

FORM FOUR CLUSTER KCSE MODEL1

PHYSICS PAPER 1 QUESTIONS

SECTION A (25 Marks)

Answer ALL questions in this section

1. State two basic quantities of measurement and state its SI units.

.....
.....
.....

2. Figure 1 below shows a micrometer screw gauge used by a student to measure the thickness of her pen. If it has a zero error of -0.04mm , what is the actual thickness of her pen?

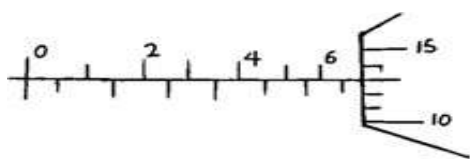


Fig. 1

3. Figure 2 shows water drops on two surfaces. In (a) the glass surface is smeared with grease while in (b) the glass surface is clean.

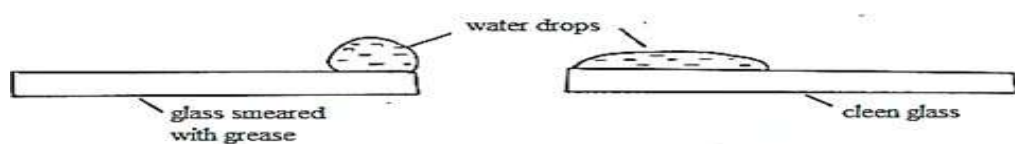


Fig. 2

Explain the shapes of the water drops on the two glasses.

.....
.....
.....

4. Figure 3 below shows a liquid being siphoned from one container to another.

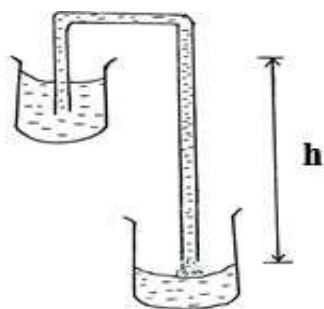


Fig. 3

State and give reason what would happen to the flow if the system is placed in a vacuum.

.....
.....

.....
.....

5. Explain the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell.

.....
.....

6. Figure 4 shows a set-up used to study expansion in liquids. State and explain the observation made when the flask is gently heated.

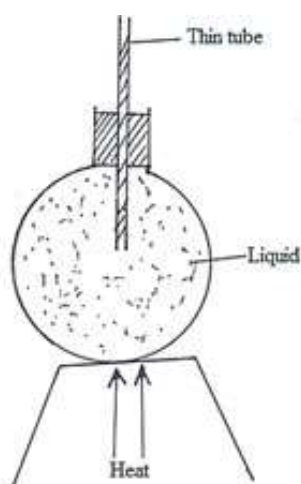


Fig. 4

.....
.....

7. Figure 5 shows a model of a hot water system. Tube X is for carrying hot water upwards.

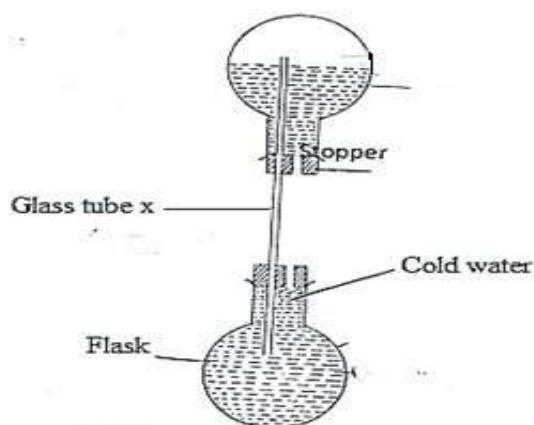


Fig. 5

Complete the diagram by inserting another glass tube in the free holes of the stoppers so that hot water from the lower flask rises to the top flask while cold water moves down to replace it.

8. Figure 6 shows a uniform bar of mass 70 kg. Two other masses 65 kg and 10 kg are hung 20 cm

and 100 cm from end A respectively.

Determine distance d .

