

Name: Adm No:.....

Index No. Class:

232/1
PHYSICS THEORY
PAPER 1
AUGUST 2022
TIME: 2 HOURS



ALLIANCE HIGH SCHOOL
Kenya Certificate of Secondary Education (K.C.S.E.)
TRIAL EXAMINATION
232/1
Physics
Paper 1

INSTRUCTIONS TO THE CANDIDATES:

- Write your Name, Index No, Adm No and Class in the spaces provided above.
- Answer *all* the questions both in section A and B in the spaces provided below each question
- All workings *must* be clearly shown; marks may be awarded for correct steps even if the answers are wrong.
- Mathematical tables and silent electronic calculators may be used.

FOR EXAMINERS' USE ONLY

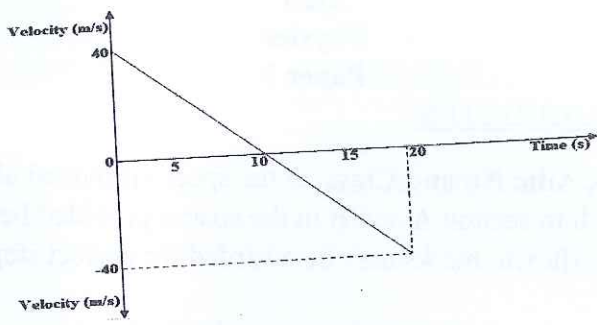
SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
Section A	1-14	25	
Section B	15	13	
	16	12	
	17	15	
	18	09	
	19	06	
	TOTAL		80

This paper consists of 15 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions is missing

SECTION A (25 MARKS)
ANSWER ALL QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED

1. A micrometer screw gauge which had an error of $+0.02\text{mm}$ was used to measure the diameter of a spherical marble whose diameter was 3.67mm . Determine the actual reading of the gauge (2 marks)
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2. The figure shows graph of velocity against time for a body in motion for 20 seconds. Study the graph and answer the questions that follow



Describe the motion of the object in the 20 seconds (2 marks)

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3. When a steel ball is allowed to fall freely in a viscous fluid, it is observed to attain terminal velocity after some time. State the reason why the ball attains terminal velocity (1 mark)

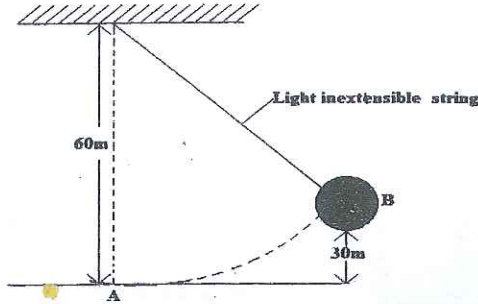
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4. A weightless non-uniform rod balanced by two forces of 5N and 4N . The position of the pivot is at 1.2cm mark. Given that the 5N force is acting at the 0 cm mark while the 4N force is at extreme end. Determine the length of the rod (2 marks)

The figure shows a bob of mass 100g is suspended using a string of 50cm from a support and swings through a vertical height of 30 cm as shown below:



Give the reason why the amplitude of the pendulum reduces as it continues to oscillate between points A and B (1 mark)

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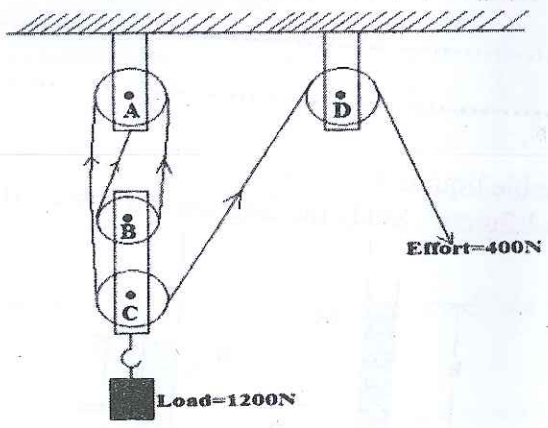
A highly inflated balloon bursts when transferred to a hotter environment. Explain this observation using kinetic theory of gases (2 marks)

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The figure shows a pulley system that has two pulleys on the lower block and one pulley on the upper block. The system is used to lift a load of 1200N using an effort of 400N. Study the diagram and answer the questions that follow



