LEARNER'S NAME: …… STREAM: ……...

SCHOOL NAME:
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LEARNER IDENTIFICATION NO.		

(MEPSA) END OF YEAR ASSESSMENT 2023

Uganda Certificate of Lower Secondary Education

S.3 PHYSICS

Paper 1

2 HOURS

INSTRUCTIONS TO LEARNERS;

This paper consists of Two Sections, ***A****, (40 marks) and* ***B,*** *(40 marks). Answer* **ALL** *items in Section* ***A*** *and Any* **TWO** *items in* ***B****.*

Write in dark blue or black pen.

Write your answers in the spaces provided on the Question Paper for Section A and in answer booklet for Section B item.

Assume where necessary;

- *Acceleration due to gravity* $g = 10ms^{-2}$
- *Density of water* $\rho_w = 1000kgm^{-3}$

FOR OFFICIAL USE ONLY			
	QTN NO.	**SCORES**	**EXAMINER'S INITIAL**
SECTION A	1 - 8		
SECTION B			
TOTAL SCORES			

TURN OVER

SECTION A
(Short response question)

1. Phionah poured 100cm^3 of water in a beaker. **"The density of water is 1 gcm^{-3}"** said Sarah.

   (a). As a physics student, discuss what Sarah meant. (1)

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   (b). Phionah later mixed 400cm^3 of salt solution of density 1.6gcm^{-3} in the water above. Determine the density of the mixture. (3)

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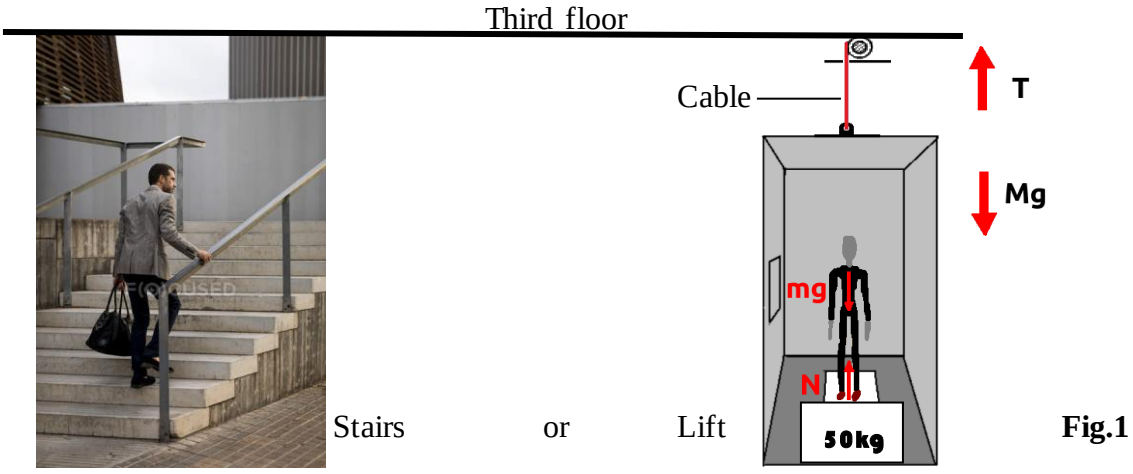
2. At Acushier moll is a lift (elevator) of 100kg mass heavy, operated by a motor of power 6000watts connected by a cable of a certain tension.



Stairs or Lift **Fig.1**

On a given day, Mike who is 50kg heavy was urgently needed at the third flow of the building which is 40m above the ground. Mike would take half a minute to reach the third floor when he uses stairs.

(i) Advise Mike on the best means to use in order to reach earlier to the third floor. (3)

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(ii) If Mike uses a Lift, what tension is in the cable. (2)

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3. (a) Samuel wishes to make two magnets. One should be permanent, and other temporary magnet. As a physics student advise Samual on the best method and materials he need to make the above magnets. (2)

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(b) the compass need is a small magnet free to rotate. The head of the arrow on the compass needle is an N – pole. Abar magnet is placed between two compasses as shown in fig.2 below.

