PHYSICS PAPER 232/2 K.C.S.E 2003

1a. Fig 1 shows the displacement time graph of the motion of a particle.

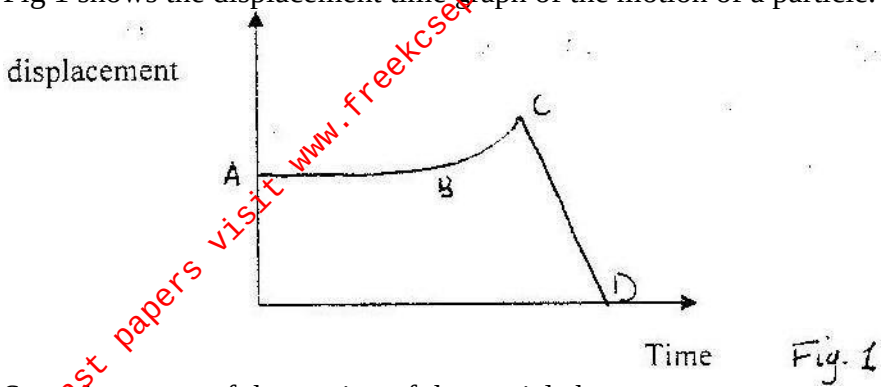


Fig. 1

State the nature of the motion of the particle between:

(i) A and B (ii) B and c (iii) C and D

b) A ball is thrown horizontally from the top of a vertical tower and strikes the ground at point 50m from the bottom of the tower. Given that the height of the tower is 45m, determine the :

i) Time taken by the ball to hit the ground.

ii) The initial horizontal velocity of the ball

iii) Vertical velocity of the ball just before striking the ground. (Take acceleration due to gravity g as $10ms^{-2}$) Total 13 marks

2a) A crane lifts a load of 200kg through a vertical distance of 3.0m in 6 seconds. Determine:

(i) Work done

(ii) Power development by the crane.

(iii) Efficiency of the crane given that it is operated by an electric motor rated 12.5kW.

(b) A child of mass 20kg sits on a swing of length 4m and swings through a vertical height of 0.9m as shown in figure 2..

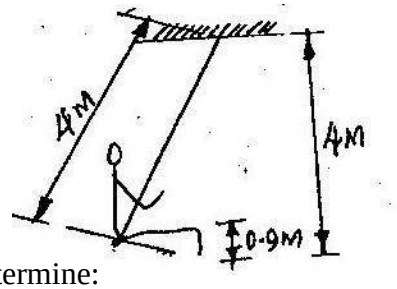


Fig. 2

Determine:

(i) Speed of the child when passing through the lowest point.

(ii) Force exerted on the child by the seat of swing when passing through the lowest point.

(14mks)

3a) State what is meant by the term 'specific latent heat of vaporization'

b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100^0C was passed into water contained in a well-lagged copper calorimeter. The following measurements were made;

(i) Determine the:

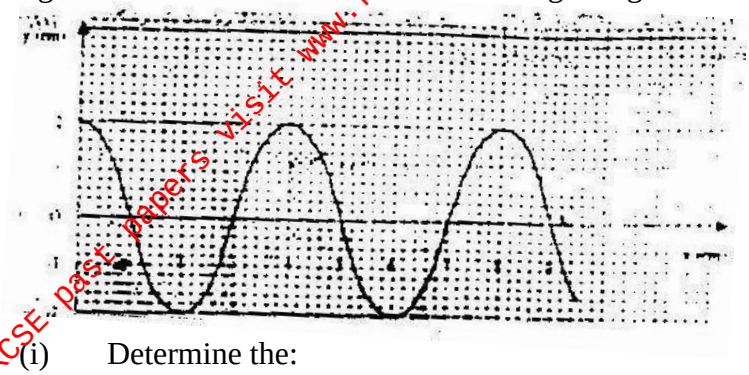
I Mass of condensed steam

II Heat gained by water

Heat gained by calorimeter

(ii) Given that L is the specific latent heat of vaporization of steam,
I write an expression for the heat given out steam.
II Determine the value of L.

4 a) Figure 3 shows a transverse wave traveling along x-axis.



(i) Determine the:
I Wavelength of the wave
II Amplitude of the wave.

