PHYSICS PAPER 232/1 K.C.S.E 2005 QUESTIONS

1. Figure 1 shows the reading on a burette after 55 drops of a liquid have been used.

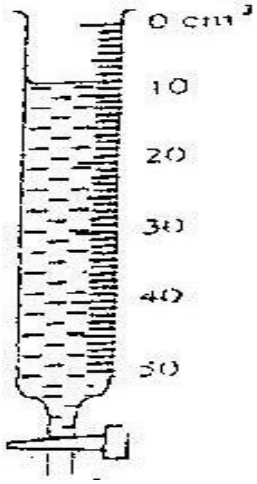


Figure 1

If the initial reading was at Zero mark, determine the volume of one drop.

(2mks)

2. Fig 2 shows a solid cylinder standing on a horizontal surface. The cylinder is in stable equilibrium.

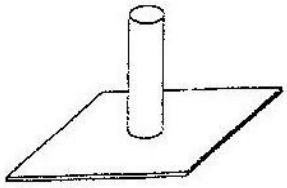


Fig 2

On the horizontal space provided, sketch the cylinder in neutral equilibrium.

(1mk)

3. The light uniform bar in Fig 3 is equilibrium. The two beakers A and B contain water at the same

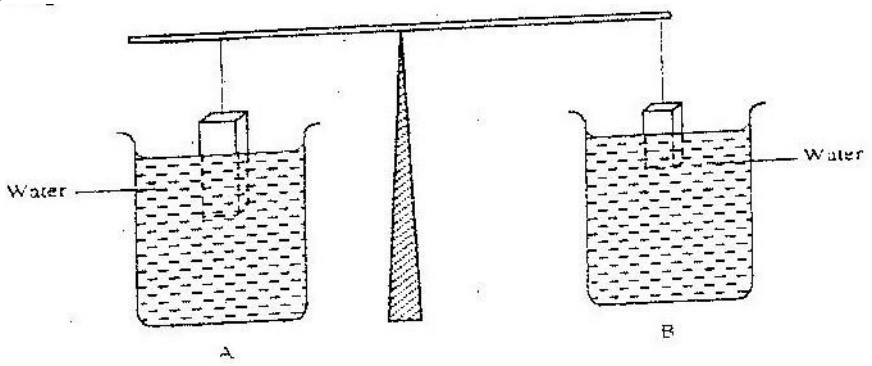
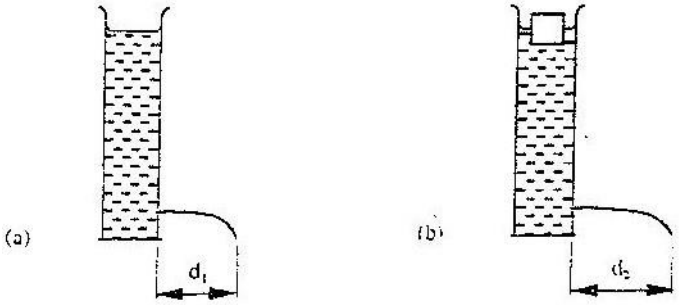


Figure 3

temperature. The two blocks are made of the same material.

If the temperature of the water in beaker A is now raised, explain why the beam tips to side A.
Assume the solid does not expand.

4. A can with a hole on the side is filled with water to a certain height. Water jets out as shown in Fig. 4(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 Fig. 4 (b)



State the reason why the maximum distance of the jet, d2 is greater than d1 (1mk)

