a teacher picked at random teaches only one subject.

(c) Find the surface area of the smaller can.

ITEM TWENTY THREE

The traffic police arrests all motorists travlelling along Kampala-Jinja highway with a speed greater than 80km/hr. A motorist travelled the first 90 km at an average speed of 60 km/hr and for the next $3\frac{1}{2}$ hours he travelled at an average speed of 80 km/hr. On a certain day a car travelling at s km/hr can be stopped within a distance d metres

where $\boldsymbol{d = \frac{s^2}{200} + \frac{s}{10}}$ The table below gives some values of $\boldsymbol{d}$ against $\boldsymbol{s}$.

s	0	10	20	30	40	50	60	70	80	90	100
d	0			7.5				31.5			60

(a) Find out if the motorist will be arrested.

(b) Find the stopping distance for a car moving at 46 km/hr and at 85 km/hr. Also find the

speed at which a car is moving if its stopping distance is 35 metres.

ITEM TWENTY FOUR

In a survey 100 people were asked which form of transport they used. 46 people only used bicycles (M). 21 people only used buses (N). 11 people only used motor bikes (P). 5 people used buses and bicycles but not motor bikes. 3 people used buses and motor bikes. 6 people used bicycles and motor bikes. 9 people declined to respond. Customs duty and purchase tax are levied on certain imported goods as Customs duty = 35% of the value of the good.

Purchase tax= 15% of (value +duty)

Task

(a) Find the;

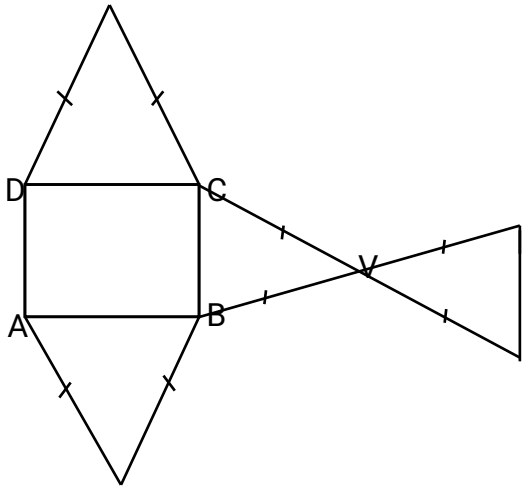
(i) number of people who used all the three forms of transport.

(ii) percentage of people who used only two forms of transport.

(b) Find the total amount levied on a disco deck valued at 1.7millions.

ITEM TWENTY FIVE

The figure below shows a net of a right pyramid with a rectangular base ABCD.



If V is the vertex of the pyramid VABCD above the base ABCD, $AB = 16cm$, $BC = 12cm$, and the slant sides of each triangle measure 26cm.

a) Draw the right pyramid showing clearly points VABCD,

b) Find the height of the pyramid.

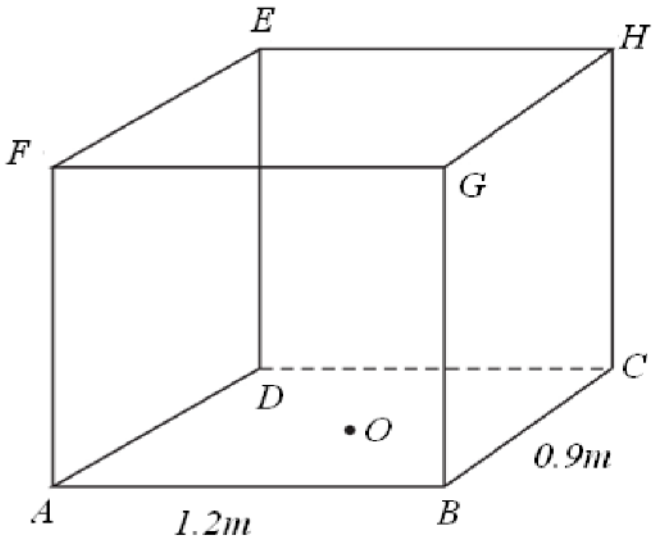
c) Find the area of plane VAB

d) Find the angle between; (i) Edge VA and the base

(ii) Face VAB and the base.

ITEM TWENTY SIX

Mr kyeswa is buying a conatiner to start a hardware in Kisooba Village to sell bags of cement. Each bag occupies an area of 0.8cubic meters. The container is $ABCDEFGH$ with AB = 12 m, BC = 9m, $ADEF$ is a square and O is the point of intersection of AC and BD.



(a) Find the distances;

(i) BE,

(ii) OH.

(b) Determine the angle formed between;

(i) line BE and the base,

(ii) plane BDH and the base.

(c) Calculate the capacity of the cuboid above in litres and how many bags can be accommodated.

ITEM TWENTY SEVEN

Pamungu bought a car in January 2017 from his friend at shs. 12,500,000. If the car depreciates at a rate of 10% per annum. Calculate the value of Pamungu's car by January 2020.

A Ugandan tourist left Germany for Uganda through Switzerland. While in Switzerland he bought a watch worth 54 Deutsche Marks (Germany currency). 1 Swiss Franc = 1.28 Deutsche Marks ,1 Swiss Franc = 1,350 Ugandan Shillings

A secondary school teacher as a requirement by the government pays PAYE every month according to the tax structure below.

Income (shs) per month	Tax rate(%)
01-50,000	5%
50,001 - 100,000	9.5%
100,001 - 180,000	15%
180,001 - 300,000	18%
300,001 - 400,000	23%
400,001 - 500,000	30%
Above 500,000	35%

The teacher earns Shs.760,000 and his allowances include

Marriage allowance	-	shs.50,000 per month
Water and electricity	-	shs.60,000 per month
Housing allowance	-	shs 150,000 per month
Medical allowance	-	shs.300,000 per annum
Transport allowance	-	shs.3,000 per day
Paying for insurance and relief	-	shs.180,000 per annum

Family allowance for only three children. For children in the age bracket

0 to 10 years, shs 12,000 per child, Between

10-15 years shs. 9000 per child 15 years and

above shs 5000.

Given that the employee has five children, two of whom are aged between 0 and 10, the other two aged between 10 and 15 while the other 18 years. (A month has 30 days

(a) Find the value of the watch in; (i)
Swiss Francs
(ii) Ugandan Shillings.

(a) Determine the teacher's Net-income

(b) Determine the percentage of his gross income that goes to tax.

ITEM TWENTY EIGHT:

Kyazze and his father Kyagulanyi have an age difference of 20 years and the product of their ages is 800 years. One day during a mathematics lesson Kyazze borrows a calculator from his neighbor and on the screen he finds a number 840 which made him wonder which two numbers he could have entered to get the as a product of the figure. Later on during the festive season Kyazze and his elder brother David were visited by their uncle and were each given shs.42000 and shs.53500 respectively. Kyazze used all his money to buy 4 shirts and 3 vests while David used all his money to buy 5 shirts and 4 vests.

Tasks:

(a) How old do you think is Kyazze and his father Kyagulanyi.

(b) Help Kyazze figure out all the possible values that his neighbor could have typed in the in the calculator to get the number on the screen.

(c) Help the two brothers explain to their father how much he would spend if he wanted to buy

three vests and five shirts for their cousin brother Isaac.

ITEM TWENTY NINE :

Mr. Lwanyaga the head of mathematics department organized a mathematics study trip to Namanve where assembling of Toyota vehicle and manufacturing of Coca-Cola products are done, and in his report to the members of mathematics department shows the cost of hiring a school bus is constant for any a bus and other varies as the distance covered by the bus. He later reviled that if a bus covers 100km then charged kshs.4500 and kshs.4000 for a distance of 60km. The distance between the school and Namanve is 480km and they expected to live the school at 8:00am at an average speed of

$100k\ m/\text{h}r$ according to the school's study trip rules and procedures and after the trip they students would rest for forty-five minutes and then proceed back to school.

Tasks:

a) As the treasure of the mathematics department help Mr. Lwanyaga to know total expenses for the total journey.

b) By representing the journeys on a suitable graph explain the motion of the bus to the bus to the school administrators.

ITEM THIRTY:

In Uganda, many are worried about the fire problem in schools which is becoming a threatening hazard. Research experts have carried out a survey to investigate the likely cause of the rampant fires in Education institutions. Findings showed that, three categories of stake holders were found to be responsible for the fire outbreaks in Education institutions. 50 respondents said they are learners, 50 respondents said they are parents and 40 respondents said they are school administrators. 10 respondents attributed it to all categories. 15 attributed it to learners and parents, 20 attributed it to parents and school administrators and 15 attributed it to learners and school administrators.

Task:

a) Help the expert researchers to summarize their report and be able to establish number of respondents who attributed it to;

i. Learners only
ii. Parents only
iii. School Administrators only

b) Find the total number of the respondents in the survey.

c) What is the probability that the fire problem in schools is attributed to learners?

ITEM THIRTY ONE:

Henry is a farmer in mityana district who practices both farming and rearing of animals on a large scale. Due to demand of products that come out of animals, henry puts much emphasis on rearing of birds and cows on his farm. All together there at least 200 heads of birds and cows and There are at most 240 legs of birds and cows on the farm, the number of birds on the farm are two times than cows on the farms. Henry wishes to maximizes profits by selling each bird at shs. 50,000 and each cow at shs.1.5million but doesn't know the number of birds and cows to sell to fulfil his wish. Task:

(a) write mathematical statements that show the relation between the cows and birds.
(b) Show the feasible region of the relation on the Cartesian plane.
(c) Help your friends to determine the maximum amount of money they will possibly make from the sale of cows and goats.

ITEM THIRTY TWO:

The caterer of a school located in Makindye division -Kampala city is required to buy food stuffs for a school party. The foodstuffs to be bought include: 100 kg of rice, 150kgof meat and 200kg of Irish potatoes. The cost is UGX 3500, UGX15,000, and UGX1500 per kg of rice, meat and Irish potatoes respectively in Nakasero farmers' market. The same items cost UGX. 3000, UGX. 12,000 and UGX. 1,100 per kg of rice, meat and Irish potatoes respectively, in Kalerwe farmers' market. To hire a pick-up from Nakasero farmers' market to school costs UGX 60,000 while a pick-up hire from

Kalerwe farmers' market is UGX95,000. Task:

(a) What would be the easiest way to display the information provided above?
(b) Using the information provided above, how would the caterer decide on where to do the shopping from? Justify your answer.

