

**KAIRI SECONDARY SCHOOL**

**DEPARTMENT OF PHYSICS**

**END OF TERM TWO 2021 PHYSICS FORM TWO HOLIDAY ASSIGNMENTS**

**March 2020 EXAMINATIONS**

**NAME** \_\_\_\_\_ **TIME: 6 Weeks**

**ADM NO** \_\_\_\_\_ **CLASS** \_\_\_\_\_

**DATE OF SUBMISSION:** \_\_\_\_\_

**INSTRUCTIONS**

- answer all the questions
- for enquiries contact the author: +254716844478
- Credits given to clear explanations and proper illustrations
- Use the correct symbols to express formulas
- Show all your workings
- Be careful to submit the work on the day of reporting back to school
- The assignment constitutes 10% of the next terms work

1. Fig. 3 shows a device for closing a steam outlet.  
The area of the position is  $4.0 \times 10^{-4} \text{ m}^2$  and the pressure of the steam in the boiler is  $2.0 \times 10^5 \text{ Nm}^3$ . Determine the weight  $W$  that will just hold the bar in the horizontal position shown. (4 marks)

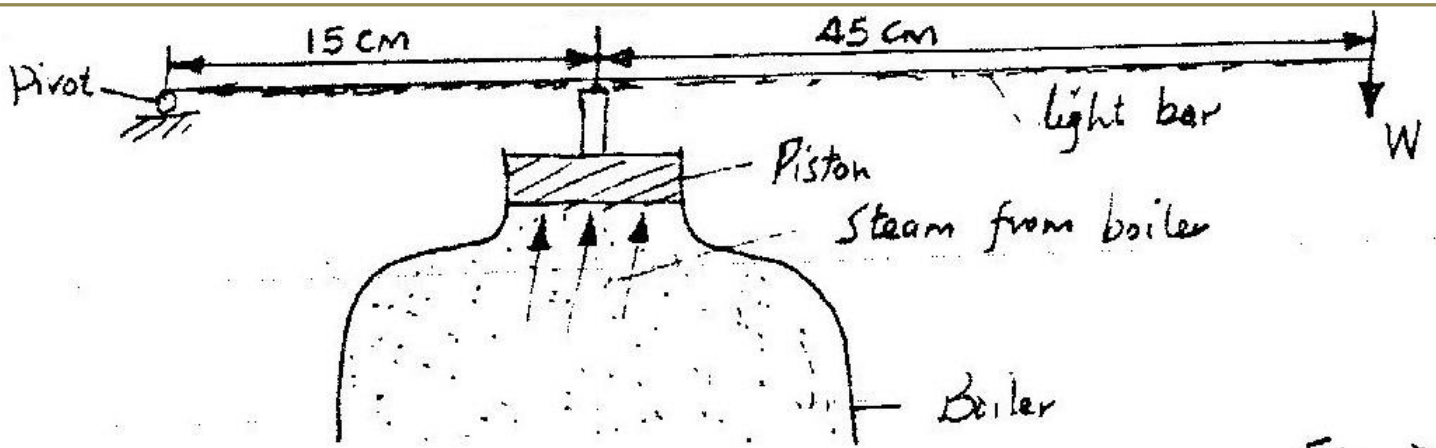
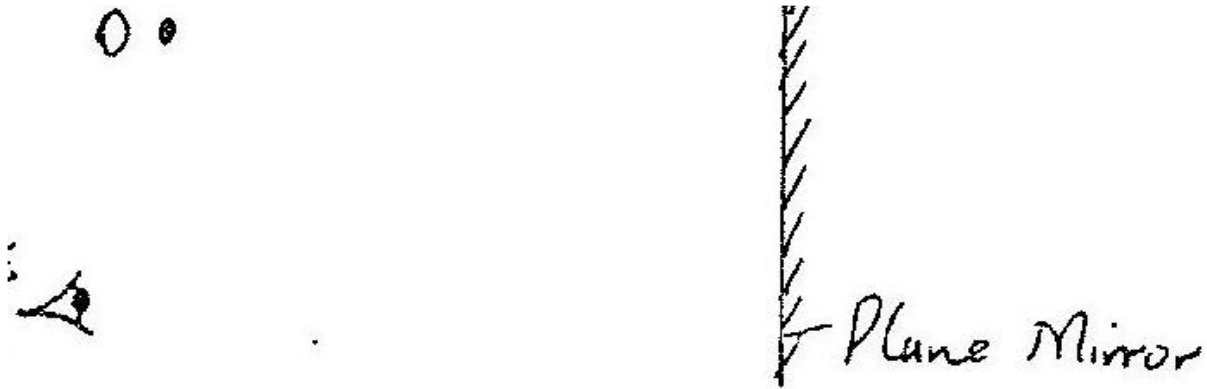


