NAME…….. INDEX NO…….....

232/1
PHYSICS
PAPER 1
(THEORY)
TIME: 2 HOURS

CANDIDATE'S SIGN……..……..

DATE……..……

Kenya Certificate of Secondary Education
PHYSICS
PAPER 1
(THEORY)
TIME: 2 HOURS

INSTRUCTIONS TO THE CANDIDATE:

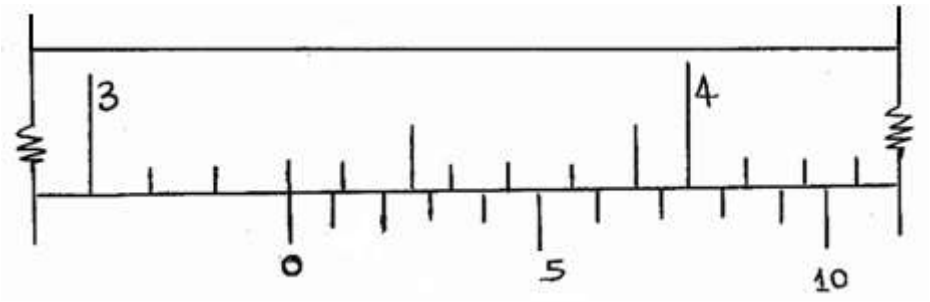
(a) Write your **name** and **index number** in the spaces provided above.
(b) **Sign** and write the **date** of examination in the spaces provided above.
(c) This paper consists of **two** Sections **A** and **B**.
(d) Answer **all** the questions in sections **A** and **B** in the spaces provided.
(e) All working **must** be clearly shown in the spaces provided.
(f) Mathematical tables and electronic calculators **may be** used.

FOR EXAMINER'S USE ONLY:

Section	Question	Maximum Score	Candidate's Score
A	1 – 14	25	
B	15	12	
	16	13	
	17	11	
	18	11	
	19	8	
Total Score		80	

SECTION A: (25 MARKS)

1. What is the vernier reading shown in the figure below? (1mk)

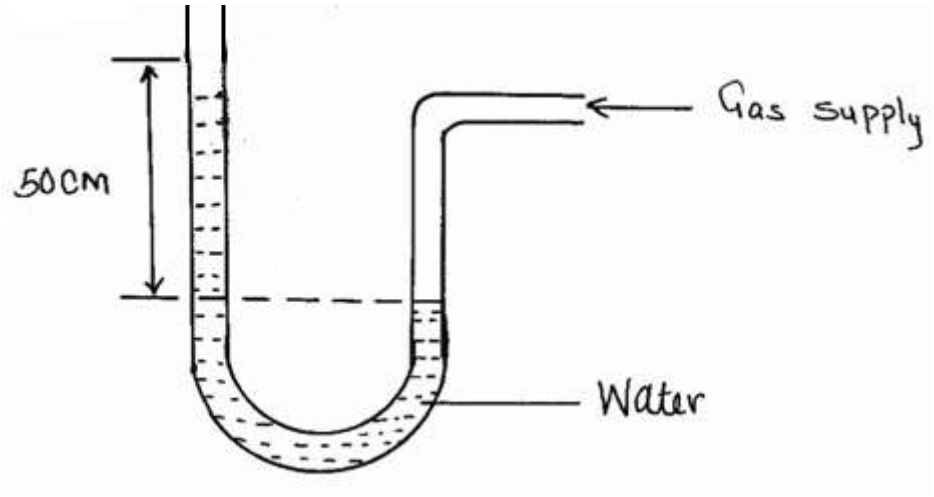


2. Explain why oil trailers prefer to travel early in the morning and night and not when the sun is hot. (1mk)

3. State **two** advantages of mercury in glass thermometer over an alcohol in glass thermometer. (2mks)

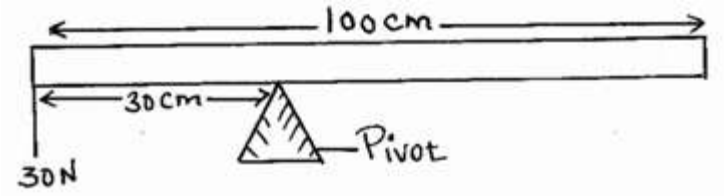
4. A body of mass 5.0kg resting on a horizontal surface is given an initial velocity of $10ms^{-1}$. If the force of friction on the body is 2.5N, how far does the body slide on the surface? (3mks)

5. The figure below shows a U-tube manometer attached to a gas supply. If the atmospheric pressure is 100,000pa, determine the pressure of the gas supply. [Density of water = 1000kg/m³]. (2mks)



