GENIUS EXAM 2024

NAME……...…CLASS……...…ADMN NO……

DATE……SIGN…….

232/1
PHYSICS
FORM FOUR
TIME: 2HRS

KCSE PREDICTION 2024
Kenya Certificate of Secondary Education 2024

PHYSICS PAPER ONE

INSTRUCTIONS TO CANDIDATES

i) Write your name and admission number in the spaces provided above.
ii) Sign and write the date of examination in the spaces provided above
*iii) This paper consists of **TWO** sections **A** and **B.***
*iv) Answer **ALL** the questions in section **A** and **B** in the spaces provided.*
*v) All working **MUST** be clearly shown.*
vi) Non programmable silent calculators may be used.
*vii) This paper has **12 PAGES**. It is the responsibility of the candidate to ascertain that all the pages are printed as indicated and that no questions are missing.*
viii) Candidates should answer the questions in English.
Constant: g=10N/kg or 10m/s^2

For Examiners Use Only

Section	Question	Maximum Score	Candidate's Score
A	1 – 14	25	
B	15	10	
	16	12	
	17	10	
	18	13	

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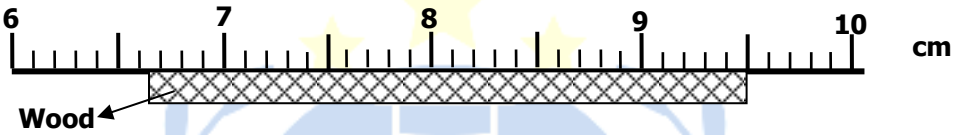
	19	**10**	
	TOTAL SCORE	**80**	

SECTION A: (25 MARKS)

1. The figure below shows a section of a meter rule used to measure length of a piece of wood.



Find the length of the wood (2marks)

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2. The diagram below shows a capillary tube immersed in water.



(a) Make a sketch on the figure alongside (b) to show the appearance of the capillary tube if it was inserted in mercury. (1 mark)

(b) Explain the difference if any between figure (a) and (b) above (2 marks)

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3. Explain why a partially inflated balloon released at sea level would become fully inflated at a higher altitude. (1mark)

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4. A catapult is used to project a stone of mass 40.0g vertically upwards to a height of 50.0m. Calculate the amount of elastic potential energy initially present in the catapult. (2marks)

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5. A turning effect of force depends on the magnitude of the force. State any other factor that determines the moment of a force (1mark)

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(i) Mercury is usually preferred over water for use as a barometric liquid. Give a reason for this. (1mark)

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(ii) .State the property of Freon that makes it suitable for use as refrigerant. (1mark)

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(iii) Other than the mass of ice, State another physical quantities that remain constant while pure ice is being converted to water. (1mark)

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6. Giving a reason, explain why it's advisable for luggage carrier compartment to be put under the seats than at the roof tops of the buses. (1 mark)

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7. Other than angle of banking, state any other factor that affects the critical velocity of a vehicle negotiating a bend. (1 mark)

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8. A balloon filled with argon gas of volume 200 cm^3 at the earth's surface where the temperature is 20^0C, and the pressure 760mm of mercury. If it is allowed to ascend to a height where the temperature is 0^0C and the pressure 100mm of mercury, calculate the volume of the balloon. (2marks)

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10.It is a common behavior for a high jumper to slightly flex their knees just before landing. Explain the importance of this behavior from your knowledge of physics. (1mark)

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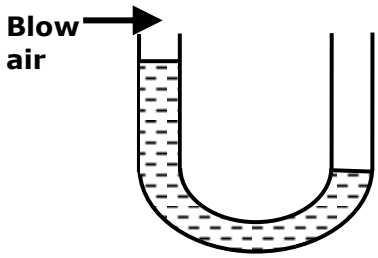
11. The figure below shows a manometer containing water. Air is blown across the mouth of one tube and the levels of the water changes as shown.



Explain why the level of water in the left limb of manometer is higher. (2 marks)

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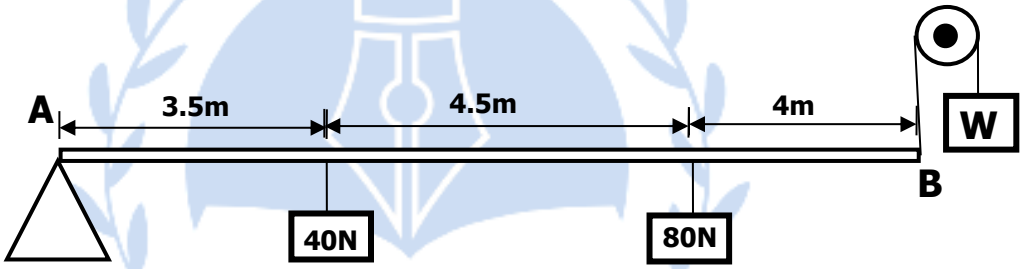
12. The figure below shows a uniform rod AB of weight 20N pivoted at A.



