

## PHYSICS PAPER 232/1 K.C.S.E 2000

1. Fig 1 shows part of a measuring cylinder calibrated in  $\text{cm}^3$  containing water whose level is indicated. Some  $3.0\text{cm}^3$  of is added into the cylinder. Indicate on the diagram the new level of water.

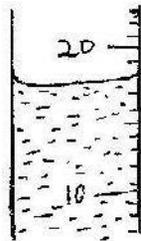


Fig. 1

2. A bag of sugar is found to have the same weight on planet earth as an identical bag of dry sawdust on planet Jupiter. Explain why the masses of the two bags must be different.
3. Fig. 2 shows a beaker placed on a bench. of ice is placed in the beaker as shown.

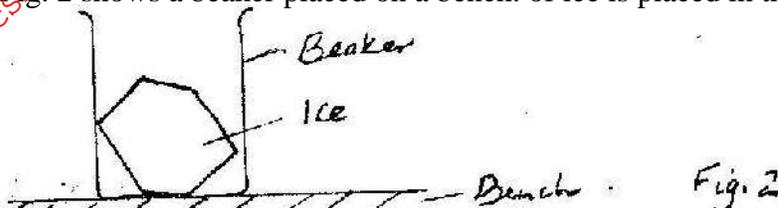


Fig. 2

State and explain the change in the stability of the beaker when the ice melts.

4. A positively charged rod is brought near the cap of a leaf electroscope. The cap is earthed momentarily by touching with the finger. Finally the rod is withdrawn. The electroscope is found to be negatively charged. Explain how this charge is acquired.
5. Fig. 3 shows a device for closing a steam outlet.

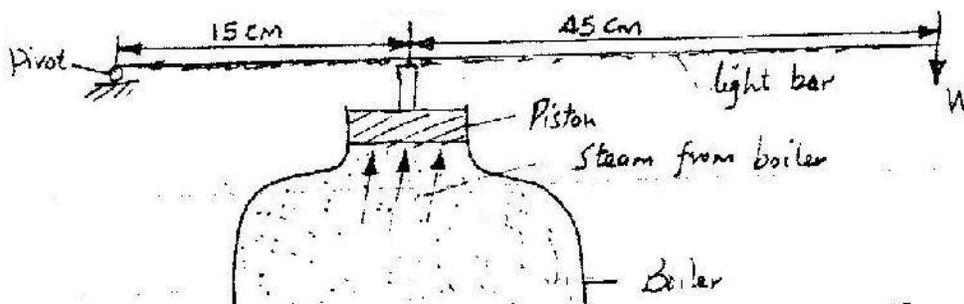


Fig. 3

The area of the piston is  $4.0 \times 10^{-4} \text{ m}^2$  and the pressure of the steam in the boiler is  $2.0 \times 10^5 \text{ Nm}^{-2}$ . Determine the weight  $W$  that will just hold the bar in the horizontal position shown.

6. State the reason why gases are easily compressible while liquids and solids are not?

7. Fig. 4 shows a bimetallic thermometer.

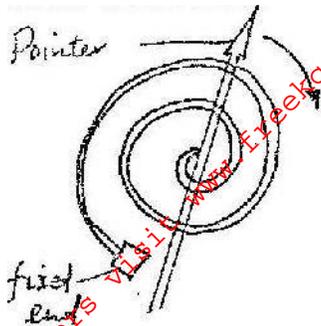


Fig. 4

Explain how a rise in temperature causes the pointer to move in the direction shown.

8. A wooden bench and a metal bench are both left in the sun for along time. Explain why the metal bench feels hotter to touch.
9. Fig. 5 shows an object O placed in front of a plane mirror.

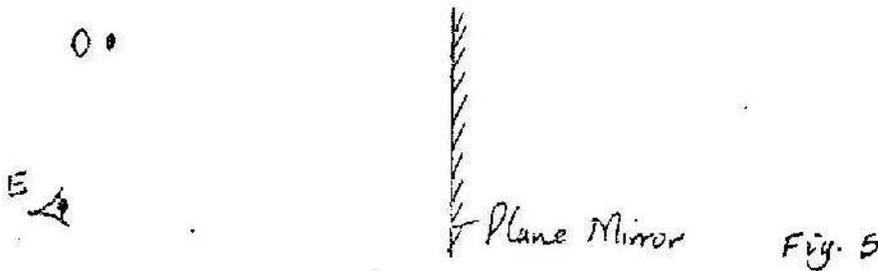
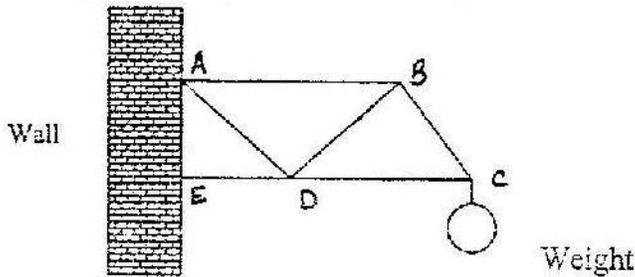


Fig. 5

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

10. State one advantage of an alkaline accumulator over a lead – acid accumulator.
11. The structure in fig. 6 is in equilibrium. Identify the struts and the ties in the structure.