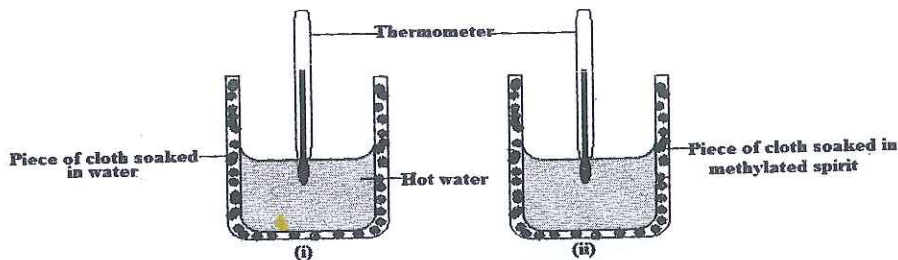
State the purpose of pulley D (1 mark)

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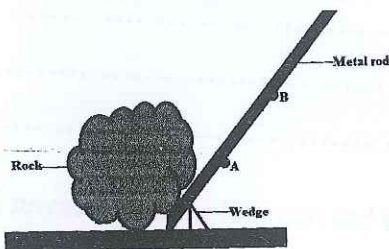
8. The figure shows hot water at same temperature placed in two identical beakers. One beaker is covered using a piece of cloth soaked in methylated spirit while the other is soaked in water. Study the diagram and answer the questions that follow



1. A
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2. After some time, the thermometer in (ii) recorded a lower temperature. Explain this observation (2 marks)
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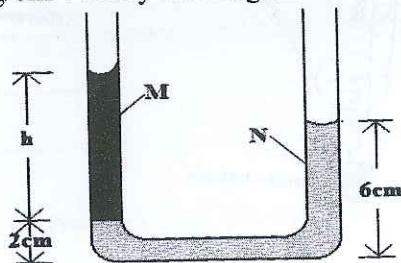
9. The figure shows a metal rod used to roll a rock. Study the diagram and answer the questions that follow



D

State with a reason at which point A or B on the metal rod where it is easier to roll the rock (2 marks)
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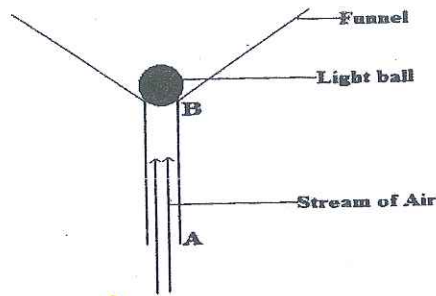
10. The figure shows two immiscible liquids M and N placed in a u-tube manometer. Liquid M has a density of 0.8g/cm^3 while that of N is 1.2g/cm^3 . Study the diagram and answer the questions that follow



Determine the height h

(2 marks)

11. The figure shows a light ball placed on a funnel at point marked B



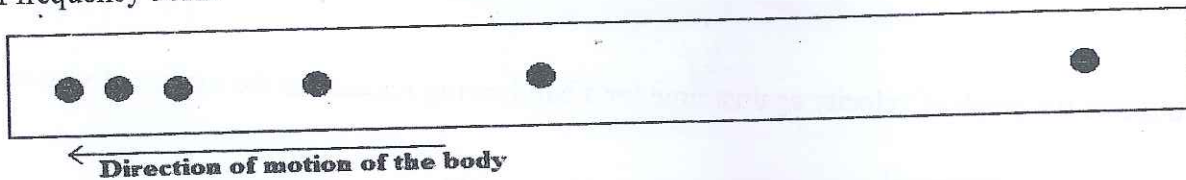
When air is blown from A through to side B it is observed that the ball remains at point B. Explain this observation (3 marks)

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12. The figure shows an extract from a ticker timer (not to scale) obtained from an experiment using a timer of frequency 50Hz

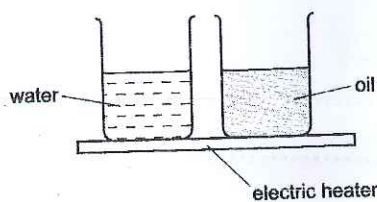


State whether the body is decelerating or not the acceleration of the body whose motion is represented in the tape. (1mark)

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13. The diagram shows an electric heater being used to heat a beaker of water and an identical beaker containing oil. Both are heated for one minute.



