# FORM FOUR CLUSTER KCSE MODEL9

# PHYSICS PAPER 1 QUESTIONS

## SECTION A (25 Marks)

### Answer ALL questions

1. Figure 1 shows a rule being used to measure length of a block AB.

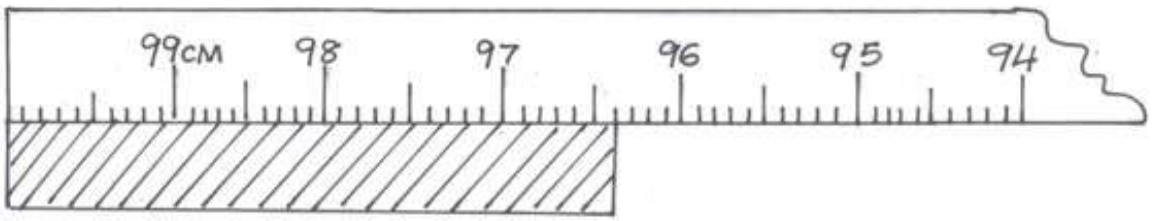


**Fig.1**

i) Find the least count of the rule.

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ii) Determine the length of AB in cm.

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2. Apart from friction, name another factor that reduces efficiency in machines.

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3. A body is initially in motion. If no external force acts on the body, describe the subsequent motion.

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4. A student obtained ice at 00c from a refrigerator and placed it in a beaker on a bench. After 4 minutes, the temperature rose to 40c. State the changes that would be observed in the water in terms of. a) Volume

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b) Density

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c) Mass

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5. Figure 2 shows a uniform rod of length 5m and mass 800g. It is suspended by a string tied at a point 3.5m from one end. Determine the size of load which should be hung at point X to keep the plank horizontal.

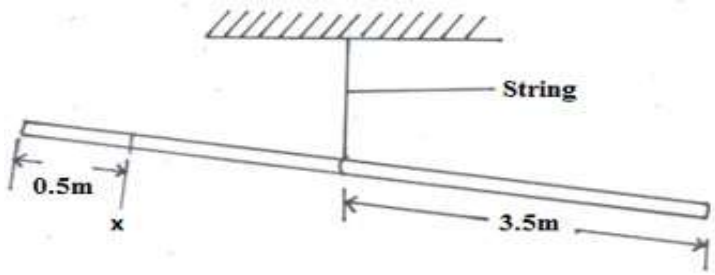


**Fig.2**

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6. Figure 3 shows two capillary tubes of different internal diameters dipped in the mercury in each tube. Indicate on the diagram the relative level of mercury in each tube.

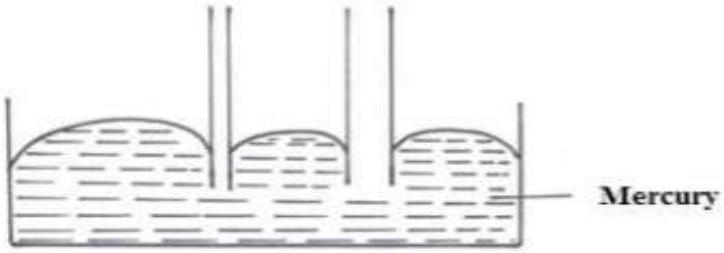


**Figure 3**

7. Equal masses of water and paraffin are heated for same length of time. Given that the specific heat capacity of water is greater than that of paraffin, which of the two liquids is likely to have a greater final temperature? Explain

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8. A tube of radius 9mm has a constriction of diameter 10mm. Water flows in the tube a 3ms-1. Determine the velocity of water in the constriction.

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9. Explain why ice skaters use sharp – edged shoes to slide on ice.

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10. A faulty thermometer reads $2^0c$ when dipped in ice at $0^0c$ and $95^0c$ when dipped in steam at $100^0c$. What would this thermometer read if placed in water at room temperature of $18^0c$?

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11. State two factors that lowers the freezing point of ice.

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12. State any two ways of minimizing heat gains to a substance placed in a vacuum flask.
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13. State one condition that must be met for a body to float in a fluid.

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## SECTION B (55 Marks)

### Answer ALL the questions

14. a) Distinguish between velocity and speed.

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b) Figure 4 illustrates the motion of a ball projected vertically upwards from the surface of a planet. Weight of the ball on this planet is 40N.