If the system is in equilibrium, determine the weight W shown. (3marks)

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13. A cemented floor feels cold to the feet, but a woolen carpet on the same floor feels warm. Explain this. (1mark)

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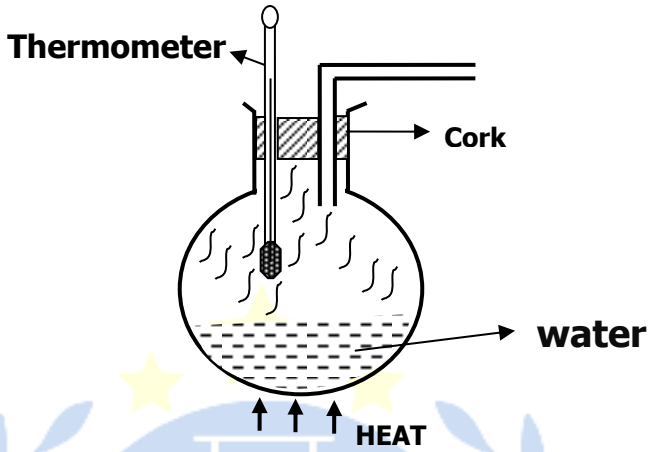
14. The diagram below shows an arrangement used to determine the upper fixed point of ungraduated thermometer.



(i) Why is the bulb of thermometer not dipped in the water? (1mark)

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(ii) Explain how the sensitivity of a thermometer can be improved. (1mark)

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SECTION B (55 MARKS)

15.(a) State Archimedes' principle . (1 mark)

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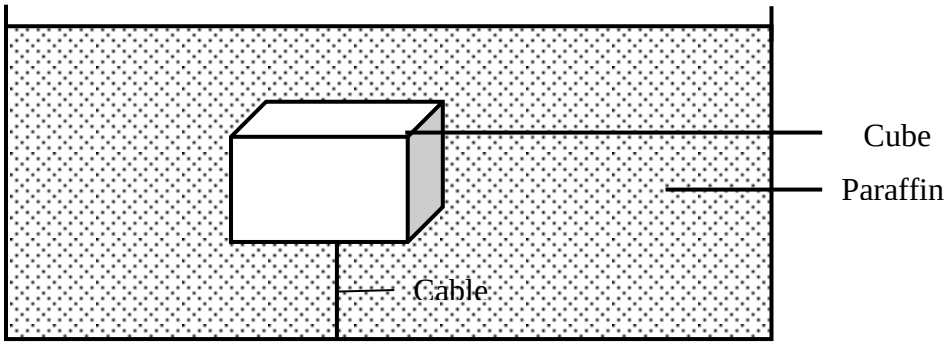
(b) The figure shows a cube of side 2.0 m block and of mass 4,800 kg attached to the base of a tank containing paraffin of density 800 kgm^{-3} by means of an inextensible and light weight cable.



Determine:

(i) The density of the block. (2marks)

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(ii) The upthrust acting on the block. (3 marks)

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(iii) The tension in the cable. (2 marks)

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(iv) The cable is then released, and the block rises to the surface where it subsequently floats. Calculate the fraction of the block which is beneath the surface of the paraffin. (2 marks)

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16. (a) Give **two** ways of increasing the boiling point of a liquid. (2 marks)

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(c) A lagged copper calorimeter of mass 0.8 kg contains 0.6 kg of water at 22.0^0 C. A metal nut of mass 0.4 kg is transferred quickly from an oven at 300^0 C to the calorimeter and a steady temperature of 52^0 C is reached by the water after stirring. Given that the specific heat capacity of copper is 400 $Jkg^{-1}K^{-1}$ and that of water is 4200 $Jkg^{-1}K^{-1}$, calculate:

(i) Heat gained by the calorimeter and water. (3 marks)

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(ii) Energy lost by the metal nut. (1 mark)

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(iii)The specific heat capacity of the material making the nut. (3 marks)

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(c) An electric kettle rated 120 V, 60 W is used to melt 20 g of ice at 0^0C to water at 0^0C in 112 seconds, calculate the specific latent heat of fusion of ice. (3 marks)

