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SCORING GUIDE

BIOLOGY

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Paper 1

For Facilitations and Consultation Call;

Theory

0703909330/0781961153

May 2025

$2\frac{1}{2}$ Hours

BRISTLE RESOUCFUL EXAMINATIONS

Uganda Certificate of Education

BIOLOGY

Paper 1

Theory

2 Hours 30 Minutes

Instructions to candidates

1. This paper consists of two sections **A** and **B**.
2. Section **A** has **three compulsory** items and **four** items in section **B**.
3. Answer **ALL** items in section **A** and **two** items in section **B**, **one** from each part.
4. Any additional item attempted will not be scored.
5. Start each question on a fresh page in the answer booklet provided.
6. Indicate the item attempted in section **B** in the table below.

FOR EXAMINER'S USE ONLY

Score	1	2	3			Total
Score						

SECTION A

Attempt all items in this section in the space provided

1. Mr. Joseph is a qualified herbalist in Wakiso district. He obtains herbal medicine from different plant structures in the nearby forest either by plucking off leaves, digging out roots, removing bark of trees or uprooting out the plant. Despite some plants regenerating their barks, forming more leaf buds and some cells near the damaged roots differentiating into meristematic tissues, the number of medicinal plants in the locality has greatly reduced, and this has raised a lot of concerns.

a) State the plant processes affected by Joseph's poor harvesting methods.

Photosynthesis **UI**

Gaseous exchanges **UI**

Transpiration **UI**

Translocation **UI**

Absorption of water and mineral salts **UI**

b) Describe how the actions of Mr. Joseph affected the normal functioning of the medicinal plants, leading reduction in their number.

Plucking off the leaves reduced the number of leaves which reduces the surface area for trapping sunlight for photosynthesis therefore less food was manufactured which reduces growth rate hence decrease in the number of medicinal plants **Ue.**

Removing the bark of the stems removed/destroyed the phloem vessels, which reduced the translocation of manufactured food to other parts for metabolism; hence poor growth and reduction in the number of plants. **Ue**

Digging out roots of the trees decreased the number of roots which reduces surface area for absorption of water and mineral salts required for metabolism, resulting into poor growth and reduction in the number of plants **Ue.**

Uprooting the whole plant causes the plants to dry up, which stops/prevents all metabolic processes in the plants resulting into death hence reduction in the number of plants. **Ue**

Plucking off leaves reduced number of stomata which reduces entry and exit of gases like oxygen during gaseous exchange., less energy is produced during respiration hence poor growth and reduction in number of plants. **Ue**

Acc explanation of transpiration

>2Ue=4scores 2Ue=3scores <2Ue=2 scores UI=1 score

c) How are some of the medicinal plants able to survive despite the poor harvesting methods of Mr. Joseph.

Through regeneration of the barks containing phloem vessels which enabled the plants to translocate the manufactured food to all parts for metabolism hence their survival. Ae

Through formation of leaf bud that undergo mitosis to form more leaves providing surface area for trapping sunlight for photosynthesis, hence producing more food which promotes survival. Ae

Some cells near damaged roots became meristematic tissues which undergo mitosis to form new roots/repair damaged roots enabling the plants to absorb water for metabolism hence survival. Ae

>2Ae=4scores =2Ae=3scores <2Ae=2 scores Al=1 score

2. A 60-year-old woman spends most of her time in her dark room using a phone with brightly lit blue screen, and frequently takes overdose of her hypertension tablets. Recently, she experiences painful walking, blurry vision and difficulty in seeing objects not close to her. One day while cooking milk for her granddaughter, she suddenly saw the boiling milk spilling out of the saucepan into the fire. Upon touching the sauce pan, she immediately released it.

a) How did the old woman's body coordinate from the time she saw the milk spilling into the fire, to enable her to release the sauce pan?

Eyes saw the milk and generated impulses which were sent to the brain for interpretation via optic nerve. Ue

Receptors in the skin of the fingers become stimulated and generated impulses that were sent to spinal cord via sensory and relay neurones. Ue

The spinal cord and brain interpreted the information and sent impulses to the muscles via the relay neurone and motor neurone. Ue

Muscles contract and relax enabling her to release the sauce pan. Ue

b) Explain the causes of the health challenges experience by the old woman.

Excess light from the brightly lit blue screen damaged the photoreceptor cells of retina leading to blurry vision. Ue

Old age/overdose medication causes lens to become more stiff and less flexible hence unable to focus light properly from distant objects. Ue

Overdose of hypertension tablets damages the joints resulting into pain during walking. Ue

>4Ue=4scores =3/4Ue=4scores <3Ue=4 scores Ul=1 score

c) How can the old woman overcome her health challenges to live a better life.