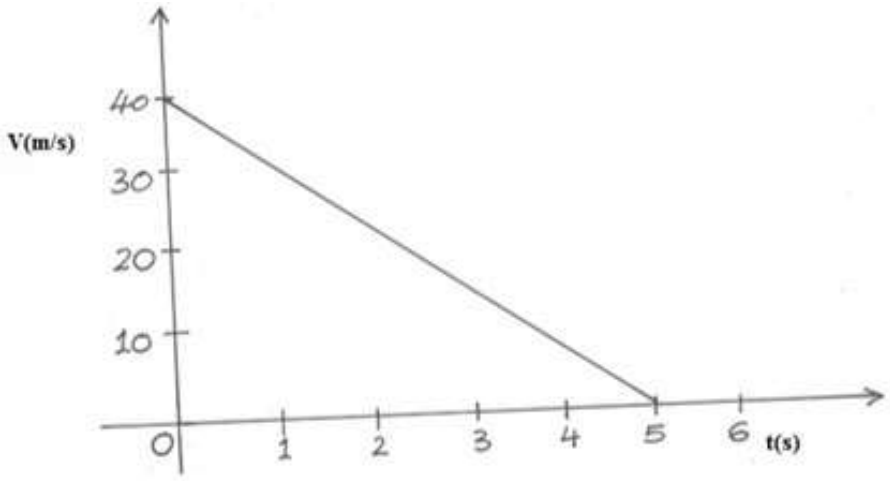


**Fig.4**

i) Determine the acceleration due to gravity on the planet.

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ii) Determine the mass of this ball on earth.

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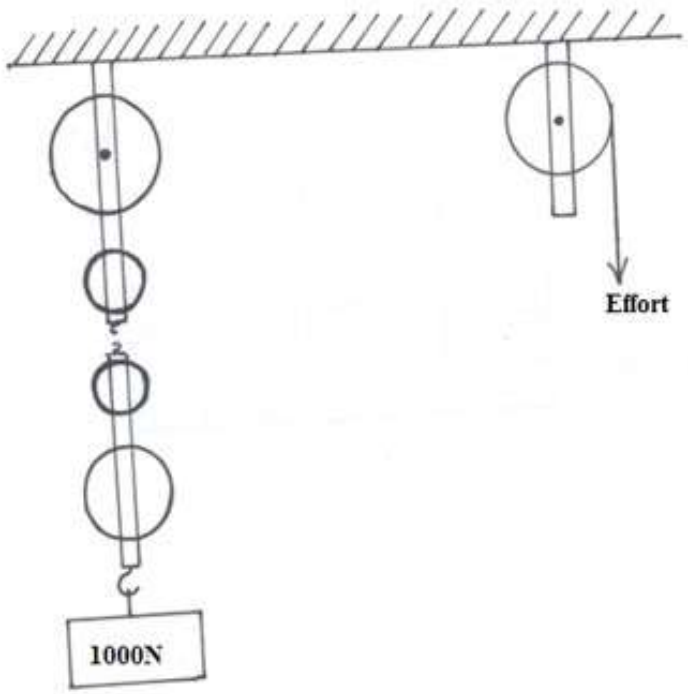


Fig. 5

i) The point of application of the effort is given. Complete the remaining part of the string.
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ii) Calculate the work done on the load if the effort moved down by 0.4m.

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iii) If the efficiency of the system is 75%, find the effort required to just lift the load.
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15. a) Give a reason why a body moving in a circular path with constant speed is said to be accelerating. .....

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b) A stone of mass 40g is tied to the end of a string 50cm long such that it is 20m above the ground as shown in Fig. 6. The mass is whirled in a vertical circle at 2rev/s.