ITEM THIRTY THREE:

In order to improve on the livelihood among the community, the government has embarked on distribution of improved seeds to boost the yield of agricultural product in **Nwoya** district, **Koch Goma** sub-county which has 4 wards. The wards are A, B, C and D. Basing on the size of land in each ward for every 100 packets of seed, ward **A** gets 30 packets, ward **B** gets 20 packets, ward **C** gets 40 packets and ward **D** gets 10 packets. The government has procured 45,000 packets which are **all** to be shared equitably according to the community.

Task:

By using a statistical graph, help the local leaders to distribute these seeds to the community in wards.

ITEM THIRTY FOUR:

Due to Poor performance in Mathematics that was observed among learners. The school administration through academic board came up with strategies to improve on the learner's

performance. Some of the strategies are that a prize is given to learners scoring above 70% and a remedial exam be given to learners scoring at most 50%. A Mathematics examination was given to S.3 learners and marks were obtained as below;

38	74	28	32	10	31	49	34	50
30	56	50	42	38	64	24	64	09
18	35	12	52	41	27	08	48	22
42	43	52	59	72	70	15	79	29

TASKS:

Using a classes with equal class width of 10 marks and starting with a class having the lowest class mark of 1;

a) Help the administration to find;

i. The number of learners to be awarded prize

ii. The number of learners to be given remedial examination.

b) What is the average performance of the class?

ITEM THIRTY FIVE:

Mr.kyagulanyi owns a swimming pool in Muyenga and in his swimming pool, 4 people can swim butterfly style and 11 can swim free style. The people who can swim butterfly are a subset of those who can swim free style. There are 15 people in the pool in total.



Tasks:

a) Display this information on a Venn diagram

b) Find the number of people who can swim;

i. free style but not butterfly style.

ii. neither stroke.

iii. Advise Mr. kyagulanyi on how to increase on the number of customers in order to increase profits if each person pays Ugshs. 10,000 as entry fee.

ITEM THIRTY SIX:

During a mathematics lesson, Mr. Kabuye taught some learners how to rotate and enlarge different shapes given the Centre and angle of rotation, scale factor and center of enlargement. You are requested to help the absentees catch up in the next lesson. Given the triangle with vertices A(1,3), B(3,3), C(3,1) to enlarge it with scale factor of -4 about (2,2) and then rotate it through a positive quarter turn about (0, −4) to a similar shape.

Tasks:

a) Use a graph paper to determine the vertices of the images of a triangle hence confirm whether the shape remains the same after enlargement and rotation.

b) Help the absentees to find out the areas of the object and its images. Hence comment on the areas.

ITEM THIRTY SEVEN:

In Bukaaru village, Mr. Kyagulanyi had six children; Kintu, Mpindi, James, Talemwa, Mohammed and Nakayi. He made his will and kept it with a friend. After his death, children were fighting for the property as the elder son wanted to claim 50% as the heir. The lawyer saved the situation by reading the will. Nakayi was given 10% of the property. The remaining property was shared among the boys and the wife. Kintu was given 1/5, Mpindi was given 15%, James was given 20%, Talemwa was given 5% and Mohammed was given 20%. The remainder was given to the wife.

Tasks:

a) Help the family administrator to know how much property will each take given that Kyagulanyi had property worth UGx6,000,000.

b) What percentage of Mr. Kyagulanyi 's property was allocated to his wife?

ITEM THIRTY EIGHT:

.A certain tourist in USA is planning to visit the following places in Africa next month. The tourist has highlighted the following places on the map of Africa. These include; South Africa, Burundi, Kampala, Dodoma, Accra, Bujumbura, Nairobi , Ghana, Johannesburg, Tanzania, Uganda, Kenya, Cairo, Kigali, Egypt and

Rwanda. Mr. Apeku Elias is an agent for three companies of soda: Coca cola. Pepsi and Riham beverages. He earns 10% commission on every carton of soda sold. He sells each carton of Coca cola at UGx.1 1,000, Pepsi at UGx.11,000 and Riham at UGx.10.000 On a good day, he sells 30 cartons of coca cola, 20 cartons of Pepsi and 10 cartons of Riham. Tasks:

a)Help the tourist to sort the places by use of an arrow diagram.

b)i.List the places in the Domain set.

ii. List the members of the range

iii.What is the relationship between the domain and the range?

iv.Describe the type of mapping in the arrow diagram in (a) above

C) Help Apeku to know the commission earned on a good day from all the sales

ENGLISH HOLIDAY PACKAGE

SECTION A

1. **Read the following text and respond to the task that follows.**

Did you know that cigarette smoking can make men impotent and therefore make them fail to fulfill their conjugal obligations in marriage, and make women unable to conceive or give birth to premature, underweight or stillborn babies?

Dr. Victoria Mukasa, a public health specialist, says that cigarette smoking, besides causing cancers and heart diseases, also brings about impotence and barrenness to men and women respectively. She says the cigarette smoke contains more than 4000 chemicals and approximately 60 carcinogens (cancer causing agents). These include nicotine which she says is responsible for constricting and narrowing down blood vessels in the human body hence causing inadequate supply of blood to various parts of the body including reproductive organs.

'For example,' she says, 'erection needs sufficient supply of blood to the man's reproductive organ (penis), so the inadequate supply of blood could affect the ability to erect and eventually lead to impotence.'

Besides, she adds that cigarette smoking also damages the sperms and when a wife of a smoker conceives, the likelihood of the foetus being abnormal is high. Dr. Mukasa says effects on women are worse as they find it difficult to conceive and if one conceives, the likelihood of miscarrying is higher as compared to non-smokers.

She explains that women smokers normally give birth to low weight babies of 2.5 kilograms and that such babies may not survive as compared to those born at the standard weight of three to four kilograms. 'Nicotine constricts blood vessels and hence inadequate blood reaches the placenta, meaning that there are less blood nutrients to the fetus hence inadequate growth or death," she explains.

According to Mukasa, these health risks could also be passed onto passive smokers through exposure to cigarette smoke.

'The chances of contracting smoke-related diseases are still there. People react differently to the same exposure. While one person may get infected out of the same exposure, another may not,' she explains.

In addition to impotence and infertility, Dr. Mukasa reveals that of all the cancers reported in hospitals, majority are related to cigarette smoking or tobacco chewing. These include cancers of the nose, tongue, lungs, throat, stomach,

pancreas, big colon, rectum, anus, kidney and bladder as the most common cases in men. In women, uterine, breast and cervical cancers are commonplace.

Dr. Sylvester Onzivua, an anatomical and forensic pathologist at Mulago referral hospital says that there is a progressive increase in the number of people diagnosed with cancers at the hospital. However, he cautions that there was no scientific research conducted to establish whether this has any connection with cigarette smoking, though he admits that in other countries, this, to a larger extent, is linked to smoking.

'We don't have concrete scientific data to link the increasing cases of cancer to cigarette smoking. Basically, we have not been targeting that data. But cancers of the mouth, tongue, lips, lungs and esophagus are on the increase,' he says, adding that, 'these have been scientifically proven elsewhere in the world to be related to cigarette smoking.'

He also says that respiratory diseases, which are also related to cigarette smoking, follow malaria among diseases affecting people in the country. Dr. Mukasa says that cigarette smoke causes heart diseases, narrows blood vessels especially in the heart thus causing inadequate flow of blood to other organs of the body.

It also causes gradual loss of hair and solidification of eye lenses (cataracts) which eventually leads to blindness. She explains that all these diseases are common among active smokers though, with constant exposure, even passive smokers can get them.

Task:

Having read the text, explain the side effects of cigarette smoking to your colleagues that might not have knowledge about it in about 100 words.

ROUGH COPY

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FAIR COPY

2. Read the text below and respond to the tasks that follow.

A Fight at the Food Stall

A nasty fight erupted at the shopping center this morning. I watched it all and I thought it was rather silly and sad. Why should two grown-up human beings fight like Cockerell in public over a little matter which they can settle through a simple discussion?

Anyway, it all started when Okecho, the bicycle mechanic, walked up to Nabirye's roadside food stall and ordered a chapati. He gave Nabirye a one-thousand-shilling note and she gave him the chapati. When Okecho asked for his change. Nabirye gave him four hundred and fifty shillings. Okecho could not believe it. He expected change for five hundred shillings.

"What do you mean?" he asked Nabirye.

"The price has gone up to five hundred and fifty shillings each," said Nabirye simply.

"When did you raise the price? Why didn't you tell us?" asked Okecho angrily.

"Well, I am telling you now," retorted Nabirye. "Where would I find the time to go telling everyone about the price changes?"

"Why didn't you put up a public notice? You thief," bellowed Okecho fiercely. "You will not rob me in broad daylight."

"I am not a thief," Nabirye Shouted back. She tightened the knot on the wrapper around her waist and looked Okecho straight in the eye. "You have no right to come here and call me a thief, when I am going about my business" Shouted Nabirye. If you do not want my chapati, just give it back and take your lousy money."

Okecho threw the chapati straight into Nabirye's face. The two exchanged insults and finally a fight broke out between them.

Within a short time, people had gathered around them. They separated Okecho and Nabirye and tried to calm them down. Nabirye and Okecho kept yelling insults at each other.

Eventually, Mbabazi, the Chairperson of the Market Traders Association, was called. She asked everyone to be calm so that they could resolve the conflict in reasonable manner.

"First,"said Mbabazi, "how did this whole thing begin?"

It was not easy to get a clear picture of what exactly had happened. Nabirye insisted that Okecho had attacked her without any provocation. Okecho, on the other hand, just kept saying that Nabirye was trying to steal from him.

The people around started to take sides supporting either Nabirye or Okecho. Mbabazi patiently listened to the arguments from each side.

After a while, she said,"I am glad we are discussing this matter rationally. Maybe if Nabirye and Okecho had talked over their differences, this unfortunate fight would not have taken place."

"Madam," said Icuma the barber, "these two were tearing at each other like wild cats. I think they should both be disciplined."

"That may be important, Icuma," answered Mbabazi, "but I think reconciliation and amicable understanding is what Nabirye and Okecho need right now."

Finally, it was agreed that Mbabazi and a few fellow traders would help Nabirye and Okecho resolve their differences in privacy of Mbabazi's shop. The crowd dispersed as the team headed to Mbabazi's shop.

Respond to each of the following tasks on this text.

a) Tell the chairperson what Nabirye said to Okecho resulting in a fight.

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.....

b)" Think twice before you act." How does this statement fit in the message of the text?

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SHAPTA

c) Character is told by what some does and from one's behavior. With reference to the text above, describe the kind of person that Okecho is.

.....
.....

d) We always attach emotions towards people depending on what they do to us. In reference to the above, explain the feelings you have for Nabirye.

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.....

e) ln all that we do, we have something new we learn. From Nabirye, Okecho's saga new things do you from the text.

