FORM FOUR CLUSTER KCSE MODEL 3

PHYSICS PAPER 1 QUESTIONS

SECTION A (25 Marks)

Answer ALL questions

1.A micrometer screw gauge is used to measure the diameter of a copper wire. The reading with the wire in position is as shown in diagram 1. The wire is then removed and the jaws closed. Diagram 2 shows the new reading.

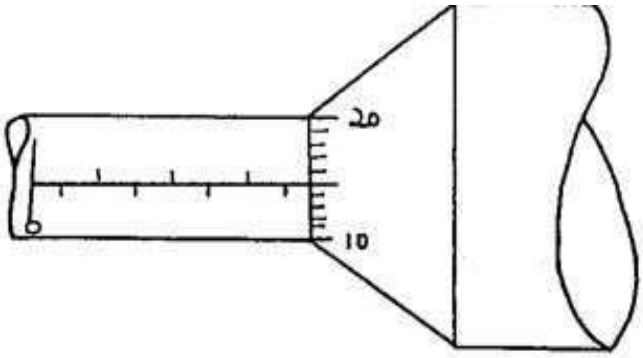

Diagram (1)

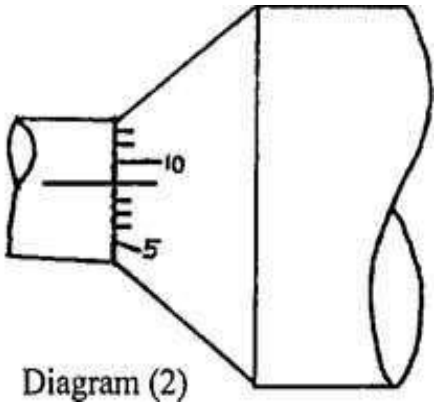

Diagram (2)

What is the diameter of the wire?

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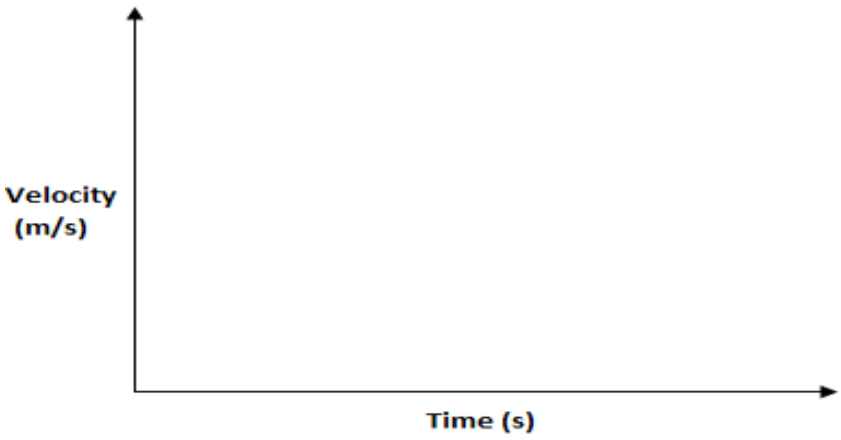
2.A steel ball of mass m, is released inside a viscous fluid. Sketch on the axis provided below a graph to show how its velocity varies with time.