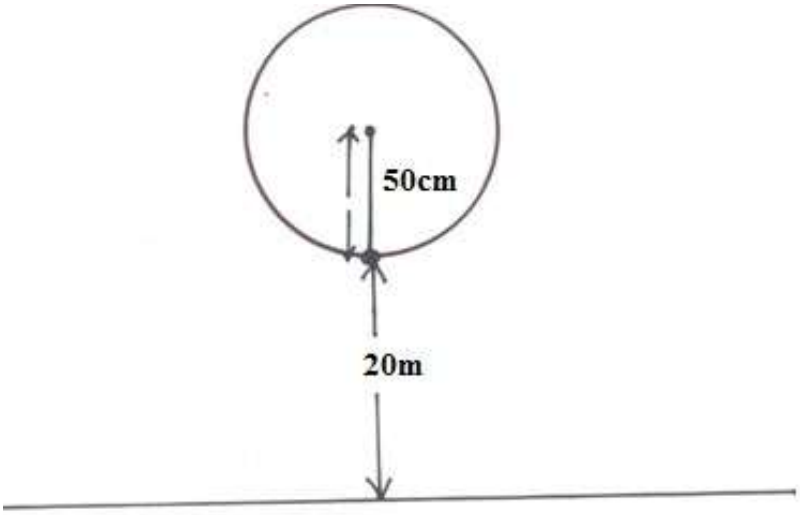


Fig.6

i) Calculate the maximum tension in the string.

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ii) If the string breaks when the mass is at its lowest point on the circle, determine the maximum horizontal distance it travels from the breaking point.

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16. a) Give a reason why ink is most likely to ooze out of a pen when one is up in a plane.
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i) Figure 7 shows a simple hydraulic machine used to raise heavy loads. The system is at equilibrium.

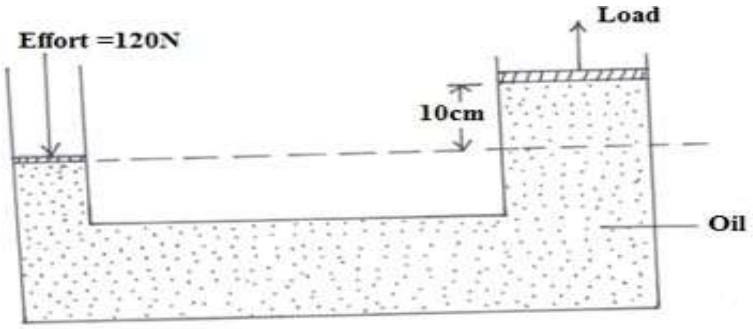


Fig.7

Cross –section area of the effort piston is 0.006m2 and that of the load piston is 0.50m2. The density of oil is 1.2g/cm3.

i) Find the pressure exerted on the oil by the effort.

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ii) Determine the maximum load that can be raised.

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iii) State two properties which makes the oil suitable for use in this machine.
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c) The Altitude of mount X is 1306m. The barometric reading at sea is 74cmHg. The density of mercury is 13600kgm-3 and that of air is 1.25kgm-3. Determine the barometric reading at the top of the mountain in cmHg.

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17. a) What is meant by specific latent heat of fusion of a substance?

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b) In an experiment to determine the specific latent heat of vaporization, steam at 1000c was passed into water contained in a well –lagged copper calorimeter. The following measurements were made.

- Mass of calorimeter =60g
- Mass of water and calorimeter = 145g
- Final mass of calorimeter, water and condensed steam =156g
- Final steady temperature of the mixture = 480c.

(Specific heat capacity of water =4200Jkg-1k-1, specific heat capacity of copper =400Jkg-1k-1)

Determine the;

i) Mass of condensed steam.

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ii) Heat gained by the calorimeter and water if initial temperature of the calorimeter and water in 200C. .....

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iii) Specific latent heat of vaporization of steam.

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iv) State the assumption made in the calculations above.

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18. a) State two conditions that must be met for a gas to obey pressure law.

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b) The set up in figure 8 was used in an experiment to verify Charle's law.