Fig. 3

2. Fig. 5 shows an object O placed in front of a plane mirror



On the same diagram draw rays to locate the position of the image I, as seen from the eye E. (3 marks)

3. Fig. 7 shows how magnets are stored in pairs with keepers at the ends

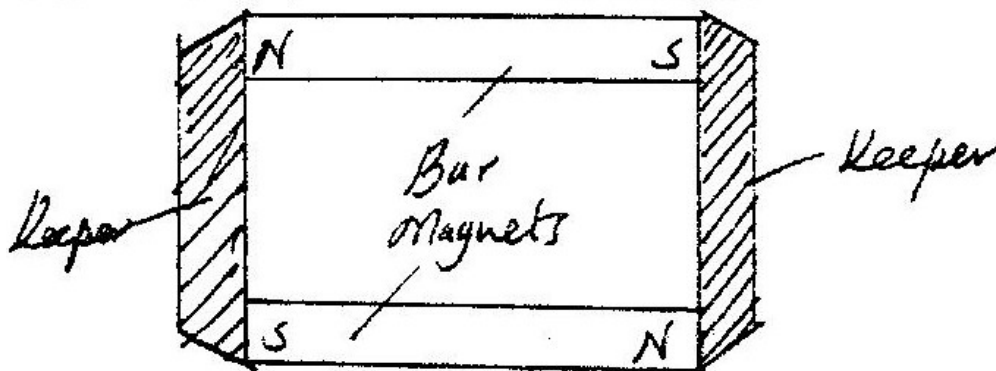


Fig. 7

Explain how this method of storing helps in retaining magnetism longer. (2 marks)

4. Fig. 12 shows a ray of light incident on a convex mirror

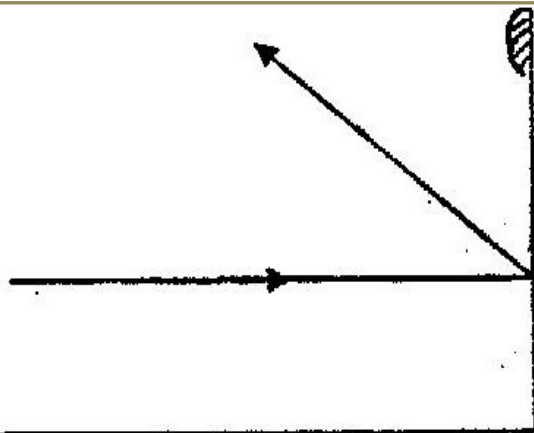


Fig. 12

Using a suitable construction on the same diagram determine the radius of curvature of the mirror. (2 marks)