3. Figure 1 shows a worker ready to lift a load wheelbarrow

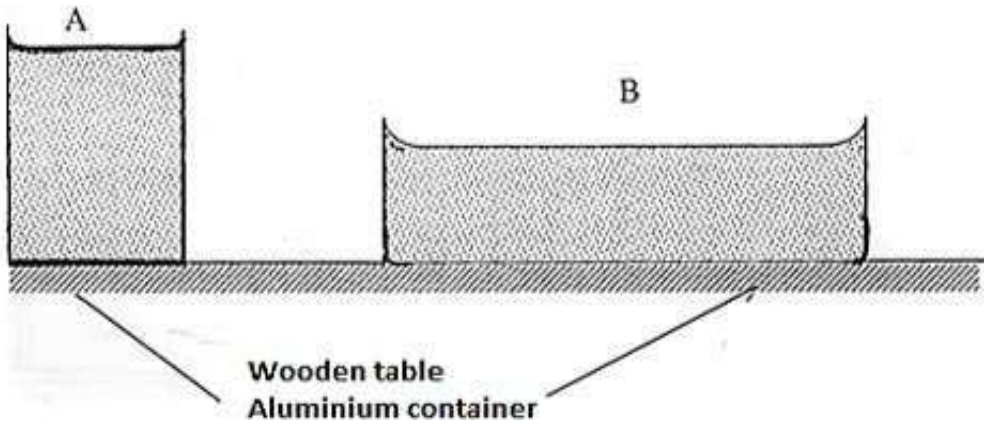
Fig. 1

Indicate and label on the diagram any two forces acting on the wheelbarrow when the person is just about to lift the handlebars

4. The height of the mercury column in a barometer at a place is 64cm. What would be the height of a column of paraffin in barometer at the same place? (Density of paraffin = 8.0 x 102 kgm-3)

5. Figure 2 shows two aluminium container A and B placed on a wooden table containers A and B have equal volume of hot water initially at the same temperature

Fig. 2



Explain why water in B cools faster than water in A.

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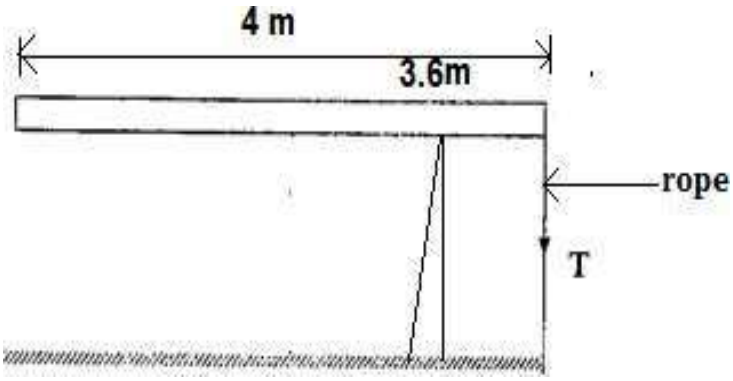
6.A uniform rod of length 4m and mass 4 kg is pivoted at 3.6m mark. The rod is held horizontally with a vertical rope at 4m mark as shown below



Calculate tension T in the rope (Take g=10N/kg)

7.A body of mass 5kg was being pulled by a constant force of 10N on a rough surface. if the coefficient of friction was 0.03, calculate the acceleration produced.

8.The figure 4 below shows a Bunsen burner.

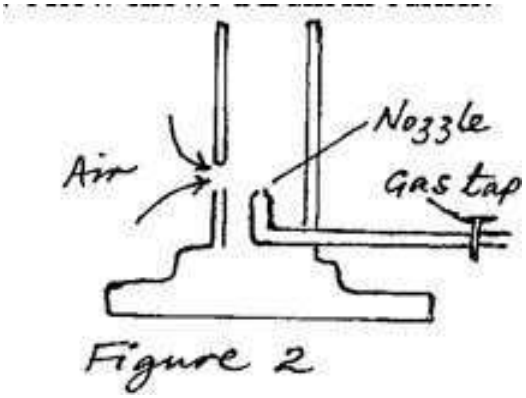


Figure 2

Use Bernoulli's Principle to explain how air is drawn into the burner when the gas tap opened.

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9.A light spiral spring extend by 4 mm when loaded with a weight W. the spring is connected in series with an identical spring. The combination is loaded with W determine the extension of the combination.

10. Some concrete floor concrete pavements are made of several slabs joined together instead of a continuous single piece. State with reasons which of the two pavements may last longer

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11. One of the transport TLB rules is that a passenger should put on the safety belt. Explain how the belt enhances safety incase of an accident.

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12. State the reason why gases are easily compressible while liquids and solids are not.……

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13.The diagram below shows an empty wine glass.