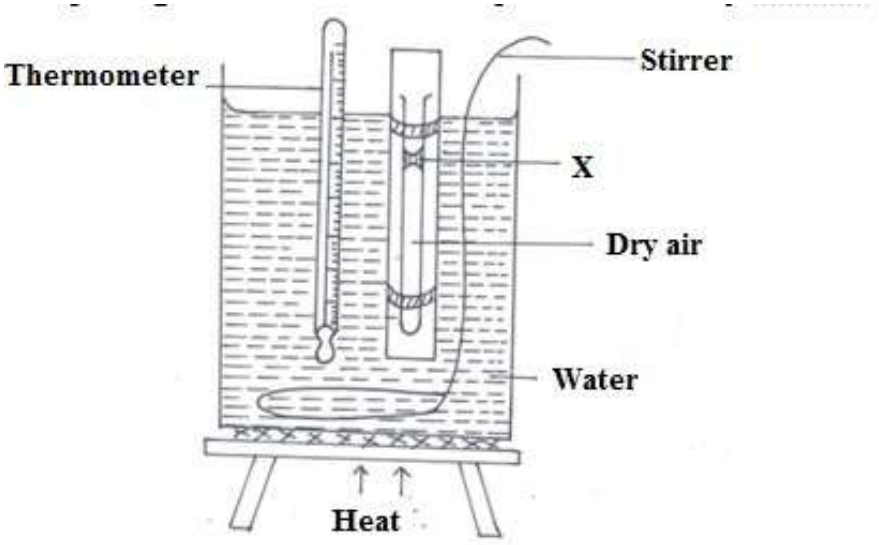


Fig.8

i) Give the name of part labelled X.

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ii) State any two functions of the named in (i) above.

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iii) Briefly explain how the set up above is used to verify Charles law.

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19. a) Differentiate between floatation and sinking interms Archimedes principle.

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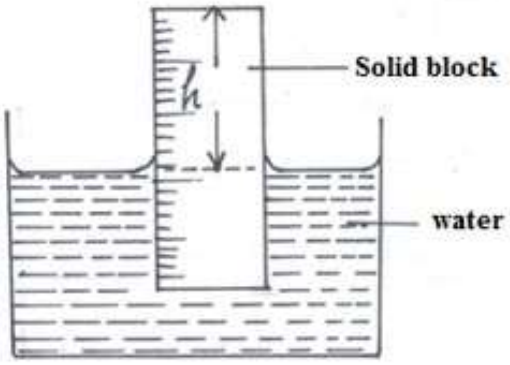
b) A solid block of cross-section area 4cm2 and density 250kg/m3 floats in water has shown in figure 9.




Some known weights F were added on the solid and corresponding value of h noted, as the objects floats in water. A graph of h(cm) against F was plotted as in figure 10.

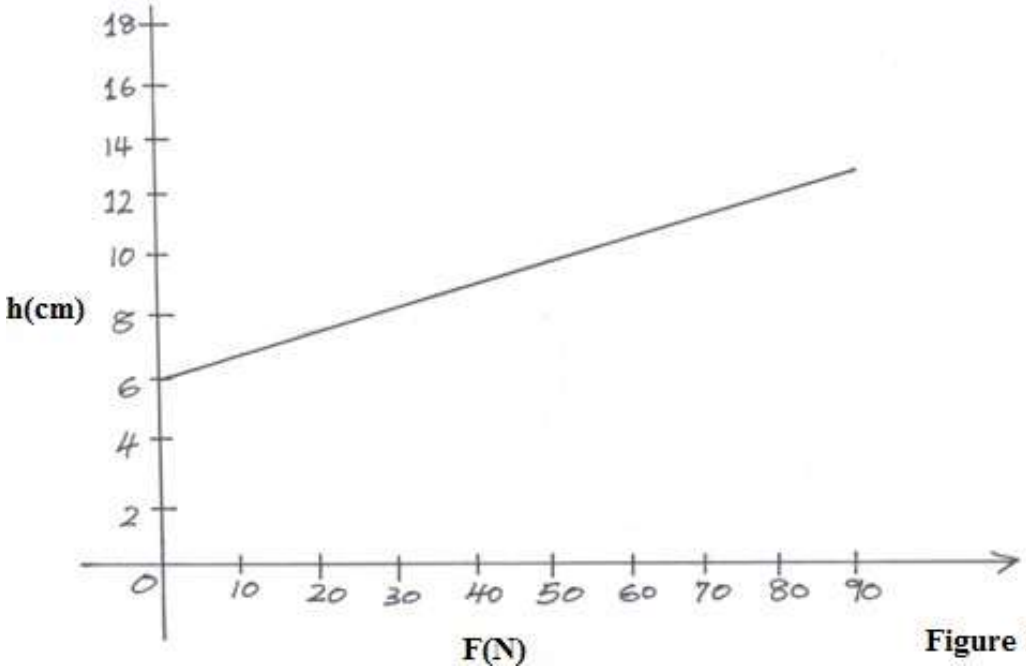



Figure 10

From the graph; i)

Find the weight of the floating solid.

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ii) Find the total height of the solid.

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