Weight

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

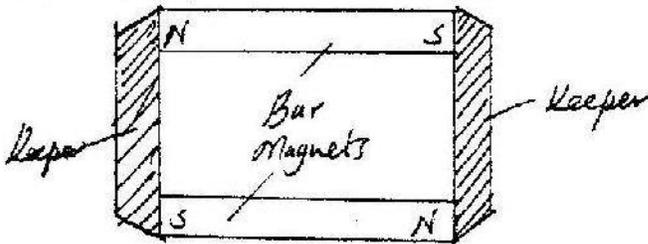


Fig. 7

Explain how this method of storing helps in retaining magnetism longer.

13. In fig 8 the arrow indicates the directions of the current in the conductor.

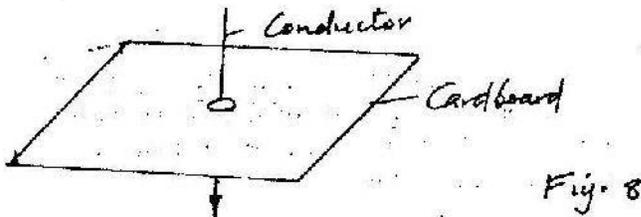


Fig. 8

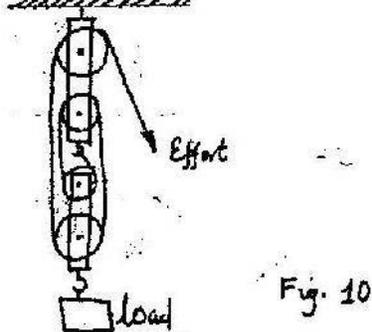
Sketch on the diagram the magnetic field pattern due to the current.

14. In fig 9 the couple represented by forces  $F_1$  is acting on light uniform bar.



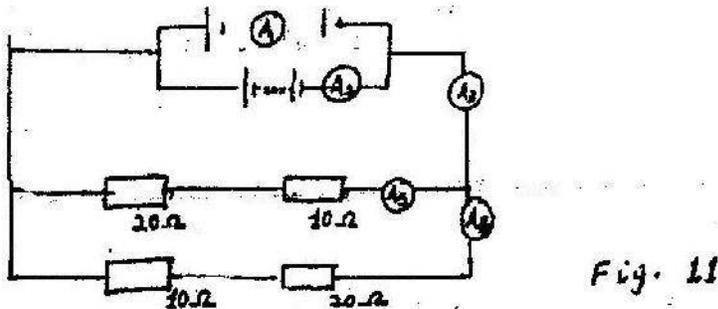
Sketch on the figure a couple represented by forces  $F_2$  such that the bar is in equilibrium. And the forces  $F_2$  have minimum magnitude.

15. Fig 10 shows a pulley system being used to raise a load. Use the information given in the figure to answer the questions 15 and 16.



Determine the velocity ratio (VR) of the system.

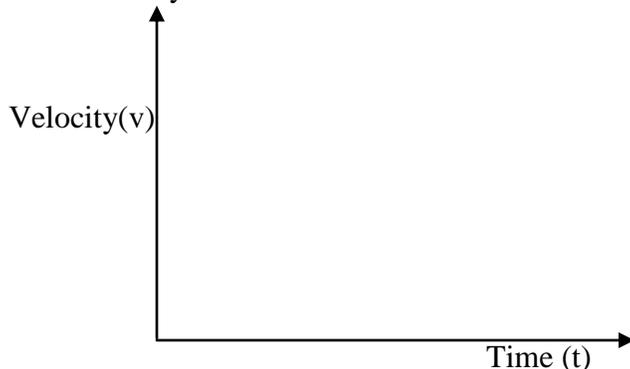
16. If a load on 100N is raised by applying an effort of 28N, determine the efficiency of the system.  
 17. Give one example of a longitudinal wave.  
 18. In fig. 11 ammeters have negligible resistance and the cells are all identical.



Show that all the ammeters  $A_1$ ,  $A_2$ , and  $A_5$  have the same reading.

Let  $A$ 's represent current through the ammeters using the Kirchoffs law.

19. An electric bulb rated, 40W is operating on 240V mains. Determine the resistance of its filament.  
 20. A body initially resting on horizontal surface is accelerated by a constant force. It passes over a small region where it experiences a force of friction equal to the accelerating force before returning to the frictionless horizontal surface. On the axes provided, sketch the velocity time graph for the motion of the body.



