WORKSHEET ①

A. Tick (✓) the correct option.

1. The pressure inside a liquid of density ρ at a depth h is
   a. $h/\rho g$.
   b. $h\rho/g$.
   c. hg.
   d. $h\rho g$.

2. A hydraulic jack is used
   a. in lifting truck.
   b. to lift elevators.
   c. at service centres.
   d. all of these.

3. The CGS unit of atmospheric pressure is
   a. kilogram/sec.
   b. newton/metre^2.
   c. dyne/cm^2.
   d. pascal/metre.

4. During a certain wind storm, light roofs of straw are blown off because
   a. roofs have typical shape.
   b. roofs are not tightly tied.
   c. wind blowing creates high pressure.
   d. high wind blowing over the roofs creates a low pressure on the top.

5. The normal atmospheric pressure is
   a. 76 mm of Hg.
   b. 76 cm of Hg.
   c. 76 Pa.
   d. $76 \, \text{N m}^{-2}$

B. Fill in the blanks.

1. Pressure at a point at a depth h in a liquid is given by _____

2. Pressure at a point inside the liquid is _____ proportional to its depth.

3. Pressure at a depth is _____ proportional to the density.

4. A hydraulic press works on _____ principle.

5. Pressure is a _____ quantity.

C. State whether the following statements are true or false.

1. Pressure varies with direction at a point inside the liquid.

2. The pressure applied at any point of a liquid is transmitted undiminished everywhere in the liquid.

3. There is air above the mercury column in the true barometer tube.

4. An aneroid barometer can be used as an altimeter.

5. The sideways pressure exerted by a liquid is called its lateral pressure.

D. Match the following.

1. Pressure in a fluid increases   is equal in all directions.
2. Pressure in a fluid is directly   proportional to the acceleration due to gravity.
3. Pressure in a liquid is independent of shape   at all points in the same horizontal plane.
4. Pressure in a liquid at a point   with increase in density.
5. Pressure in a liquid is equal   and size of the container.

Name: ....   Teacher's signature: ....

Class: .... IX ....   Date: ....

E. Answer the following questions.

Very short answer questions

1. What do you mean by the term fluid pressure?

2. Write an expression for the pressure at a point inside a liquid. Explain the meaning of the symbols used.

Short answer questions

1. State three factors on which the pressure at a point in a liquid depends.

2. State the laws of liquid pressure.

Long answer questions

1.   i. What do you understand by the term atmospheric pressure?

  ii. What is the cause of atmospheric pressure?

  iii. State the numerical value of atmospheric pressure in (a) cm of mercury (b) pascals (c) bars.

2. Describe the principle, construction and working of a hydraulic jack.

ANSWERS

A. Tick (✓) the correct option.

1. d
2. d
3. c
4. d
5. b

B. Fill in the blanks.

1. hdg
2. directly
3. directly
4. Pascal's
5. scalar

C. State whether the following statements are true or false.

1. F
2. T
3. F
4. T
5. T

D. Match the following.

1. Pressure in a fluid increases — with increase in density.
2. Pressure in a fluid is directly — proportional to the acceleration due to gravity.
3. Pressure in a liquid is independent of shape — and size of the container.
4. Pressure in a liquid at a point — is equal in all directions.
5. Pressure in a liquid is equal — at all points in the same horizontal plane.

E. Answer the following questions.

Very short answer questions

1. The force exerted by a fluid on a unit surface area is called fluid pressure.
2. $P = h\rho g$

   Here, P = Pressure at a point, h = Depth, ρ = Density and g = Acceleration due to gravity.

Short answer questions

1. There are three factors on which the pressure at a point in a liquid depends. These are:

   i. Depth of the point,

   ii. density of the liquid, and

   iii. acceleration due to gravity.

2. The five laws of liquid pressure are as follows:

   i. Pressure at a point inside the liquid at a given depth increases with the increase in the density of the liquid.

   ii. Pressure is same in all directions, about a given point within the liquid.

   iii. Pressure is the same at all points in a horizontal plane at a given depth in a stationary liquid.

   iv. Pressure at a point inside the liquid increases with the depth from the free surface of the liquid.

   v. A liquid seeks its own level.

Long answer questions

1. i. Atmospheric pressure or air pressure is the force exerted by the earth's atmosphere per unit surface area of the earth.

   ii. Our earth is surrounded by a thick band of air which consists of a mixture of gases and is known as atmosphere. Earth's gravity pulls the atmosphere down which exerts thrust on the surface of the earth and its surroundings. This thrust or pressure is commonly called atmospheric pressure.

   iii. The numerical value of atmospheric pressure is:

   (a) 76 cm of mercury (b) 1.013×10^5 pascal (c) 1.013 bar.

2. Hydraulic jack

   Principle: A hydraulic jack works on the principle of Pascal's law. It is used to lift heavy vehicles like trucks, cars and buses during servicing in service centres.

   Construction: A hydraulic jack consists of two cylindrical vessels A and B. Both vessels are connected with a tube R having a valve V. Piston Q with a wide platform is connected to vessel B and Piston P attached to a lever is connected to vessel A. Both the vessels are filled with water.

Hydraulic jack
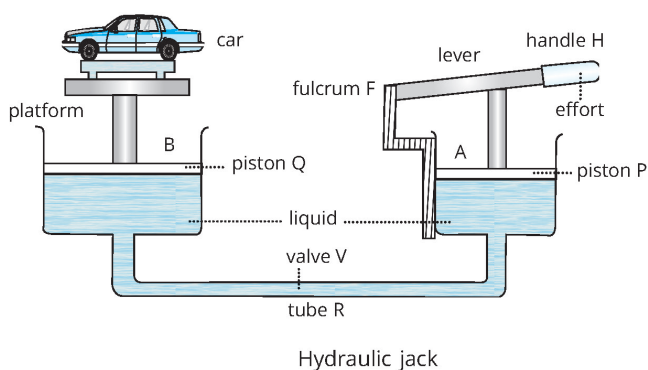
   Working: When force is applied on handle H of the lever, the valve opens as the pressure in cylinder A increases. The liquid runs out from cylinder A to B resulting in a rise of platform. When the car reaches the required height, the handle H of the lever is no longer pressed. Then the valve is closed and water does not flow from cylinder B to A. In this way a hydraulic jack works.