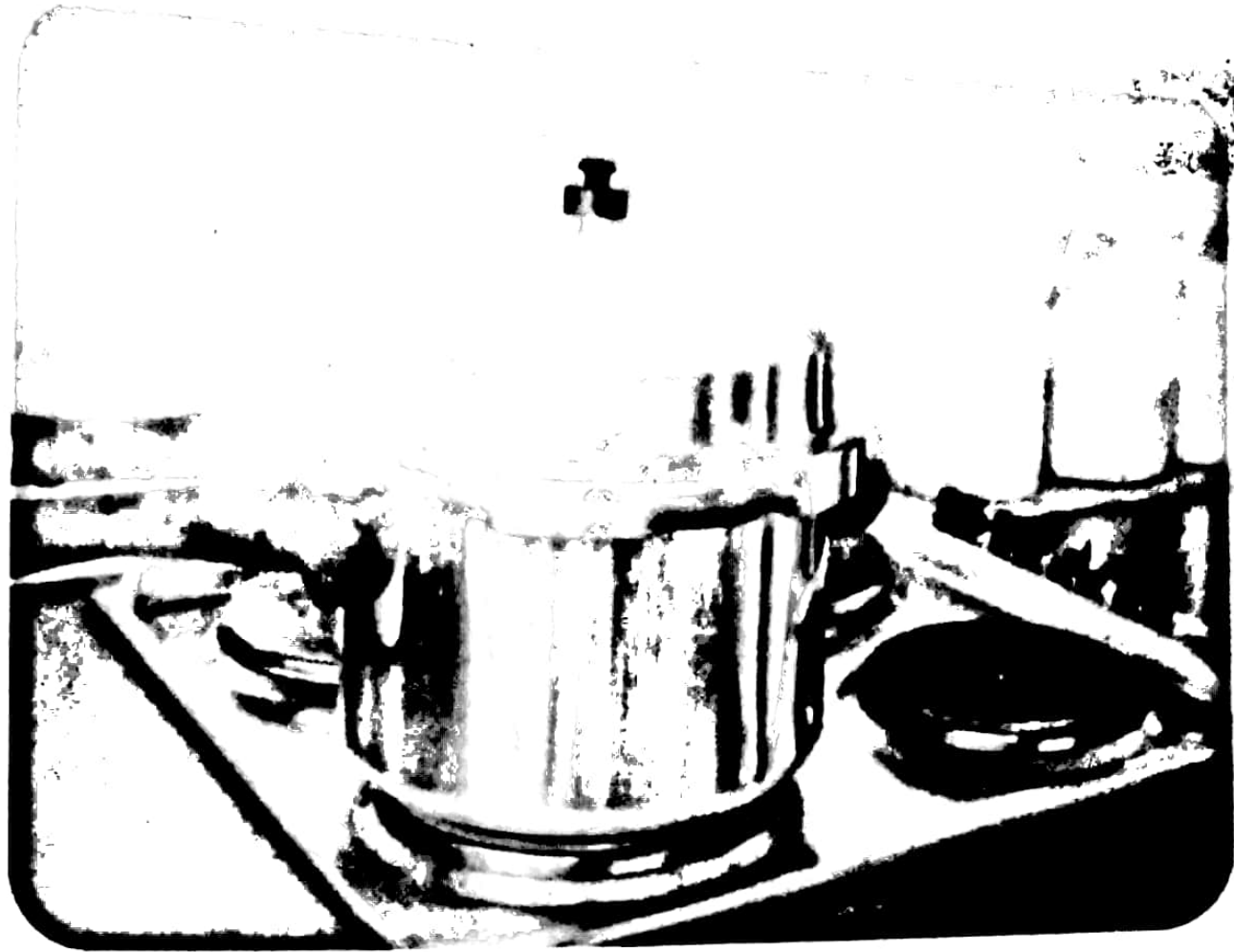


Chapter
7

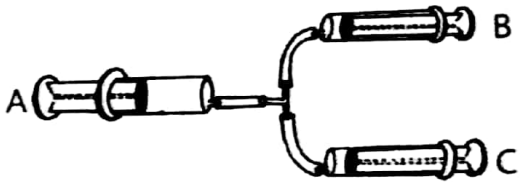
**FORCE
AND
PRESSURE**



QUESTIONS

Encircle the correct option.

