Name .....Index No. .....

School .....ADM NO. .....Candidate's signature .....

Date .....

232/1

PHYSICS
Paper 1
July/August 2018
Time 2 hours

FORM FOUR END OF SECOND TERM EXAM

Kenya Certificate of Secondary Education

PHYSICS

Paper - 232/1

July/August 2018

Time: 2 hours

INSTRUCTIONS TO CANDIDATES

a) Write your name and index number in the spaces provided above.
b) Sign and write the date of the examination in the spaces provided above.
c) This paper consist of two sections A and B.
d) Answer ALL questions in section A and B in the spaces provided.
e) All working must be clearly shown in the spaces provided in this booklet.
f) Silent non-programmable electronic calculators and KNEC mathematical tables may be used.
g) Candidates should answer the questions in English

FOR EXAMINER USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 - 13	25	
B	14	11	
	15	11	
	16	12	
	17	13	
	18	08	
TOTAL SCORE		80	

This paper consists of 10 printed pages

Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

SECTION A (25 marks)

Answer ALL the questions in the spaces provided.

1. A drug manufacturer gives the mass of an active ingredient in a tablet as 800mg. Express this quantity in kilogramme and in standard form. (1 mark)

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2. State **two** measurements that you would take in an experiment to determine the upthrust experienced by an object which is immersed in a fluid. (2 marks)

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3. A can with a hole on the side is filled with a liquid to a certain height. The liquid jets out as shown in figure 1(a). A second identical can is filled with water to the same height and a block of wood floated on the water as shown in figure 1(b)

Fig 1a

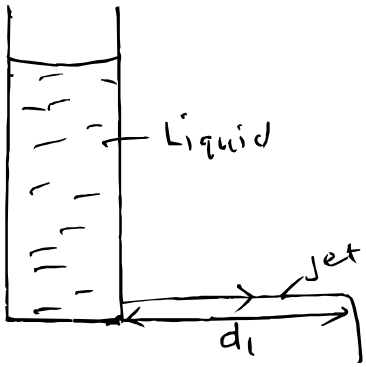
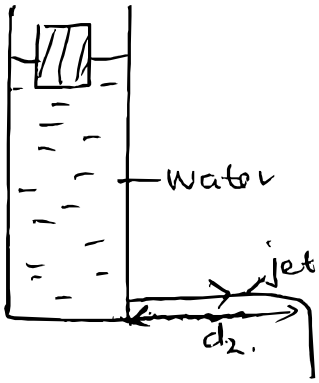


Fig 1b



It is observed that d_1 is greater than d_2.

i) State a reason for the above observation. (1 mark)

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iii) State two adjustments that can be made in the above experiment to make the two jets d_1 and d_2 equal. (2 marks)

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4. Two identical tubes P and Q held horizontally contain air and water respectively. A small quantity of coloured gas is introduced at one end of A while a small quantity of coloured water is introduced at one end of B. State with a reason the tube in which the colour will reach the other end faster.

(2 marks)

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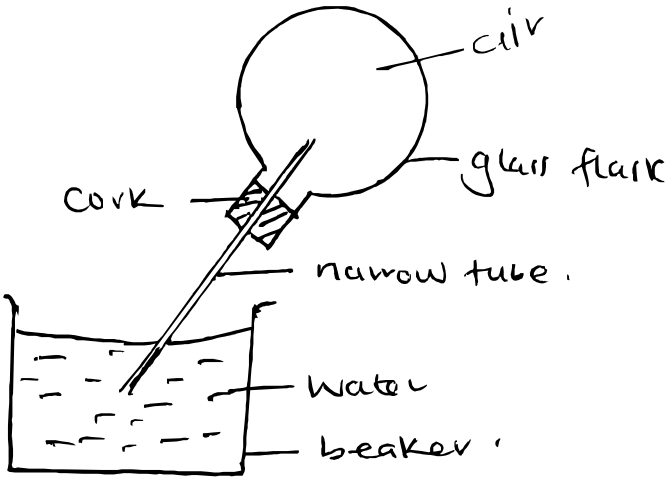
5. Figure 2 shows a glass flask fitted with a narrow tube dipped into a beaker containing water at room temperature.

Fig 2



Explaine what is observed when ice-cold water is poured on the flask. (2 marks)

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6. Figure 3 shows two identical balloons A and B. The balloons were filled with equal amounts of the same type of gas. The balloons are suspended at distances S_1 and S_2 from a metal cube filled with boiling water and placed on an insulating material.