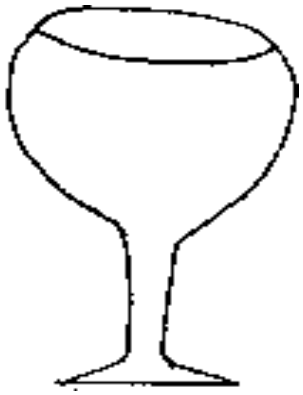

Fig.5

State the effect on its stability when the glass is filled with wine.

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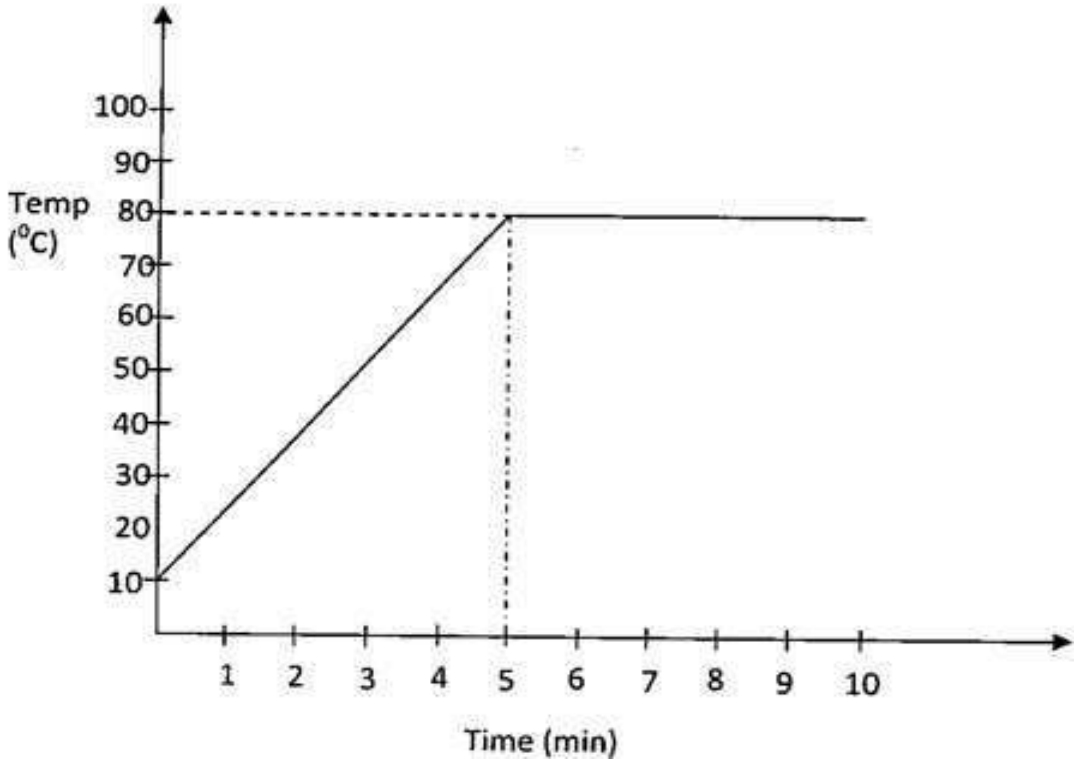
SECTION B (55 Marks)

Answer all questions in this section

14.(a) 1200g of liquid at 10°C is poured into a well-lagged calorimeter. An electric heater rated 1KW is used to heat the liquid. The graph below shows the variation of the temperature of the liquid with time.

fig.6



i)State the boiling point of the liquid in Kelvin scale.

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ii)State a reason why the graph does not start from origin.

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iii)Determine how much heat is given out by the heater to heat the liquid to the boiling point.

iv.Determine the specific heat capacity of the liquid

v.If 50 g of the liquid vapor was collected by the end of the 8th minute, determine the specific latent heat of vaporization of the liquid.

15.In an experiment to determine the density of sand a density bottle, the following measurements were recorded: Mass of empty density bottle = 43.2g Mass of density bottle full of water = 66.4g Mass of density bottle with some sand = 67.4g Filled up with water = 82.3g Use the above data to determine the:

(a) Mass of the water that completely filled the bottle:

(b) Volume of water that completely filled the bottle.

(c)Volume of the density bottle:

(d) Mass of sand.