(ii) If the time taken by the wave to move from 0 to A is 0.09 seconds, determine the:
I Frequency of the wave.
II Speed of the wave

b) Figure 4 shows a Geiger muller (GM) tube

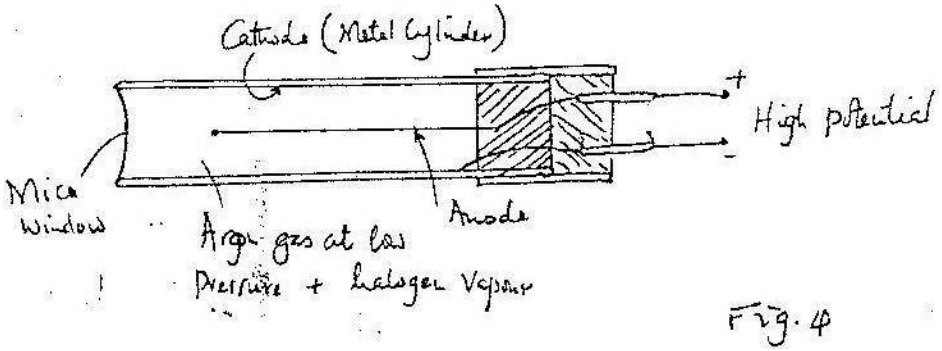
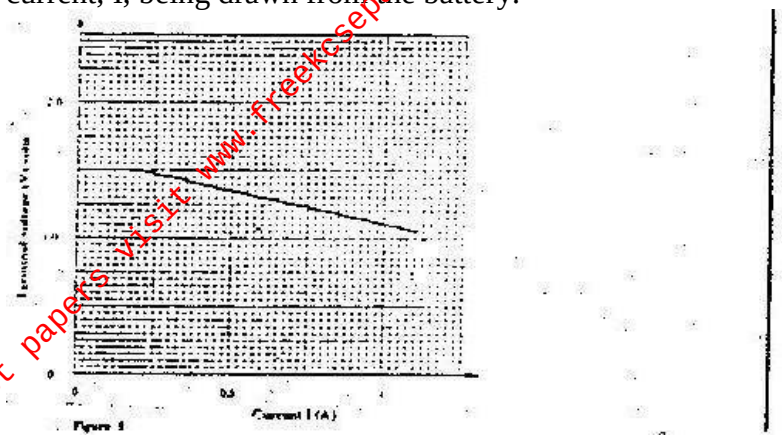


Fig. 4

(i) Give the reason why the mica window is made thin.
(ii) Explain how the radiation entering the tube through the window is detected by the tube.
(iii) What is the purpose of the halogen vapour

5 a) States what is meant by electromotive force (em.f) of battery.

b) The graph in figure 5 shows the terminal voltage, V, of a certain battery varies with the current, I, being drawn from the battery.



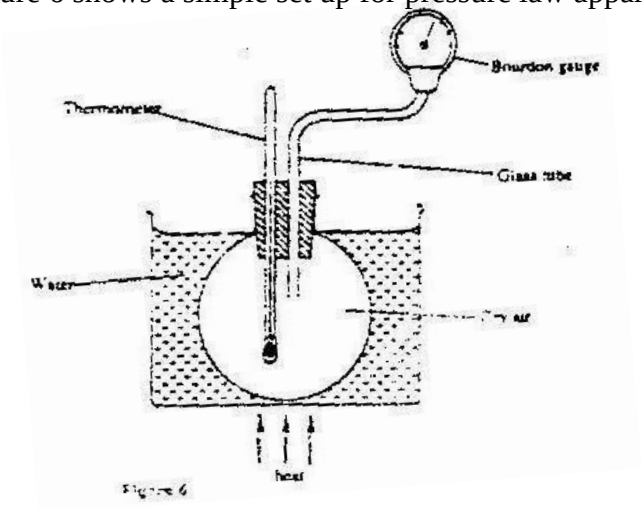
(i) Write an expression relating the e.m.f. E, terminal voltage, V, current, I and the internal resistance, r, of the battery for the circuit drawn in
(i) above.

(iii) From the graph determine the; I internal resistance, r, of the battery.

(C) A galvanometer of resistance 10Ω gives a full-scale deflection when a current of 0.03A flows through it. Determine the resistance of the resistor, which would be required to convert the galvanometer to an ammeter reading up to 3.0a.

SECTION II

6 a) Figure 6 shows a simple set up for pressure law apparatus.



Describe how the apparatus may be used to verify pressure law. Initial reading of pressure and temperatures are recorded.

b) The graph in fig 7 shows the relationship between the pressure and temperature for a fixed mass of an ideal gas at a constant volume.