She should adhere to/take the recommended dose of her hypertension tablets to prevent damage caused to joints. Ae

She should wear spectacles with concave/diverging lens which properly focuses the light rays from far objects onto the retina. Ae

She should minimize the brightness of the screen or put her phone to eye care mode to prevent excess bright light from damaging the lens. Ae

>2Ae=4scores =2Ae=3scores <2Ae=2 scores Al=1 score

3. Mary a university student became pregnant after engaging in multiple sexual relationships occasionally having unprotected sex. Since she became pregnant upto when she gave birth, Mary refused to visit any hospital for antenatal care. When she gave birth, Mary refused to breast feed the baby. Mary's child now frequently falls sick, has low body size and weight, and shows retarded mental and body growth, and also had HIV/AIDS. Mary's child also has a flat face, short neck, and squat hands due to a condition the doctor revealed to be genetic.

a) Explain how Mary's behaviour during and after birth affected her child.

It resulted into transmission of HIV/AIDS to the baby and the virus destroyed the baby's CD4/T4 cells, which weakens the baby's immune system leading to frequent sickness Ue

Defaulting antenatal care and breast feeding resulted into low body size and weight due lack of essential nutrients required by the body. Ue

Defaulting breast feeding also resulted into poor mental and body growth due to lack food nutrients from breast milk required for mental and body growth. Ue

b) Explain how the genetic condition of Mary's child comes about (arose).

The genetic condition due to;

Mutation that results into failure of chromosome 21 to separate during formation of gametes. Ue

During meiosis and gamete formation, failure of chromosome 21 to separate results formation of gamete with an extra chromosome (n+1). Ue

During random fertilization, the gamete with extra chromosome (n+1) fuses with a normal gamete resulting into formation of an individual with an extra chromosome. Ue

>3Ue=4scores 3Ue=3scores <3Ue=2 scores Ul=1 score

b) Explain to Mary how she can manage the health issues of her child to ensure that her child lives a better life.

She should feed her child on balanced diet in order to supply nutrients required for proper growth and development. Ae

Mary can also start breast feeding her child to provide antibodies/passive immunity and nutrients that boost immunity. Ae

Taking child for therapy to improve child's speech and motor skills. Ae

Regular body checkup to monitor and treat associated health complications. Ae

>2Ae=4scores =2Ae=3scores <2Ae=2 scores Al=1 score

SECTION B

Part I

Attempt one item from this section

4. As a result of a civil war in the neighbouring country, many people entered into Uganda as refugees. The local authorities decided to settle them on a piece of land, part of which was a forest reserve next to a swamp and a river. Due to large influx of people running away from the war, the trees in the forest reserve and around the riverbank were cleared to expand the camp. A lot of human wastes and polyethene bags were disposed into the river, people also constantly burnt plastics and wood for charcoal. This resulted into respiratory diseases, outbreak of dysentery, flooding in the camp and loss of biodiversity.

Task

a) Explain how the environmental challenges in the area came about.

Poor disposal of human wastes into the river which contaminates the water with germs resulting into outbreak of dysentery. Ue

Burning of plastics and wood for charcoal produces smoke containing harmful gases and chemicals which damages the respiratory system leading to respiratory diseases. Ue

Disposing plastics in rivers and surface runoffs/soil erosion caused by cutting down trees blocks the drainage channels/trenches leading to flooding Ue

Cutting down of trees to expand the camp for human settlement destroyed habitats and breeding sites for living organisms and death of plants and animals hence loss of biodiversity. Ue

>2Ue=4scores 2Ue=3scores <2Ue=2 scores Ul=1 score

b) Explain to the local authorities why it was important to conserve the environment.

The forest reserve provides soil cover that covers/holds the soil particles together which prevents soil erosion/flooding. Ae

The forest reserve, swamp and river acts as habitats and breeding sites for many animals and plants which promotes their survival hence increases biodiversity. Ae

Forest reserve, river and swamps acts as a source of food/herbal medicines for animals which promotes their survival. Ae

Trees absorb carbon dioxide from the environment/releases oxygen during photosynthesis which prevents accumulation of carbon dioxide and hence prevents global warming/provides oxygen for respiration. Ae

The trees in the forest reserve add humus into soil/prevents erosion which maintains soil fertility for proper plant growth. Ae

>3Ae=4scores =2/3Ae=3scores <2Ae=2 scores Al=1 score

5. The shores of Lake Victoria are highly populated especially near urban center, people in the area carryout overfishing, commercial crop growing, sand and clay mining along the shores. Foreign investors have also constructed industries along the shores. This has resulted into a number of challenges to the people living around the shores of Lake Victoria.

Task

a) Explain to the people the causes of the challenges experienced in the areas.

Over fishing due to high demands for fish results into depletion of the different kinds of fish which results into loss of biodiversity. Ue

Commercial crop growing results into discharge of agricultural wastes like pesticides, fertilizers, herbicides which causes suffocation and death of aquatic organisms hence loss of biodiversity. Ue

Mining of sand and clay destroys the habitats and breeding sites of the fish which reduces the number of fish in the water body/causes death and scarcity of fish and other aquatic organisms. Ue

Construction of industries near the shores results into release of harmful industrial wastes/pollutes the water and hot water resulting into death of aquatic organisms/makes water unsuitable for domestic use resulting loss of biodiversity/diseases. Ue

>2Ue=4scores 2Ue=3scores <2Ue=2 scores Ul=1 score

b) Explain how these challenges can be solved.