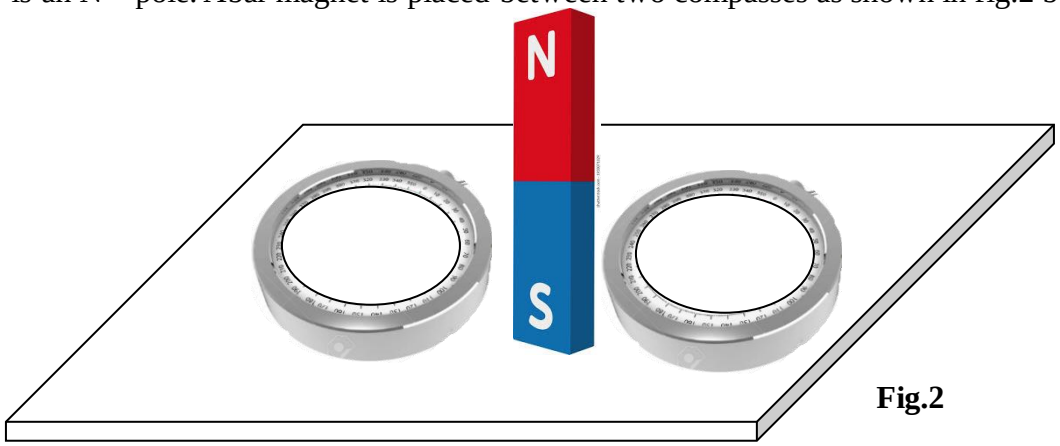

Fig.2

(i) On the figure.2 above, draw the needles onside the two compasses and mark the N – pole of both compass needle (1)

(ii) Explain why repulsion is the only sure way of testing polarity. (2)

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4. (a) Kicoco bought a Vacuum flask and she realized that could not keep water hot for 24 hours. She loves her flask and not ready to take it back to the shop.

(i) Suggest and define the physics term that could have caused heat loss in the vacuum flask. (1)

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(ii) Explain how can this be reduced. (2)

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(b) During cold day, Kicoco touched the metallic part of a knife and felt it was colder than when She touched the wooden handle. Explain Kicoco's Observation. (3)

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5. During the night, a child hide himself at the corner from his mother who wanted to bit him. The mother came with a torch calling him, but the child could only hear the mothers voice and no light from the torch was seen and all of a sudden, he realized when the mother had reached him already. Use physics knowledge to explain the incidence. (3)

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6. Makasa an electrician stretches an electric wire which sags to avoid circuit.

Fig.3

(a) Identify and describe the potential energy acting on the electrician and the wires. (2)

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(b) (i) After use the electrician throw the Plier Png to the ground as shown. Suggest the energy changes on it as it strike the ground. (1)

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(ii) At speed is the plier before it hits the ground. (2)

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7. Cars a long Kampala – Masaka road travel at very high speed and hence causing accidents. One day a cinol truck (big in size) and a saloon car (small car) were accelerating at the same speed knocked a building.

(a) Which of the two cars caused more damage and explain why. (3)

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(b) Tinah ties a stone on a string and swung in a circle at a constant speed. Give the reason why the stone is said to be accelerating. (1)

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8. A student during the car drive training was going to crush with a tree 44.09m ahead. A driving instructor gives a sudden order to stop the car in the shortest possible time to avoid the crush. the speed-time graph of the motion of the car from the moment the order is given is shown.