Fig 3

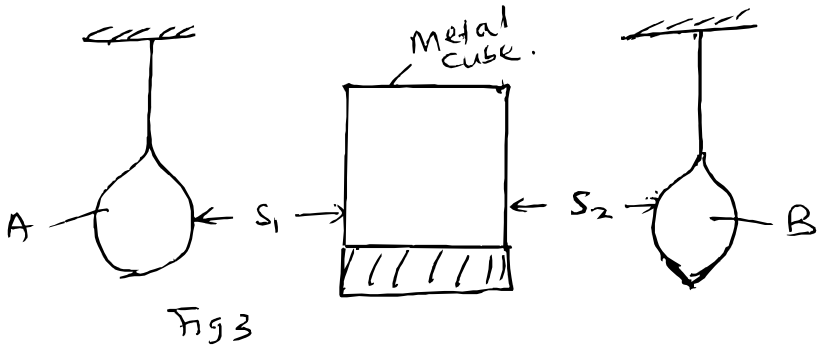

Fig 3

The face of the cube towards B is dull and the face towards A is shiny. The rate of change of temperature in A is observed to be lower than that in B.

i) Explain this observation. (1 mark)

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ii) State one adjustment that can be made on the distances S_1 and S_2 so that the rate of change of temperature in both balloons is the same. (1 mark)

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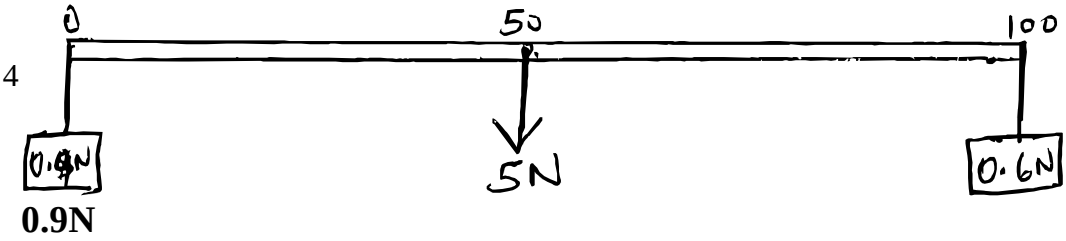
7. Figure 4 shows a metallic uniform metre rule of weight 5N with two weights of 0.9N and 0.6N suspended from its sides.

Fig 4



0.9N

Determine how far from the 0.9N weight a pivot should be placed in order to balance the metre race. (3 marks)

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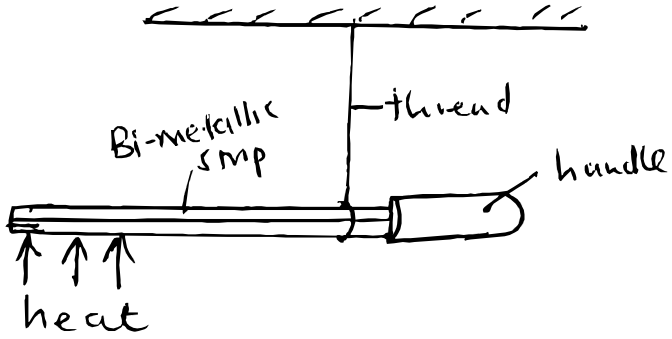
8. Figure 5 show a bi-metallic strip with a wooden handle suspended horizontally using a think thread.

Fig 5



The strip is heated at the point shown. Explain what is observed. (2 marks)

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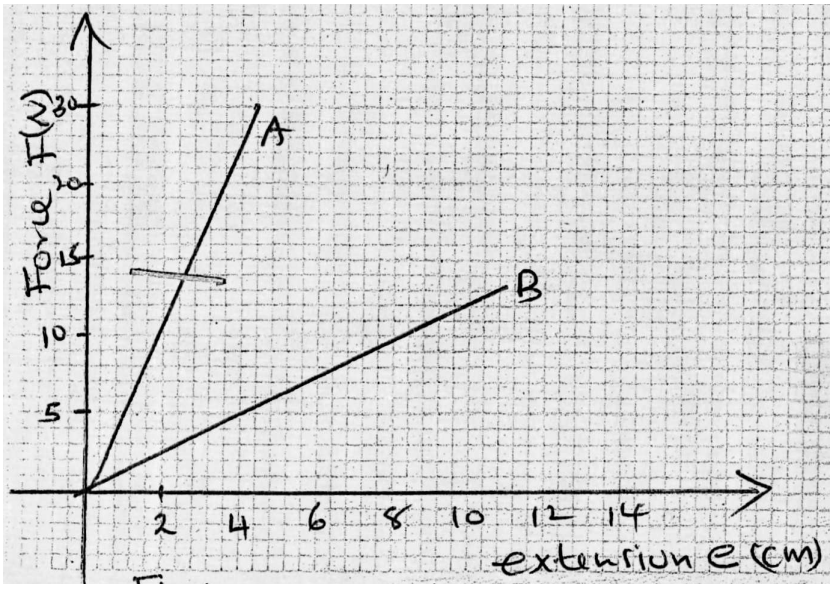
9. The graphs in figure 6 represent the relation between extension, e and force, F loaded on two springs A and B.