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f) "Everyone is entitled to their opinion," people say. As a person who has read the text above, what's your comment on the saga?

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.....

SECTION B

3. It has been realised that many students are visiting the school sickbay and reporting similar symptoms and this has left the entire school in fear. As a Health prefect, you have been tasked to investigate what could be causing sickness. Write to the teacher in charge of Health detailing the findings and what you think should be done.

SHAPTA

END

BIOLOGY PACKAGE

Item 1

In recent years, the government has put efforts to keep the environment safe from destruction by human beings. One of the ways through which it has done so is through civic education. Last Monday, the Mbale district environmental officer was on a radio holding an education session about environmental conservation. When Jalia tuned in to listen she only heard the last statement made by the environmental officer. The only words she heard were, 'when we do that, we shall be able to conserve the swamps which are very vital for the good of man". She was however unable to know what the environmental officer meant by the statement. She regretted why she had not tuned in earlier.

Task.

Design a message to help Jalia understand the meaning in the last statement made by the environmental office.

Item 2

A few months before the Non-aligned Movement Summit (NAM) in Kampala Uganda, the top government officials were concerned that the city was not looking as good as they intended it to be. They cited the lack of adequate green cover which made the place less attractive. It is also recommended by NAM member countries that cities should have green cover to provide fresh air for the people that live there. Some areas were still bare due to the previous road renovations. They appointed a committee which was tasked to make the place green in a shortest possible time. One of the members suggested that asexual means can be used to achieve the goal faster than sexual means of reproduction. The committee has approached you for help.

Task.

Help the committee to understand the best asexual methods to use and the possible plants that can be used for making the area green in a short time.

Item 3

Mr. Kamoli is a farmer who keeps both rabbits and Fish on the same piece of land. He employed a caretaker for the animals because he is a lays not around to take care of them himself. However, the caretaker he employed is a chain smoker. He also takes less care for the fish. Sometimes he forgets to prevent runoff into the fish pond. Dirty rain water with suspended particles ends ups into the fish pond. Last week, some of his fish died. Mr. Kamoli became puzzled.

Task

Write a recommendation letter to Mr. Kamoli explaining to him the cause of the situation on his farm and hoe he can go about it.

Item 4

Your school football team for football competitions. Some of the footballers refused to eat claiming that the food makes them heavy and too lazy during the match. Other footballers ate food rich in a recommended level of carbohydrates before the match. After the first half, the footballers who ate the food were still energetic and did not complain of weakness. The ones t5hat had refused to eat anything were very weak and did not continue with second half.

Task

Explain the steps that occurred in the bodies of footballer who ate carbohydrates that enabled them keep energetic.

Item 5

Kiibi is a drunkard. He drinks from a bar far from his home. Last evening he was coming from the bar staggering and met a snake along a swamp near his home. He tried to get a stone to hit the snake but he was too weak to target it. Eventually, the snake escaped.

Task

Describe the sequence of coordination events that occurred from the time he saw a snake to the time he threw a stone. What are the likely effects of kiibi's behavior and how can you advise him?

END

CHEMISTRY PACKAGE

Item 1

The world suffer from global warming and greenhouse effects due to mismanagement of carbon cycle by human being. This has become a global issue that calls for every one's contribution if the world is to be a better place for human being since global warming has resulted into climatic changes with effects on the operation of human being. As a chemistry learner, you are required to sensitize your community about this global challenge

TASK

Sensitize the community about the global warming and greenhouse effect, in your sensitization message clearly reflect on the meaning of global warming and greenhouse effect, how human being mismanaged carbon cycle resulting into global warming and greenhouse effect and solution to global warming and greenhouse effect.

Item 2

Salts are very important in our everyday lives as some of them are used in medicines, add taste to our food. Many of these salts can be prepared in the laboratory.

TASK

a) Suggest three ways in which salts can be prepared.

b) Ammonium chloride is an example of the salts prepared from the laboratory. When it was dissolved in water and the solution tested, it was found to be acidic. Explain why the solution was acidic.

c) State three other applications of salts in your community.

Item 3

Lira city is known for its good climate, good security entertainment and businesses. However, hard water continues to be a challenge in the city. The residents in the city use a lot of soap when washing and bathing. This has greatly affected their economy on a daily basis. As a chemistry learner, you have been invited by the area MP on a radio station in lira to help and teach the residents on how to make hard water soft using any physical method that can remove both permanent and temporary hardness

TASK.

Write a paper that you will use over the radio during your presentation. The presentation should clearly reflect the materials needed, procedures followed and results or conclusion

Item 4

Human beings respond to the cut from razorblade in different ways, some respond by crying and do not go to the hospital, some by crying and going to the hospital while some don't cry and neither do they go to the hospital. This too happens with elements on the periodic table. As a chemistry learner, you are required to demonstrate that elements also respond differently when subjected to similar conditions.

TASK

Demonstrate with the help of word equations how potassium, sodium and magnesium respond differently when in contact with water.

SHAPTA

END

PHYSICS PACKAGE

Answer **all** items from this section

Item 1

There is a parent project in your school to construct two rectangular pit latrines. One at the girls 'wing and another at the staff quarter's wing. However, the Board of Governors and the school administration have failed to agree on the choice of materials to use in construction.

TASK

Using the knowledge and skills learnt in ''mechanical properties of materials'' Suggest the choice of materials you would advise the school board to use in the construction of the latrines

Item 2

Your uncle operates one of the largest supermarkets in Hoima city. However he has been having some challenges especially theft of his goods in his supermarket.

TASK

Using the knowledge of reflection of light, what advice would you offer him to overcome such losses due to theft of his goods?

Item 3

A heap of weed of mass 3 Tonnes is moving towards the turbines at the Jinja power station. A group of engineers needs to use a machine operating at 20 KW for five minutes to remove the weed from the river and place it at the bank which is 15 M above the river.

a) Determine the efficiency of the machine.

b) Comment on the efficiency of the machine.

Item 4

On a hot day, a student dropped three ice cubes at -6 oC in a jug of water at room temperature. If the final temperature of the mixture after all the ice has melted was 16 oC

a) Sketch a temperature-time graph for the ice.

b) Describe the key features of your graph in (i) above.

Item 5

A certain family stays near the marram road and a school. Every day, the family receives dust raised by moving vehicles from the road and the bad smell from the school pit latrines. In the morning hours, the dust is not so much and the smell from the pit latrine is not so much either. But these conditions worsen around midday on hot sunny days. The family is disgusted by these conditions. They don't know the cause of these conditions.

TASK

a) As a physics learner, what would be the causes of the above conditions?
b) Evaluate the possible ways of solving the above problem in the scenario?

Item 6

In a certain country, a Television reporter was reporting live near the ocean about the high tides during night time. Viewers in another country were watching the live broadcast of the news bulletin during day time. The viewers wondered how it could be day and night at the same time, and how the event in one country could be watched live on TV in another country.

TASK

As physics learner, how would to help the viewers to understand;

(a) The possibility of it being day in one place and night in another place.

(b) The occurrence of High Ocean tides.

(c) How an event in one place can be broadcast live in another country.

END

MATHEMATICS PACKAGE

Item 1

Your classmates are arguing whether to produce Sausages(S), or Popcorns (P), or cakes(C) or daddies (D) for the school project. To solve the argument, your class teacher assigned you as the group manager to make research and present the findings on a diagram and hence use it to decide. You questioned a group of 40 students from different classes of which product they prefer and below where there responses:

S	C	S	P	P	S	D	P	S	C
P	P	S	P	D	C	S	D	P	S
P	S	P	S	C	P	S	P	S	P
D	C	S	S	S	P	S	S	D	S

TASK:

a) Fulfill the teacher's assignment.

b) Which product do you think you and your fellow students will end up producing?

Item 2

Five girls whose homes when marked on a grid make a trapezium, wanted to buy clothes. They realized that if they buy them in a bunch, it will be cheaper. So they mobilized themselves and each person contributed as follows:
Girl 1: Contributed one hundred thirty-three thousand two hundred fifty shillings.
Girl 2: Contributed 20% more than that of girl 1
Girl 3: Contributed 11 2 of the amount girl 1 contributed.
Girl 4: Contributed a fraction that is 1 5 less than the fraction of girl 3 of the amount of girl 1
Girl 5: She contributed the balance required to make the Shs.800, 000 required.

TASK:
a) Locate the homes of the girls on a grid while labeling their coordinates.

b) What amount did each girl contribute?

c) In which other way could they contribute the amount required fairly and according to that way, how much would each contribute?

Item 3
You have a piece of wood that is 12cm in length and 12cm in width. You to use it to make a simple money bank that is in shape of a cube and you use it to save your coins. You want to make it in such a way that to remove your money, you don't break it but rather you unfold it and then fold it back. You plan to start making it on 27th November 2023 and you want it to be done in one week!

TASK
a) Accurately illustrate how many pieces of wood you would cut out of the piece of wood you have for your money bank clearly showing their width and length.

b) Show how you will arrange them on the floor such that when you start folding them, they form the shape you want.

c) What space will your money bank occupy?

d) On which date will your money bank be ready for use?

Item 4
You are a store's manager in your school bakery project. You missed two days of school due to an emergence. On returning, you found out that the total wheat used in the two the two days was 24 packets. You want to find out the exact amount of wheat used on those two respective days but the student who was getting the wheat from the store didn't attend school! So you went to those in the production department and they told you that all they know is that the packets of wheat used they on day two multiplied that of day one by the same number.

TASK
a) Use the information you have gathered at the moment, to find out the amount of wheat used on day one and day two respectively.

b) The number of new students who enroll in the school each term is about 40. If currently you're in term three and the number of students are 500. How many students will the school have by term three of the following year?

Item 5

You are going to host some friends for a movie night. You have four options you can choose from: **C= comedy, A= animation, M= musical, R= romance**. You decided to ask them which one they would love to watch so that you choose one that is preferred by most of them. Below where their preferences:

C	A	A	R	R	M	M	C	M
R	C	R	R	M	A	A	R	M
A	A	R	A	R	R	R.		

TASK:

a) Summarize your data.

b) Represent your data.

c) Which movie will you choose to show your friends?

ITEM 6

At school you are requested to use a piece of wood to create a rectangular photo frame with a circular space in it where the photo will be put. Your parents have no money to buy you a new piece of wood but you have a piece of wood that is in shape of a parallelogram. Two of its angles are made up of an obtuse angle and two of them are made up of an acute angle. One of the sides is 6cm and the other 4cm.

TASK:

Illustrate accurately how you will cut the piece of wood you have to create what the teacher assigned you to do clearly showing and labelling the:

a) Obtuse and acute angles of the piece of wood you have.

b) The length and width of the rectangular piece of wood you will be able to cut out of the wood.

c) The circular space.