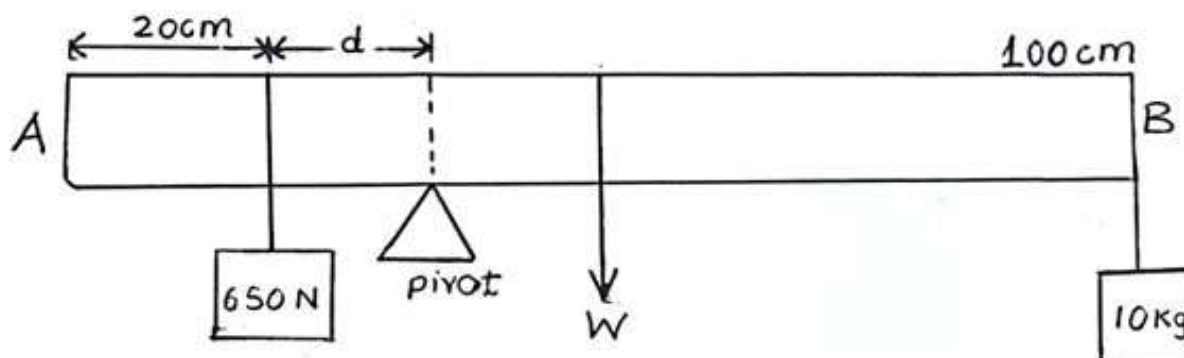


Fig. 6

9. Figure 7 shows two identical beakers A and B. Beaker A is filled with water and B is half filled. When tested for stability B is found to be more stable than A. Explain this observation.

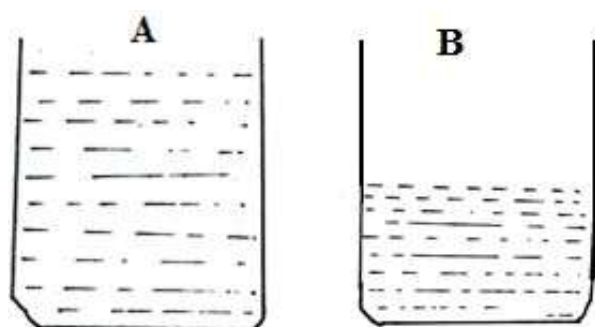


Fig. 7

.....

.....

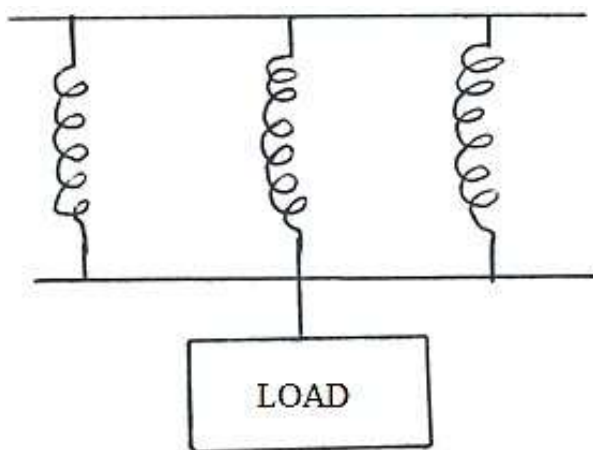
10. Explain why a physics laboratory is necessary in studying physics.

.....

.....

11. Figure 8 shows three identical springs of springs constant 60 N/m. The arrangement of the springs is used to support a load.

If each spring extends by 2.0 cm, determine the weight of the load.



12. Figure 9 shows a pith ball placed in a flask. When a jet of air is blown over the mouth of the flask as shown, the pith ball is observed to rise from the bottom. Explain the observation.

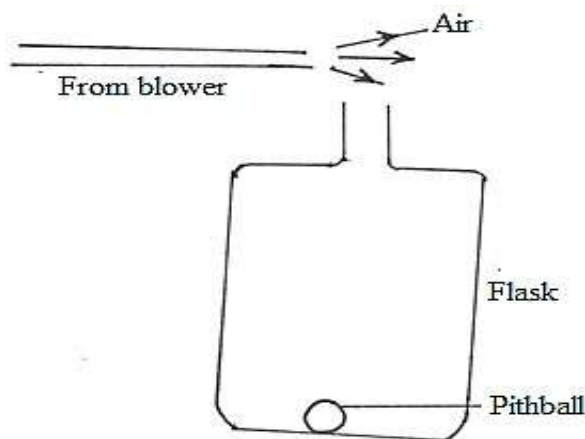


Fig 9

.....