5. In a vacuum flask the walls enclosing the vacuum are silvered on the inside. State the reason for this. (1mk)

6. Fig 5. Shows an arrangement of a source of light, an opaque object and screen.

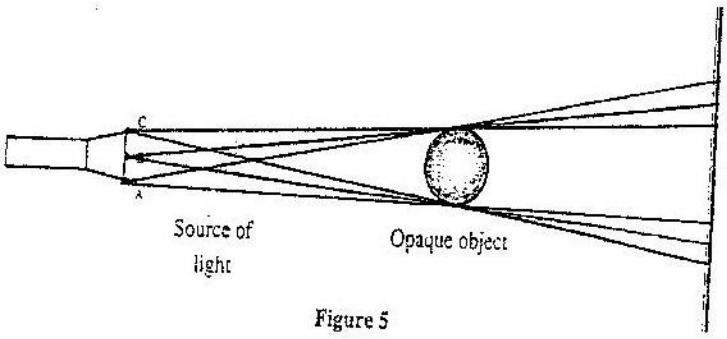


Figure 5

Using A, B and C as point sources, sketch on the same figure labeled ray diagram to show what is observed on the screen. (2mks)

7. Two identical tubes A and B 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 reason the tube in which the colour will reach the other end faster.

8. Sketch the electrostatic field pattern due to the arrangement of the charges shown in Fig 6

(1mk)

Fig 6

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

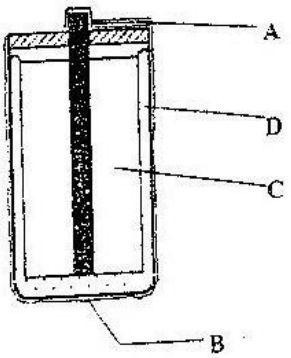


Fig 7

State the polorites of the parts labeled A and B. (1mk)

A……..

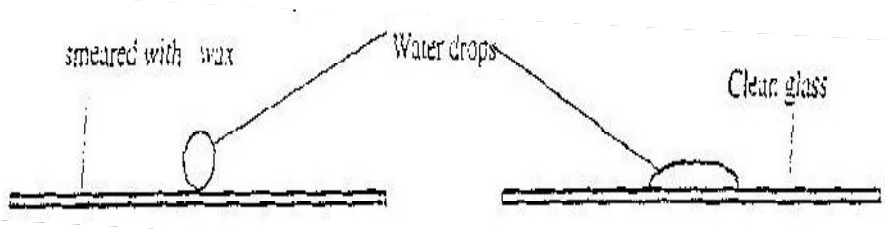
B……..

10. Name the chemical substance in the parts labelled C and D (2mks)

C……..

D……...

11. 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) b)

Fig

Explain the difference in the shapes of the drops. (2mks)

12. Fig 9 shows a current carrying coil in a magnetic field. The direction of the current and the resulting force are shown. Study the figure and answer questions 12 and 13.

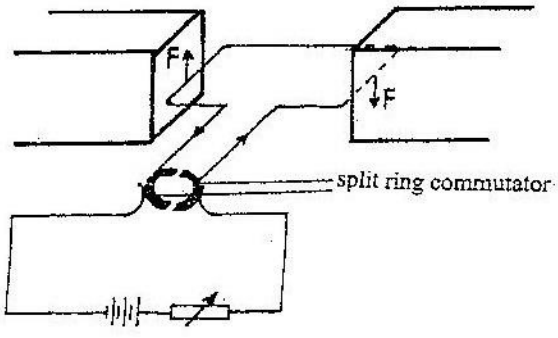


Fig 9

Label the poles of the magnets. (1mk)

13. Explain the purpose of the split ring commutator in the principle of the D.C motor shown in the diagram. (2mks)
14. A bullet is fired horizontally from a platform 15m high. If the initial speed is $300ms^{-1}$. Determine the maximum horizontal distance covered by the bullet. (3mks)
15. A certain machine uses an effort of 400N to raise a load of 600N. If the efficiency of the machine is 75%, determine its velocity ratio. (3mks)

16. Fig 10 represents a transverse wave of frequency 5 Hz traveling in the x direction.

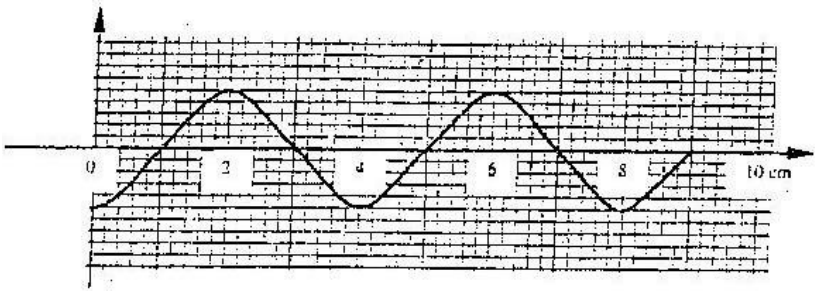


Fig 10

Determine the speed of the wave. (3mks)