5. State one application of each of the following.

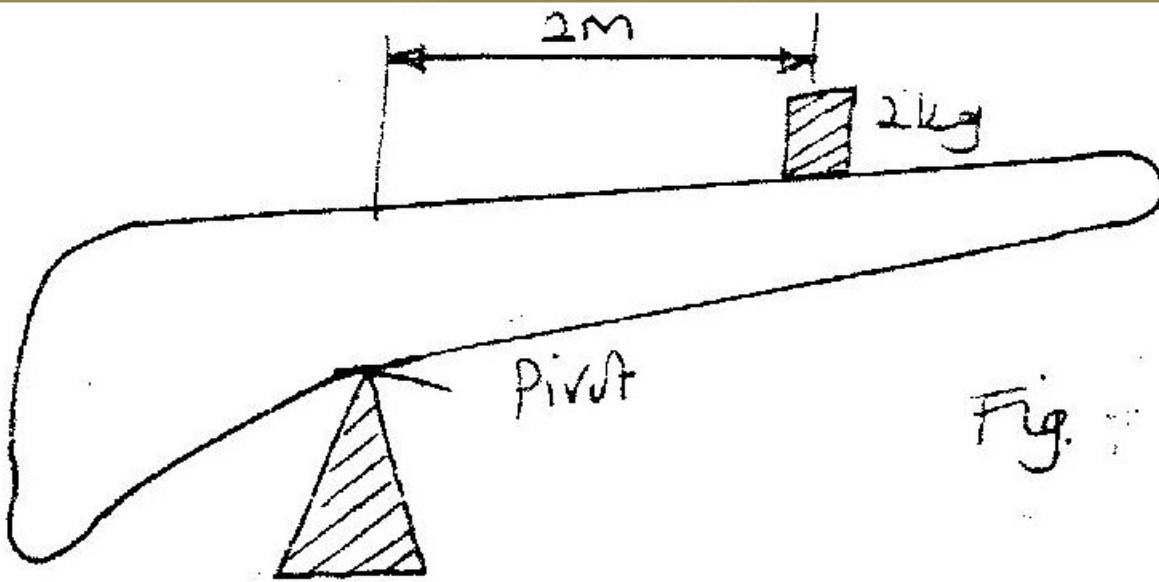
(i) Convex mirror-

(ii) Parabolic mirror –

6. The total weight of a car with passengers is 25,000N. The area of contact of each of the four tyres with the ground is 0.025m<sup>2</sup>. Determine the minimum car tyre pressure. (3 marks)

7. When an inflated balloon is placed at equal in a refrigerator it is noted that its volume reduces. Use the kinetic theory of gases to explain this observation. (2 marks)

8. Fig. 7 shows a non – uniform log of mass 100kg balanced on the pivot by a 2kg mass placed as Shown.



Determine the distance of the center of gravity of the log from the pivot. (3 marks)

9. The reading on a mercury barometer at a place is 700mm. What is the pressure at the place  $\text{Nm}^{-2}$  (Density of mercury is  $1.36 \times 10^4 \text{ kgm}^{-3}$ ) (3 marks)

