535/1
PHYSICS
Paper 1
(Theory)
2 Hours

WUNNA EDUCATIONAL SERVICES

LEARNERS' ASSESSMENT BOARD (WESLAB)

Uganda certificate of Lower secondary education

E.O.T 1 ASSESSMENT ONE

S.3 PHYSICS PAPER 1

2 hours

INSTRUCTIONS TO CANDIDATES:

- ✓ *This paper consists of **four** assessment items.*
- ✓ *Answer **any three** items.*
- ✓ *All answers **must** be written in the booklets provided.*
- ✓ *Poorly arranged and untidy work will not be marked.*

ITEM ONE

One hot afternoon, a group of learners walked along a tarmac road in the westward direction to check on the new swimming pool. On the road, they noticed what looked like water near a car in the distance, but the "water" disappeared when they reached the spot and reappeared farther ahead. Later, the weather changed, and there was a light drizzle while the sun was still bright. Looking eastward, they observed a semi-circular distribution of colours in the sky (a rainbow). They finally reached the swimming pool, where the pool attendant warned them that the pool might appear shallow when filled with water.

Meanwhile, one of the learners was curious about how light behaves and decided to perform an experiment involving refraction. They directed a ray of light from air into a glass block at an angle of incidence of 30°. Given that the refractive index of the glass is 1.5, that the speed of light in air is approximately 3.0×10^{8} m/s

SUPPORT

Task

Using your knowledge of physics, assist the learners to understand:

(a) The process that leads to what they observed on the tarmac road

(b) The process that leads to what they observed in the sky

(c) Why the swimming pool appears shallow when filled with water

(d) For the experiment with the glass block:

i. Calculate the angle of refraction inside the glass.

ii. Calculate the speed of light within the glass.

ITEM TWO

In a certain country, a Television (TV) reporter was reporting live near the ocean during nighttime. Viewers in another country were watching the live broadcast of the news bulletin during daytime. The viewers wondered how it could be day and night at the same time, how the event in one country could be watched live on TV in another country, and how the phases of the Moon are related to events on Earth.

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) The phases of the Moon and their relationship to events on Earth.

ITEM THREE

A boy lost control of his umbrella during a strong wind, causing the spring and plastic handle to break. He noticed the metal part of the handle felt colder than the plastic. A specialist advised him to buy a new spring with a force constant of 50 N/m, a length of 0.25 m, and a diameter of 0.02 m. For the spring to work effectively, a maximum force of 2 N should be applied—enough to withstand **strain** and **stress**, though the boy didn't understand these terms.

During a class experiment, the boy's group tested a homemade thermometer. In ice, the alcohol thread rose to 2.0 cm. In steam, it reached 10.0 cm. When placed under the armpit, it rose to 8.3 cm. They wanted to check if the thermometer was well-calibrated.

HINT: The normal human body temperature is 37°C.

Tasks

a) As a learner of physics, help the boy to:

i. Understand the meaning of the two strange words used by the specialist.

ii. Know why the metallic part of the umbrella handle was colder than the plastic part.

b) Know the amount of:

i. Stress the spring can withstand

ii. Strain the spring can withstand

c) Is the thermometer in good working condition?

d) Identify the most suitable thermometric liquid which could have been used in this.

ITEM FOUR

In your village of Kyatega, located in Kyegegwa District, Western Uganda, you are known as the most educated among your childhood friends, having progressed to the secondary school level. During your holiday visit, you shared your knowledge of Physics with the curious community members and childhood playmates. You explained how you learned about magnetism and the phenomenon of lightning. Fascinated, your playmates wanted to see how magnets work and asked you to teach them how to make their own magnets. Meanwhile, the community members approached you to address the long-standing myth that lightning deaths in the village are caused by bad fortunes from ancestors or wicked individuals. They sought your help in understanding how lightning occurs and how they can protect themselves.

SUPPORT

Task:

a) As a senior THREE student who learned about Magnetism, help your playmates on the different methods they can use to produce their own magnets in their history despite their levels of education.

b) As a physics student who learned about electrostatics, educate the community on how lightening occurs and ways they can safely guard themselves from the lightening