Fig 6



Given that the two springs are made of the same material, state one reason why the graphs are different. (1 mark)

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10. An aeroplane is moving horizontally through still air at a uniform speed. If the speed of the aeroplane is doubled, explain why would be observed. (2 marks)

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11. A ball bearing falling through glycerine attains terminal velocity after a short time. State the reason why it attains terminal velocity. (1 mark)

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12. A balloon filled with a light gas is observed to rise in air upto a height of 2.5km before floating.

i) Explain why the balloon rises. (1 mark)

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ii) Explain why the balloon floats at 2.5km above the ground. (1 mark)

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13.a) State one reason why water is not a suitable thermometric liquid . (1 mark)

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b) State one factor that determines the conductivity of heat in a copper wire of length 30.0cm (1 mark)

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SECTION B: 55 marks

14. Figure 7 shows a block of mass 50.0kg being pulled up a slope by a force F at a constant speed. The friction between the block and plane if 40.0N.

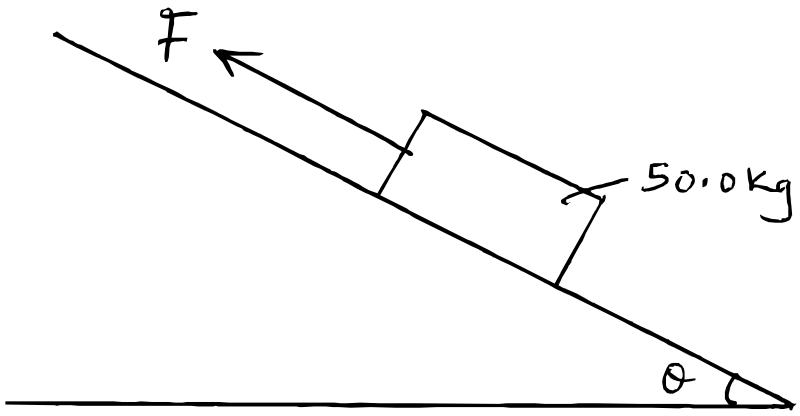

Fig 7

a) i) On the same figure **name** and **indicates** the other forces acting on the block. (3 marks)

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ii) State how each of the forces named in (i) above is affected when the angle θ is reduced. (3 marks)

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b) If the value of force F applied on the block is 120N, and the block moves through a distance of 8.0m along the plane, determine

i) the acceleration of the block (3 marks)

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iii) the work done by the force F. (2 marks)