(e) Mass of water that filled the space above the sand.

(f)Volume of the sand:

(g)Density of the sand.

16.(a) State the pressure law for an ideal gas.

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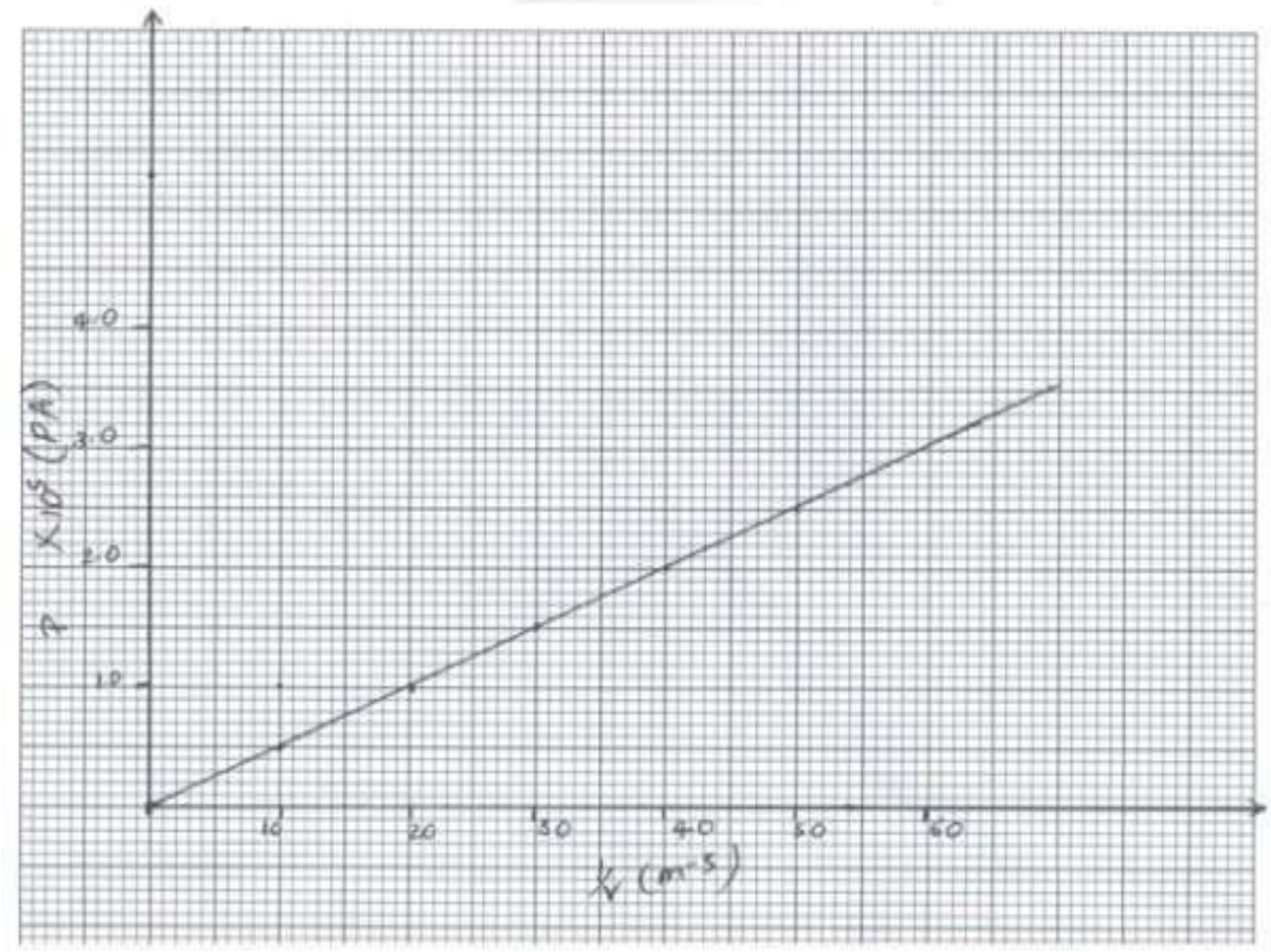
(b) The pressure P of a fixed mass of a gas at a constant temperature of T=200K is varied continuously and values of corresponding volume recorded. A graph P against v 1is shown on grid below