6. Ventilations in a house are normally placed high on a wall near the ceiling. Explain. (1mk)

7. The figure below shows a uniform beam held at equilibrium as shown. Calculate the weight of the beam. (2mks)

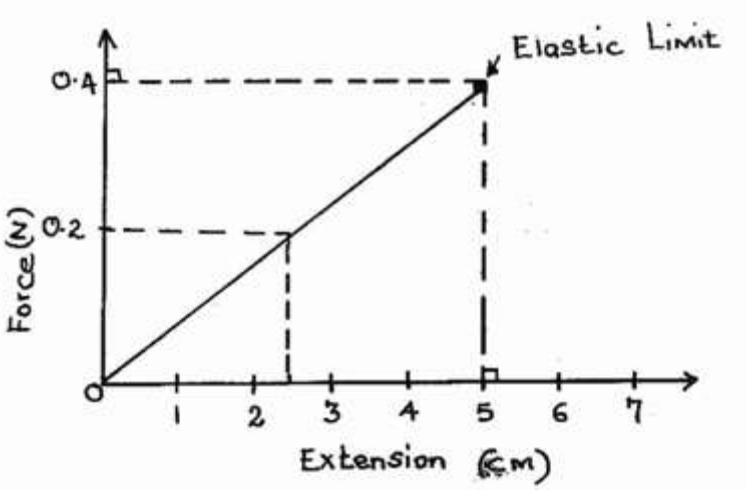


8. State **two** assumptions made when determining the size of an oil molecule in the oil drop experiment. (2mks)

9. A mass of 8kg is whirled in a vertical circle using a rope of length 80cm. If it makes 2.5 revolutions per second, calculate the maximum tension the rope experiences. (2mks)

10. Give a reason why traffic police officers insist that all passengers in a moving bus should put on safety belts. (1mk)

11. The graph below shows the relationship between force and extension for a spring. Use the graph to calculate the energy stored in the spring at the elastic limit. (3mks)



12. A stone is projected vertically upwards and returns to the thrower. Sketch a velocity-time graph to describe the motion of the stone. (2mks)

13. A piece of wax of mass 380g and volume 400cm³ is kept under water by tying it with a thin thread to a piece of metal. Determine the tension in the thread. [Density of water = 1gcm⁻³]. (2mks)

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14. An air bubble in water bursts as soon as it emerges from the surface of water. State a reason for this. (1mk)

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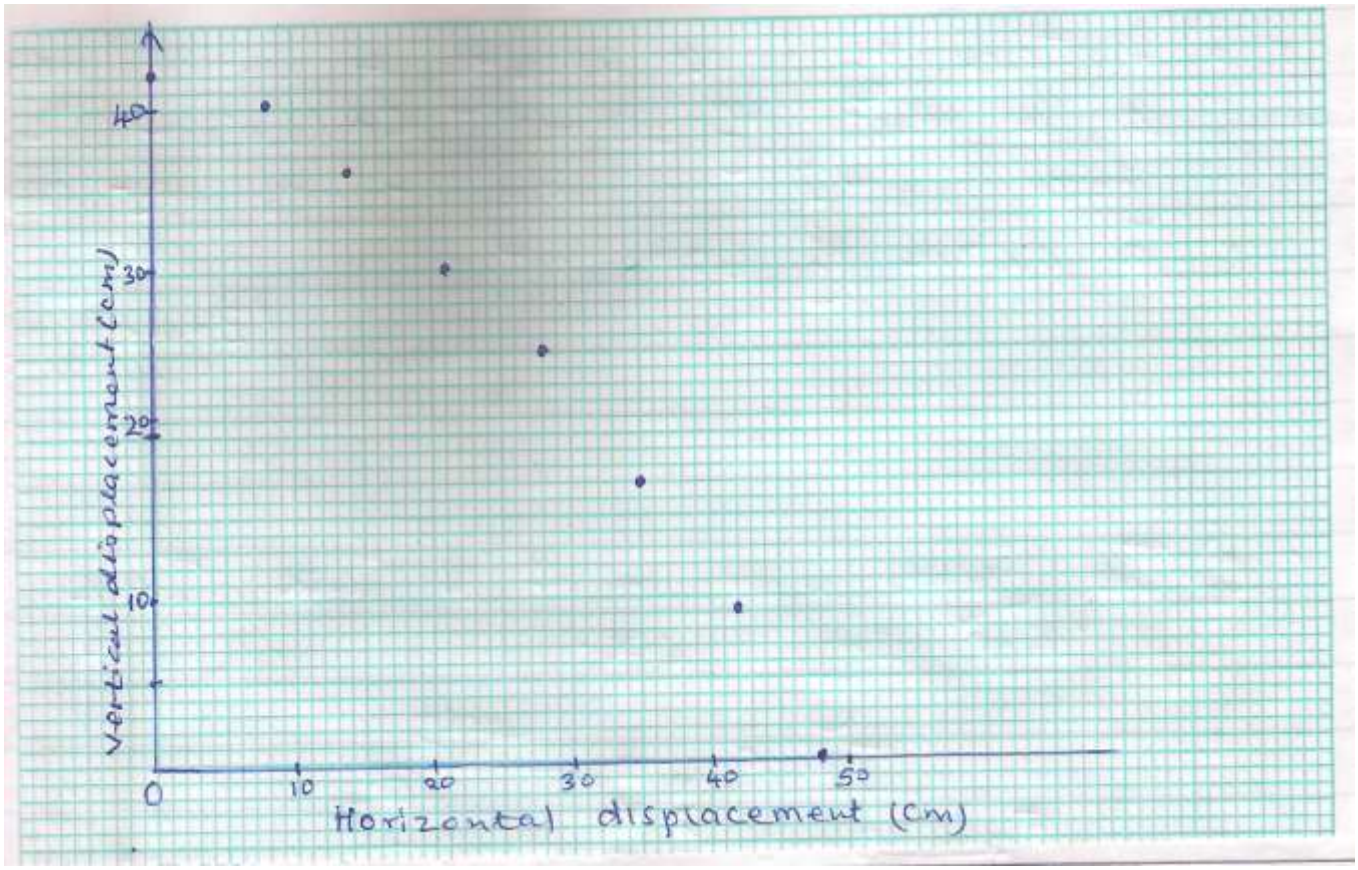
15. (a) The figure **below** shows positions of an object projected horizontally from a raised platform. The positions were marked after every 0.04 seconds starting at t = OS.