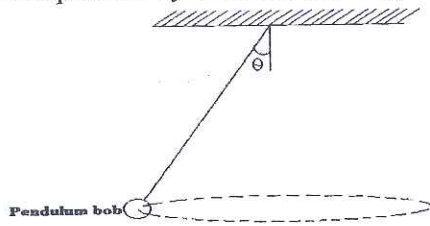
The specific heat capacity of water is higher than that of oil. State with a reason the liquid that will have a higher temperature after one minute (2 marks)

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14. The figure shows a pendulum bob suspended by a thread moving in a horizontal circle



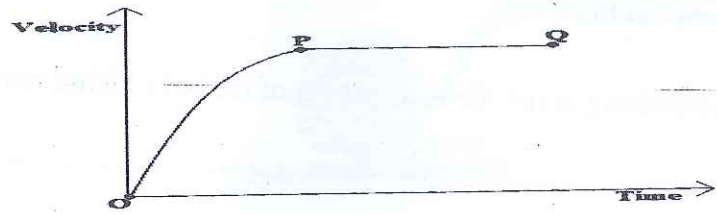
Name the forces acting on the pendulum as it moves (2 marks)

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SECTION B (55 MARKS)
ANSWER ALL QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED

15. a) The figure shows the graph of velocity against time for a ball bearing released at the surface of viscous liquid



Explain the motion of the ball bearing for parts (2 marks)

i. OP (2 marks)

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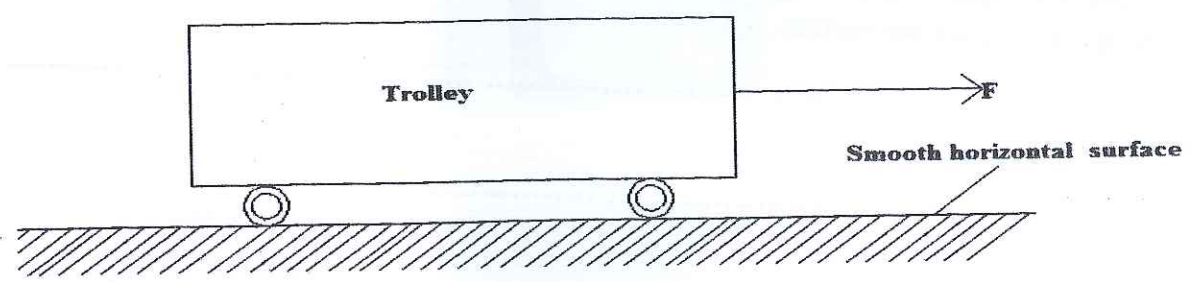
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ii. PQ (2 marks)

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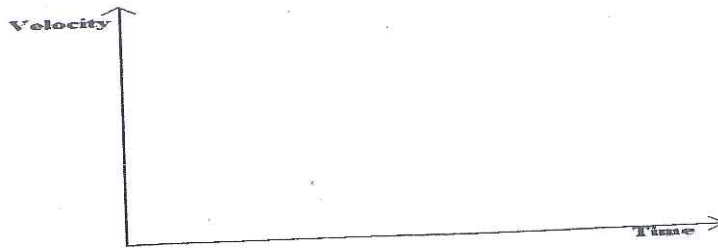
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iii. The figure shows a trolley on a smooth surface being pulled by a constant force F

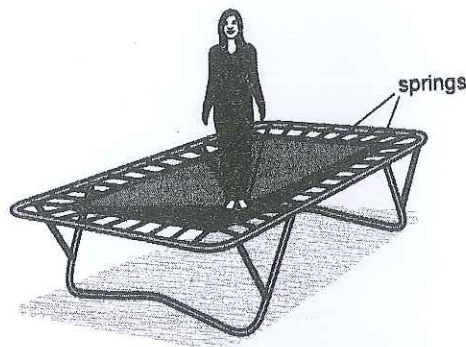


On the axis provided, sketch the velocity-time graph for the motion of the trolley

(2 marks)



b) An athlete of mass 64 kg is bouncing up and down on a trampoline. At one moment, the athlete is stationary on the stretched surface of the trampoline as shown in the figure below.



State the form of energy stored due to the stretching of the surface of the trampoline.

(1 mark)

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c) The stretched surface of the trampoline begins to contract. The athlete is pushed vertically upwards and she accelerates. At time t , when her upwards velocity is 6.0 m/s , she loses contact with the surface. Determine

i. Her kinetic energy at time t .