Use the graph to:

(i)Determine the volume of the gas when the pressure reads reads pa 5108.2

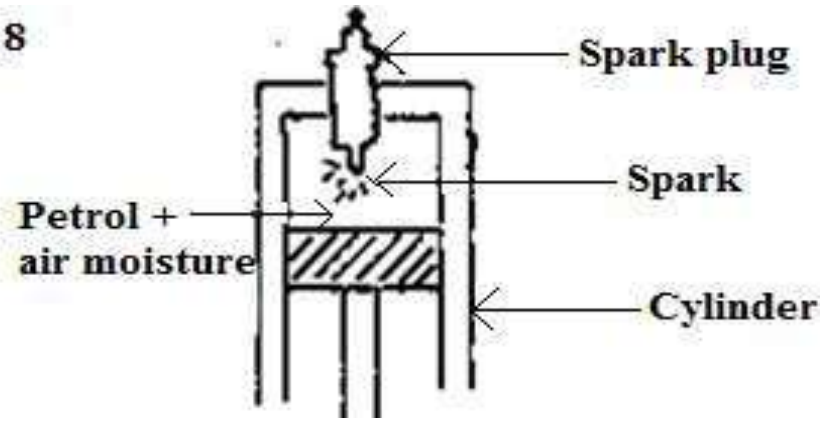
(ii)The Slope of the graph. (2marks)

(iii)Given that R PV T 2

where R is a constant, use the slope obtained in (ii) above to find the value of R.

(c) The petrol air mixture in the cylinder of a car engine is ignited when the piston is in the position shown below.

Fig 8



Explain in terms of kinetic theory why the piston moves downwards.

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17. (a) Figure 11 shows a pulley system being used to raise a load.

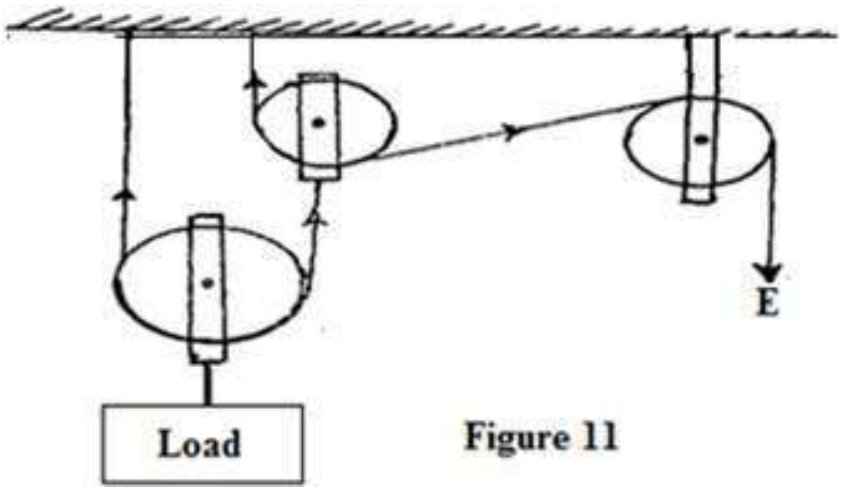


Figure 11

This pulley system has an efficiency of 75%

(i)Determine the velocity ratio of the system.

(ii) Determine the mechanical advantage of the pulley system

(iii) Determine the effort required to raise a load 240kg.

(iv) Determine the work done by a person using this machine in raising a load of 120 kg through a vertical distance of 2.5 m.

(b) Figure 12 was used to investigate the variation of the centripetal force. F with the radius, r of the circle on which a body rotates.

