PHYSICS PAPER 232/1 K.C.S.E 1997

Answer all the questions in this paper mathematical tables to be used

Take: *Density of mercury = 1.36×10^4*
Speed sound = 340ms^{-1}
Speed of light = 3.0×10^8 ms^{-1}
g = 10ms^{-2}

1. Figure 1 shows a measuring cylinder, which contains water initially at level A. A solid of mass 11 g is immersed in the water, the level rises to

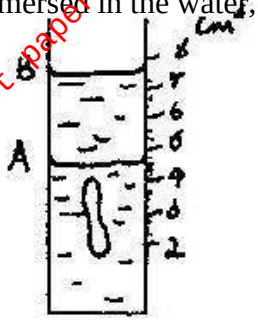

Fig. 1

Determine the density of the solid. (Give your answer to 1 decimal place)

2. Figure 2 shows a rigid body acted upon by a set of forces. The magnitudes of the forces are as follow

$F_1 = 3N_1$, $F_2 = 6N$, $F_3 = 3N$, $F_4 = 4\ N_1$, $F_5 = 3N$ and $F_6 = 3\ N$

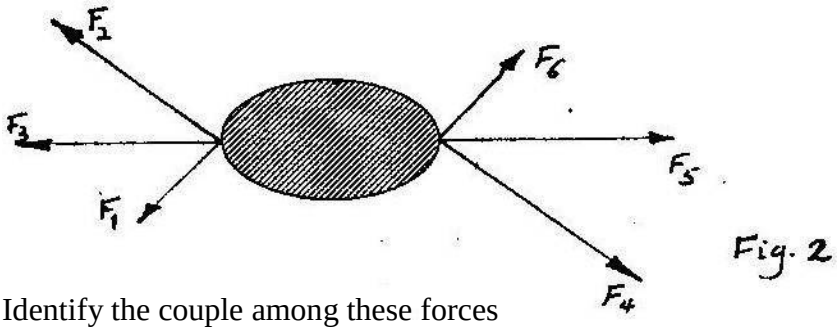

Fig. 2

Identify the couple among these forces

3. Give a reason why the weight of the body varies from place to place

4. A butcher has a beam balance and masses 0.5 kg and 2kg. How would he measure 1.5 kg of meat on the balance at once?

5. 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 = 8.0×10^2 kgm^{-3})

6. The number of molecules in 18cm^3 of a liquid is 6×10^{23}. Assuming that the diameter of the molecules is equivalent to the side of a cube having the same volume as the molecule. Determine the diameter of the molecule.
7. Explain why a glass container with thick walls is more likely to crack than one with a thin wall when a very hot liquid is poured into them.

8. State the reason why water spilled on a glass surface wets the surface

9. Figure 3 shows two aluminium containers, A and B placed on a wooded table. A and B have equal volumes of hot water initially at the same temperature.

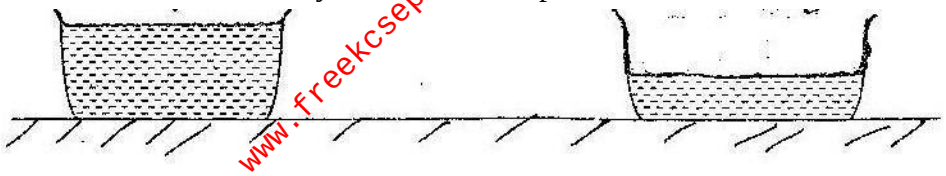

Fig. 3

10. Figure 4 shows two point objects A, and B, placed in front of a mirror M

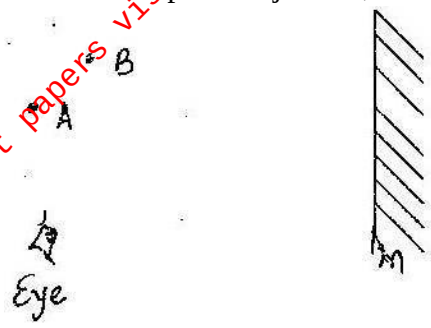

Fig. 4

Sketch a ray diagram to show the positions of their images as seen by the eye.

11. Figure 5 shows two charged identical conduction spheres on insulting stands. Each cross represents a charge. The spheres are briefly brought into contact and then separated.

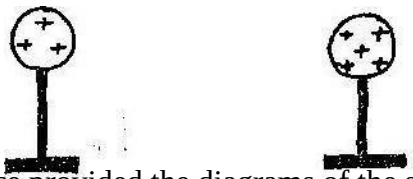

Fig. 5

Sketch in the space provided the diagrams of the spheres showing charge distribution after separation

12. Name a device used to convert light energy directly into electrical energy

13. Figure 6 shows a beam AB supported at points A and B. A large F is applied on the beam as shown. Mark on the diagram, the position X, where a notch is likely to appear.