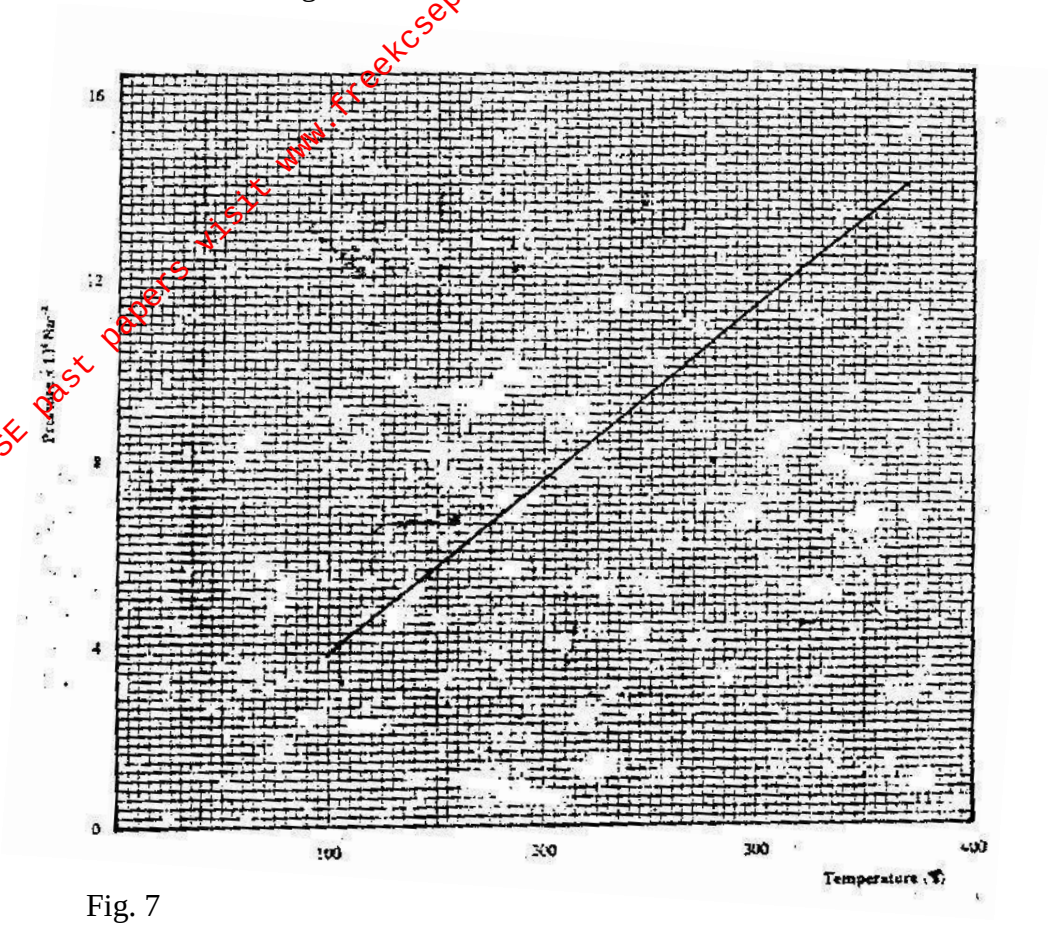


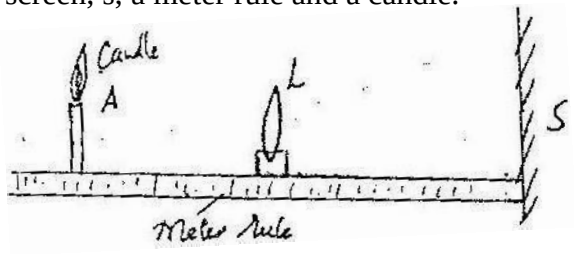
Fig. 7

(i) Given that the relationship between pressure, p, and temperature, T n Kelvin is of the form P = kT+ C where k and C are constants, determine from the graph, values of k and c.

(ii) Why would it be impossible for pressure of the gas to reduced to zero in practice?

(c) A gas is put into a container of fixed volume at a pressure of 2.1×10^5 Nm^{-2} and temperature 27^0C. the gas is then heated temperature of 327^0C.
Determine the new pressure.

7. a) Fig. 8. shows an experimental set up consisting of a mounted lens. L, a screen, s, a meter rule and a candle.

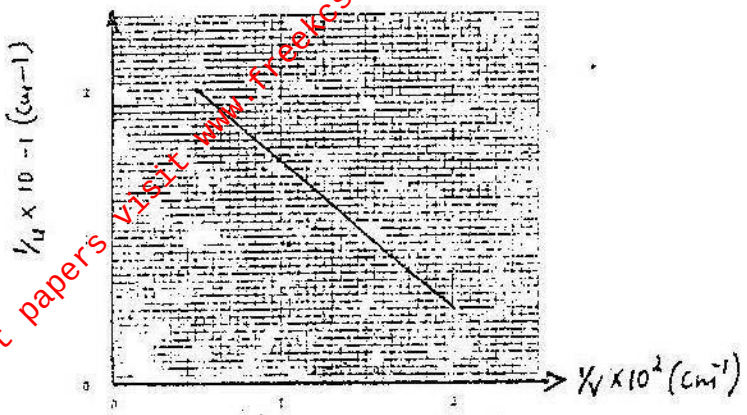


(i) Describe how the set-up may be used to determine the focal length, f, of the lens.

(ii) State the reason why the set-up would not work if the lens were replaced with a diverging lens.

(b) The graph in figure 9. shows the relationship between $^1/_r$ and $^1/_v$ for

converging lens where u and v are the object and image distances respectively.



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.