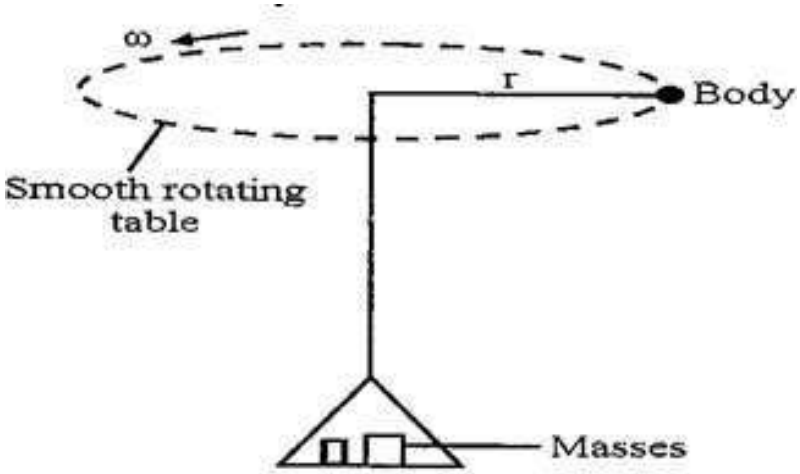
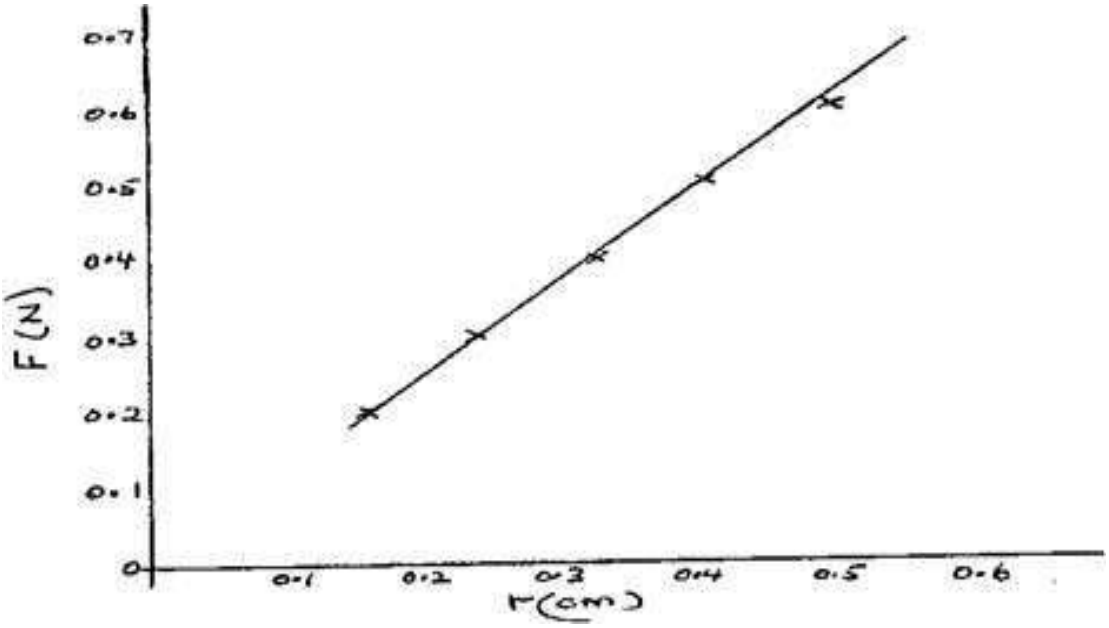


Figure 12

Describe how the setup can be used to carry out the investigations.

The graph shows the relationship between force on the body and radius



From the graph determine the angular velocity, ω

the body given that m=200 g and c mF where c is constant. (2marks)

(b) (i) Distinguish between angular and linear velocity.

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18.. (a) A block of wood measuring 0.8 m by 0.5 m by 2 m floats in water.1.2 m of the block is submerged.

(i) Determine the weight of the water displaced.

(ii) Find the force required to just make the block fully submerged.

(d) A piece of sealing wax, weight 3N in air and 0.22N when immerses in water, calculate the density of the wax.

(e) A balloon weighs 10N and has a gas capacity of 2m3.The gas in the balloon has a density of 0.1kg/m3.If density of air is 1.3 kgm-3, calculate the resultant force of the balloon when it is floating in air.