PRESSURE

1. Define pressure and state its unit.
2. Calculate the pressure exerted on the road by a car of mass 1200 kg and area of contact between the road and each of the four tyres is 50 cm^2.
3. A brick of mass 5 kg measures 20 cm x 10 cm x 5 cm. Calculate:

(i) The minimum pressure it exerts.

(ii) The maximum pressure it exerts.

4. Explain the following observations:

(i) A pin penetrates deeper than a nail if someone steps on them.

(ii) The rear tyres of a tractor are made wider than the front ones.

5. Explain factors that affect pressure in liquids.
6. A flask is filled to a depth of 16 cm with a liquid of density 800 kgm^{-3}. Find the pressure exerted by the liquid on the base.
7. (i) Describe a simple experiment to show that pressure in a liquid depends on depth.

   (ii) What is the pressure 100 m below the surface of sea water of density 1150 kgm^{-3}?
8. On a certain day, atmospheric pressure as read from a mercury barometer is 750 mmHg. What is the pressure in pascals if the density of mercury is 136000 kgm^{-3}.
9. Describe an experiment to show that pressure in a liquid does not depend on the shape of a container.
10. (i) State Pascal's principle of transmission of pressure in fluids.

    (ii) Give any three applications of the Pascal's principle.

    (iii) Explain why a liquid is used in hydraulic machines and not gases.
11. A hydraulic jack is used to lift a car by applying a force of 120 N at the pump. If the area of the ram and pump piston is 100 cm^2 and 1 m^2 respectively. Calculate the force that is applied to the ram.
12. (i) Define the term atmospheric pressure.

(ii) Describe a simple experiment to demonstrate the existence of atmospheric pressure.

13. Explain why mountain climbers may suffer from nose bleeding at the top of a mountain.
14. (i) Describe how a mercury barometer can be constructed to measure atmospheric pressure.

    (ii) A mercury barometer reads 760 mmHg at the foot of a mountain 440 m high. What is the barometric reading at the top of the mountain? (Density of air = 1.2 kgm^{-3}, density of mercury = 13600 kgm^{-3}).
15. With the aid of a diagram describe how you can measure gas pressure using a manometer.
16. Fig.1 shows a column of air trapped in a tube using mercury. Given that the atmospheric pressure is 76 cmHg. Calculate the pressure of the enclosed air.

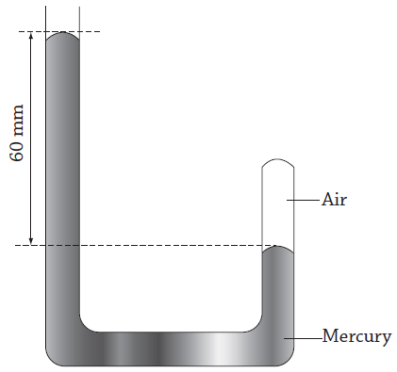

Fig. 1

17. An open U-tube manometer containing mercury shows a difference in levels of 12 cm when connected to a gas supply. Find the excess pressure of the gas above atmospheric pressure if the density of mercury is 13600 kg/m^3.
18. A television tube has a flat rectangular screen of size 50 cm × 30 cm. Calculate the force exerted by the atmosphere on the screen, if the atmosphere pressure is 1.02×10^5 Pa.
19. (i)Using a diagram explain the action of a force pump

(ii) State all the other applications of atmospheric pressure.

20. An open U-tube contains columns of water and a liquid X and mercury as shown in Fig. 2. Calculate the density of the liquid.

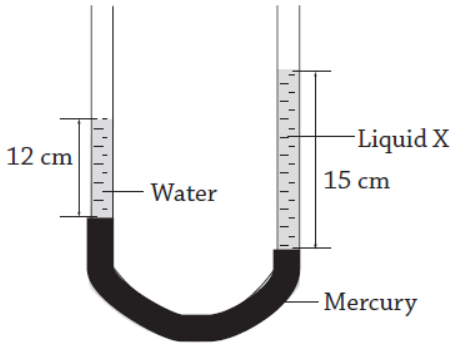

Fig. 2