(2 marks)

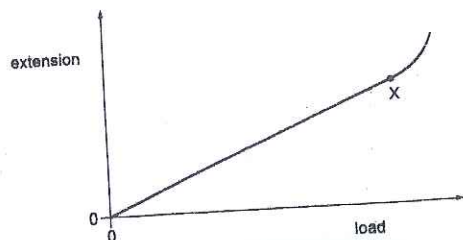
ii. The height at which the kinetic energy will be zero

(2 marks)

iii. In practice, she travels upwards through a slightly smaller distance than the distance calculated in (ii). Suggest why this is so.

(1 mark)

- d) The trampoline springs are tested. An extension-load graph is plotted for one spring as shown in the is the graph.



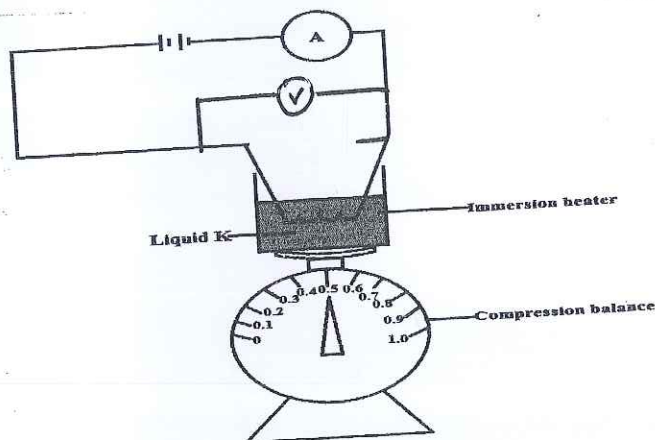
On the same axes sketch a graph of another spring whose spring constant is higher than the trampoline springs (1 mark)

16. a) State the meaning of the term specific heat capacity (1 mark)

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- b) The figure shows a set-up that was used to determine the specific latent heat of vaporization of water. Study it and answer the questions that follow



- i. State and explain the effect on the reading of the compression balance when the liquid K was heated for some time (2 marks)

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- ii. Apart from the mass of liquid K state two measurements that need to be taken to determine the specific latent heat of vaporization of the liquid (2 marks)

(2 marks)

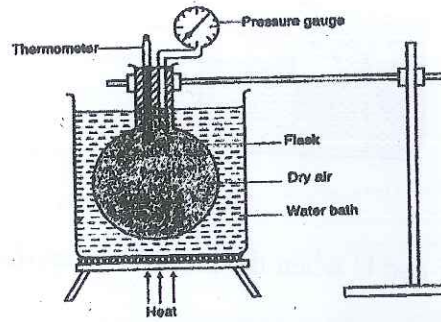
iii. State two sources of errors in the experiment

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c) The diagram below shows a set-up used to investigate a particular gas law. Study the diagram and answer the questions that follow



i. State with a reason which gas law is being experimented by the set-up (2 marks)

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ii. Name the two factors that are held constant in the experiment (2 marks)

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iii. Give the reason why heating is done through a water bath (1 mark)

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17. a) State the law of flotation. (1 mark)

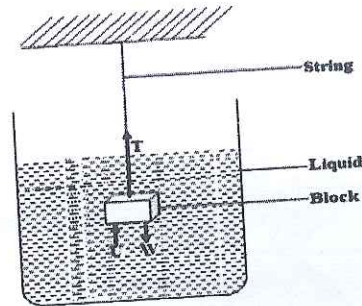
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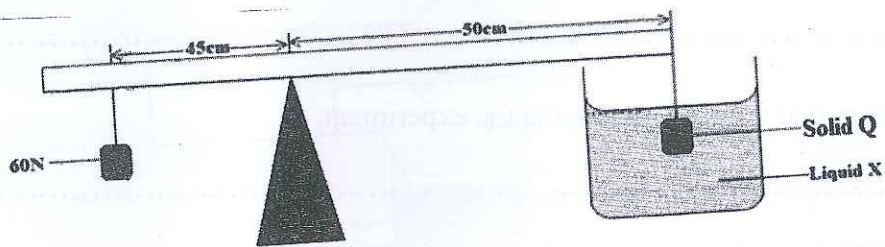
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- b) The figure shows a rectangular metal block of density 10800kgm^{-3} and dimensions $80\text{cm} \times 30\text{cm} \times 30\text{cm}$ suspended inside a liquid of density 800kgm^{-3} by a string attached to a point above the liquid. The three forces acting on the block are; the tension, T , on the string, the weight, W of the block and the up thrust, U , due to the liquid.