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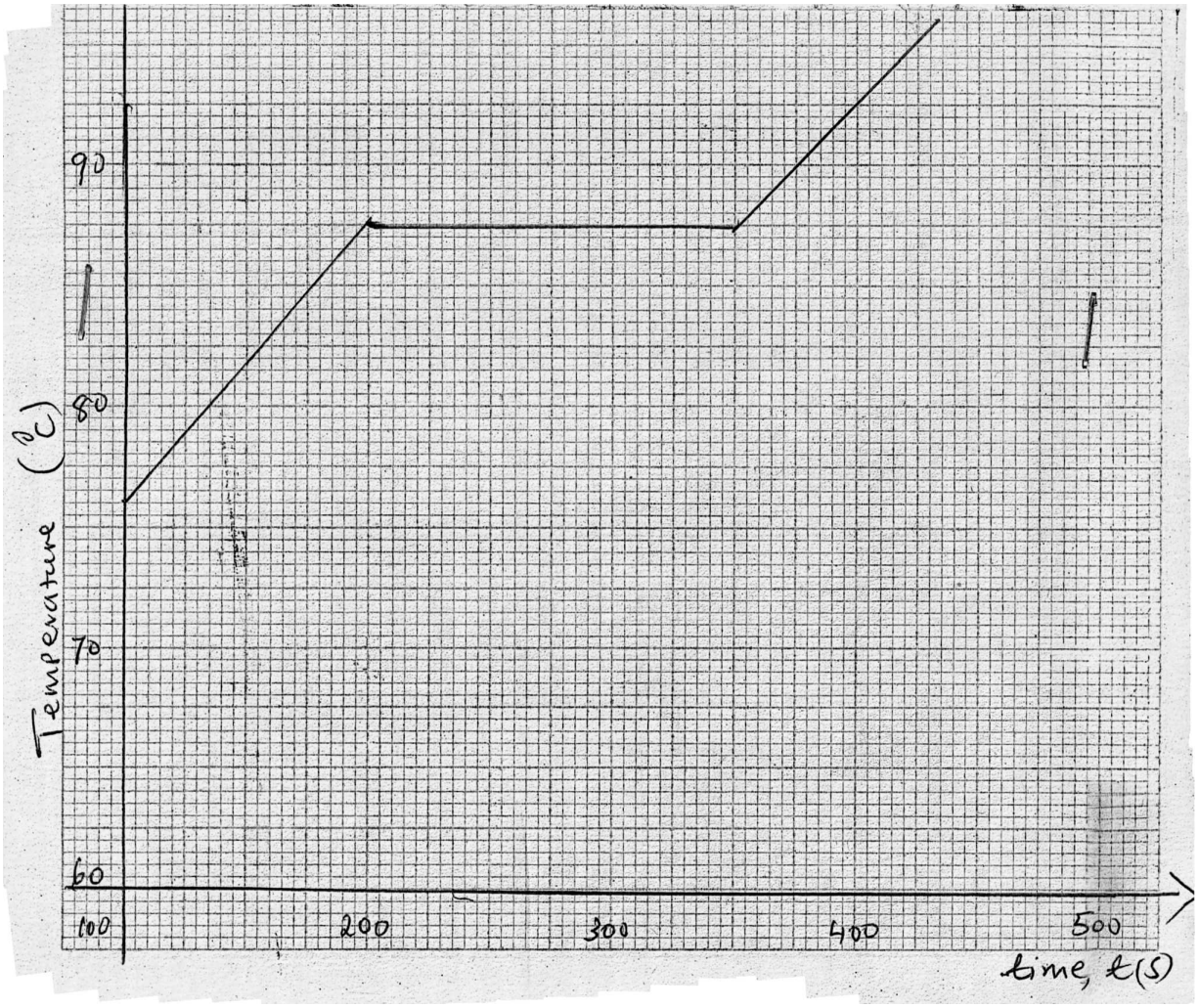
15. A solid of mass 500g was heated in a container by an electric heater rated 800W for some time. The graph below (Fig 8) shows the variation of temperature of the solid with time.



a) From the above graph, determine;

i) the melting point of the solid. (1 mark)

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ii) the quantity of heat supplied by the heater from the time the solid starts melting to the time it has all melted. (3 marks)

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b) What is meant by specific latent heat of vapourisation? (1 mark)

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c) In an experiment to determine the specific latent heat of vapourisation of water, steam at 100°C was passed into water contained in a well lagged copper calorimeter. The following measurement were made.

Mass of calorimeter	= 50g
Initial mass of water	= 70g
Initial temperature of water	= 5°C
Final mass of calorimeter + water + condensed steam	= 123g
Final temperature of mixture	=30°C
Specific heat capacity of water	$=4200Jkgk^{-1}$
Specific heat capacity of copper	$= 390Jkgk^{-1}$

i) Determine the

I) mass of condensed steam (1 mark)

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II) Heat gained by the calorimeter and water. (2 marks)

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ii) Given that L is the specific latent heat of vapourisation of steam;

I. Write an expression for heat given out by steam. (1 mark)

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II. Determine the value of L. (2 marks)

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16.a) State two ways in which the centripetal force on a body of mass M can be increased. (2 marks)