17. An electronic siren producing sound continuously at a certain frequency is dropped from the top to a deep hole. State and explain what is observed about the pitch of the sound reaching the observer at the top. (3mks)

18. A student wishes to investigate the relationship between current and voltage for certain device X. In the space provided, draw a circuit diagram including two cells, rheostat, ammeter, voltmeter ad the device X that would be suitable in obtaining the desired results. (1mk)

19. A hair drier is rated 2500W, 240V. Determine its resistance. (3mks)

Fig 11 shows the variation of temperature,θ, with time t, when an immersion heater is used to heat a certain liquid. Study the figure and answer questions 20 and 21.

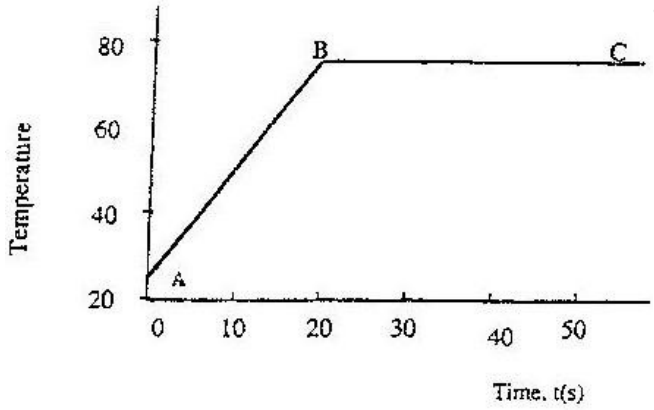


Fig 11

20. State the reason for the shape of graph in the section labeled BC (1mk)

21. Sketch on the same axes the graph for another liquid of the same mass but higher specific heat capacity when heated from the same temperature. (1mk)

22. Fig. 12 shows a vertical object, O, placed in front of a convex mirror.

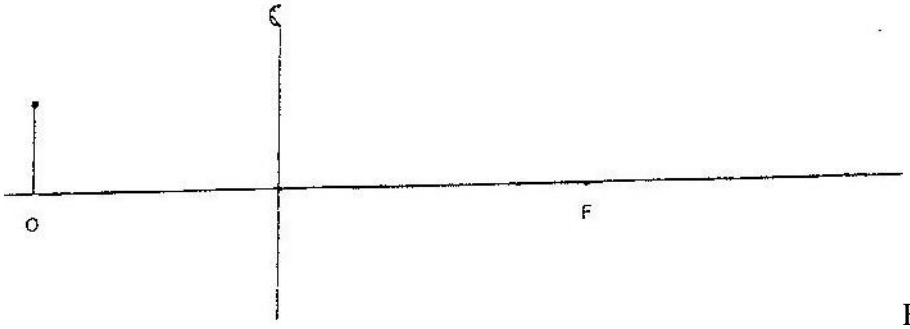


Fig 12

On the same diagram draw the appropriate rays and locate the image formed (3mks)

23. Fig 13 shows rays of light AO,BO, and CO incident on a glass-air interface. OA' OB' and OC' are the corresponding emergent rays. Study and answer questions 23 and 24.