Putting in place strict laws and enforcement against overfishing/discharge of industrial wastes/agricultural wastes in order for the number of fish to increase again/to minimize water pollution. Ae

Sensitizing the people at the shores about the dangers of water pollution /overfishing/over mining in order to conserve the resources. Ae

Gazetting industrial areas away from the water bodies to avoid easy discharge of industrial wastes into the water bodies. Ae

Recycling/cleaning of industrial wastes/agricultural wastes before releasing them into water bodies to avoid water pollution. Ae

Construction of artificial ponds where fish can be grown from to promote biodiversity of the fish species. Ae

>3Ae=4scores =2/3Ae=3scores <2Ae=2 scores Ul=1 score

Part II

Attempt one item from this part

6. A man was attacked and beaten severely by a group of thugs. Unfortunately, he sustained several physical injuries leading to severe bleeding, and lost most of his teeth. Since then, he has presented a number of health complications such as swelling especially in legs, dizziness, body weakness, weight loss and diarrhea. In the hospital further examination using a scan revealed that his pancreas and kidney were severely damaged, which has made him worried about his life. While in hospital, the doctors recommended to feed him on small quantities of glucose solution, juice from citrus fruits blended with green vegetables, blood transfusion and regular dialysis alongside other medications.

Task

a) Explain how the actions of the thugs affected the functioning of the man's body.

It resulted into loss of teeth hence difficulty in chewing/physical digestion of food, therefore food was poorly digested leading to body weakness due to lack of energy in the body. Ue

It resulted into severe bleeding which reduced volume of blood and red blood cell count, therefore less oxygen was transported to the brain leading dizziness. Ue

Damage of the pancreas prevented the release of digestive enzymes from the pancreas into the alimentary canal/duodenum therefore food was properly digested which leads to diarrhea and body weakness. Ue

Damage of the kidney resulted into accumulation of toxic/waste substances in the blood, which leads to fluid retention hence swelling of legs. Ue

>2Ue=4scores 2Ue=3scores <2Ue=2 scores Ul=1 score

b) Describe how the doctor's recommendations enabled the man's body to return to normal state and functioning.

Feeding on small quantities of glucose which can be respired to produces energy reducing body weakness without causing other complications like diabetes. Ae

Feeding of juices from citrus fruits containing vitamin C essential for boosting immunity of the body to enable in the healing process. Ae

Feeding of juice from vegetables to provide vitamin K essential blood clotting and also rich in iron to increase the red blood cell count in blood to prevent dizziness. Ae

Dialysis to remove the toxic/waste products from the body to prevent their accumulation and retention of fluids, hence preventing swelling of body. Ae

Other medications would enable the damaged body organs/parts/structures to health and to recover the normal functioning. Ae

>3Ae=4scores =2/3Ae=3scores <2Ae=2 scores Al=1 score

7. Kadero, a 40-year-old woman has been a heavy smoker for over 10 years. Lately she has been experiencing high blood pressure, extreme headache and dizziness, and yellowing of teeth and difficulty in chewing. She also experienced a miscarriage at 7 months of her pregnancy. Although the baby boy survived, he had extremely low body weight and looked under developed for the age.

a) Explain to Kadero the causes of the health challenges experience by herself and her baby.

The harmful chemicals in the smoke progressively damages the walls the blood vessels which results into inflammation/narrowing/hardening/atherosclerosis which increases resistances to blood flow hence high blood pressure. Ue

Narrowing of blood vessels/artries reduces amount of blood containing oxygen and glucose supplied to the brain which leads to dizziness and headache. Ue

Accumulation of deposits of tar/nicotine/plaque on the teeth results into yellowing of the teeth. Ue

The harmful chemicals in smoke/tar/nicotine causes inflammation of gums/teeth loss/weakening of teeth leading to difficulty in chewing which causes reduced food intake/improper breakdown of food/improper digestion hence body weakness. **Ue**

Harmful chemicals in smoke/nicotine/carbon monoxide crosses the placenta into the foetal circulation causing constriction of blood vessels reducing amount of oxygen and nutrients reaching the foetus, and excess accumulation of toxic wastes in the foetus leading to miscarriage/low body weight/under grown. **Ue**

>3Ue=4scores 2/3Ue=3scores <2Ue=2 scores Ul=1 score

b) Advise her on how to manage the health challenges for both herself and baby to live a better life.

Quitting smoking to avoid harmful chemical in smoke from causing harm to the body. **Ae**

Practicing proper oral hygiene to prevent/minimize yellowing of teeth/teeth loss/difficulty in chewing. **Ae**

Regular check in hospital for blood pressure, respiratory complications and any other associated health issues. **Ae**

Adhering to medication provided by the professional doctor to enable her recover. **Ae**

Feeding on semisolid food to improve swallowing, digestion **Ae**

Exclusive breast feeding of the baby to provide immunity and more nutrients for the baby to gain weight **Ae**

Supplementing breast feeding with formulated feeds/balanced diet to avail more nutrients for proper growth. **Ae**

>3Ae=4scores =3Ae=3scores <3Ae=2 scores Al=1 score

END

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VOLUME 1 AND VOLUME 2