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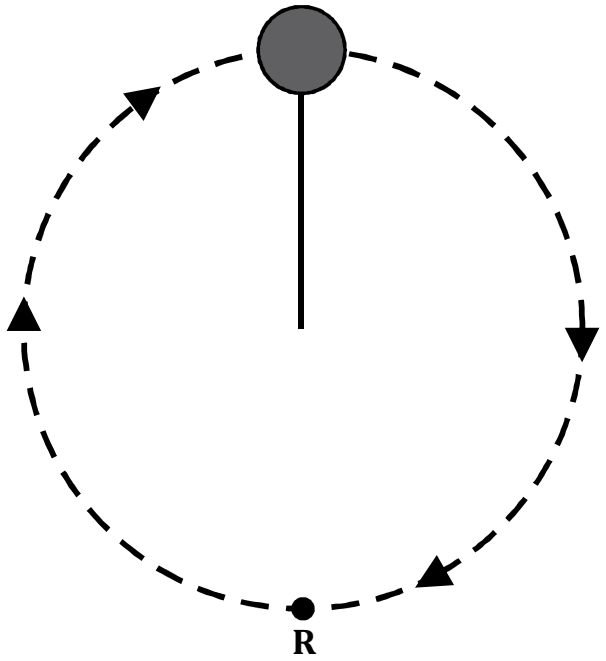
b) Figure 9 shows an object of mass 200g at the end of a string 120cm long being whirled round a vertical circle in the direction shown.

Fig 9



i) state two forces acting on the object at any instant as it continues to move in the vertical circle. (2 marks)

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ii) Indicate with an arrow on the figure the direction of ;
I) Centripetal force. (1 mark)

II) Velocity at the position shown (1 mark)

iii) State the reason why the object is accelerating while its speed remains constant.
(1 mark)

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iv) Given that the angular velocity of the body is 5 rad s^{-1}, find the tension of the string at point R, the lowest point. (3 marks)

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v) Determine the minimum velocity required to maintain the above body in a vertical circle.
(2 marks)

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

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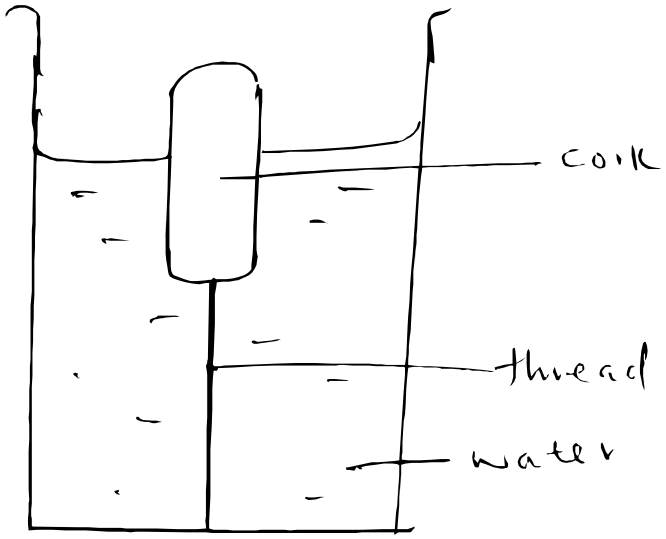
b) Figure 10 shows a cork floating on water and held to the bottom of the beaker by a thread.

Fig 10



i) Name the forces acting on the cork. (3 marks)

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ii) Describe how each of the forces mentioned in (i) above changes when water is added into the beaker until it fills up. (3 marks)

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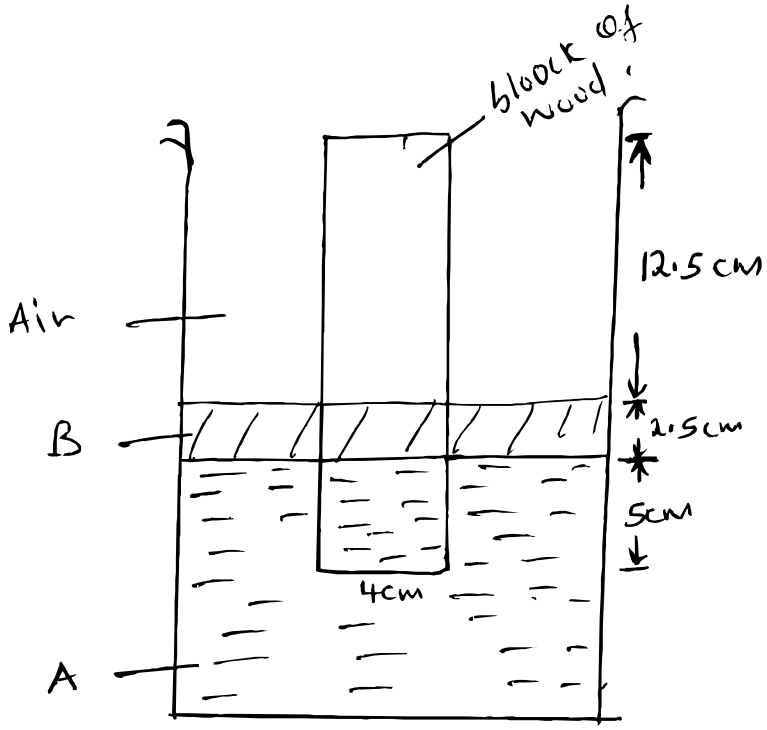
c) A rectangular wooden block floats in two liquids A and B shown below.