11 Explain the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell. (2 marks)

12. In the set up shown in Figure 4, it is observed that the level of the water initially drops before starting to rise.

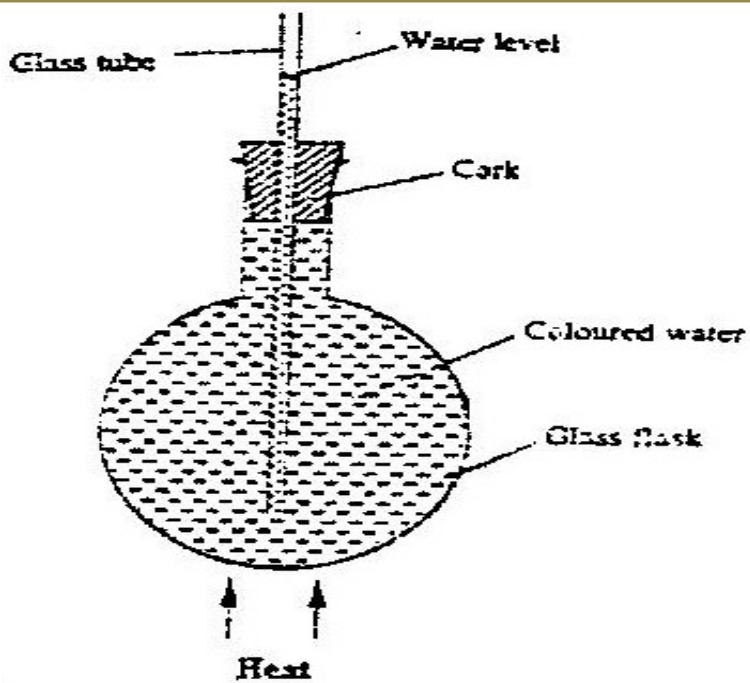


Figure 4  
Explain this observation ( 2 marks)

13. (a) Figure 6 shows a ray of light being reflected from a mirror.

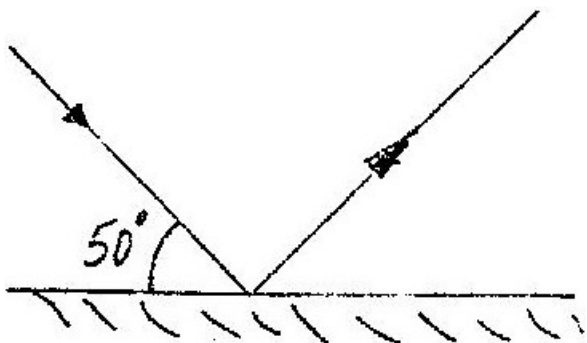
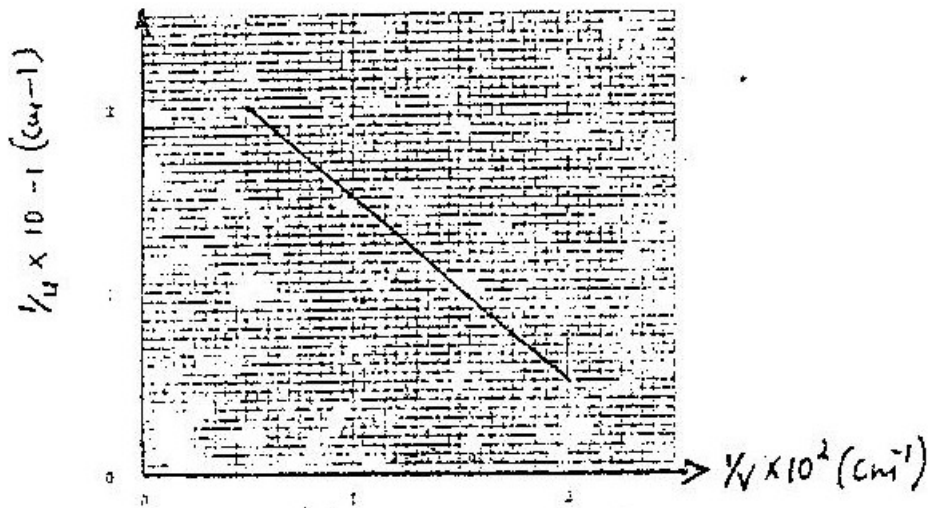


Figure 6

What is the angle of reflection?

(b) The graph in figure 9. shows the relationship between  $1/u$  and  $1/v$  for converging lens where  $u$  and  $v$  are the object and image distances



For the graph, determine the focal length,  $f$  of lens.

(c) An object placed 15cm from a convex lens is magnified two times. Determine the focal length of the lens.

14 . Figure 8 shows a bar of soft iron placed near a magnet.

Figure 8

On the same diagram, sketch the magnetic field pattern due to the set up

13. Give a reason why the core of the electromagnet of an electric bell is made of soft iron and not steel.

SOFT IRON

N

S

15 Figure 7 shows a highly negatively charged rod being brought slowly near the cap of a positively-charged leaf-electroscope. It is observed that the leaf initially falls and then rises.