21. A wire is stretched between two fixed points such that when it is plucked, it produces sound. Explain why the pitch of the sound produced may become lower when the temperature of the surrounding rises.
22. Two identical blocks of copper are taken from the same furnace. One block is dropped into a well-lagged calorimeter containing 200g of methylated spirit. Both water and spirit were initially at the same temperature. After being given time to stabilize the temperature, it was found that more spirit than water had evaporated. State two factors that could have caused this difference.
23. Fig. 12 shows a ray of light incident on a convex mirror.

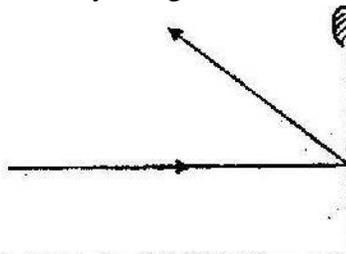
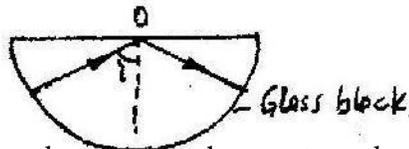


Fig. 12

- Using a suitable construction on the same diagram determine the radius of curvature of the mirror.
24. Fig 13. Shows a semicircular glass block placed on a bench. A ray of light is incident at point O as shown. The angle of incidence,  $I$ , is just greater than the critical angle of glass.



A drop of water is now placed on the bench so as to make contact with the glass at point O. Sketch on the same figure the path followed by the ray after placing the drop of water.

25. A student holds a sheet of paper at one end so that it hangs in the position A shown in fig. 14

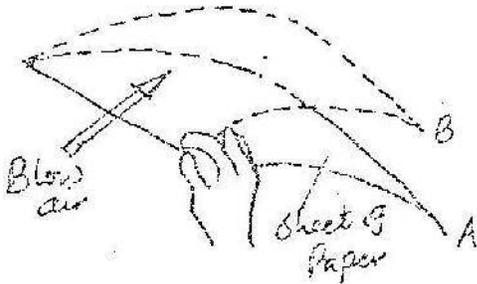
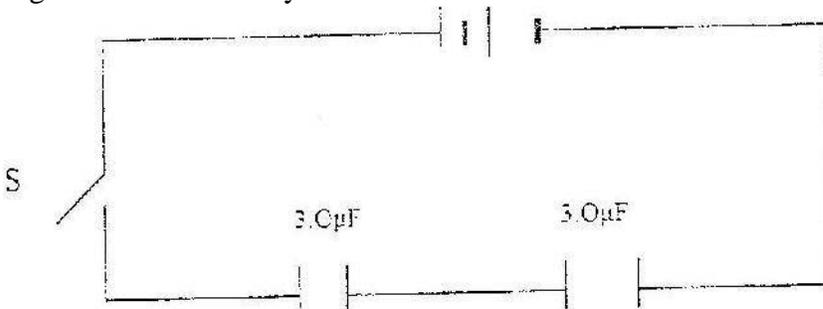


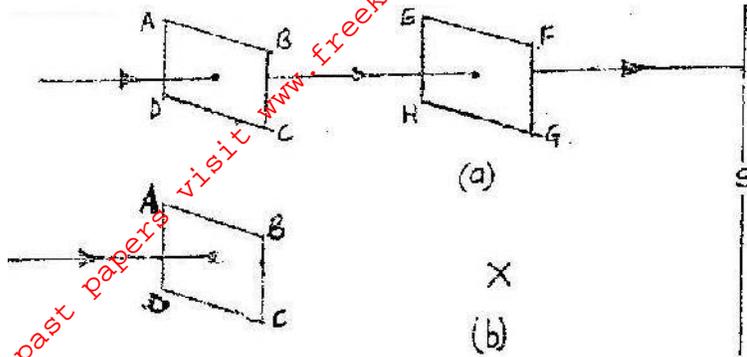
Fig. 14

Explain why the paper rises to the position B when the student blows air in the direction shown by the arrow.

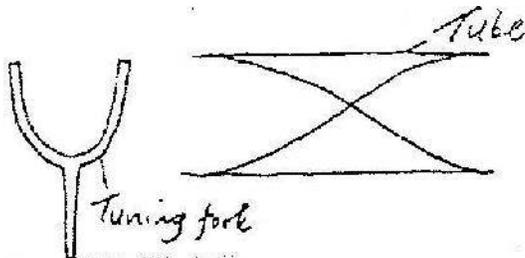
26. Fig. 15 shows a battery of emf 3.0 V connected in series with two capacitors.



27. In fig 16.(a) the Polaroids ABCD and EFGH are oriented such that maximum light reaches the screen S. Sketch at X on Fig. 16 (b) the orientation of EFGH such that no light reaches S.