Fig 11



Given that the density of liquid A is 1.5g/cm³ and that of B is 0.8g/cm³ and that the dimensions of the wooden block

i) upthrust experienced by the block. (3 marks)

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ii) the weight of the block. (1 mark)

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iii) density of the block (2 marks)

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18. State the law that relates the volume of a gas to the temperature of the gas . (1 mark)

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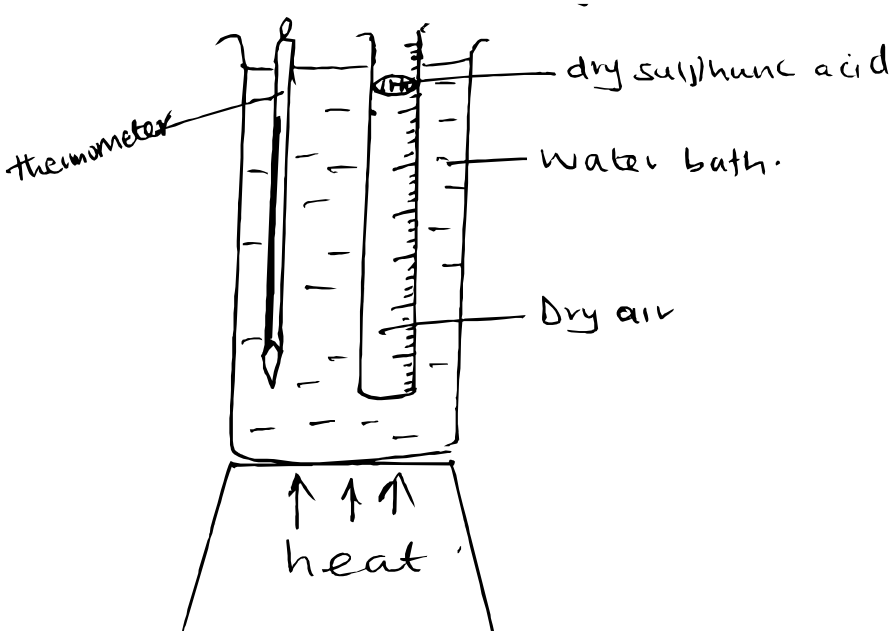
b) Figure 12 shows an experiment set-up that may be used to investigate one of the laws. The glass tube containing dry air has a uniform bore and it is graduated in millimetres.

Fig 12



i) Describe how the experiment is carried out to verify the law. (4 marks)

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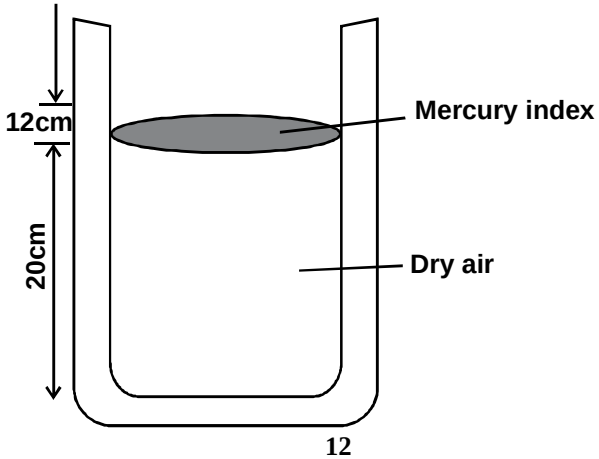
c) A thick glass tube has 20cm³ of dry air trapped in it by a 12cm long column of mercury as shown in figure 13 below.

Fig 13



Calculate the new volume of the trapped air if the tube were held horizontally. (Atmospheric pressure = 74.5cmHg and density of mercury = 13600kgm^{-3}.) (3 marks)

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