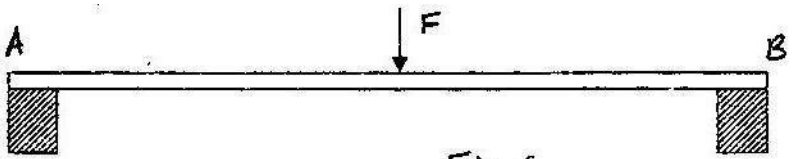

Fig. 6

14. Distinguish between soft and hard magnetic materials
15. A current of 0.5A flows in a circuit. Determine the quantity of charge that crosses a point in 4 minutes.
16. Figure 7 shows an incomplete circuit of an electromagnet. Complete the circuit between X and Y drawing the windings on the two arms of the core such that A and B are both North poles when switch S is closed. Indicate the direction of the current on the windings drawn.

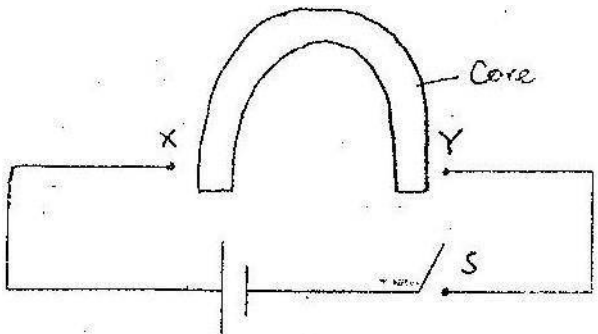

Fig. 7

17. An observer watching a fireworks displays sees the light from an explosion and hears the sound 2 seconds later. How far was the explosion from the observer?
18. Water flows in a horizontal smooth pipe. State the changes that would be observed in the nature of the flow if the speed of the water is steadily increased from low to a high value
19. A transformer in a welding machine supplies 6 volts from a 240V main supply. If the current used in the welding is 30A. Determine the current in at the mains.
20. An object dropped from a height h attains a velocity of 6 ms^{-1} just before hitting the ground. Find the value of h.
21. Calculate the wavelength of the KBC FM radio wave transmitted at a frequency of 95.6 Mega Hertz.

Using the information in figure 8 answer questions 22 and 23.

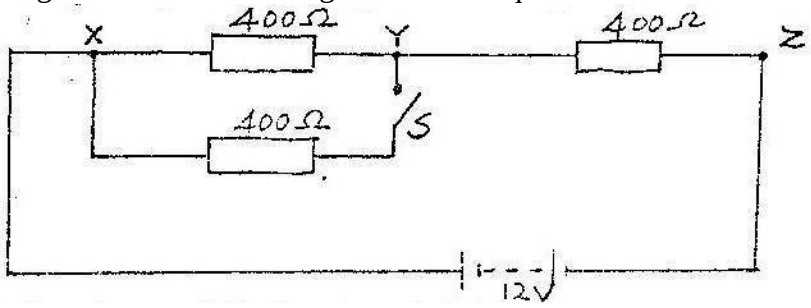

Fig. 8

22. What is the p.d across YZ when the switch S is open?
23. Determine the p.d across YZ when the switch S is closed
24. How many 1000W electric irons could be safely connected to a 240V main circuit fitted with 13A fuse?
25. Ice changes to water at 0^0C. Equal masses of the ice and water at 0^0C are each heated to 1^0C. Give a reason why more heat energy is required to heat ice.
26. Figure 9 shows two parallel rays incident on a concave mirror. F is the focal point of the mirror.