Item 7

Your facilitator gathered information on the ages of some few learners in the school from different classes. Below are his records:

14	15	16	17	18	21	18	17	15	16	21
21	17	14	18	15	17	17	15	16	21	18
18	21	17	15	14	21	16	17	16	21	16
15	16	21	17	18	16	17	21	18	15	17

TASK:

a) In which other way can the facilitator record the information above such that even another person looking at it can easily tell the number of learners in each age group?

b) Illustrate your suggestion in (a) above.

c) State which age are the majority of the learners in the school.

d) Your facilitator wants to sell either cartoon stickers or stickers for different singers in the school. According to the above records, which stickers do you think will be suitable?

SHAPTA

END

AGRICULTURE PACKAGE

Item 1.

a) In Kamuli village, farmers were provided with potato vines, cuttings and a few tree seedlings. However, due to their ignorance some did not bother to use them in their gardens. Up to now, these farmers still complain about the low yields, prolonged maturity rates and low quality of their crops. And others have persistently continued to use their locally produced seeds in planting and other planting materials thus continuous low production.

TASK

Basing on the above scenario, what advice would you give to these farmers?

b) Kanyere a farmer in Kisozi Sub County in Uganda was advised to start a dairy farm on his one-hectare piece of land. He planted elephant grass and Congo signal grass in plots A and B respectively at the same time. He expects to receive in-calf dairy heifers in six months' time and both pastures have already reached their flowering stages. Therefore, there is no likelihood of him feeding the current pastures to the heifers which are yet to come. At the same time, he is not interested in selling his pastures in a green state to other farmers. In his first attempt to conserve the pastures, the final product was rotten, black in colour and produced an unpleasant smell.

TASK

What advice would you give to Kanyere on how to conserve his pastures?

Item 2.

As a result of the increased demand of vegetables in your community, you decided to venture into vegetable growing. However, some areas of your community are rocky with shallow soils while other areas are gently sloping with deep, well drained and fairly fertile soil. Due to those differences, the seedlings that were

raised in the nursery came out bent, small sized and some were diseased. This led to poor quality and low yields realized by these learners.

TASK

Suggest the improvements you should do to ensure profitable vegetable production.

Item 3.

Mr. Kagoda is a poultry farmer producing both eggs and meat on a large scale. Recently he got a new farm manager and instructed him to establish a poultry breeding unit using the parent stock he has to produce chicks for sale. However, the farm manager was not getting the expected number of chicks from the hatchery. The farm is located in an area with many other poultry farmers and there is free movement of chicken from one farm to another. Birds from the neighboring farms were observed with cough, blood-stained faeces, mucus discharge and scratch marks on their bodies. Operation Wealth Creation has provided tools and equipment to livestock farmers in the community especially for disease and parasite management.

TASK

Write guidelines to help the farm manager meet Mr. Kagoda's requirement.

Item 4.

Bizimana, an agricultural extension officer from Kabanyolo Agricultural Research Institute visited Karungi's farm and in his report, he indicated that the roof of a calf pen was blown off and the walls were full height. Also, the cows were bonny and their dung contained worms. The adult animals could hardly find what to eat and were grazing on woody natural pastures. The only source of water had snail shells, algae and dung. The lactating cows had cracks on their teats. Hair-like substances were seen in the milk which was filtered using an old cloth. The farm owner uses a basin for mixing the acaricide.

TASK

Basing on the report from Mr. Bizimana, how can the farm owner improve on the productivity of his livestock farm?

Item 5.

The maize farmers in Uganda experienced low yields in 2021. This was generally attributed to the changing weather patterns, the up surge of pests and disease attacks, the poor-quality seed used, poor soils and the poor post-harvest handling methods employed. The demand for the grains became eminent and this translated into increase in the price to shs. 2,000/= per kg from shs. 1200/= per kg in various markets of Arua City. Trucks bearing labels of different schools were seen packing at various market lanes as the loaders kept filling the trucks with sacks of maize grains and posho. The high prices of maize at this time caused a lot of pain to the farmers whose yields had been lowered in the previous season and they were discouraged from venturing into maize growing ever again. In addition, farmers who had plenty of maize in stores, started witnessing changes in color of the grains; bad smell through rotting as a result of attack by bacteria and fungi.

TASK

You are the quality assurance officer in Arua City. Write a newsletter that will benefit the farmers and improve on the maize production in Arua City.

Item 6.

A vegetable farmer decided to grow a hectare of tomatoes. He set up a nursery bed in a free draining area near a water source. After preparing the nursery, he broadcast the seeds, covered them well with soil and watered the bed. The seeds germinated well and seedlings covered the entire soil surface. He maintained all the seedlings up to the time of transplanting. Transplanting began at twelve noon on a sunny day as the farmer had to attend a meeting at 2.00 pm the same day. After a week, some empty spaces were noticed within the crop rows. The plants which survived had many branches and leaves. When the farmer inspected his garden before the crops reached maturity, he observed dark brown patches on the leaves and stems. Dark brown circular spots were also covering large parts of the fruits. At a later stage, holes were also observed on some bigger fruits. At harvest,

farm workers picked the fully ripe red fruits, packed and sealed them in plastic bags. The packed fruits were to be delivered to the market in a week's times.

TASK

Write a message to the vegetable farmer advising him on how he should carry out tomato production efficiently.

END

GEOGRAPHY

Item 1: Photograph Skills

Study Fig. 1, a photograph taken from Ruwenzori area in Western Uganda, and the text provided below it.



You are a geography teacher who has taken learners for a field trip to Kasese specifically Rwenzori areas. One of the learners is very inquisitive about knowing how landforms in the background were formed and how their impact on the lives of local people in the area.

Task:

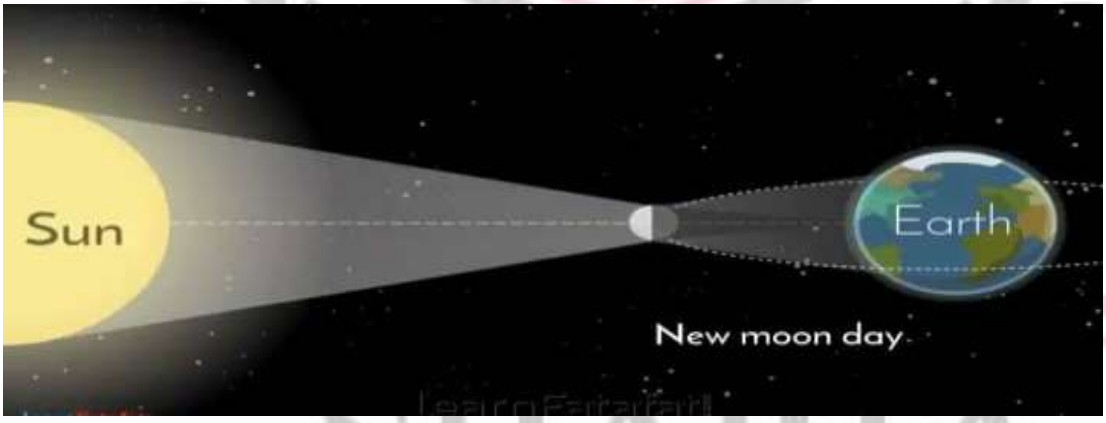
a) Draw a landscape sketch of the photograph and on it mark and name the features found in the area shown in the photograph.
b) Explain to learners the mode of formation of the major landform found in the area shown in the photograph and how they affect the local people.

Item 2

A total solar eclipse happened on 8th April 2024 had many eulogies. Many local and international media platforms written informing people that it will take almost six days when the world is in total darkness. Such eulogies worried many of African countries because they're backward in terms of technology and emergency handling. However, on the eve of the eclipse, it was observed in North America, Mexico, US and Canada. Here in Uganda people were observing it from the television and other websites. It started at 2:07p.m EDT (Eastern Day light Time) along Mexico's Pacific coast when in Uganda it was 8:00pm EAT (East African standard Time.)

Your friend in Canada observed the eclipse from the start to the end. However he doesn't know how it happen and why it was not visible to the rest of the world particularly Africa.

Support material:



Task

As a geography student, write a letter of about 250-300 words you will send to your friend via email helping him understand this matter well.

Item 3

During Uganda's mineral exploration, many valuable minerals were discovered in different parts of Uganda such as Gold in Kaabong and Kassanda, oil in Albertine region and wolfram in south western Uganda. However, in a bid to exploit these minerals like Oil from Albertine flats, many infrastructures has to be set like pipeline, drilling station, roads leading to the area etc. this leads to displacement of people in order to create room for infrastructural set up.

People in some communities are against this attempt besides all compensation plans. This is because they lack information about the impact of mineral exploitation particularly oil to their communities and the country at large.

Support Material



TASK

As a minister for mineral development, organize a community meeting and prepare a written speech of 400 words which you will present to convince these communities to embrace the government program.

ITEM 4

Uganda's population has continued to increase rapidly over time. It increased from 9.5 million in 1969 to 24.2 million in 2012. The provisional results from the 2014 national population and Housing census were 34.9 million. As we talk today, Uganda's population is estimated to be over 49.6 million people. 11.7 million People are urban population. According to the previous census, urban population is seen increasing rapidly at a rate of 5.74%. This is due to a number of factors. This rapid urban population has not been addressed for the past years and local people are worried.

Support material:

Year	Population (in millions)
1969	9.5
1980	12.6
1991	16.7
2002	24.2
2014	34.6
2023	48.6

Source: from population census count and UBOS 2023 with minor changes.

Task

a) Draw a suitable graph to show the information in the table.
b) Using the information provided in the text and table, in not more than 300 words, write an article to be published in one of the local newspaper showing why people are worried.