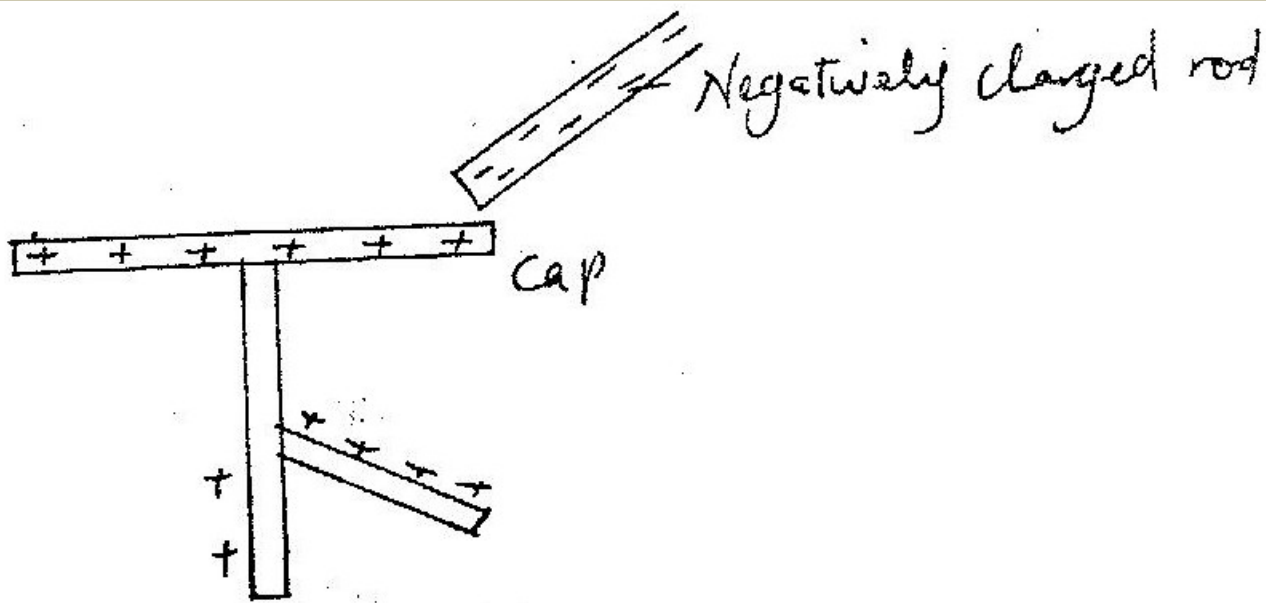


Figure 7

Explain this observation (2 marks)