- (i) The SI unit of pressure is:
- a. watt
 - b. joule
 - c. pascal
 - d. newton
- (ii) When same amount of force is applied on different areas, it exerts:
- a. low pressure on small area.
 - b. no pressure on small area.
 - c. high pressure on small area.
 - d. high pressure on large area.
- (iii) A pressure of 10Nm^{-2} is equal to:
- a. 10Pa
 - b. 100Pa
 - c. 1000Pa
 - d. 10,000Pa

- (iv) A force of 1800N is acting on the surface area of 0.06m^2 . The pressure exerted by the force will be:
- 3 kPa
 - 30 kPa
 - 300 kPa
 - 3000 kPa
- (v) Hydrostatic pressure of the liquids depends on:
- shape of the vessel
 - size of the vessel
 - volume of the vessel
 - depth of the liquid
- (vi) People on hills experience atmospheric pressure:
- more than that at the sea level
 - less than that at the sea level
 - same as that at the sea level
 - four times more than that at the sea level
- (vii) When the plunger A shown in the figure is pushed:
- plunger B will move out more than C
 - plunger C will move out more than B
 - both B and C will move out equally
 - neither B nor C will move out
- 
- (viii) A gas in a container develops pressure due to:
- collision of molecules with each other
 - collision of molecules with walls of the container
 - weight of the gas
 - composition of the gas
- (ix) As we go up in the air:
- atmospheric pressure increases
 - atmospheric pressure decreases
 - atmospheric pressure does not change
 - atmospheric pressure becomes zero at the height of 1km
- (x) What instrument is used to measure height?
- Hydrometer
 - Hygrometer
 - Altimeter
 - Sphygmomanometer

7.2 Define the following.

(i) Force

Ans. Force:

Force is an agent which brings a change or tries to bring a change.

(ii) Area

Ans. The space upon which force acts is called area. Area denoted by "A".

(iii) Pressure

Ans. Pressure is the force per unit area, acting normally on the surface of an object.

(iv) Hydraulics

Ans. The branch of science which deals with the transmission of pressurized liquids through pipes as a source of mechanical force is called hydraulics.

(v) Pneumatics

Ans. The branch of science which deals with the study and application of pressurized gas to produce mechanical motion is called pneumatics.

7.3 Give brief answers.

(i) Give the commonly used units of force.

Ans. Commonly used unit of force is Newton.

(ii) Give the commonly used units of area.

Ans. Commonly used unit of area is m^2 .

(iii) Give the commonly used units of pressure.

Ans. Commonly used unit of pressure is Newton per metre / Nm^{-2} or Pascal (Pa).

State Pascal's law.

Pascal's Law:

"Pascal's law states that fluids enclosed in a vessel exert pressure which is transmitted equally in all directions".

Differentiate between hydrostatic pressure and atmospheric pressure.

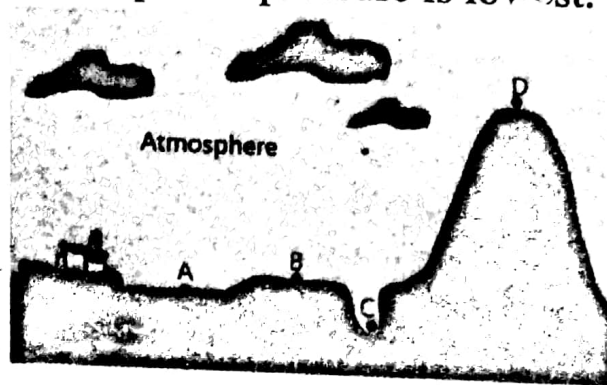
- Liquid pressure which increases with the depth of the liquid in a container is called hydrostatic pressure.
- The weight of air column per unit area on the earth is called atmospheric pressure.

In the figure shown below indicate the location where atmospheric pressure is expected to be lowest.

A location D (in the figure) the atmospheric pressure is lowest.

Explain the following.

- Water Pressure
- Atmospheric pressure
- Aerosols



a) Water Pressure

Water contained in a tank exerts pressure on its walls. Water pressure of a tap depends upon the height of the water tank above the ground floor. This pressure is transmitted through the pipes to the tap. Due to this water pressure, speed of water from a tap on ground floor is greater than speed of water from a tap on the upper story.

b) Atmospheric Pressure

The weight of air column per unit area on the earth is called atmospheric pressure. The unit for the measurement of atmospheric pressure is called atmosphere (atm).

$$1 \text{ atm} = 101300 \text{ Pa}$$

$$1 \text{ atm} = 101.3 \text{ kPa}$$

The instrument used to measure the atmospheric pressure is called barometer.

c) Aerosols

The products using "Sol" systems are called aerosols. "Sol" is a mixture of suspended solid or liquid particles in a gas or air. They are used as air fresheners, insect repellent, hair spray and spray paints etc.

7.5 Describe an application of Pascal's law.

Ans. In hydraulic jack, a small force F is applied on a small piston which produces pressure P on the oil. This pressure "P" is transmitted to a large cylinder fitted with a piston. A large force is produced by pressure "P" at this bigger piston which may be used to lift something very heavy such as a car.

7.6 Describe the use of a pneumatic system in daily life.

- Ans.**
- i. Automatic tyres are inflated with compressed air.
 - ii. Spray guns use compressed air for spraying paints.
 - iii. Compressed air is used in air powered tools like hammers and drills.
 - iv. It is also used in air brake system in heavy vehicles.