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PHYSICS
Theory
Paper 1
March/April 2026
2 hours

ASK INTEGRATED TEACHER'S EXAMINATIONS BUREAU LTD

Uganda Lower Secondary Certificate of Education

S.3 MOT I ASSESSMENT 2026

PHYSICS PAPER 1

(Theory)

2 Hours

INSTRUCTIONS TO CANDIDATES:

Answer all items.

Answers to all items must be written in the answer sheets provided.

Graph paper is provided.

Mathematical tables and silent non-programmable calculators may be used.

ITEM 1

An investor seeking to establish a ceramics company requires guidance on using a hydraulic press to manufacture concrete pavers, blocks and bricks. The hydraulic press supplier contacted provided a manual booklet with a sketch drawing to help the investor understand the technical aspects. The manual has instructions for the hydraulic press to be operated effectively.

The investor also needs pure cement to be used in the manufacture of these pavers, but unfortunately one of his workers one day by accident allowed the cement to get contaminated with numerous ½ inch nails.

TASK

As a learner of physics;

(a) Explain to the investor the principle of working of the machine.

(b) Explain why the oil is the most suitable to be used in the hydraulic machine.

(c) You are provided with batteries in a holder, connecting, switch K, coil of copper wire and a six inch nail, explain to the investor how he can use the six inch nail to separate the ½ inch nails from the cement?

(d) If the hydraulic press has efficiency of 80% and needs to press concrete requiring output of 2000J. Advice the investor on how much energy, he has to put into the press?

ITEM 2

Some two S.2 boys had an argument pertaining to charging of a Gold Leaf Electroscope positively by the method of induction. To dispel any doubts, these boys were provided with two suitable insulators (Glass and Ebonite) and an uncharged Gold Leaf Electroscope.

TASK

(a) Describe how glass and ebonite can be charged by friction?

(b) Resolve the argument by explaining how an uncharged Gold Leaf Electroscope can be charged by induction using a negatively charged ebonite rod.

(c) Help these boys understand how a Gold Leaf Electroscope can be used to detect the presence of charge on a body.

(d) Where in real life is the knowledge of electrostatics applied?

ITEM 3

Your aunt in Canada calls to check up on you and the family in Uganda. During the phone call, she mentions that it is 1:00 PM daytime in Canada while it is 9:00 PM nighttime in Uganda, and she tells the entire family about the different seasons they experience there. After the call, your cousin turns on the news, and many coastal people are complaining about tides. Some family members are amused and wonder how all this is possible.

Task:

Using your knowledge of physics, explain:

(a) How day-time and night-time are possible at the same time but different locations on Earth.

(b) The occurrence of various seasons here in Uganda and in Canada where your Aunt stays.

(c) How tides affect the coastal people?

ITEM 4

During a classroom activity, your group made a thermometer and wanted to check whether its calibrations were correct. They placed it in pure melting ice, and the alcohol thread rose to 2.0 cm. Then, they put it in steam above pure boiling water, and the thread rose to 19.0 cm. Finally, they placed it in one of the group member's armpits, and the thread rose to 8.3 cm. The thermometer is in good working condition if the length of the alcohol thread approximately corresponds to normal human body temperature.

Hint:

- Normal human body temperature is 37°C.

Task:

(a) Is the thermometer in good working condition?

b) Earth is the only known habitable planet so far because of its unique features compared to other planets. One reason it is habitable is the formation of ice from water. Aquatic animals, such as fish, are able to thrive in seas and oceans under extremely cold conditions. People in your community are wondering how this is possible. Explain to the community how this is possible.

END