16. In the circuit diagram shown in fig. 12, the lamps are identical and the cells are also identical.

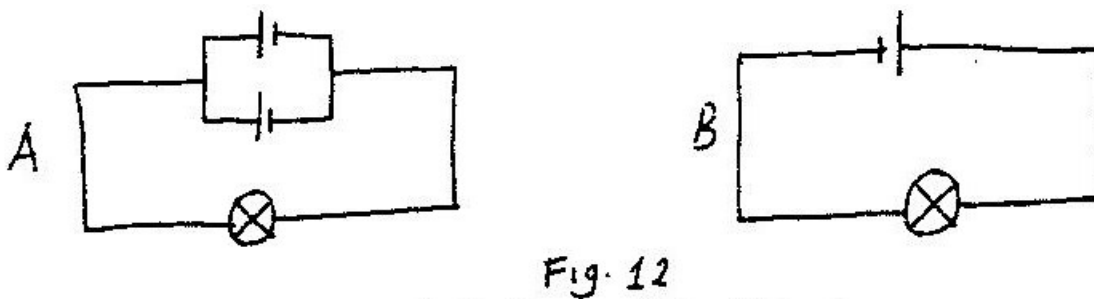
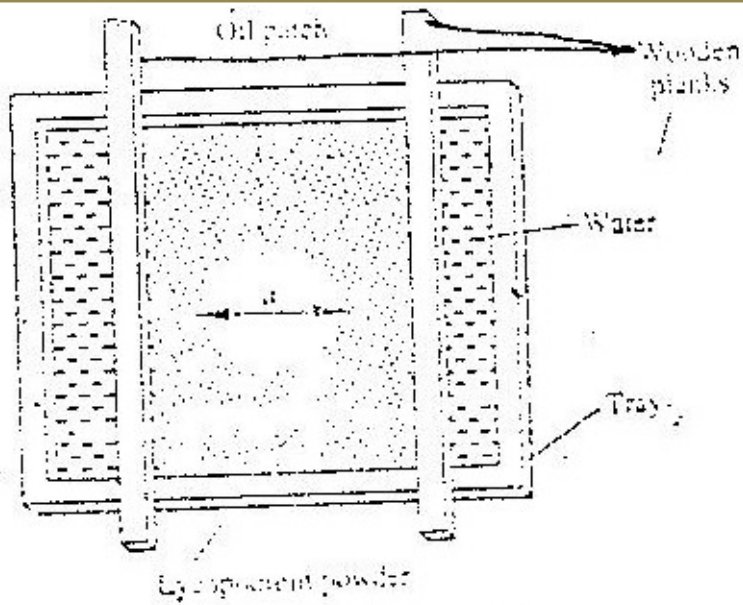


Figure 12.

State with reason, in which circuit the lamp will be lit for longer period (2 marks)

17. (a) Fig 3 shows part of an experimental set up for estimating the diameter of an oil molecule.



i) Describe how the oil patch is formed

ii) In an experiment the diameter  $a$ , of the patch was measured to be 200mm for an oil drop of radius 0.25mm. Determine the diameter of the molecule of the oil.(4 marks)

18. Fig 7 shows the features of a dry cell (Leclanche's). Use the information in the figure to answer question 9 and 10

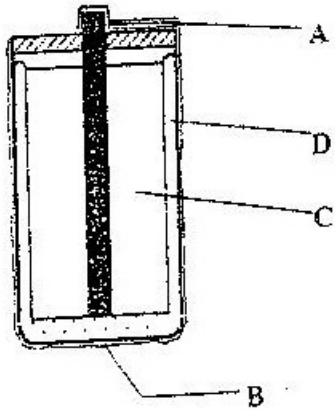


Fig 7  
State the polarities of the parts labeled A and B. (1mk)

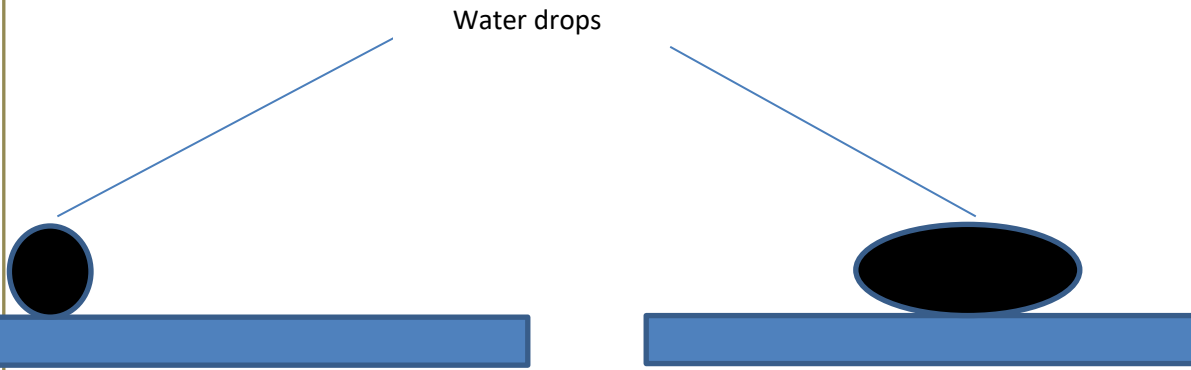
A.....  
B.....