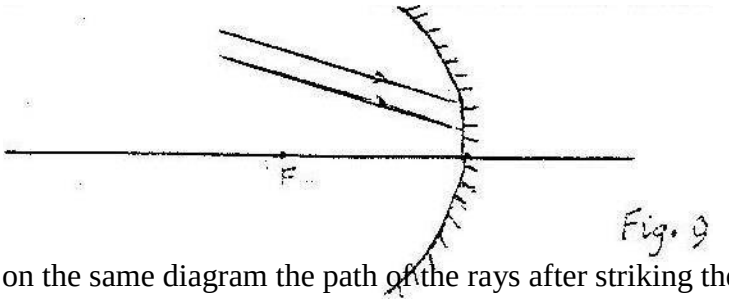

Fig. 9

Sketch on the same diagram the path of the rays after striking the mirror

27. Figure 10 shows the apparent position of a fly in air as seen by a fish in water

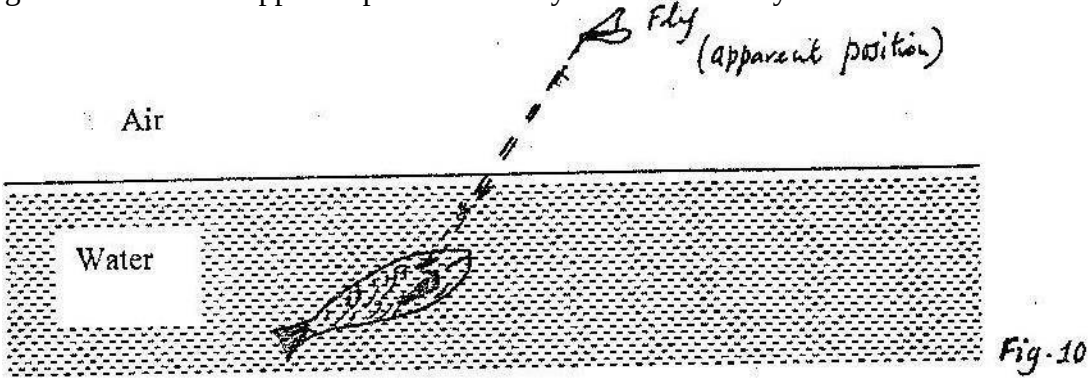

Fig. 10

Sketch on the same diagram rays to show the actual position of the fly

28. A trolley is moving at constant speed in a friction compensated track. Some plasticine is dropped on the trolley and sticks on it. State with a reason what is observed about the motion of the trolley.

29. Figure 11 shows part of a circuit containing three capacitors

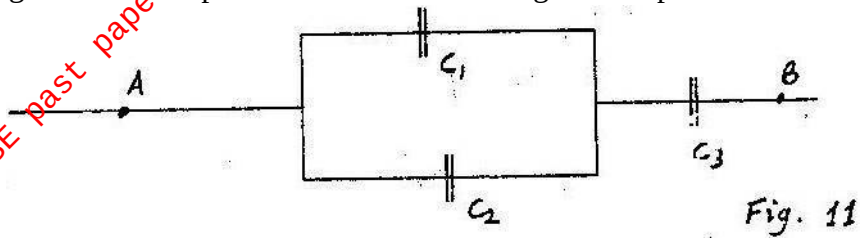

Fig. 11

Write an expression for C_T the effective capacitance between A and B.

30. What is the value of -20^0C on the absolute temperature scale?
31. Figure 12 shows an experiment arrangement. S_1 S_2 and S are narrow slit

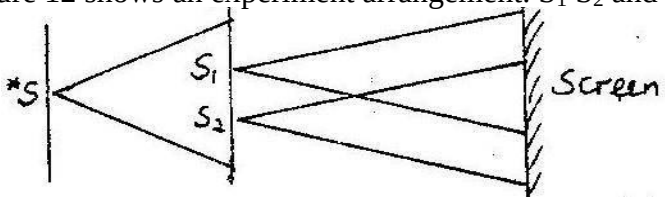

Fig. 12

State what is observed on the screen when the source is?
(a) Monochromatic (b) White light

32. Two turning forks are sounded together. What is the condition for the beats to be heard?
33. Using the components symbols shown in figure 14, sketch a series circuit diagram for a forward biased diode.

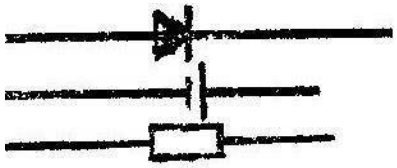

Fig. 13

34. State how eddy currents are reduced in a transformer
35. A lithium atom has 3 protons in its nucleus. Complete the diagram in figure 14 by marking X in the appropriate shells show the electron distribution when the atom is not excited

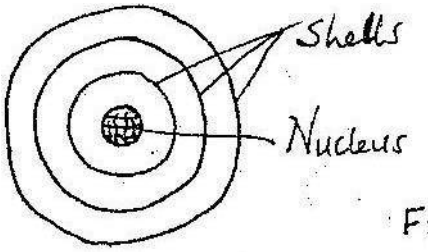

Fig. 14

36. In a sample there are 5.12 x 1020 atoms of krypton – 92 initially. If the half of krypton; 92 is 3.0s determine the number of atoms that will have decayed after 6s.