535/1

PHYSICS

Paper 1

(Theory)

April, 2026

2 hours

MATIGO EXAMINATIONS BOARD

SENIOR TWO

END OF TERM ONE

PHYSICS

Paper 1

(Theory)

2hours

INSTRUCTIONS TO STUDENTS

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

Section **A** *has* two *compulsory items.*

Section **B** *has* **two** *items, Answer* one *item from this section.*

Answer **three** *items in all.*

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

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

SECTION A

Respond to only **ALL** *items*

Item 1

At a rural school, a science teacher prepares learners to observe a rare daytime sky event in which the brightness of the Sun gradually reduces and its circular shape appears partly covered.

To ensure safe observation, the teacher constructs a simple viewing device using a sealed box with a very small hole on one side and a white screen on the opposite side. When the device is pointed toward the Sun, a small circular image appears on the screen.

During testing, the distance between the hole and the screen is adjusted to **0.4 m**, and the diameter of the image formed on the screen is measured as **0.02 m**.

Two primary pupils, Amina and Kato, begin to argue about how far the Sun is from the Earth:

- **Amina** says, "The Sun must be at a distance of **3.0×10^{13}m** from the earth"
- **Kato** disagrees and says, "The Sun is actually at **2.8×10^{13}** from the earth"

The teacher, who is unsure how to settle the argument, asks you for help.

On the day of the event, learners observe that the circular image of the Sun slowly changes shape as part of it disappears.

Hint: The actual diameter of the Sun is approximately **1.4×10^{12} m**

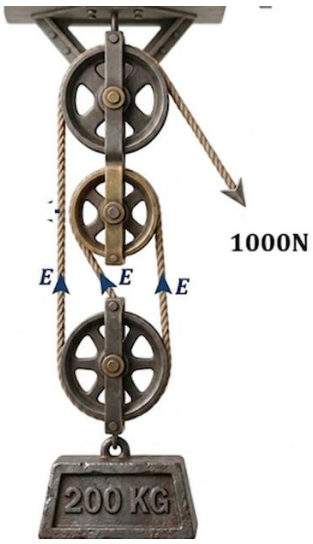
Task

As a physics student help him to

(a) Settle the argument
(b) Elaborate to the leaners how the circular image of the sun behaves that way

Item 2

At a community construction site in a rural area, workers are using a system (as shown in the diagram) to lift materials to the top of a building.



During operation, one worker, **Okello**, claims,
"This system is **100% efficient** because all the effort we apply is used to lift the load."
However, another worker, **Namara**, disagrees.

Nearby, a group of farmers have constructed a **transparent structure** for growing flowers. They observe that the inside of the structure becomes much warmer than the surrounding air, especially during sunny days. This has helped improve flower production, but some farmers are concerned about the increasing warmth in their area.

The site engineer asks you to help explain both the **performance of the lifting system** and the **temperature changes observed in the farming structure**

Task

As a physics student

(a) State, with reason, which worker (**Okello or Namara**) is correct and provide a necessary recommendation.
(b) Explain why the transparent structure is used for growing flowers.
(c) Briefly describe one other application of such a system in daily life.

SECTION B

Respond to only **one** *item*

Item 3

During a science trip, a group of secondary school students visits a lakeside research and recreation center. The center conducts experiments and demonstrations to show how physics concepts are applied in real life.

When the students arrive, they are first taken to a laboratory to observe microscopic life in the lake water. Using microscopes, they observe tiny pollen grains and dust particles and shifting positions in the water

After the lab session, the students move to the recreation area where they are shown how to make ice cream using ice and salt. They also prepare cold drinks with ice cubes and notice how the ice melts over time, cooling the drinks.

Later, the students go to the lakefront and watch a large steel ferry move slowly across the lake. Some of them are surprised that a ship made of steel, can float without sinking.

As a physics student

(a) Explain the behaviour of the pollen grains
(b) Describe another application of the changes in the recreation centre in everyday life
(c) Elaborate why the steel ship behaves that way.

Item 4

Five students are helping at a community water project. Their task is to carry water to a storage tank located at the top of a building. Each student carries a different amount of water vertically up a **flight of 10 stairs**, with each stair **30 cm high**. The employer has promised to pay **500 UGX for every joule**, but the employer has a **maximum budget of 1 million UGX** and is unsure whether it will be enough to pay all the students.

The table below shows the names of the students and the amount of water each carries:

Student Name	**Litres of Water Carried**
Amina	10
Brian	12
Chika	8
Daniel	15
Esther	9

At the same time, the students are conducting an experiment to see how **different liquids respond to heat**. They notice that the instruments used to measure the liquid's heat might **not give accurate readings**. To ensure reliable results, the students first **check the instruments using ice and boiling water** and make necessary adjustments so that the readings reflect the correct heat levels. After this, they measure a container of water exposed to sunlight and record their readings using the adjusted instruments.

Task

(a) Determine whether the employer's **budget** is enough to pay all five students.
(b) Describe the steps the students can take to **ensure their instruments give correct readings** before measuring the liquids.

END