19. Name the chemical substance in the parts labeled C and D (2mks)

C.....  
D.....



20 .Fig 8 shows water drops on two surfaces. In 8 (a) the glass surface is smeared with wax while in 8 (b) the glass surface is clean.



a) glass smeared with wax

b) clean glass

Fig

Explain the difference in the shapes of the drops. (4 mks)

21. Figure 3 shows the levels of two liquids A and B after some air has been sucked out of the tubes through the tap. Use this information and the figure to answer questions 4 and 5.

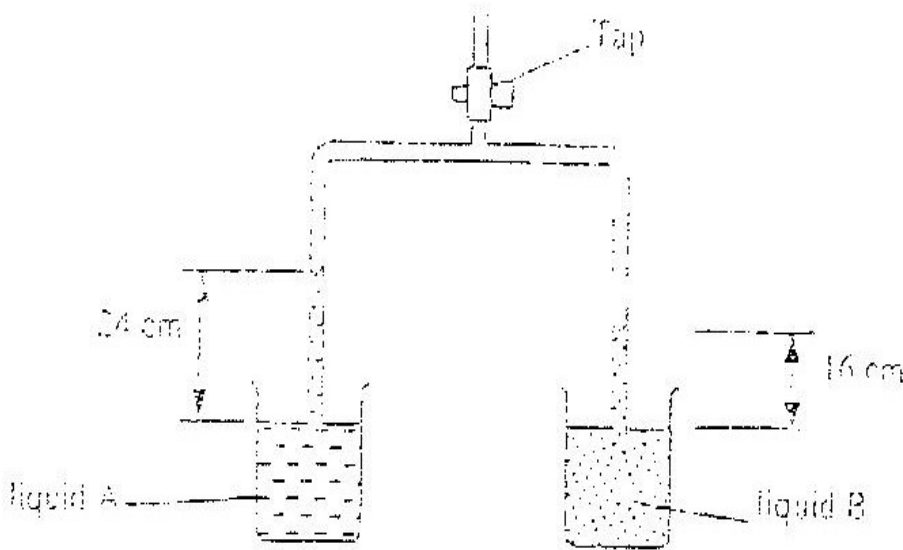
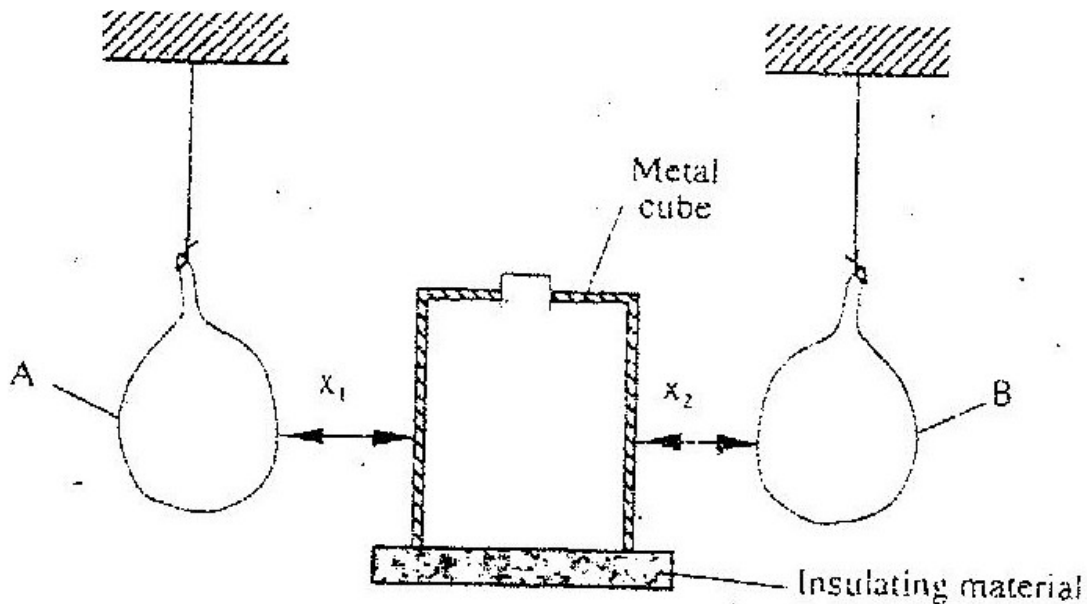