From the figure determine the;

(i) horizontal velocity of the object. (3mks)

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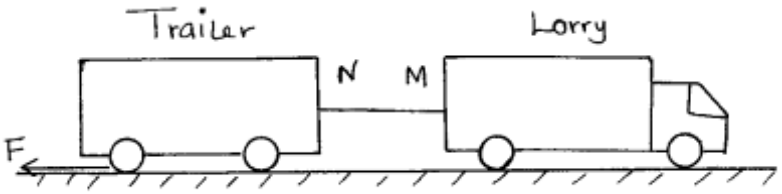
(ii) vertical acceleration of the object. (3mks)

(b) (i) A body is initially in motion. If no external force acts on the body, describe the subsequent motion. (1mk)

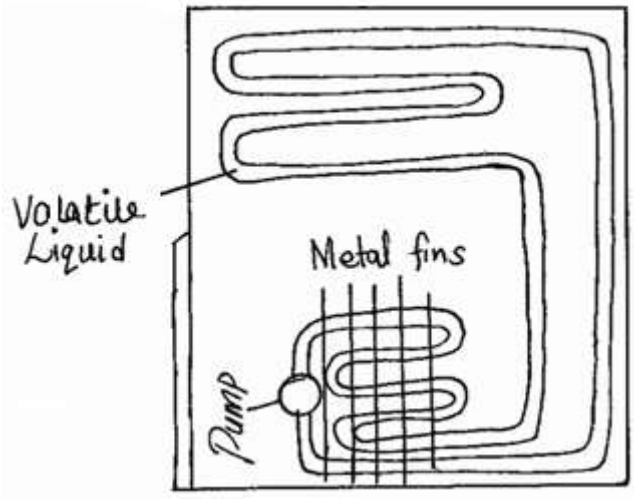
(ii) A truck of mass 2400kg is initially moving at a velocity of $50ms^{-1}$. Calculate the force needed to bring it to rest over a distance of 60m. (3mks)

(c) The figure below shows a truck towing a trailer using a rope.