ITEM 5

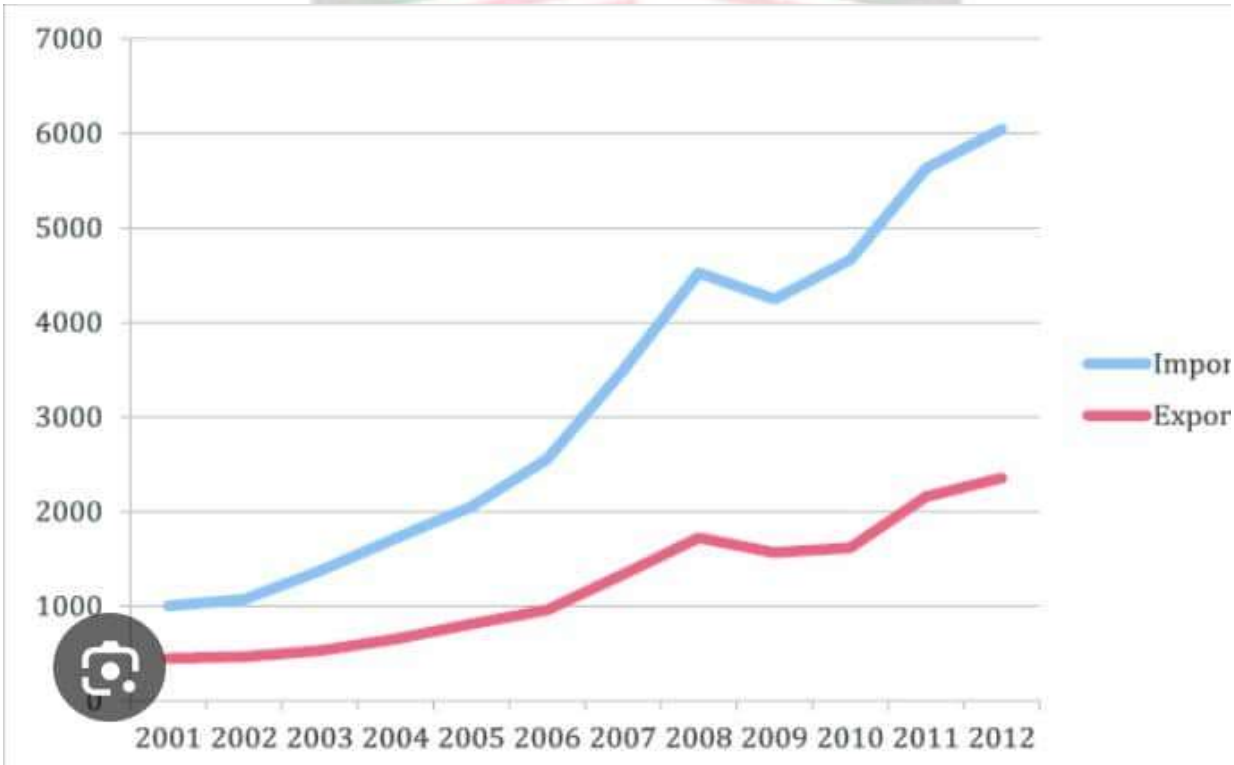
Uganda is open to foreign trade, which accounts for 35% of its GDP (World Bank). The country is a member of numerous international organizations, such as the WTO, COMESA, EAC ETC. Uganda mainly exports coffee, fish, beans and legumes and others whereas imports are led by petroleum, medicaments, road vehicles, and plastics, iron and steel and others. Uganda exports with U.A.E, China, Japan, India, USA, UK and African countries..

Uganda's trade balance is structurally in deficit. In 2022, exports of good decreased to USD 3.9b from 4.1b while imports reached USD 9.3b. This imbalance in trade has threatened members in your community because they don't know how to support the government

SHAPTA

Support material

A COMPARATIVE LINE GRAPH SHOWING UGANDA'S INTERNATIONAL TRADE FOR THE YEARS 2001 AND 2012.



Source: UBOS, import and export trade 2012.

TASK

a) Using evidence from the graph and the information provided in the above scenario, explain the trend of this trade in the respective years and the likely effects on the development of the country.

b) If you're a student of statistics at Makerere University, which kind of advice would you give the finance ministry that can rescue the situation? Use 250 words.

END

ENTREPRENUERSHIP

Item 1

Musoke is a trader in Kampala and has faced challenges of not keeping proper books of accounting, poor customer care, low sales, among others however, he keeps some transactions in an exercise book. Assuming you paid him a visit and he asked for your advice.

TASK:

(i) Which innovations can you suggest to him to adopt?

(ii) As an Entrepreneurship student, how can the subject help you to overcome such challenges?

Item 2

Kanyere has an acre of land next to a lake. He has saved UGX4, 000,000 and would like to use these resources to start a business. However, he is not sure of what to do.

TASK:

Use your entrepreneurial skills to guide Kanyere;

(a) Select a viable type of business.

(b) Budget for the selected business.

(c) Register the business.

Item 3

Mariam is operating a tailoring business in her home town. She employs five workers who usually conflict on their roles especially when taking measurements, cutting, sewing, fixing button or zips and ironing clothes of customers.

The business has three manual sewing machines. When Mariam gets many orders from her customers, she fails to complete the work in time and sometimes fails to finish sewing them neatly. Other customers are also complaining that their orders are either forgotten or given clothes that are not theirs. This has made many customers to take their clothes to other tailors. Mariam is planning to buy more machines but she is not sure from where to buy them.

TASK:

(a) Identify the qualities demonstrated by Mariam as an Entrepreneur.

(b) How can Mariam solve the challenges in the scenario as an Entrepreneur?

Item 4

Joseph owns a bakery in a trading center in his home area. He recruited employees who start working from 5:00 am to 11:00 pm at a pay of UGX1, 500 per day yet none of them has a working contract. The town council authorities have threatened to close Joseph's business for not paying taxes. Joseph does not know the taxes to pay. At times, customers return bread bought to Joseph claiming that it weighs less than what is indicated on the label.

Last week, there was a short circuit that caused fire in the bakery. An oven was destroyed and production in the bakery stopped for two days. The bakery delivery van which had a comprehensive insurance policy was also stolen. Joseph is now confused and is wondering whether he should close the business or continue with it.

TASK:

(a) What are the likely effects of Joseph's behavior on the business?

(b) Explain to Joseph how he should solve the challenges in the scenario.

SHAPTA

END

HISTORY AND POLITICAL EDUCATION

Item 1

For over three decades, a number of people have moved to Uganda settling in different parts of the country including your community. Their coming has largely led to conflicts with the local people in the area they have settled. The local leaders of these areas have identified you to work with them to resolve this conflict and encourage the natives to accommodate them.

TASK

How would you convince the natives to accommodate the above settlers?

Item 2

Two families in your community have been fighting for two years. Every day they argue, fight and abuse one another. They are not greeting each other anymore. Their fights will never be resolved and there is something which needs to be done.

TASK

How best can you help the local leaders on the steps they can follow to address the above issue.

Item 3

Currently, we see many Christian groups such as Catholics, Anglicans and Protestants in east Africa but originally these groups were not in east Africa. They come from England, France among others but as they come, they performed certain activities that created an impact on east Africa which we still see even today. Our past has it that these groups on their coming made a lot of activities which impact Ugandans.

TASK

Do you think our past is right? Support your response?

Item 4

In 1986, the National Resistance Movement captured power to rehabilitate the country after a civil war. President Museveni Kaguta established a ministry of Rehabilitation and the Ministry of local government to support, recover and enhance political consolidation of the NRM in power. Over 35 years in power, the local government governs councils and committees which are still weak and centers of corruption.

TASK.

Advise the government on best the local government can be used to improve the standards of living among the members of your community

Item 5

In 2020-2021 Budget, the Kampala Capital City Authority Set up 9 billion shillings to punch up the potholes on different city roads. The Minister for Kampala Betty Amongi told the Journalists at Uganda Media center that they had seek permission from the Minister of Finance to have all the meant for infrastructures works that were dedicated to the emergency road repairs. Betty Amongi said that 38 roads, 8 were in Rubaga division, 5 in Nakawa division, 8 in Makindye division including salaama road which is in bad condition, 8 in Kawempe division and 9 roads in central division were to be worked on. Unfortunately, in 2020-2021 Budget the Minister of Finance Matia Kasaijja told the parliament committee that the money meant for repairing these roads was not there. The parliamentary committee chairperson was shocked with his members on the committee.

TASK
How better can the government do to prioritize the road construction and Maintenance through better allocation of funds?

Item 6

In a small, remote village in Eastern Uganda, the majority of villagers practice a traditional Ugandan religion centered on ancestral worship and appeasing spirits for good harvests. However, a Charismatic Pentecostal Pastor has recently arrived and established a church. The Pastor strongly criticizes traditional practices, calling them primitive and demonic. The villagers think these attacks disrespect their ancestors and heritage. Others, caught between their ancestors and the pastor's promises of salvation, become withdrawn and avoid participating in traditional rituals. Villagers who convert to Pentecostalism stop contributing to communal activities centered on

traditional beliefs. This strains the social fabric and threatens the future of these cultural practices. The conflict has worsened, leading to arguments, dismissal of converts, and even violence.

TASK

How better can you resolve the situation mentioned in the scenario.

SHAPTA

END

ART AND DESIGN HOLIDAY PACKAGE

Answer all items



Fig 1.1

Item1

Our school director approached me this morning and showed me the above artwork from his phone. He has admired it so much and asked whether the art students of senior four can make it in school compound. He wants a report about the artwork so that he can plan to finance it

Task

Write a report about the artwork



Fig 2.2

This art is admired throughout the world and it's the expensive art work the world has ever known. The head teacher wants to know the history about this art work.

TASK

Write about the history of the art work and submit it to her

END

ICT

Item 1

As a senior four ICT learner, Boston local council has sent you to Karamoja to sensitize masses about the good farming methods that can help them do away with famine in their region. You have been tasked to use a presentation programs to conduct a presentation.

TASK:

a) Explain why the Local council is deciding that you should use electronic presentation other than papers.

b) Identify five challenges you are most likely to face while using the software in the villages of Karamoja.

Item 2

During times of Covid-19, schools were required to conduct online lessons (distance learning) as physical lessons had been banned.

TASK:

You are required to;

a) Explain how ICT is used in distance learning.

b) Discuss the advantages of online (distance) learning in this 21st century.

Item 3

Your friend went to United Arab Emirates one month ago but she complaining that she is being mistreated. She has sent you photos via WhatsApp of how she lives under harsh conditions and she wants you to keep them on a CD for future reference.

TASK

Explain how;

a) You will copy pictures from WhatsApp to your laptop

b) You will burn the files on a CD for future reference

Item 4

Your school director wants to fully stock the computer lab by purchasing more computers.

TASK.

As an ICT learner, you are required to;

a) Give guidance on how the computers can be cared for such that they work efficiently and last longer

b) Give five health problems caused by prolonged use of computers.

Item 5

Mr. Bulesa Saul uses a computer to capture information about his business. Of late, his computer started to slow down and hang during use.

TASK

a) Explain an appropriate solution that Mr. Bulesa Saul can use to solve the problem with his computer?

i) Identification of the problem, the computer could be infected with viruses with the OS and a number of programs corrupted.

ii) Needs to back up all the work on the computer

iii) Re-install the OS and all other programs

b) In a school computer laboratory, senior one learners directly access the files of their fellow students. What appropriate measure can be used to improve security of the computer files?

i) Identify the various users and create user logins.

ii) Provide backup options where copies of deleted files can be retrieved.