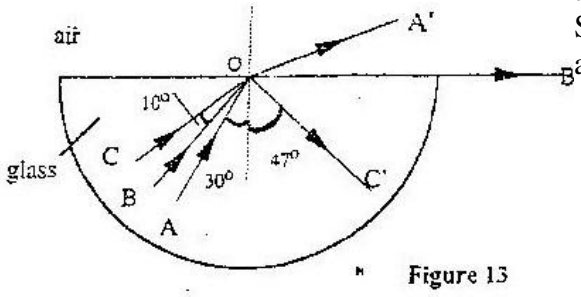


Figure 13

Determine the critical angles of the glass material

24. Determine the refractive of index of the glass material. (3mks)

25. Fig 14 shows the velocity- time graph for a small metal sphere falling through a viscous fluid.

Fig 14 .

On the axes provided sketch the graph of momentum against time for the same mass. (1mk)

26. State Bernoulli's principle. (1mk)

27. The melting point of oxygen is given as -281.3^{0}C. Covert this temperature to Kelvin (K) (1mk)

28. Fig 15 shows an arrow which indicates the direction of travel of a wave in a medium. P is a particle of the medium that is in path of the wave.

Fig 15

In the space provided sketch diagram to show how the particles P moves when the wave is

(i) A transverse wave

(ii) A longitudinal wave. (1mk)

29. A car of mass 800kg moves on a circular track of radius 20m. The force of friction between the tyres and the tarmac is 4800N Determine the maximum speed at which the car can be driven on the track without skidding.

30. An illuminated vertical object is initially placed on the principal axis of a converging lens and 32cm from it. The focal length of the lens 15cm. The object is new placed at a point 12cm from the lens and on the same side. State two changes other than magnification than magnification that that are observed on the image formed due to this change.

31. Explain how an "excited' hydrogen atom is able to emit radiations of different wavelengths.

32. Fig 16 shows wave fronts in a ripple tank approaching a shallow region in the tank.

Figure 16

Complete the diagram to show the wave front as they pass over the shallow region and after leaving the regions. (1mk)

33. The target of X-ray tube s made of melting point. Give a reason for this (1mk)

34. Explain why a drop of methylated spirit on the back of the hand feels colder than a drop of water at the same temperature.

35. Draw appropriate symbols the circuit diagram of a junction diode in reverse bias. (1mk)

36. The following represents a nuclear reaction involving the nuclide polonium Po

$$^{218}_{84}Po \xrightarrow{m} {}^{214}_{82}Pb \xrightarrow{n} {}^{214}_{83}Bi \longrightarrow {}^{214}_{84}X$$

(3mks)

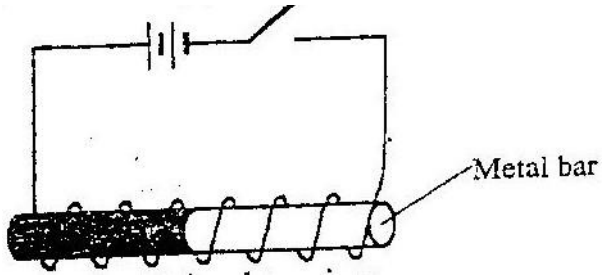
Identify m, n and X

m

n

X

37. In the set up Fig 17 the metal rod is made up of steel and iron pieces joined end. Your are provided with two iron nails.



Explain how you would use two nails provided to determine which side is iron (2mks)

38. Fig 18 shows two spherical materials one an insulation conductor, the other a conductor, Negative charge are introduced at point A in each case.

Figure 18

One the same figure indicate the final position of the charges. Explain your answer. (2mks)

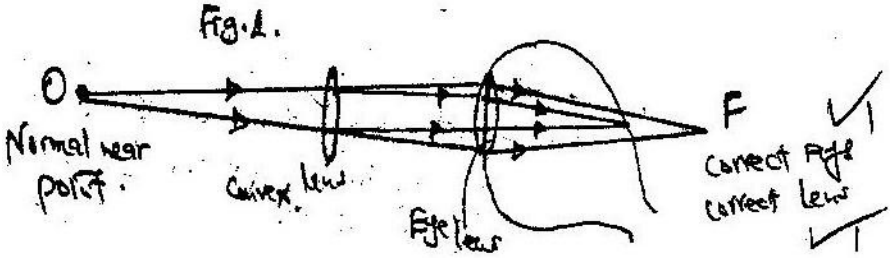
PHYSICS PAPER 232/2 K.C.S.E 2005 QUESTIONS