The lorry exerts a force **N** on the trailer and the trailer exerts an equal but opposite force M on the lorry. The frictional force between the trailer and the road is **F**. Explain how the forces **N**, **M** and **F** enable the trailer to move. (2mks)

16. The figure shows a diagram of a refrigerator.



(a) State the role of

(i) the compressor pump. (1mk)

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(ii) the metal fins. (1mk)

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(iii) the volatile liquid. (1mk)

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(b) Describe **one** special feature that enables a refrigerator to operate at maximum efficiency. (1mk)

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(c) An electric heat rated 6000W is used to heat 2kg of ice initially at -5°C until all the mass turns to steam. Given that, the specific

Latent heat of fusion of ice = $334000JKg^{-1}$
Specific heat capacity of ice = $2100JKg^{-1}K^{-1}$
Specific heat capacity of water = $4200JKgK^{-1}$
Specific latent heat of vapourization of steam = $226000JKg^{-1}$

Calculate:

(i) the amount of heat required to convert ice into water at O°C. (3mks)

(ii) the amount of heat required to convert water to steam at 100°C. (3mks)

(iii) the minimum time required for activity in (i) and (ii) to take place. (2mks)

(iv) Explain why the time calculated in (iii) above is minimum. (1mk)

17. (a) (i) State the law of flotation. (1mk)

(ii) A block of steel sinks in water while a ship which is mainly made of steel floats. Explain. (2mks)

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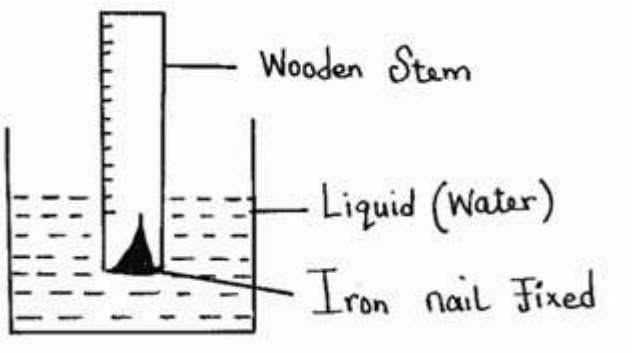
(b) The figure **below** a simple hydrometer made of wood.



(i) State the purpose of the nail fixed at the bottom. (1mk)

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(ii) How would the hydrometer be made more sensitive? (1mk)

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(iii) Describe how the hydrometer is calibrated to measure relative density. (2mks)

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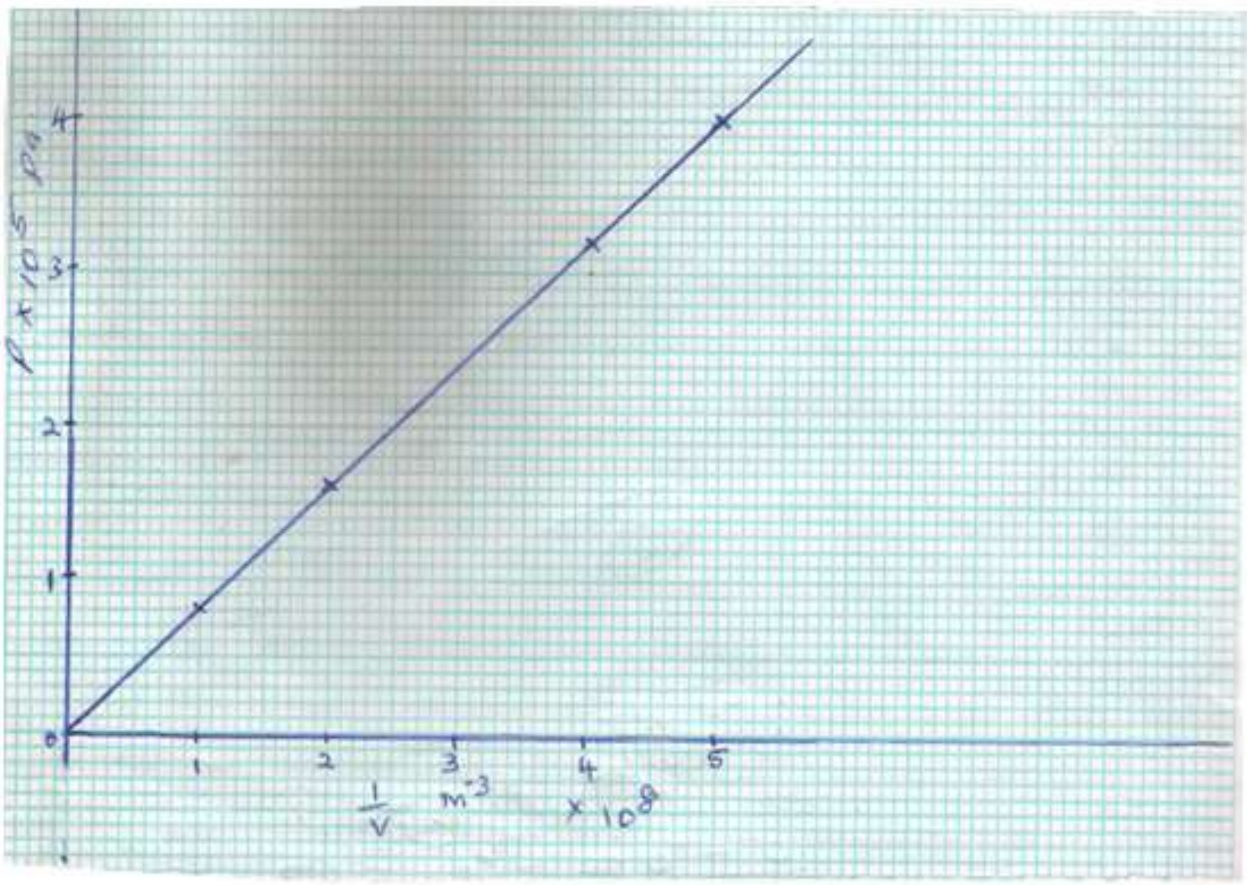
(c) The graph below shows the variation of pressure P of fixed mass of a gas with reciprocal of the volume.