13. An oil drop has a volume of 0.01 mm^3 . When it is placed on the surface of some water it spreads out to form a circular patch of area 500 cm^2

Calculate the diameter of the oil molecule.

SECTION B (55 Marks)

Answer ALL questions in this section

14. (a) A bullet is fired horizontally at a target, neglecting air resistance, give a reason why the horizontal acceleration of the bullet is zero. (1mark)

.....

(b) Figure 10 below shows a piece of tape pulled through a ticker –timer by a trolley. The frequency of the timer is 100 HZ

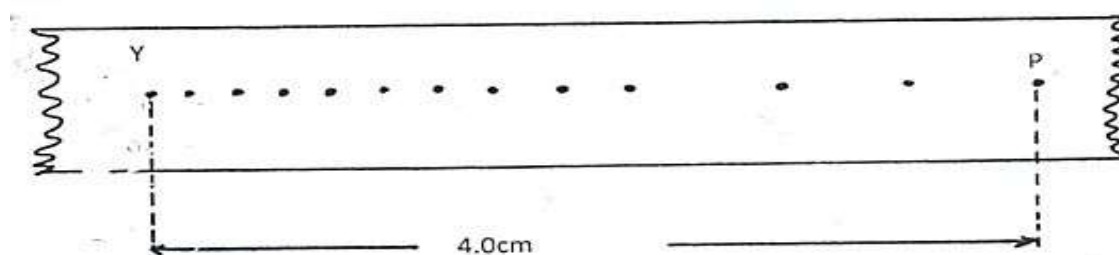


Fig.10

- (i) Find the time between two consecutive dots. (1marks)
- (ii) Determine the average velocity of the trolley between Y and P (3marks)
- (c) An object is released to fall down vertically from a height of 100 m. At the same time another object is projected vertically upwards with velocity of 40 m/s.

- (i) Calculate the time taken before the two objects meet. (3marks)
- (ii) At what weight do the two objects meet? (2marks)

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

.....

(b) Figure 11. Below shows a cubic block of side 4 cm and density 800kg/m^3 attached to the base of water container using a light inextensible string.

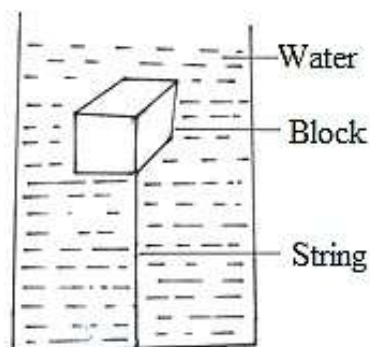


Fig. 11

- Determine the: (i) Weight of the block. (3marks)
 (ii) Up thrust on the block. (3marks)
 (iii) Tension in the string. (3marks)

16. (a) Give a reason why bodies in circular motion undergo acceleration even if their speeds are constant. (1mark)

(b) Define the term angular velocity. (1mark)

.....

.....

(c) Figure 12 shows an object of mass 0.2 kg whirled in a vertical circle of radius 0.5 M moving at uniform speed of 5 m/s.

