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PHYSICS
Paper 1
July/August 2025
2½ hours



WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

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 answer booklets/sheets provided.*

SECTION A

Answer **all** the items in this section.

Item 1

Your family went for swimming in a pool at a nearby hotel and later in the evening for a show in a theater during your first term holiday. One of your brothers is curious about what he saw during this outing.

- The swimming pool appeared shallow than its actual depth.
- In the theater the walls are well covered with curtains, his yellow shirt turned green in green light and at his position, the sound from two loud speakers reached him at two different intervals.

Hint speed of sound in air = 320 ms^{-1}

Task:

Using your knowledge of physics.

- (a) Help your brother to understand, why
 - (i) the swimming pool appeared shallower.
 - (ii) the walls are well covered.
 - (iii) his shirt turned green.
- (b) Help your brother to estimate the time interval of the sound from the two loud speakers if the speakers are 50 m and 40 m away from his position.

Item 2

The government has discovered a precious and rare mineral in a certain part of the country A team of men picked samples and kept them in the stores of one of the hospitals where photographic plates are also stored. The mineral was checked on regularly and they made the following observations.

- All photographic plates had darkened.
- It's mass reduced spontaneously with time as shown below.

Mass (g)	200	150	70	35	25
Time (days)	0	4	16	28	30

Task:

As a learner of physics,

- (a) Support the view that the mineral is a radioactive material.
- (b) Use a graph to estimate its half life.
- (c) Explain the best ways of storing this rare mineral.
- (d) What are the dangers of exposing this mineral to the public?

Item 3

Uganda is now one of the few countries that have been able to launch a satellite in space despite the financial implications involved and the government insists that the project is cost effective for the purpose of weather forecast as agriculture is the back bone of our country.

Your parent has come across an article in one of the newspapers describing our satellite as an Artificial satellite and he thinks government misused a lot of money by investing in such an expensive project. He is also wondering now which one is a natural satellite.

Task

As a learner of physics,

- (a) Explain to your parent the other uses, apart from weather forecast and so Uganda government had to fund such a big project.
- (b) Explain to him with examples the differences between natural and artificial satellite.
- (c) Help your parent to know the cause of season changes.

SECTION B

PART I

Answer one item from this part

Item 4

Workers at the construction site are meant to raise pieces of scrap of mass 6 kg through a height of 15 m. Their manager always complains that workers who carry the pieces of metal do work slowly especially in the afternoon when the temperature is high and in the morning when temperature is low. In response the workers claim their hands are burnt by the hot metals which slows them down. One of the workers suggested they use a pulley system of velocity ratio 4 and efficiency of 80%.

Task

Use your knowledge of physics to;

- (a) Explain why metals feel cold in the morning and hot in the afternoon.
- (b) Draw a design of the required pulley system and explain how it can be used to solve the problem.
- (c) Determine the minimum force required to ensure an efficiency of 80% is achieved.
- (d) Determine if the string suggested above would be suitable for the purpose.
- (e) Suggest ways in which the efficiency of the pulley system can be improved.

Item 5

During a tour to a water packing factory constructed on a mountain, students stopped at the railway crossing to allow fast moving train to cross, but it was still at a distance. They came out of the bus to view the train and take selfies. One tried putting his ear on the railway then made loud alarm because he heard the sound of the train approaching as if it almost knocked him. When the train was crossing, they experienced a force pushing them towards the train, they wondered that whether the train was a magnet that attracted human beings. At the water factory they saw that heated water moves through a vertical height against gravity to another storage tank without pumping it on top of the hill where the factory is located, the mercury barometer read 740 mmHg.

Hint:

Density of air = 1.3 kgm^{-3}

Density of mercury = 13.600 kgm^{-3}

Acceleration due to gravity = 10 ms^{-2}

At sea level, mercury barometer reads 760 mmHg

Task

As a physics student, write a report explaining.

- (a) Two occurrences at the railway crossing.
- (b) What makes it possible for hot water to move against gravity.
- (c) How high is the hill, where the factory is constructed above sea-level.

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Turn Over
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PART II

Answer one item from this part.

Item 6

During a science study tour to an electricity generation plant, the learners were taken through various processes from the generation, transmission, to consumption points. The learners were informed that power is generated and transmitted at 13 kV using thick aluminum wires and later stepped down to 240V for the domestic consumption. The learners were all told to put on the rubber shoes and gloves during the study tour at the plant. The learners now were left wondering how voltage can be reduced from 13 kV to 240 V and why put on rubber shoes at the plant.

Task

As a learner of physics,

- (a) Explain to the fellow learners why power transmission is done at such high voltage and transmitted in thick aluminum cables.
- (b) Help the learners to know the device that steps down the voltage, its structure and how it works.
- (c) Help the learners to know why they were told to put on rubber shoes and gloves.

Item 7

For a science club in a public school, students were tasked to classify the pieces of magnetic substances given as soft or hard substances. They were provided with the nickel U-shaped piece, copper wires, a battery and iron powder to do the investigation.

On the same note, some students visited their old student who runs a mini salon for herself with the appliances marked 2.5 kW, 240 V heater, three 15 W, 240 V lamps and 1.2 kW, 240 V laundry iron.

The time for use of the appliances was 2 hours daily, 8 hours per day and 30 minutes twice a week respectively. Electricity board charges Shs. 800 per unit of electricity used.

Task

As a physics student,

- (a) Help the learners to understand the meaning of soft and hard magnetic materials and also give one example of each.
- (b) Help the learners to carryout scientific investigation to distinguish the soft magnetic material and hard magnetic material.
- (c) Help the old student to understand the meaning of label 2.5 kW, 240 V on heater to help her in controlling the cost of using the appliance.
- (d) Help the old student to estimate the cost of running the appliances for a week.

END