Give that $\frac{PV}{2R} = T$ where R is a constant and T = 200K.

(i) From the graph determine the value of R. (3mks)

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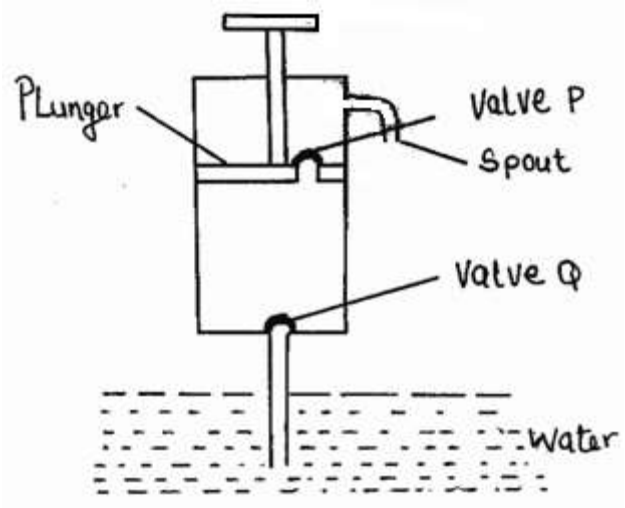
(ii) If value of T was increased beyond 200K sketch, on the same axis, the expected graph. (1mk)

18. (a) The figure **below** shows a lift pump.



Explain why, when the piston is

(i) pulled upwards, valve **Q** opens while valve **P** closes. (2mks)

(ii) pushed downwards, value **Q** closes while valve **P** opens. (2mks)

(iii) state two advantages of a force pump over the lift pump. (2mks)

(b) A boy lifts a load of weight 108N through a vertical distance of 3.2N using a pulley system of velocity ratio 2. He applies an effort of 60N. Calculate the;

(i) work done on the load. (2mks)

(ii) mechanical advantage of the machine. (2mks)

(c) Give a reason why the efficiency of machine is less than 100%. (1mk)

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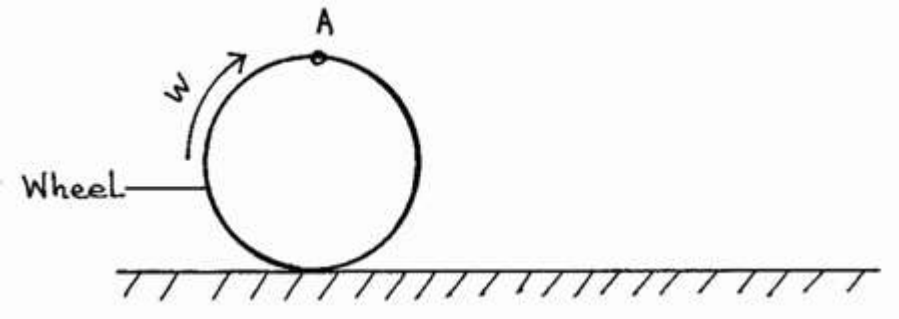
19. (a) A wheel of a car of diameter 40cm is rotating at a rate of 7 revolutions per second. A small stone embedded in the tyre tread flies off the wheel at point A shown in the figure below.



(i) Sketch on the same figure, the path followed by the stone until it touches the ground. (1mk)

(ii) Indicate on the figure with an arrow, the direction of the stone just before it flies off. (1mk)

(iii) Determine the horizontal velocity of the stone just before it flies off. (3mks)

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(b) Explain why a bucket of water can be rotated in a vertical circle without the water falling out of the bucket. (3mks)

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