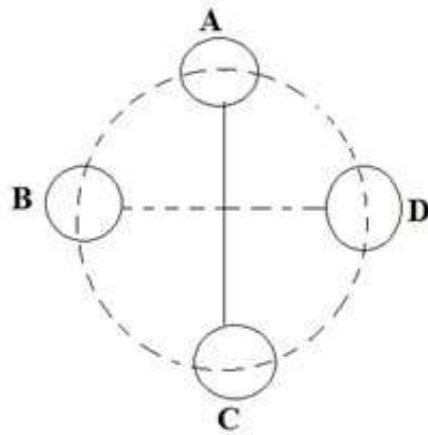


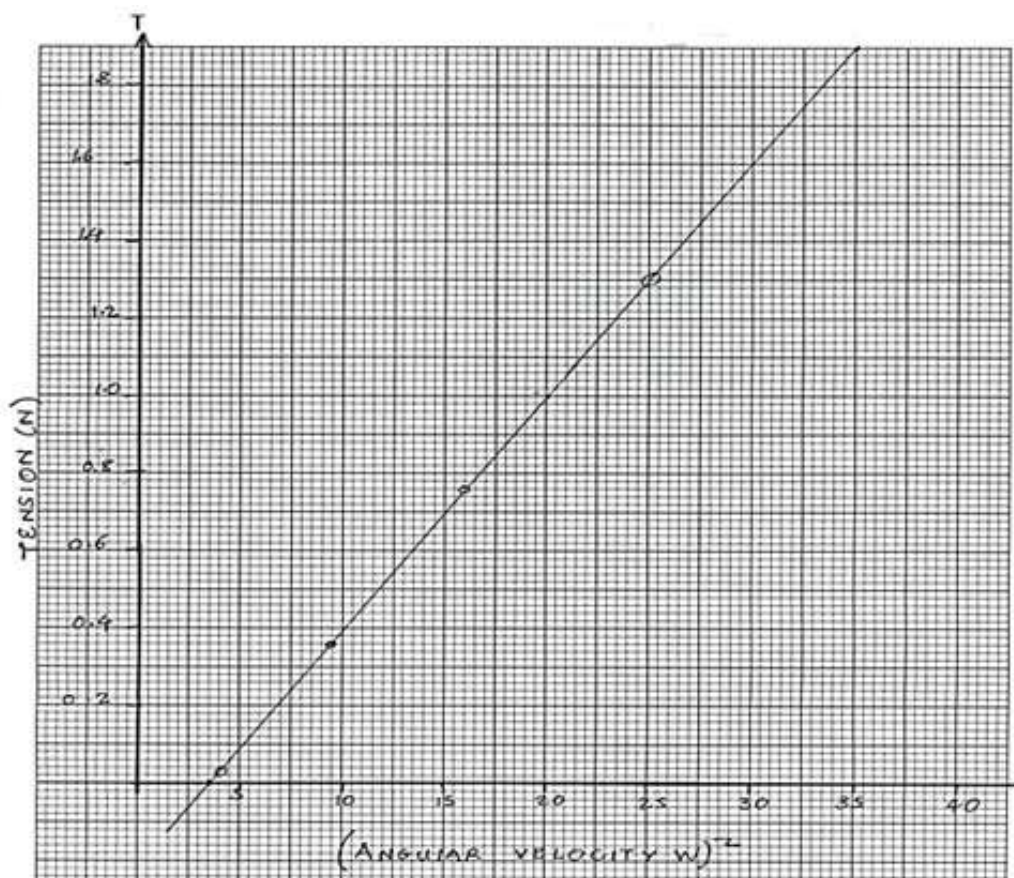
Fig.12

- Determine: (i) The tension in the string at position A. (2marks)
(ii) The tension in the string at position B. (1mark)
(iii) The tension in the string at position C. (2marks)
(iv) From the values obtained in (i), (ii) and (iii) above, determine the point the string will most likely snap.

Explain. (2marks)

.....
.....
.....
.....

- (d) (i) From the graph determine the mass m of the body given that $T = mr\omega^2 - c$ where c is constant and $r = 100\text{cm}$ (3marks)



17. (a) What is meant by specific latent of heat of vaporization. (1mark)

.....

(b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100°C was passed into water contained in a well lagged copper calorimeter. The following measurements were made: Mass of calorimeter = 50g Initial mass of water = 70g Initial temperature of water = 50°C Final mass of calorimeter + water + condensed steam = 123 g Final temperature of mixture = 30°C Specific heat capacity of water = 4200 J kg⁻¹ K⁻¹ and specific heat capacity of copper = 390 J kg⁻¹ K⁻¹. Determine:

- (i) Mass of condensed steam (1mark)
 (ii) Heat gained by the calorimeter and water. (2marks)
 (iii) Given that L is the specific latent heat of vaporization of steam.

- (i) Write an expression for the heat given out by steam. (1mark)

.....

- (ii) Specific latent heat of vaporization heat of vaporization of water. (3marks)

.....

