MASINDI ARMY SECONDARY SCHOOL

535/1
PHYSICS
Paper 1
2025
2½ Hours

Group 12

Uganda Certificate of Education

RESOURCE MOCK EXAMS 2025

PHYSICS PAPER 1

Theory

2 Hours 30 Minutes

INSTRUCTIONS TO CANDIDATES:

- *This paper has* **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.*

SECTION A

Item 1

A disco hall in a certain town is faced with a number of challenges.

- The people in the neighborhood complain of too much noise that comes from it. A survey done in the village showed people could hear the sound from more than 1 km away while only those in a 0.5 km radius could hear the sound during day time. This surprised the manager of the hall since there were no speakers outside the hall and the speakers were set to the same volume all the time.

- The town council insisted the bottom part of each car that visits the hall is checked. A mirror that could form upright images of the same size was bought but it proved ineffective.

- A slide projector with a lens of Power 5D was to be mounted in the hall with the intention of forming an image of magnification 6. The owner had no clue of how to determine the required position.

Hint.

The distance between the slide and the lens is 40 cm.

Task

Use your knowledge of Physics to;

a) Explain to the manager of the hall why sound could be heard from outside the hall and why it was heard at various distances. Also suggest a way in which the complaints from the neighbors can be reduced.
b) To suggest an effective way of achieving the town council's directive.
c) To determine if the projector would produce the desired image.

Item 2

The government of Uganda plans to set up a Nuclear power plant to reduce the energy production cost. The following ideas were fronted by a Members of Parliament but he couldn't explain their rationale;

- All the workers at the plant were to wear safety wear.
- A detailed procedure of how the radioactive materials produce electricity was required.
- Assuming $\mathbf{1}kg$ of radioactive material with a half-life of **two (2)** weeks was to be used, a clear time frame was required as to when a replacement will be required.

Hint:

The radioactive material will only be used to produce electricity when the mass of the material is more than 50g

Use your Knowledge of Physics to help provide a suitable response to the Member of Parliament about the raised Concerns.

Item 3

A soldier who travelled to another continent noticed that the country he had gone to was covered in snow which he had never seen in his home country. In fact, his home area had been in a dry season for about two months prior to his trip.

After a month, he observed that the moon appeared every night like in his home country but its appearance kept on varying. This made him wonder. After trying to contact his relatives through a letter, he was told he could make a telephone call to his relatives. This surprised him as he thought a person could only make telephone calls to a country, he is in.

Task

Use your knowledge of physics;

a) Explain why the country he was in covered with snow yet there was a long period of drought in his home area.
b) Help the soldier understand why the moon behaved the way it did.

c) Help the soldier understand how telephone calls like the one he made are possible.

SECTION B
Part 1

Item 4

An aluminium pan of mass 800g and specific heat capacity of 800 $JKg^{-1}K^{-1}$ containing 2.5 kg of ice blocks at -10 °C was accidentally put under a tap producing steam at 100 °C by a house help. After a few minutes, the ice had all melted and the temperature of the water in the pan was 25 °C. The house help was surprised by the disappearance of the ice cubes and was tasked to ensure the water did not become warmer without putting it in a refrigerator and to determine the increase in the mass of the contents of the saucepan.

Hint

Latent Heat of Vaporization = 2.26×10^6 JKg^{-1}

Latent Heat of Fusion = 3.4×10^5 JKg^{-1}

Use your knowledge of physics to;

a) Determine how much steam was bubbled into the saucepan.
b) Explain what happened to the ice blocks
c) Suggest ways in which the water can be kept at that temperature for a long time.

Item 5

A certain pump in a school is meant to be used to fill a tank of diameter of 10m and a height of 12m. However, it is currently utilized for a limited time to regulate the amount of electricity owed and they aren't sure of how much time it will take for the tank to fill. They are worried about the noise produced as the water pours into the tank and how to keep the water in the tank at the same temperature without it warming up.

Given that the pump has a power rating of 10W, and has to pump the water through a height of 5m,

Task

Use your knowledge of physics;

a) To determine if one hour would be enough to fill the tank.
b) Why the water makes noise as it pours into the tank.
c) To suggest ways in which to keep the water in the tank at the same temperature.

Part 2

Answer one item from each part.

Item 6

A builder was worried about a number of items specified by an electrician during the wiring of the house;

- The electrician insisted on the earth wire being connected to a metallic rod surrounded by charcoal and salt.
- The electrician also suggested that the laundry machine be connected to a fuse in order to safeguard it.

He however did not specify its rating or how it does so. The builder went to an electronics shop to buy a fuse but was told only two were available one rated **10 A** and the other **18A**.

The electrician also had no time to estimate weekly cost of using the laundry machine of rating **240 V, 4000W.**

Just when the electrician was leaving, he told the builder to remind the house owner to include a lightning conductor on the house. The builder informed his colleagues of the items that had been listed by the electrician and inquired from them if anyone had knowledge about them but none could.
They have approached you because you stay in the neighbour hood to help them.

Use your knowledge of physics to help the builder understand the information given to the him.

Item 7

From an electricity substation, learners were told that electricity is transmitted as alternating current (AC) at 12 kV with a current of 0.05A for use inside a house at a voltage of 240 V. The learners were told the voltage is changed using a transformer that is 80% efficient but they were curious to know how the transformer works and why power is transmitted at such high voltages.

They also wanted to know if a television set (TV) that operates on direct current between 1.0 A to 2.0 A would work effectively.

Task

Use your knowledge of physics to help the learners;

a) Understand how the voltage is changed.

b) Understand why the power is transmitted at high voltages.

c) To determine if the television set will work effectively and how that will be possible.

END