END

CRE

Item 1

My name is Kanyuma; my first day to see that people pray in different ways was when I visited my aunt. Aunt favor stays in Kampala and prays from St. Charles church. I went with her to the church and after the Revland finished teaching the word of the God, it was time for prayer, people started praying in different ways, others prayed silently from their hearts while others shouted, others were crying others where banging walls, others were closing their eyes, others were moving up and down and others were stamping the ground.

In my former church, prayers were led in such a humble way by priests and we read prayers already written. I realized that people pray differently.

TASK:

a) According to the story, mention the ways people prayed

b) Do you think there are prayers which are more important than others? Explain why?

c) Generate a list of the ways Christians in your local church pray?

Item 2

One morning, my friend Jackie was coming from school. She heard voice of an old person crying in the nearby bush close to the premises of St. Johns secondary school. He was shouting ‘help, help”. Although Jackie was rushing home, she checked to see who could me crying and she found a blind, old woman who had lost her way back home. She had fetched firewood and she had fallen in a shallow hole around the school, Jackie carried the firewood and led the old woman to her

relatives in the village. The relatives were very happy about Jackie's act. After that Jackie went home and told us what she had done, am telling you every one thanked her so much.

TASK:

a) From the story above, how do you describe Jackie's act?

b) Explain the benefits associated with Jackie's act?

c) Which act of charity did Jackie do?

d) As a Christian which lessons do you learn from the story?

Item 3

St. Balikuddembe church of Uganda is well known for baptism young children every Sunday service to those that are ready to convert into Christianity in order to increase on the number of believers in the community because most of the people in our village, kiruddu believe so much in ancestral spirits. They worship the gods daily and they offer human sacrifices, fowls, foodstuffs like cassava, sweat potatoes to the goddess in the shrine for such a purpose, the spirits are pleased and the blessings befall the village.

TASK:

a) In your own opinion, how is baptism conducted in your church?

b) With examples, describe the steps taken during this ritual?

c) In your own view, explain the benefits of baptism ritual to a Christian?

Item 4

In some village in Uganda, existed a polygamous marriage, in which a man had two wives with six children. However, he had not yet fulfilled marital obligations of bride price payment and Church wedding with any of the wives. The man separated with one of the wives due to marital unfaithfulness (adultery). She left behind her children with the man and the co-wife. The remaining wife then took responsibility for all the six children but she now feels that the step children should leave the home for her convenience. The husband is not in agreement with her idea and feels all the children should stay in his home.

TASK

(a) Explain the Christian values that the scenario teaches young people about marriage.

(b) Explain Traditional African marriage approaches that should have been used to keep the marriage in the scenario stable.

Item 5

Societies today are changing. Many people have become career-oriented and care less about marriage. People are comfortably choosing to live as single parents. As long as one has a good job, marriage is no longer considered a necessity. In addition, societies are being attacked by the vice of sexual deviations. Homosexuality is on the rise. The elders, politicians, local community leaders and religious leaders are all concerned because marriage is God's original plan. You have been invited by a Reverend of the Church of Uganda in your community for sensitization on marriage.

TASK:

Prepare sensitization message of 100 words on the importance of marriage in fostering the values of love, honesty, respect and generosity in the community.

SHAPTA

IRE

Item 1

Read and answer items that follow.

Islam teaches that angels are heavenly, immortal beings, God's first creation. According to the Quran, human was formed from clay, but angels were made out of light. They are God's messengers, the channels through which we can become aware of his laws and his purpose in our lives. They are God's servants and they can take on many without sin and so they can enter into God's divine presence, and they can also communicate with humans. Muslims believe that, although angels are invisible, they exist everywhere, thought the whole universe. They are never far away and they are always in contact with humans especially when someone prays or thinks about God. They have no physical bodies but the Quran describes them as having wings and they are always described as male. The Quran says, "Whoever is an enemy to Gabriel- it is (none but) he who has brought the Quran dawn upon your heart, (Mohammad), by permission of God", confirming that which was before it and as guidance and good tiding for the believers. Quran 2:27.

TASK

a) As a believer, mention the unique nature in which Allah created his angels in reference to the passengers.

b) Mention and give the duty of each.

Item 2

The mosque near your school has got very many new converts. As adults they have to immediately start practicing the Islamic culture and norms. The converts have written a letter to your school requesting for any senior one learner to teach the converts about the culture of Islam.

TASK

a) As a religious leader representing senior one of your school, Prepare a written speech that you will use to address the new converts.

Item 3

Akutex is an energetic and skilled person. However, he does not want to work and spends most of the day time sleeping. He begs for money and other necessities from his friends. When he gets the money, he spends it in night clubs, sports betting and other games of chance.

TASK:

Explain the;

(a) Islamic views that can address Akutex's attitude towards work.

(b) Traditional African ways of using free time that can be of help to Akutex.

Item 4

Joshua was once a healthy and wealthy hardworking young man with a happy family in Bukomansimbi village. As time went on things changed as a results of group influence and Joshua started engaging in taking alcohol, smoking, and using illicit drugs like Shisha. He later got lung cancer and almost reached at the verge of death. Joshua lost all the wealth he had accumulated and couldn't spend time with family and friends anymore.

TASK

a) In what ways did Joshua abuse the gift of Life?

b) What were the effects of his actions of abuse of life?

c) In what other ways do people abuse the gift of Life?

d) If you were Joshua's friend, what advice would you give to him so as to respect life?

Item 5

At kanyere secondary school, two learners had a disagreement resulting from one stealing the other's property in the dormitory. This turned into a bitter quarrel during which the two learners exchanged unpleasant words. All this led to hatred. The two learners stopped greeting and even avoided

each other. The classmates have shown concern about what is happening between the two learners and would like the disagreements to be resolved.

TASK:

Explain ways in which the two learners in the scenario above can resolve their disagreements.

END

LUGANDA HOLIDAY WORK

1. Kyusa ekitundu kino okizze mu Luganda. (Obubonero 15)

CHALLENGES FACED BY WORKING PARENTS

A number of working parents say that their parental responsibilities greatly affect their job performance since they are expected to work hard to meet the domestic and workplace demands. Some employers give much work to their workers every day, which forces most parents to put in extra hours in order to impress their bosses. "You can't leave work at 5:00 P.M when your desk is full simply because you have to go back home early to attend to your children. My conditions of service stipulate that in order to keep my job, my work comes first", a female employee said.

The school system in Uganda also puts a lot of pressure on the children and even if the parents tried to create time to be with them, the children would not be available due to the heavy school workload in form of homework. Other parents are however of a different view, saying that there is much time to spend with their children after work but the problem is lack of money to cater for their needs. “We would want to spend time with our children, but what do you do with them when you don’t have money? When you are given time off to be with them, you begin to see your own children as a burden and hence you resort to hiding at a drinking place with your friends hoping that you will find them in bed by the time you go back home”, said a male parent working with a factory.

(Extracted with minor modifications from: Situational Analysis of Workers with Parental Responsibility by UWONET)

Kola 2(a)oba 2(b)

2. (a) Ku mitwe egikuweereddwa londako gumu oguwandiikeko emboozi ya bigambo **380-400**.

(Buli gumu gwa bubonero 30)

i. Ezaamuweerera zaafa busa.
ii. Okupangisa lumbe lwa kubiri. Kubaganya ebirowoozo.

iii. Obukulu bw'okwekebeza omusaayi ku kawuka ka siriimu.
iv. Okubbula abaana mu Buganda.

Oba

(b) Ku mitwe gino wammanga londako ebiri (2) buli gumu oguwandiikeko embozi nga bw'olagiddwa. (Buli mutwe gwa bubonero 15)

i. Kitwale nti Ssaabasajja Kabaka asiimye n'akuwa obwami. Wandiika by'onooyogera nga weeyanza obwami obwo. (Kozesa ebigambo nga **200**.)
ii. Ggwe mwogezi omukulu mu musomo ogutegekeddwa nga gukwata ku by'entambula. Wandiika by' onooyogerera mu musomo ogwo ku mutwe guno. "Ebyentambula mu Uganda". (Kozesa ebigambo nga **200**.)
iii. Kitwale nti ggwe mukulu wa Kampuni emu mu ggwanga. Mwalanga omulimu ogw'okujjuza ekifo ekimu mu Kampuni eyo. Wandiikira omu ku bantu abaali basabye omulimu ogwo ng'omutegeeza ng'okusaba kwe bwe kutaayitamu. (Kozesa ebigambo nga **120 - 150**.)
iv. Ggwe mukulu w'ekibiina ky'enkula n'enfaanana y'ensi mu ssomero lyammwe (Geography Club). Wakulembedde bayizi banno okugenda okusomera ebweru w'ekibiina (Field Work). Wandiika alipoota gy'onoowa omukulu akulira eby'ensoma mu ssomero (Director of Studies) nga mukomyewo. (Kozesa ebigambo nga **200**.)

3. Soma ekitundu kino n'oluvannyuma oddemu ebibuuzo ku nkomerero yaakyo.

BUGANDA

Kabaka Kimalempaka Bukulu bwe yalaba ng'akaddiye nnyo obwakabaka n'abuwa mugandawe Ntege Nalusiri Buganda alamule mu kifo kye. Ntege naye teyagaana n'alamula ensi Muwawa nga ne mukulu we Bukulu akyaliwo. Kabaka Kimalempaka bwe yafa abataka baayita Kabaka Ttumbaali Ntege okugenda e abikke akabugo ku mukulu ng'akalombolombo ak'okusikira obwakabaka. Ntege yagaana ng'agamba nti, "ndi Kabaka, mukulu wange obwakabaka yabumpa akyali mulamu, era nze nnamula n'olwekyo tewali nsonga endeeta nga Kabaka ate okubikka akabugo." Abataka baawuliriza ne balaba nga Buganda Ntege mutuufu.

Abataka kwe kuyita Nankere Kiwuttakyasooka I agende abikke akabugo ku kitaawe olw'okutuukiriza akalombolombo ako akaali katalekeka. Mu kukola kino, Nankere yasikira omusaayi gwa kitaawe ate kitaawe omuto Ntege n'asikira obwakabaka bw'ensi Muwawa. Olw'okulongoosa obulungi omukolo, abataka baasaba Nankere okukakasa Ntege okukakasa ku Bwakabaka ng'amusumikira ng'amutala n'ejjoba. Yaddira engule gye baali bamutikkidde

olw’okubikka akabugo ku kitaawe Bukulu n'agitikkira Ntege okumukakasa ku bwakababaka. Nankere yasooka kugyetikkira n’agyeggyako n'agitikkira Buganda.

