535/1

PHYSICS

Paper 1

Mar./April. 2024

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

BLESSED VICTORS SENIOR SCHOOL- BUWALULA

END OF TERM I EXAMINATIONS 2024

Uganda Certificate of Education

S.4 PHYSICS

Paper 1

(Theory)

2 hours: 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **two** sections; **A** and **B**. It has **Seven** examination items.

Section **A** has **three** compulsory items.

Section **B** has **two** parts; **I** and **II**. Answer **one** item from **each** part.

Answer **five** items in all.

Any additional item(s) answered will not be scored.

All answers **must** be written in the booklets provided.

 Turn Over

SECTION A

Answer **all** items from this section

Item 1.

A brass band was invited to play during a celebration near a tall building, a distance slightly more than 17m 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 indistict. Later in the night during the celebration, coloured lights flashing red, blue and green made the colours of their clothes look different from the original colours which puzzled them.

Hint: Speed of sound in air is $330ms^{-1}$

The two friends heard sound after 4s and 5s respectively.

The two friends were originally wearing yellow clothes.

Task:

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

(a) they had the sound at different intervals of time.

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

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

Item 2.

In a certain country, a Television (TV) reporter was reporting live near the ocean about the high tides during night time in a winter season. Viewers in another country were watching the live broadcasts of the news bulletin during day time. The viewers wondered how it could be day and night at the same time, and how possible it is to have winter in one country and summer in the other country.

Task

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

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

(b) the occurrence of high ocean tides.

(c) how is it possible to have winter in one country and summer in the other.

Item 3.

During a science project, learners were given two devices, a pinhole camera of length 0.5m and a concave mirror of focal length 0.1m, These learners were told to use a device which will produce a bigger image of a boy of height 1m standing 2m away from each instrument but they don't have any idea.

Task

As a physics learner, help them to choose the right instrument and state the nature of the image formed by each instrument. Tell them the the effects of increasing the size of the pinhole on the image formed.

SECTION B

PART 1

*Answer **one** item from this part*

Item 4.

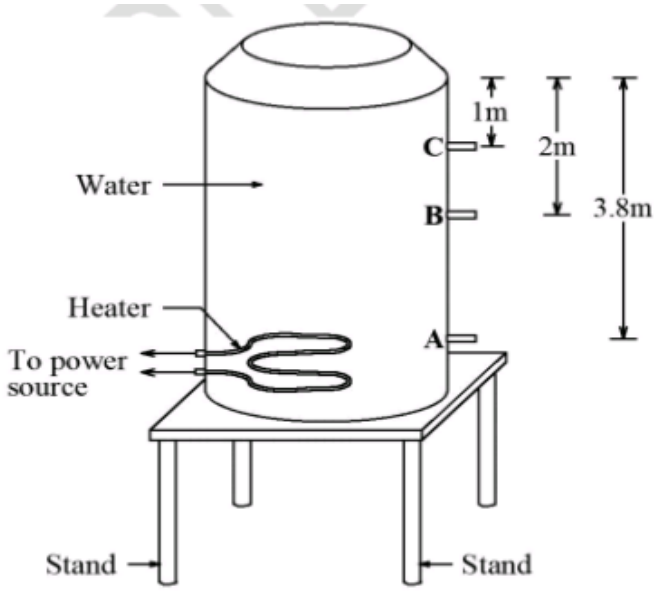
In a certain town, it is a must for drivers to be tested together with their vehicles for road worthness. On a certain day, a car started from rest and accelerated to $50ms^{-1}$ in 10s. The driver maintained that velocity for 20s and suddenly deccelerated to rest in 2s making him to crash into the windscreen.

Task

As a learner of physics, Sketch a graph for his journey and state whether the drivers average velocity does not exceed the towns speed limit of $12ms^{-1}$. Find the rate at which the cars velocity reduces and explain why the driver crashed into the windscreen and how this can be prevented.

Item 5.

A certain hotel has its bathrooms situated on the 3rd floor of a building. The hotel has its water tank on the 1st floor. A customer found an electrical heater fitted at the lower part of the tank but he didnot understand why it was done like that. Just before the hole for the outlet pipe was drilled at point **A**, the hotel customer, told the hotel manager that the correct position was either **B** or **C.** The hotel management does not allow its workers to carry the hot water via the staircase.



Task

Having studied physics;

(a) Explain to the customer 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) advise the hotel management on how to keep the boiled water hot for along 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.

PART II

Answer **one** item from this part

Item 6.

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 poutry 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 0.5 Ohms, two dry cells each of 1.5V were available for the farmer.

Task:

As a student of physics;

(a) Help the farmer to remove the pieces of iron metals 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 7.

The headteacher of your school wishes to buy two batteries each of emf 6V and internal resistance 2 Ohms to be used on the school lighting system. The school lighting system can use a maximum voltage of 6V. The head teacher would also wish to buy the connecting wires A and B. Wire A has a diameter of 0.1mm and costs 1000 shillings per metre and Wire B has a diameter of 0.15mm and costs 2500 Shillings per metre. He is not sure of which wire to buy.

Hint:

The batteries are to be connected to a bulb if resistance 4 Ohms.

The bulb may blow up if the current exceeds 3A.

Task:

As a learner of physics,

(a) advise the headteacher on how best he can arrange the batteries and the type of the wire to be used. Comment on the advantages of the arrangement chosen and the wire used.

(b) Comment on the safety of the bulb.

Physics Department

Blessed Victors Senior School- Buwalula

Wishes you success

END