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17.A stone is thrown vertically upwards from the top of a tower 30m high, with an initial velocity of 20m/s. Determine:

i) The time it takes to reach maximum height. (2marks)

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ii) The total time which elapses before it hits the ground. (2marks)

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(b)A string of negligible mass has a bucket tied at the end. The string is 60cm long and the bucket has a mass of 45.0g. The bucket is swung horizontally making 6 revolutions per second. Calculate

i) The angular velocity (2marks)

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ii) The angular acceleration (2marks)

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iii) The tension on the string. (2marks)

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18.(a)(i) During the construction of dams, the base of the dam is widened and curved. Explain.(2 marks)

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(ii) A block of density 1.60 g/cm^3 and measures 3.0cm by 5.0cm by 7.0cm was placed on the ground. Determine the difference between the maximum and minimum pressure that would be exerted on the ground by the block. (3 marks)

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b) i)State Newton's second law of motion (1 mark)

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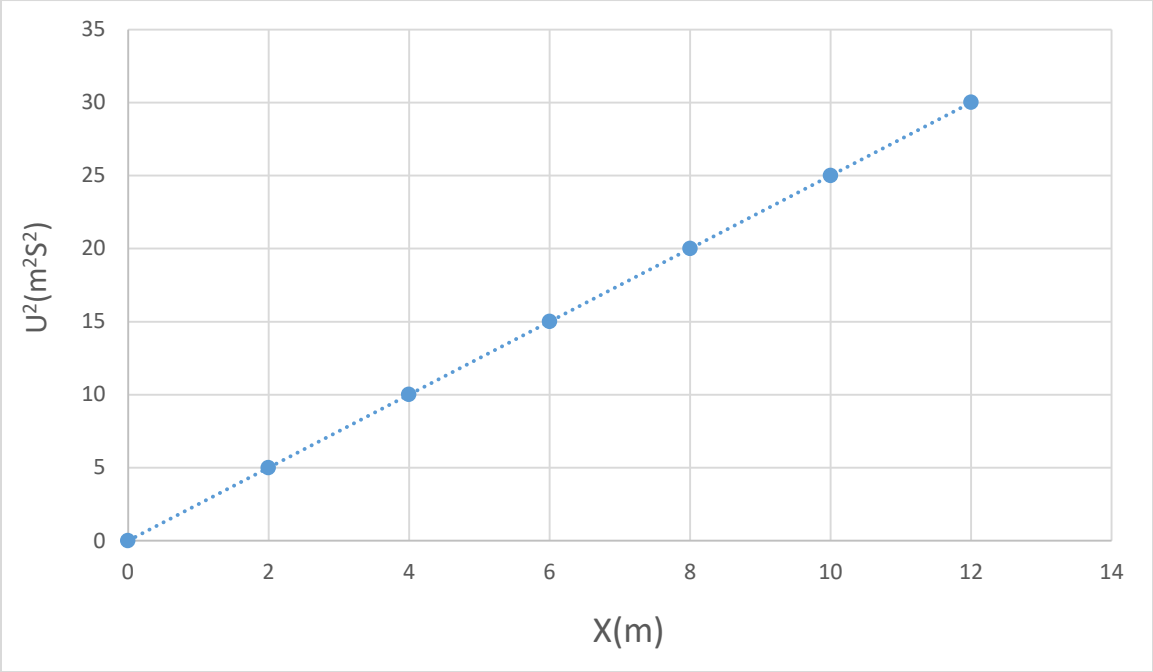
ii)A wooden block resting on a horizontal bench is given an initial velocity U so that it slides on the bench for a distance X before it stops. Various values of X are measured for different value of the initial velocity. The figure below shows a graph of U^2 against X.



i)Determine the slope S of the graph (3 marks)

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ii) Determine the value of k given that $U^2 = 20kX$ where k is a frictional constant for the surface (2marks)

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iii)State with a reason what happens to the value of k when the roughness of the bench surface is reduced (2 marks)

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19.a)(i) State the kinetic theory of gases. (1 mark)

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(ii) State the reason why it is easier to separate water into drops than to separate a solid into smaller pieces. (1mark)

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c) (i) State Hooke's law (1mark)

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(ii) Two identical helical springs are connected in series. When a 50g mass is hang at the end of the springs, it produces an extension of 2.5 cm. Determine the extension produced by the same mass when the springs arc connected in parallel. (3marks)

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d) (i)State Boyle's law. (1mark)

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(ii) Draw a suitable set up that can be used to verify Charles's law. (3marks)

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