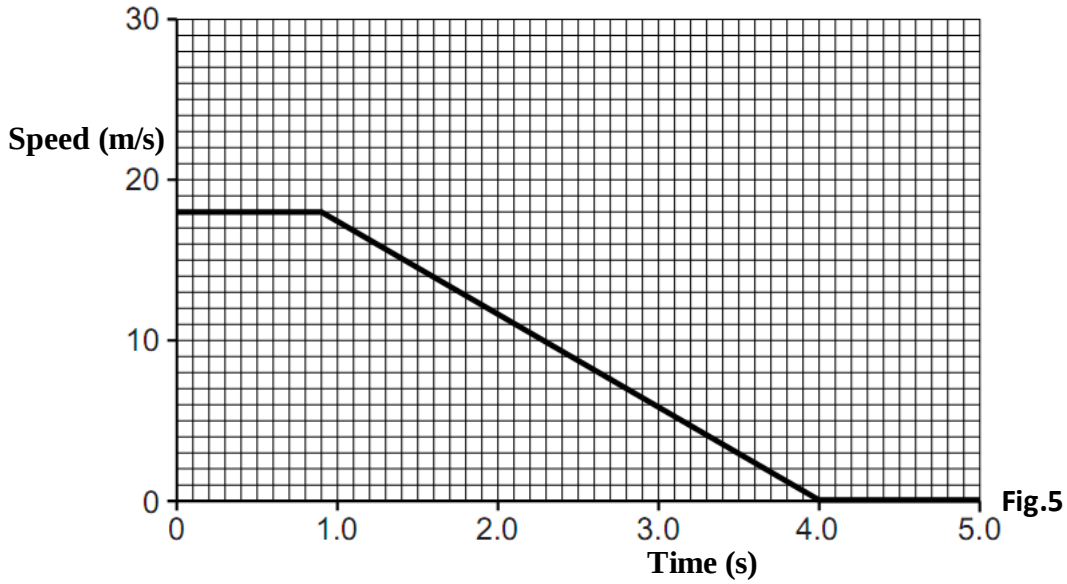

Fig.5

(a) The order to stop is given at time t = 0 s.

(i) identify the speed of the car at which an order was given. (1)

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(ii) Suggest why the car continues to travel at this speed for 0.9 s. (1)

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(b) (i) At what deceleration was the car between t = 0.9 s and t = 4.0 s. (2)

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(ii) Discus whether the car crushed the tree. (3)

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(c) Imagine the driver and the instructor did not wear a safety belt, describe and explain a danger to a driver of not wearing a safety belt during a sudden stop. (2)

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SECTION B

(Extended response items) Attempt only TWO questions

9. (a) In several cases, whenever Rinah went swimming, she could leave the water pool after swimming wet and feeling much coldness. She then dries her body with a towel and it gets wet that cannot be used the second time.

Drying using a towel **Feeling Cold and wet** **In the pool swimming**

A **B** **C** **fig.6**

(i) As a physics learner, identify and explain the forces acting on Rinah in each case.

(ii) Advise Rinah on how to reduce this challenge.

(iii) Mention some other practical applications of the above forces. (10)

(b) During the transportation of window glasses to the construction site it rained so heavily and the glasses became wet. During offloading, it became difficult to separate them by pulling one glass from the other and some ended up breaking.

Explain why this happened and guide them on the best way to do it. (5)

(c) Below a top view of a tourist vehicle in a game park and two elephants pushing against the vehicle. The two forces indicated are at right angles to each other.

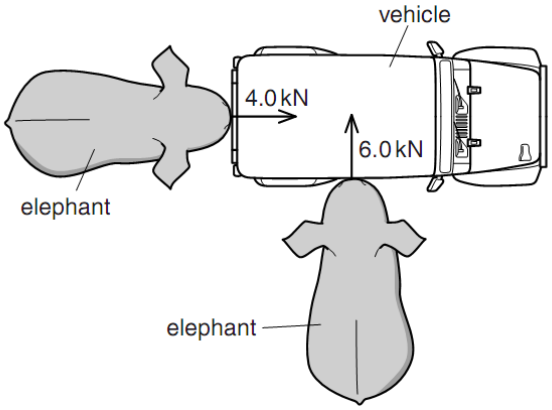

fig.7

Using a graph, draw a scale vector diagram to determine the magnitude and direction of the resultant force. Label the two forces applied and the resultant, and clearly state the scale you use. (5)

10. In your local community people always use a plane mirror as a shaving mirror but they realize it become difficult to make a smooth shave since Plane mirrors show us in the **same size** as we are hence smaller than the image. The Hygiene and sanitary committee are looking for a potential advisory team to educate the community on the best shaving mirror.

fig.8

(a) You have been chosen among the advisory team, make a write up that would convince the community members. (Nature, position and ray diagrams may be of great advantage). (10)

(b) Imagine the committee gave you sample recommended mirrors to use in the field for demonstration, one of the community members place a cup of height 5cm, 10cm Infront of the mirror of focal length 15cm. By drawing an accurate ray diagram on a graph paper, describe the; Position, magnification and nature of the image of the cup. (10)