Figure 3

State the reason for the rise in the levels of the liquids when air is sucked from the tubes. Given that the density of liquid B is  $1200 \text{ kg/m}^3$ , determine the density of liquid A.

( 3 marks)

22. Figure 4 show 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  $X_1$  and  $X_2$  from a metal cube filled with boiling water and placed on an insulating material. Use this information to answer questions 22 and 23.

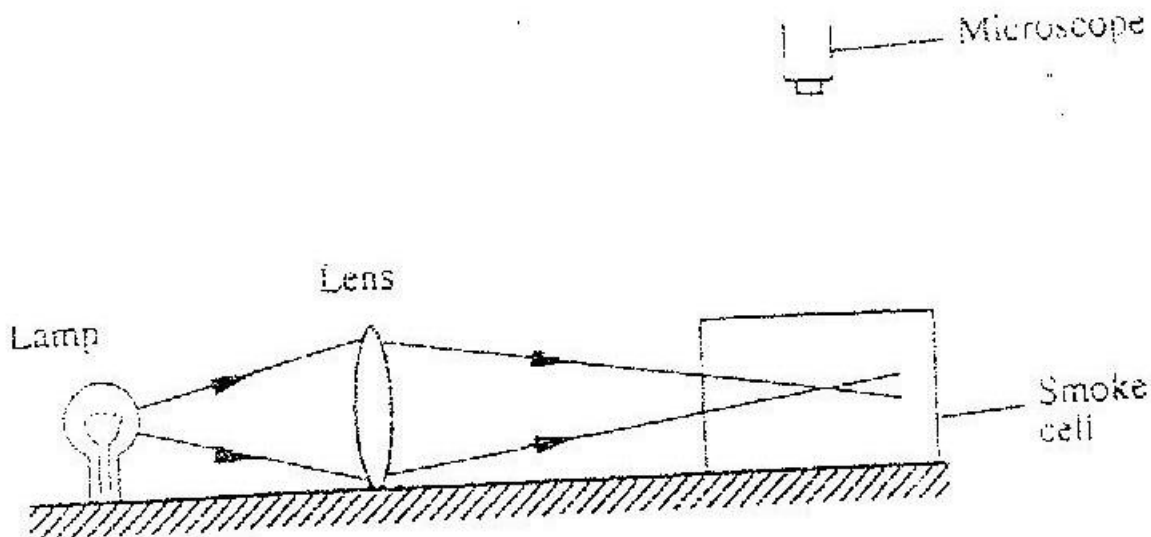


**Figure 4**

State the mode by which heat travels from the cube to the balloons (1 mark)

23. The face of the cube towards A, is bright and shiny and the face towards B is dull black. State with reason the adjustments that should be made on the distances  $x_1$  and  $x_2$  so that the rate of change of temperature in both balloons is the same. (2 marks)

15. Brown motion of smoke particles can be studied by using the apparatus shown in figure 9 to observe the motion, some smoke is enclosed in the smoke cell and then observed through the microscope.



**Figure 9**

(a) Explain the role of the smoke particle, lens and microscope in the experiment

(b) State and explain the nature of the observed motion of the smoke particles (3 marks)

(c) State what will be observed about the motion of the smoke particles if the temperature surrounding the smoke cell is raised slightly. ( 1 mark)