28. Fig 17 (a) shows the wave pattern at resonance in an open tube when a tuning fork of frequency  $f_0$  is sounded near one end of the tube.



Sketch in fig 17(b) the pattern of the wave at resonance when a fork of frequency  $3f_0$  is sounded near one end of an identical tube.

29. State two uses of microwaves.

30. In fig. 18 ultra – violet (u.v) light falls on a zinc plate placed on a charged leaf electroscope. It is observed that the leaf collapses.

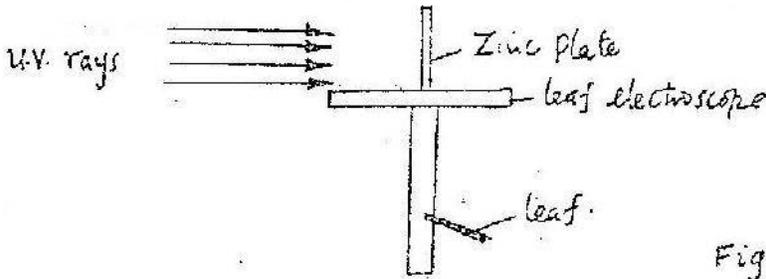


Fig. 18

31. Fig (19) drawn to scale) shows the image, I, formed by a diverging lens. F is principal focus of the lens.

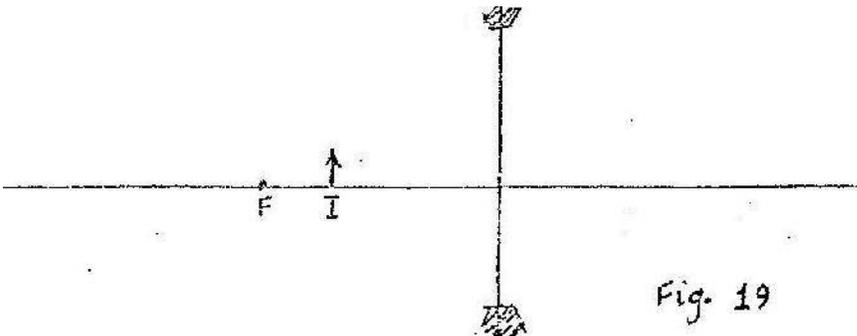


Fig. 19

By drawing the appropriate rays on the same diagram, locate the position of the object.

An armature composed of turns of insulated copper wire wound on laminated soft-iron core is rotated in a magnetic field to generate an e.m.f. Use this information to answer questions 31 and 32.

32. State two factors other than the speed of rotation that affect the magnitude of the e.m.f. generated.
33. State the reason why soft iron is laminated.
34. An atom changes from an excited state to an unexcited state releasing energy. State one factor that affects the frequency of the radiation released.
35. State and explain the effect of increasing the E.H.T in an x-ray tube on the X-rays produced.

36. The graph in Fig 20 shows the disintegration per second versus time in seconds, s for a sample of radioactive material; determine the half - life of the sample.

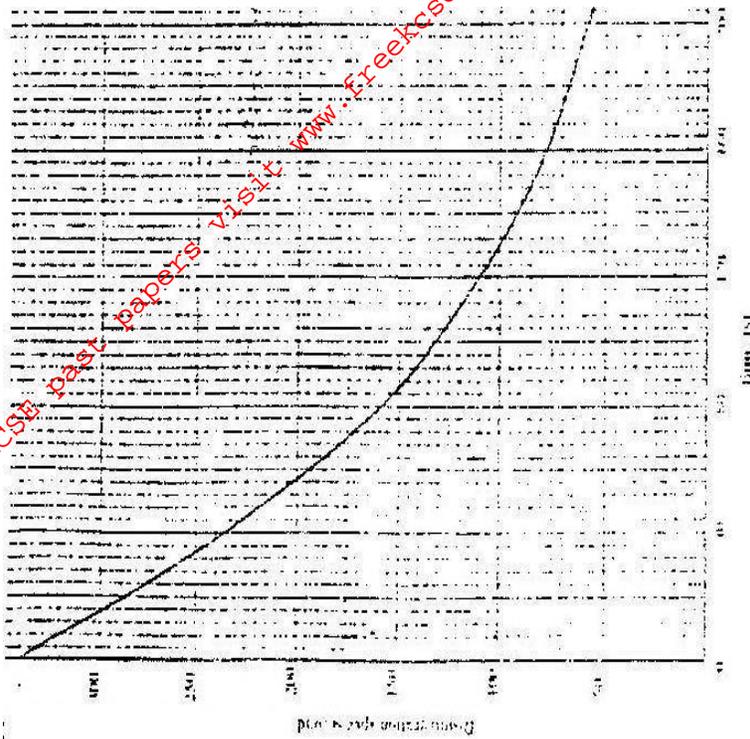


Fig. 20