- i. Write the expression relating to T , W and U when the block is in equilibrium inside the liquid. (1 mark)
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- c) The figure shows a system at equilibrium. Study the diagram and answer the questions that follow:



Determine the

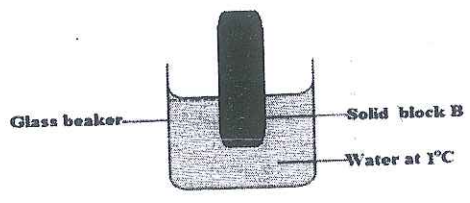
- i. The apparent weight of solid Q immersed in liquid X

(3 marks)

- ii. Volume of the solid given that the density of the liquid is 0.8g/cm^3 and the weight in air of solid Q is 60N
(Take $g=10\text{N/kg}$)

(2 marks)

iii. The figure shows a solid block B floating on water at 1°C.



When water is heated to 4°C, it is observed that the portion of the block that floats increases. Explain this observation (2 marks)

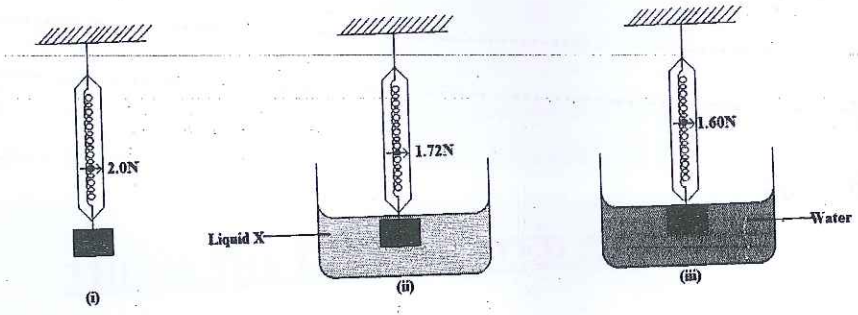
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d) The figure shows the same metal block weighed in air, liquid X and water. The reading of the level of water becomes 150cm³ when the metal is fully immersed. Study the diagram and answer the questions that follow. *Density of water = 1000 kg/m³*



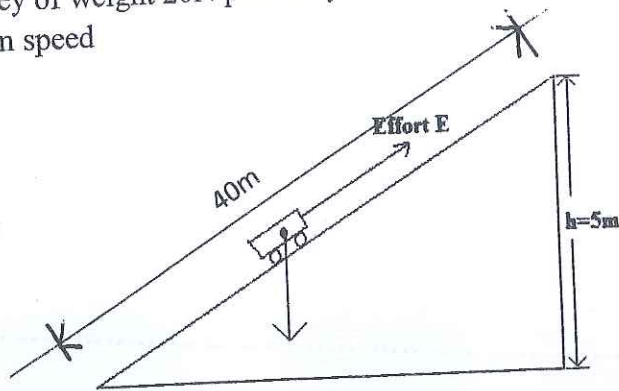
Determine

i. The volume of the metal block (3 marks)

ii. The density of the metal block (2 marks)

iii. The water level before the metal block was immersed in the water (1 mark)

18. The figure shows a trolley of weight 20N pulled by a force of 4N from the bottom to the top of an inclined plane at uniform speed



a) State the value of the force acting downwards along the inclined plane (1 mark)

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b) Explain how the value in the question above is obtained (2 marks)

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i. Mechanical advantage (2 marks)

ii. Velocity ratio (2 marks)

iii. Efficiency (2 marks)

19. a) When a bus goes round a bend on a flat road, it experiences a centripetal force. State what provides the centripetal force (1 mark)

b) A student whirls a stone of mass 0.2kg tied to a string of length of 0.4m in a vertical plane at constant speed of 2 revolutions per second (take acceleration due to gravity as 10ms^{-2})

i. Apart from tension name the other force acting on the stone when it is at the highest point (1 mark)

ii. Determine (2 marks)

I. Angular velocity of the stone

II. Tension in the string when the stone is at the highest point (2 marks)

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