1. a) Describe with aid of a labeled diagram an experiment to determine the focal length of the lens when provided with the following; an illuminated object, convex lens, a lens, a lens holder, a plane mirror and a metre rule. (5mks)

   b) A small vertical object is placed 28cm in front of a convex lens of focal length 12cm. On the grid provided, draw a ray diagram to locate the image. The lens position is shown.
   (Use a scale; 1cm rep re 4cm) (5mks)

   Determine the image distance.

   c) Fig 1 shows a human eye with a certain defect



   (i) Name the defect
   (ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. (2mks)

2. a) Fig 2. Shows a wheel and axle being used to raise a load W by applying an effort F The radius of the large wheel is R and of the small wheel r as shown.

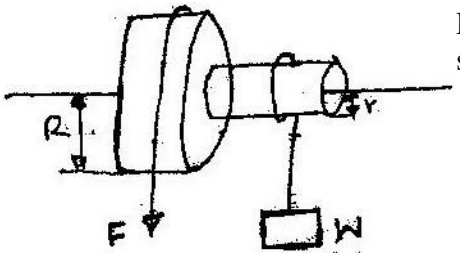


Fig.2.

   (i) Shows that the velocity ratio (V.R) of this machine is given by R/r (3mks)
   (ii) Given that r= 5cm, r=8cm, determine effort required to raise a load of 20N if the efficiency of the machine is 80% (4mks)
   (iii) It is observed that the efficiency of the machine increases when it is used to lift large loads. Give a reason for this. (1mk)

3 When the switch is closed determine the:
   (i) Ammeter reading
   (ii) Charge on each conductor (3mks)

4. Explain how doping producers an n-type semi-conductor for a pure semi-conductor material. (3 marks)

b) Fig 5. Shows the circuit of a rectifier using four diodes D1, D2, D3 and d4.

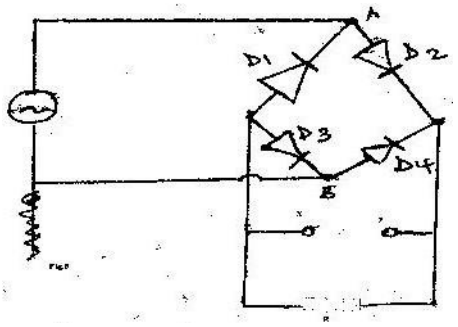


Fig 5.

(i) Explain how a rectified output is produced from the set – up when an a.c input is connected across AB (4 marks)

(ii) On the axis provided sketch the graph of output voltage against time for rectifier (1 mark)

(iii) A capacitor is now connected across XY. Explain the effect of the capacity on the output. (2 marks)

(c) A transistor in a common – emitter amplifier has life = 120. A signal in the input causes the base corresponding change in the output voltage if the load resistance is 100n. (4 marks)

5. (a) State Hooke's law (1 mark)

(b) One of a piece of a rubber was fixed to a rigid support and the other end pulled with a force of varying magnitude. The graph in fig 6 shows the relationship between the force (N) and the extension (cm)

