535/1
Physics
Paper 1
2 hours

Uganda certificate of Lower secondary education

S.2 END OF TERM I ASSESSMENT

PHYSICS Paper 1

2 hours

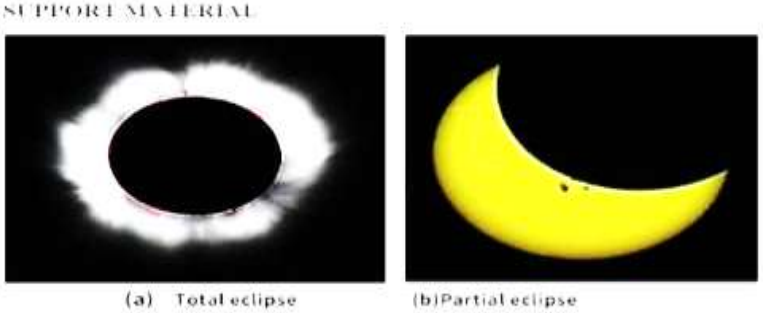
INSTRUCTIONS TO CANDIDATES:

Attempt any ***three items*** in total.

Item 1

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.



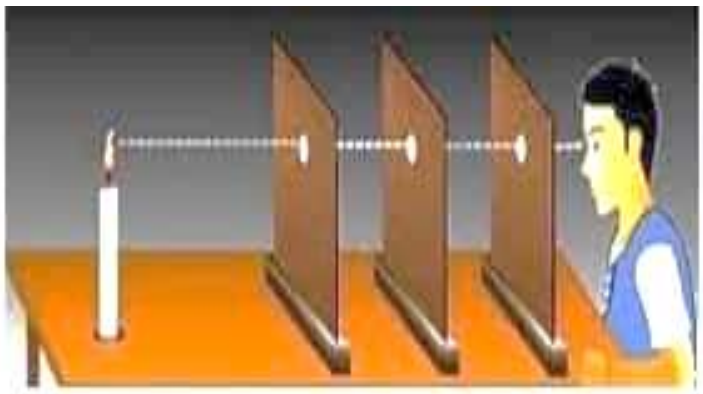
Task:

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 2

Kakebe 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 changes on matter:

a) Explain the cause and applications of kakebe 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 $0^{o}C$, relating to the diagram shown below.

Item 3

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 4

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 behavior of the fruit.

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

Item 5

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 6

At a certain construction site in a given town casual laborers 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) Explain why the efficiency of the machines is always less than 100% and state how it can be improved.
d) State the applications of pulleys in our daily life.

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