Wano we waava akalombolombo aka Nankere n'okulangirira alidde Obuganda okuba Kabaka. Era Nankere y'omu ku bataka abatafukaamirira Kabaka. Kabaka Ntege olubiri lwe yaluzimba Kazo kumpi ne Jjinja Kaloli mu Kyaddondo, so si Ttimbaali mu Busiro kubanga mukulu we Bukulu yali akyalulimu nga tannafa. Mukulu we ng'amaze okufa, Kabaka Ntege olubiri lwe yaluggya e Kazo n'alukuba e Lunnyo mu Busiro.

Mukulu wa Ntege, Kimalampaka Bukulu yali mufuzi mulungi nga tafubutukira nsonga. Yasookanga kusirika n’azekkaanya. Ekyo "Bukulu kye kyamutuumya KIMALEMPAKA (kusirika). Yatendeka Ntege bulungi ddala mu kwekenneenya ensonga ne mu kulungamya abantu mu mirembe okutuusiza ddala lwe yamuteera Obwakababaka ye ng'alaba akaddiye. Kabaka Ntege Nalusiri Buganda y'omu ku bakababaka ab'oluse lwa Tonda abaasingira ddala okufuza amagezi, obwenkanya n'emirembe. Abantu baamwagala nnyo era n'abeera mututumufu nnyo olw'enfuga ye ennungi. Kabaka Ntege ye jjajja w'Abamafumbe. Mutabani we Ntege Walusimbi yasenga ku lusozi Kisirikikadde mu Busiro gye yasimbira omutuba, era ye mukulu w’Akasolya k'Effumbe.

Kabaka Ntege ne bwe yakisa omukono teyava ku myoyo na mitima gya bantu ba nsi ye. Yali Kabaka wa 33 mu Bakababaka ba Buganda era yafuga okuva mu 1120. Bakababaka abaamuddirira nga ensi ekyayitibwa Muwawa mulimu Namusera eyali 34 (1140 - 1160), Mudandali owa 35 (1160 - 1180), Bemba owa 36 (1180 - 1200), n'abalala. Abamu baali balungi naye nga tebenkana Ntege, naye ate ye Bemba yali mubi okuzaama. Bemba yali mutabani wa Kabaka Mudandali era ye Kabaka eyasemba mu luse lwa Tonda. Yali wa nkwe nnyo. Yasigala mu Lubiri lwa kitaawe e Nnaggalabi (Buddo) nga kitaawe amaze okufa. Yanyaganga ebintu by'abantu, ngabattira n'obwereere. B'atattanga ng'ababonyaabonya okuzaama.

Bwe yabakaabya ennyo akayirigombe ne baagala okumuggya ku bwakababaka bamusikize omulangira omulala. Ekyo olwakimanya n'atandika okutta abalangira be yali alowooza okumusikira kyokka yabattanga mu mankwetu. Olwo kwe kumuyita “omusota." Abalangira abasinga obungi baddukira Ssese nga bwe bagamba nti tudduke si kulwa ng'omusota gutubojja.

Mu kiseera ekyo ne Kintu mwe yatuukira mu nsi Muwawa natabaala Bemba. Kabaka Kintu ye Kabaka omubereberye ow'oluse olwaddirira olwa Kabaka Tonda. Bwe yatabaala Bemba, Abalasangeye bangi baamwegattako mu lutalo sinziggu olwo. Kabaka Bemba baamuwangula n'okumutta ne bamuttira

e Nnagalabi (Buddo) mu lubiri lwe. Mu ntujjo ey'ekitalo ne mu mizira emiyitirivu, Kato Kintu Abalasangeye baamufuula Kabaka waabwe. Abantu baatoowolokoka nga bwe bagamba nti “kati emirembe gizzeewo nga ku Kabaka BUGANDA.” Omuntu bwe yabuuzanga munne nti "mirembe" oli ng'amuddamu nti "egya Buganda". Okuva olwo Muwawa n'eyitibwanga Buganda (ensi ey’emirembe), ate abantu baayo ne bayitibwa Abaganda (Abantu ab'emirembe.)

(**Bisimbuddwa mu:** Ennono n'enkulakulana ya Buganda ekya

Bro. A. Tarsis Nsobya)

Ebibuuzo:

Nyonnyola amakulu g'erinnya Buganda. (Akabonero 01)

Nsonga ki eyagaana Ntege okubikka akabugo ku Kimalempaka? (Obubonero 02)

Nyonnyola ensibuko y'akalombolombo ka Nankere okutikkira Kabaka. (Obubonero 03)

Nyonnyola ensonga ssatu ezaaviirako Abalasangeye okukyawa Kabaka Bemba.(Obubonero 03)

Leeta ensonga ssatu eziraga nti Ssekabaka Bukulu Kimalempaka yali mufuzi mulungi.(Obubonero 03)

Laga ebbanga Kabaka Buganda lye yafugira Muwawa onyonnyole n’engeri gy’olituuseeko. (Obubonero 02)

Nyonnyola ku makulu g’ebigambo bino nga bwe byeyambisiddwa:

(i) …. tafubutukira.
(ii) …. ab’oluse.
(iii) …. akayirigombe.
(iv) …. mankwetu.
(v) …. n’atabaala.
(vi) …. Abalasangeye.

(Obubonero 06)

EKITUNDU D

Funza ekitundu kino mu bigambo nga **100**.
(Obubonero 20)

ESSIMU

Munnange ggwe akozesa essimu zino ez'omungalo oba ziyite buliwendinkufuna bino bibyo. Essimu yo giteeke mu ddoboozi etonotono ereme kuleekaanira balala. Naye gwe munnaffe essimu n'ogiteeka mu ddoboozi nga n'ali mu mayiro ekkumi okuva w'oli awulira!

Bw'ogenda mu kifo ekiteetaaga kutaataganya balala ka tugeze nga mu kusinza, mu lukiiko, mu ddwaliro oba mu nkuŋŋaana ezitali za ngeri zimu, ggyako essimu yo oba kendeeza eddoboozi oleme kugireekanyiza balala. Mu ssimu yo kozesa akayimba akagya mu myaka gyo era nga tekaswaza. Lumu twali tutendereza Omutonzi, essimu y'omukulu omu n'evuga ng'eyimba "Akabina kagenda kapaapaala". Buli muntu yakyuka n'amutunuulira, n'aswala!

Singa omuntu akukubira essimu n'otogiwulira, kya mpisa okuddamu okumukubirako omanye ky'abadde agamba. Kino kiraga omuntu alina obuvunaanyizibwa ate era afaayo ennyo ku balala. Ne ku bubaka obuwandiike era kola bw'otyo. Munno muddemu amanye nti obubaka bwe wabufunye ate era omusiime bwe kiba kyetaagisa.

Nga tonnaweereza bubaka buwandiike sooka obusome ate weetegereze ennamba kw'ogenda okubuweereza si ku lwa nga buwaba. Olumu oyinza okuweereza omuntu omulala obubaka obwandigenze ew'omuntu ow'ekinywi kyo, okukkakkana ng'obotodde kyama oba ng'omuwemudde! Olaba! Weegendereze.

Bw'ofuna essimu ng'oli mu bantu, mwattu yoġera bulungi ate mpolampola. Leka kuwogganira balala ate era totumbula simu yo buli muntu kuwulira bye mwogera. Ogenda n'owulira omuntu ng'aleekaana ng'akirako ali emmanga mu lusuku eteri bantu oba gamba nti ali mu ttale. Leero bwe muba mu takisi, oyinza okutunuulira omuntu ng'awogganira ku ssimu n'osoberwa!

Bw'oba tolina budde bwogera na muntu akukubidde, osaana oyogere naye, omwetondere era omugambe nti onoomukubirako edda. Si kya mpisa kumala gamuggyako ayinza okulowooza nti tokyamwetaaga mu bulamu bwo.

Bwe muba mutambudde wamu ng'abaagalana oba ab'emikwano leka kubeera ku ssimu lugenderezo. Ekyakuleese mu banno kunyumya kati ekikubeeza ku ssimu kiki? Obwo si buntu bulamu. Leero nno wali zino ezookukoonako obukoonyi! Ha! Omuntu n'adda mu kusonga obugalo n'osinwa! Nyumyako ne banno oba toyagala genda ewuwo onyumye n'essimu yo.

END

KISWAHILI HOLIDAY PACKAGE

Pindua

SEHEMU A

UTUNZI WA INSHA

Ama

1.Kuanzia mwaka huu wa 2024, Jumuiya ya Afrika Mashariki inapanga kutumia Kiswahili kama lugha rasmi ya mawasiliano.

Eleza jinsi wananchi wa Uganda watafaidika na mpango huo.

Au

2. Katika shule yako inayopatikana katika wilaya ya Mpigi, wanafunzi wanapanga kugoma kwasababu ya kunyimwa haki zao shuleni. Wewe mwenyewe haujafurahishwa na mambo mengi shuleni kwenu.

Mjulishe au mweleze baba yako anayefanya kazi nchini Kenya kuhusu yale wanafunzi wanapanga kufanya na shida zako zingine shuleni.

SEHEMU B

UFUPISHO

3. *Kwa mujibu wa taarifa, usafiri wa zamani unatofautina vipi na ule wa siku hizi* ?(**maneno 70-80**)

Usafiri ni upelekezi wa watu na bidhaa au mizigo kutoka mahali pamoja hadi mahali pengine. Tuseme kutoka kituo A na kuenda kituo B.

Katika ulimwengu wa leo, watu na bidhaa husafirishwa barabarani kwa mabasi au motokaa za kila aina au kwa kutumia magari moshi yanayopita juu ya reli, au meli zinazopita majini, kadhalika,usafiri unaweza kufanyiwa hewani.

Hivyo hali haikuwa hivyo zamani. Usafiri uliojulikana sana kale ni usafiri wa miguu. Watu waliposafiri kutoka eneo moja hadi jingine walilazimika kufanya hivyo kwa miguu. Kadhalika, watu waliposafirisha mizigo mizito kutoka eneo

moja hadi nyingine, iliwabidi kubeba mizigi hiyo wao wenyewe. Mpaka leo usafiri huu upo.

Wanyama vilevile walitumiwa kama njia moja ya usafirishaji. Huku Afrika ya Mashariki kulitumika wanyama wengine kama vile punda. Punda ni mnyama anyependwa sana kwasababu anaweza kuenda mwendo mrefu pasipo kunywa maji. Mpaka leo, mnyama huyo hutumika na jamii nyingi kwa usafirishaji.

