

KALEGE HIGH SCHOOL-----No Cross No Crown

535/1

PHYSICS

Paper 1

(theory)

Mar.2026

2 hours



KALEGE HIGH SCHOOL

MID-TERM ONE S.3 2026

PHYSICS

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(Theory)

2 hours

INSTRUCTIONS:

The examination paper consists of **Five** items.

Respond to only any **four** items of your choice.

Any additional **item(s)** responded to will not be marked.

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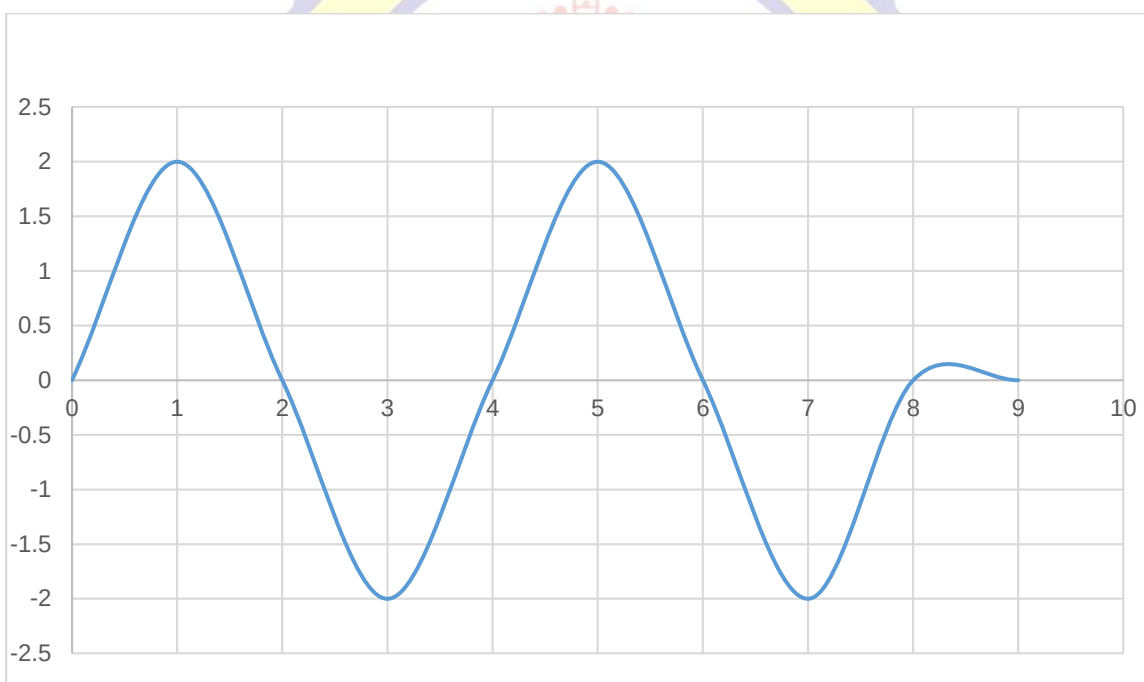
Item 1:

A war erupted in a certain mountainous area surrounded by small water bodies where soldiers only communicated by throwing a stone in water to alert their colleagues of danger ahead. Instead, this alerted their enemies. One of the soldiers had small sizeable plane mirrors and torn paper box in his bag. Their leader sent spies to peep behind hills to see if the enemies were hiding there but many were captured and killed. They totally lacked knowledge on how to solve this problem. The enemy troops had a radio call that was used for communication and wave forms of wave length were produced on the receiver's computer clearly indicating the amplitude, period and time taken for the wave to reach the receiver at the headquarter. One morning, the soldiers realized that the skies were appearing red and the same phenomenon occurred later on in the evening. This scared the soldiers even more.

Hint;

A graph obtained from the receiver's computer

Amplitude(meters)



Time(sec
onds)

Task;

As a student of physics at **Kalege High School**, help the soldiers to;

- (a) Understand why the throwing of the stone in water alerted their enemies.

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- (b) Know the best way they could reduce the rate at which their spies were being killed and captured.
- (c) Understand the **strange appearance of the skies** that scared them.
- (d) Determine the **frequency** at which the waves reached the receiver at the home base of the army.

Item 2:

Two boys of **Kalege High School** 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:

During choosing materials for construction a group was provided with bricks, tiles, iron bars, pieces of wood, gravel, sand, cement and water. Different materials were to be used for different purposes. The walls of the house were to be painted black and use of iron roof but the students argued that the wall should be painted white and the roof must be made of grass.

Hint;

- (1) The diameter of wood and iron pieces is **0.7mm**.
- (2) Iron of length **10m** can withstand force of **6000N** which causes an extension of **2.0cm**.
- (3) Wood piece of length **10m** can withstand a force of **4000N** which causes an extension of **2.5cm**.

Task;

As a learner of physics;

- (a) Confirm that iron is stronger than wood
- (b) Briefly give the properties that make any three of the listed materials, ideal for construction
- (c) Give the justification for the choice of color and nature of the roof materials.

Item 4:

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 **0.5** inch nails.

Task;

- (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 **0.5** inch nails from the cement?
- (d) If the hydraulic press has efficiency of **80%** and needs to press concrete requiring output of **2000J**. advise the investor on how much energy, he has to put into the press.

Item 5

Students in **Kalege High School** are on a trip in a mountainous area where they are allowed to climb only **500** meters per day. They moved along with a barometer. At a certain place **A**, the barometer read **69.5cmHg**, while it read **75.6cmHg** at another place **B**. the students reported that food cooked at point **B** took longer to get ready as compared to that cooked at **A**. This led to an argument between the learners since the food was prepared with the same amount of fuel. On their first night, learners were warned of the possibility of nose bleeding during their journey. They were however not sure of which of the points **A** and **B** they were most likely to nose bleed.

Task;

Use your knowledge of physics to help the students;

- (a) Determine if they had covered the required altitude for the day.
- (b) Identify when they were more likely to nosebleed.
- (c) To understand why the food prepared at **B** took longer to get ready as compared to that at **A**.

END-SUCCESS

“Physics is the language that governs the universe, therefore speak it well”