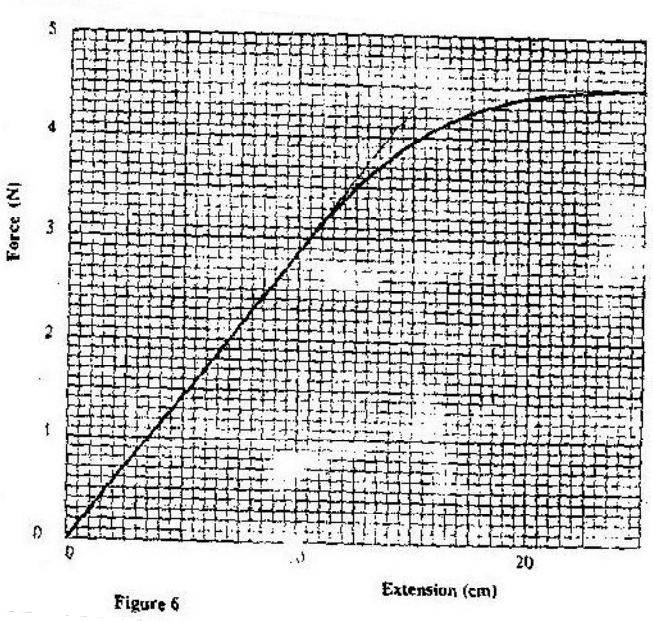


Figure 6

Using the graph, determine

(i) The stretching force at the elastic limit

(ii) The tensile stress in the rubber at an extension of 5 cm if the cross-section of the rubber is $0.25cm^2$

(iii) The tensile in the rubber at an extension of 5cm if the original length was 2 m (3 marks)

(c) In Fig 7. girders AB, BC, CD, ED, EB and BD were joined to make the rigid structure shown. The load W hangs from the structure as shown.

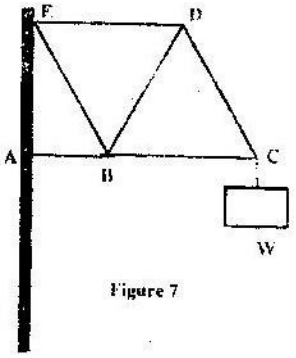


Figure 7

Which of the girders can be replaced with strings without affecting the structure? (2 marks)

SECTION II (15 MARKS)

Answer ONE question from this section in the spaces provided at the end of questions seven

6. (a) Define the term angular velocity (1 mark)

(b) A body moving with uniform angular velocity is found to have covered an angular distance of 170 radians in t seconds. Thirteen seconds later it is found to have covered a total angular distance of 300 radians. Determine t. (3 marks)

(c) Fig 8 shows a body of mass m attached to the centre of a rotating table with a string whose tension can be measured. (The device for measuring the tension is not shown in the figure)

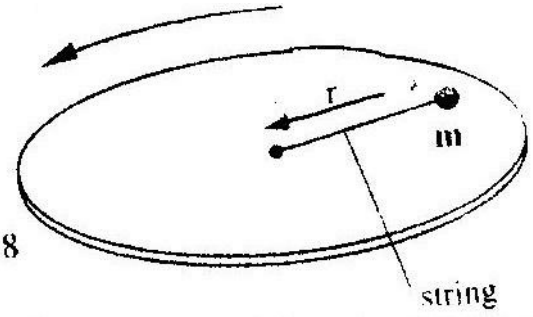


Figure 8

The tension, T on the string was measured for various values of angular velocity, w. The distance r of the body from the centre was maintained at 30cm. Table 1 shows the results obtained.

Table 1

W^2	4.0	9.0	16.0	25.0	36.0
Angular velocity w ($radi^{-1}$)	2.0	3.0	4.0	5.0	6.0
Tension T (N)	0.04	0.34	0.76	1.30	1.96

(i) Plot the graph of T (y- axis against w^2) (5 marks)

(ii) From the graph, determine the mass, m of the body given that
$T = mw^2 - C$
Where C is a constant (4 marks)

(iii) Determine the constant C and suggest what it represents in the set up.
(2 marks)

7. (a) What is meant by radioactivity (1 mark)

(b) With an aid of a labeled diagram explain the working of Geiger Muller tube as a detector of radiation (5 marks)

(c) In an experiment to determine the half of a certain radioactivity substance, the activity in disintegrations per minute was measured for sometime. Table 1 shows the results obtained

Time in Minutes	0	10	20	30	40	50	60	70	80
Activity indisintergrations	152	115	87	66	50	38	20	12	6

On the grid plot a suitable graph and sue it to determine the half life t ½ of the substance (7 marks)

(d) At time t = 40 minutes, the activity of a sample of a certain radioactive isotope with a half life 12 minutes if found to be 480 disintegration per minute.
Determine the time which activity was 3840 disintegrations per minute
(2 marks)