Mnyama mwengine aliyetumiwa sana na mpaka leo anaendelea kutumika ni ngamia. Ngamia anafaa sana katika usafiri wa jangwani. Kwato za ngamia huweza kusafiri kwa urahisi jangwani ama popote penye mchanga mwingi kwasababu kwato zake hazizami kwenye mchanga. Isitoshe ngamia wanaweza kwenda mwendo mrefu bila maji au chakula huku wakitegemea mafuta yaliyohifadhiwa kwenye nundu zao.

Katika ulimwengu wa kisasa, binadamu amepiga hatua kubwa sana katika masuala ya usafiri. Baadhi ya maendeleo hayo ni ya kustaajabisha. Kwa mfano,binadamu anaweza kusafiri kwa kutumia vyombo vya angani kwenda kwenye anga za mbali. Katika karne iliyopita binadamu amefika mwezini kwa kutumia vyombo hivyo. Kuna tetesi kwamba sasa anajaribu kuzizuru sayari zilizoko mbali na ardhi.

Ama kwa hakika, usafiri bora ni kipimo mojawapo cha maendeleo ya nchi yoyote katika ulimwengu wa sasa. Bila njia ya kisasa za usafiri, baadhi ya mambo yanayofanyika katika nchi zetu hayangefanyika.

SHAPTA

MWISHO

KISWAHILI HOLIDAY PACKAGE

Pindua

SEHEMU YA A: UFAHAMU

Soma kifungu cha habari kifuatacho kisha ujibu maswali yanayofuata:

FAIDA ZA MICHEZO

Michezo ni muhimu sana katika maisha ya binadamu. Michezo inawasaidia watu kuishi bila magonjwa hususani yale yasiyoambukizwa. Unapotembelea sehemu mbalimbali ulimwenguni utaiona michezo tofautitofauti. Lakini, michezo mikubwa inayojulikana ni mpira wa miguu, mpira wa kikapu, mpira wa wavu,kuogelea na michezo ya riadha. Michezo hii ina washiriki wengi kuliko michezo mengine.

Michezo ina faida nyingi kwa binadamu yeyote awe mdogo, mtu mzima au mzee. Michezo hujenga mwili wa binadamu na kuufanya uwe mkakamavu. Mwili unaweza kuimarishwa na chakula unachokula lakini pia michezo huimarisha mwili zaidi. Unapochunguza vizuri utawaona watu ambao hawafanyi mazoezi ya michezo wakiwa na miili isiyo na nguvu ya kutosha. Kama mtu hana nguvu kwa kiwango hiki mwili wake huweza kupatwa na magonjwa mbalimbali kwa urahisi. Michezi ni njia moja ya kujilinda na magonjwa kama vili kisukari, shinikizo la damu, mfadhaiko, unene wa kupindukia, na kadhalika.

Michezo hufurahisha wachezaji wenyewe na hata watazamaji. Mtu anapocheza hufurahisha nafsi yake na kustarehesha roho yake mwenyewena kuburudisha mwili wake. Hali kadhalika, michezo huwachangamsha watazamaji na kuwafurahisha kila wanapoitazama. Mashabiki wengi hupenda kuitazama michezo mbalimbali kwa kujifurahisha na kujistarehesha. Kwa hiyo, wao huweza kunufaika pia kwani kupumzika ni jambo muhimu sana katika maisha ya binadamu. Unapopata muda wa kupumzika na kijistaresha unaweza kuongeza kiwango chako cha kufikiri na uwezo wako wa kutenda kazi kwa ufanisi. Aidha. Unaweza hata kusuluhisha matatizo muhimu yanayojitokeza katika maisha ya kila siku.

Michezo pia hujenga uhusiano mwema kati ya mtu na mtu, wilaya na wilaya, na hata taifa na taifa. Kunapokuwa na mchezo wa kimataifa, wachezaji wa timu ya

taifa moja hukutana na wachezaji wa timu nyingine na kujenga uhusiano wa karibu. Urafiki baina ya watu wengi huweza kuanzia michezoni. Ili kuielewa vizuri suala hili, chunguza vizuri idadi ya watu wanaokuja kuitazama michezo katika eneo unapoishi. Mtazamaji mmoja akaapo na mtazamaji mwingine hawawezi kumaliza vipindi vyote vya mchezo bila kuambiana mambo kadhaa kuhusu mchezo huo. Watu wawili wasiofahamiana huweza kukutanishwa na mchezo wa timu yao na kuanzisha urafiki unaoweza kuwachochea kuanzisha pia miradi mingine ya kudumisha ushirikiano na mshikamano baina yao. Mathalani, mtu huweza kusifika katika nchi yake au kiwango cha kimataifa kwa kuwa mchezaji hodari katika mchezo wa kukimbia,kucheza mpira, kuendesha baiskeli, kuogelea, ndondi, mieleka na michezo mingine. Mtu akipata sifa kama hizo, hufurahia na kuridhika moyoni mwake. Aidha sifa hizi huweza kumnufaisha anyecheza michezo hiyo kwa kumletea pato kubwa kiasi cha kuwa tajiri. Taifa nalo hujulikana na kupata sifa kutokana na uhodari wa raia wake ambaye ni mwana michezo.

Kutokana na faida hizo zilizotajwa, tunapaswa kulitilia maanani suala la michezo duniani ili tuwe na maisha mema. Tujenge miili yetu kwa kucheza michezo ya aina mbalimbali hata kama hatuna uhodari wa kutosha kutokana na michezo Fulani.

Tujistareheshe na kupumzisha akili zetu kwa kucheza michezo hata kama hatuna uwezo mkubwa katika michezo hiyo. Tujenge uhusiano mwema kati yetu kwa kushiriki katika michezo mbalimbali.

Maswali:

Michezo ina faida gani kwa binadamu? Taja faida tatu.

Ni madhara gani yanyoweza kupata mtu asiyecheza?

Ni namna gani urafiki kati ya mtu na mtu unavyoweza kuanza michezoni?

Fafanua aina nne za michezo zilizozungumziwa katika kifungu cha habari hiki.

Ni vipi taifa huweza kunufaika kutokana na michezo?

Mtu anafaidika vipi kwa kujistarehesha na kupumzika?

SEHEMU B

UCHAMBUZI WA FASIHI

DIAMOND: Tafadhali Zari. Huyu ndiye yule msichana nilikuambia nataka kumuoa.

ZARI: (*Akitaka kumpiga kofi, lakini Diamond anamshika*) Niache!! Niache! Nimwonyeshe huyo msichana wako. Hebu mwangalie ni mweusi kama makaa na makalio yake kama "flat screen"

DIAMOND: (*Anajaribu kuleta amani kati yao*) Unajua Zari, nilifikiri itakuwa vizuri sisi sote watatu tukutane ili tuelewane vizuri. Tafadhali wacha matusi.

ZARI: *(Akivuta pumzi na kuhema*). Hakuna haja ya kuelewana. Ninawaomba nyote mtoke hapa haraka. Litoe hili Malaya lako humu ndani, tena upesi.

PINDUA

ZUCHU: (*Kwa hasira*) Malaya? Mimi Malaya? Chunga ulimi wako mwamamke wewe. Una nini kunizidi mimi hapo ulipo, hata nishindwe kuwa mke wa Diamond. Kama ni elimu nimesoma hadi chuo kikuu. Kama ni kazi, mimi ni mwimbaji tena nina pesa nyingi. Wewe kazi yako ni kukaa nyumbani kumngojea Diamond akuletee pesa. Mtaka cha mvunguni ni sharti ainame.

Usiniite kahaba tena. (*Zari anamrukia. Wanashikana kupigana, bali Diamond anaingilia kati upesi kuwatenganisha)*

DIAMOND: Ngoja, ngoja,ngoja. Wacheni! Hasira huleta hasara. Nyote wawili ni bibi zangu. Wewe Zari ni mke wangu wa kwanza. Lakini sikusema utakuwa mke wangu wa pekee.

ZARI: Ee! Mungu wangu nisaidie. Shetani gani ameingia katika familia yangu. Mume wangu ambaye nimempenda sana maisha yangu yote. Nimezaa naye watoto wannne wasichana. Haya tokeni nje. Haya yamenitosha.

DIAMOND: (*Anamshika Zuchu pole pole na kumsaidia kuketi kwenye kiti*) Nataka muelewane wewe na Zuchu huyu, ambaye atakuwa mke mwenzako. (Anajipiga *kifua na kujigamba*). Kwa mtu mwenye mali kama mimi: mtu

anayetaka kuwa mbunge wa eneo la Mityana, hakuna shida kuoa mke wa pili au wa tatu ama zaidi.

ZARI: *(Anasimama, anashika kiuno na kuelekeza kidole chake kwa Zuchu*) Wewe! Wewe ni mwanamke uliye na bahati sana. Umempata mwanamke mpenda amani, mnyenyekevu na mwenye subira. Waswahili wana methali isemayo: "ukiona vyaelea vyaundwa". Vitu vyote unavyoona hapa,runinga, friji, zulia, makochi na mali yote uavyoona na usivyooona , tilivitengeneza. Tulivitengeneza, mimi na huyu bwana, mume wangu, ambaye waelekea kuwa umemwangukia kufa. (*kwa mkazo*) siwezi kukuruhusu kuingia kati yetu, kuvunja nyumba yetu na kutuharibia maisha yetu kabisa. Mtoto wa juzi kama wewe, enda ukatafute tineja mwenzio mkajenge maisha yenu. Na kwa mara ya mwisho kabla sijawaonyesha kilichomkataza kuku kukojoa, naomba wewe na jibaba lako mtoke. Sitaki kuwaona humu nyumbani mwangu…….(Diamond na Zuchu wanatoka nje. Zari anabaki peke yake sebuleni na kuanza kuimba)

Akili itazunguka, zunguka, zunguka

Itazunguka ukiniacha mwenzako,

Maana nitaumbuka,umbuka ,umbuka,umbuka

Nitaumbuka, yote kwa ajili yako hee!

Kwikwi kwikwi, nitalia!

Kwikwi kwikwi, ukiniachilia

Kwikwi kwikwi, nitaliaaa!

Kwikwi kwikwi, sio kwa unavyonipatia.

Maswali:

Eleza sifa tatu za wahusika wowote katika dondoo hili.

Chambua mbinu za uandishi zilizotumiwa katika dondoo hili.

Kwa maoni yako, kwanini Diamond alitaka kuoa mke wa pili.

Eleza shida zozote tano ambazo wanawake wanapata katika ndoa.

Unajifunza nini kutokana na dondoo hili?



MWISHO


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