11. Fig. 5.1 shows the structure of a liquid-in-glass thermometer.

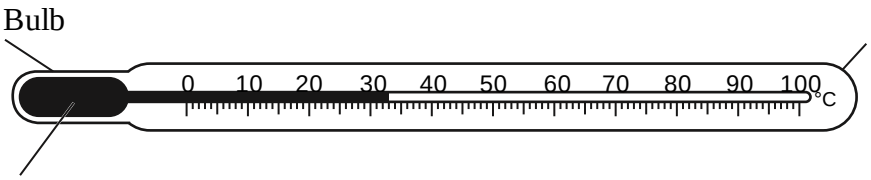

fig.10

The bulb of the thermometer is placed into a beaker of warm water. As the liquid expands, it moves along the tube.

liquid

(a) Explain, in terms of molecules, why a liquid expands when heated. (2)

(b) Explain, in terms of molecules, why a liquid expands more than a solid when heated. (2)

(c) A second thermometer has a larger bulb that contains more of the same liquid than the thermometer shown in Fig. 10. It has a different scale. In every other way, it is identical.

(i) Explain how the sensitivity of the second thermometer compares with the sensitivity of the thermometer in Fig. 10. (2)

(ii) Explain how the range of the second thermometer compares with the range of the thermometer in Fig. 10. (1)

(d) (i) State **one** everyday problem that is a result of thermal expansion. (1)

(ii) Suggest and explain **one** way of solving this problem. (2)

(e) Having taken your sister to a nearby clinic suspecting that she has Malaria, you see the nurse touching her cheek to tell her temperature. You realize the readings on their clinical thermometer are faded due to overuse.

(i) What **two** common liquids are used in the thermometer they have? (2)

(ii) Identify **any two** reasons for the choice of each liquid stated in b(i) above (4)

(iii) What steps would you advise the makers of the thermometer to follow to put the readings back on the thermometer (4)

12. (a) A musician of mass 60kg putting on high heels is found to make contact area with the ground of $0.002m^2$ per heel. Determine the total pressure she would exert when;

(i) Standing on both feet (3)

(ii) Walking (2)

(b) What one danger can you identify concerning the choice of shoes by the musician in (a) above towards;

(i) Herself (2)

(ii) The walking surface (floor) (2)

(c) You are provided with a 1.5L mineral water bottle, cello tape, water, sharp pin and basin. How can you demonstrate and conclude the effect of depth on pressure in liquids (5)

(d) A plank balances horizontally on a log of wood, which acts as a pivot.

(i) A girl sits on one end of the plank, and her brother pushes down on the other end to make the plank balance horizontally. Fig. 11 shows the arrangement.

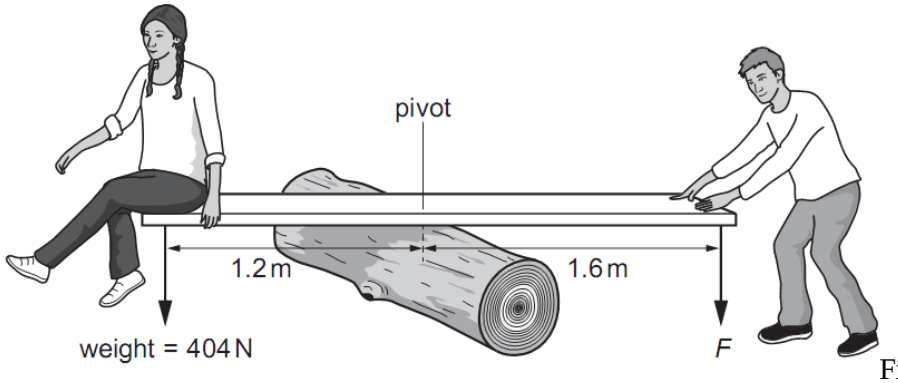

Fig.11

Calculate the moment of the girl's weight about the pivot and show that it is close to 480 N m. (3)

(ii) The plank balances horizontally when the boy pushes down with a force F at a distance of 1.6 m from the pivot. Calculate the size of force F. (3)

END