(c) Figure 13 shows a set –up of apparatus that can be used to verify the pressure law.

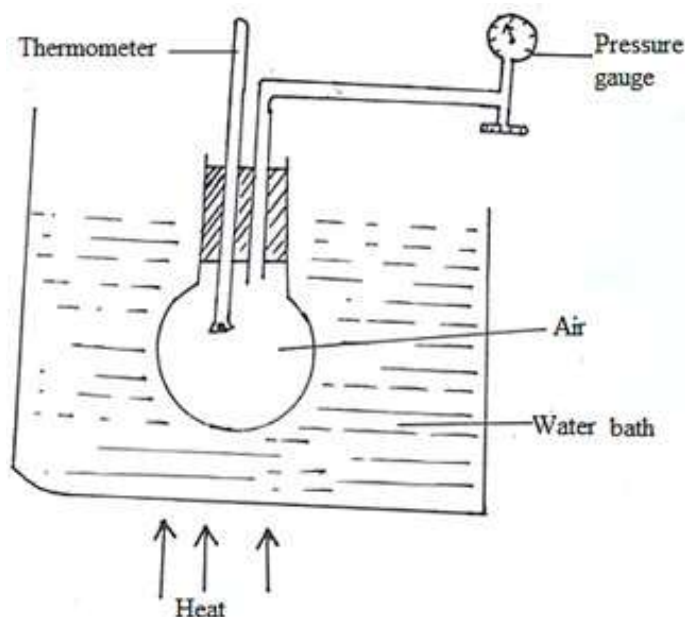


Fig.13

(i) State the necessary measurements used to verify the law. (2marks)

.....

.....

.....

(ii) State the assumption made. (1mark)

.....

.....

(d) A mass of a gas has a volume of 500 cm^3 at a temperature of -730 C and a pressure of one atmosphere what is the volume of the gas at a pressure of four atmospheres and a temperature of 470 C . (3marks)

18. (a) Distinguish between renewable and non-renewable energy resources. (1mark)

.....

.....

.....

(b) Define velocity ratio. (1mark)

.....

.....

.....

(c) Figure 14 show a pulley system used in lifting a load of 40 N at constant speed.

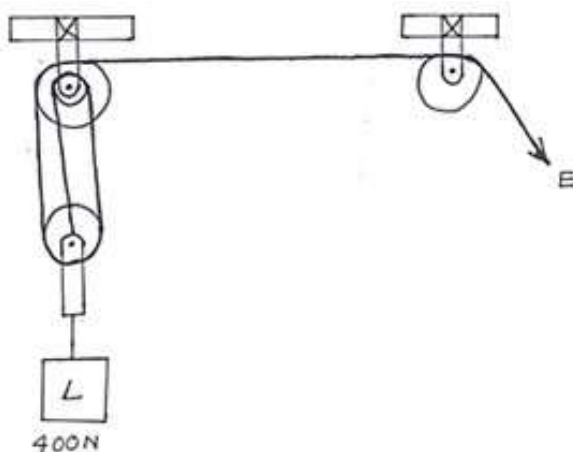


Fig.14

(i) State the velocity ratio of the system. (1mark)

.....

(ii) If an effort of 200N is required to lift the load. Calculate the efficiency of the system. (3marks)

(d) Figure 15 show a wheel an axle used to raise a load of 300N by applying an effort of 50N. The radius of the wheel is 60cm.

Calculate the radius of the axles if the efficiency of the system is 60 %. (3marks)

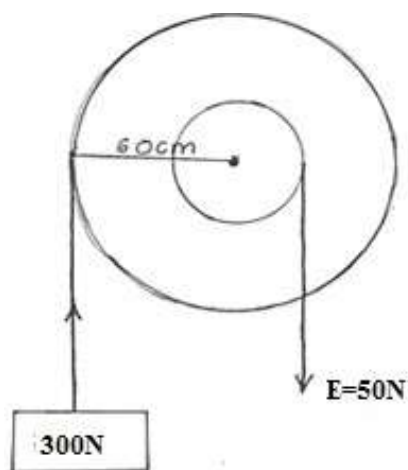


Fig. 15