Pressure in Fluids DPP - 1

1. Unit of thrust in SI system is

(a) Dynes **(c)** N/m^2

(b) Joule **(d)** Newton

2. The unit Nm-2 is the unit of

(a) force **(c)** thrust

(b) pressure **(d)** momentum

3. One pascal is equal to:

(a) Ncm^{-2} **(c)** Nm^2

(b) Nm^{-2} **(d)** Nm^{-1}

4. Thrust acting perpendicularly on the unit surface area is called:

(a) Pressure **(c)** Down thrust

(b) Moment of force **(d)** None of these

5. Pressure applied in liquids is transmitted with undiminished force:

(a) In downward direction **(c)** Sides of containing vessel

(b) Upward direction only **(d)** In all directions

6. As we move upwards, the atmospheric pressure:

(a) Increases **(c)** Remains same

(b) Decreases **(d)** Cannot be said

7. A dam for water reservoir is built thicker at the bottom than at the top because:

(a) Pressure of water I very large at the bottom due to its large depth

(b) Water is likely to have more density at the bottom due to its large depth

(c) Quantity of water at the bottom is large

(d) Variation in value of 'g'

8. The pressure exerted by 50 kg (g-$10m/s^2$) on an area of cross section of 2 m2 is :

(a) 50 Pa **(c)** 250 Pa

(b) 200Pa **(d)** 1000 Pa

9. Pressure at a point inside a liquid does not depend on

(a) The depth of the point below the surface of the liquid

(b) The nature of the liquid

(c) The acceleration due to gravity at that point

(d) The shape of the containing vessel

10. The atmospheric pressure on earth's surface is approximately

(a) 10^5 Pa **(c)** $9.6X10^4$ N/m^2

(b) 10^4 Pa **(d)** 10^{-4} Pa

PRIMARY EDUCATION & RIGHTEOUSNESS LEARNING
P E R L

Pressure in Fluids DPP - 2

1. State three factors on which the pressure at a point in the liquid depends.
2. The normal pressure of air is 76 cm of mercury. Calculate the pressure in SI units. (Density of mercury = 13600 kg/m^3 and g=10 m/s^2)
3. At a given place, a barometer records 70 cm of Hg. If the mercury in barometer replaced by water, what would be resulting reading? (Density of Hg = 13600 kg/m^3; Density of water=1000 kg/s^3)
4. The base of cylindrical vessel measures 300 cm2. Water is poured into it upto a depth of 6 cm. calculate the pressure of water on the vessel.
5. The pressure in water pipe on the ground floor of a building is 40000 Pascal's, whereas on the first floor it's 10000 Pascal's. Find the height of first floor. (Acceleration due to gravity g= 10 ms^{-2})
6. **a)** Define SI unit of pressure.

   b) The atmospheric pressure at a place is 650 mm of Hg. Calculate this pressure in Pascal's (Pa).
7. Pressure in a water pipe on the ground floor of building is 1000000 Pa. calculate the pressure in water pipe on first floor at a height of 3 m. (Density of water = 1000 kg/s^3 ; g = 10ms^{-2}).
8. P is the pressure at some point in a liquid. State whether pressure P is a scalar or vector quantity.
9. A beaker contains a liquid of density 'p' upto height 'h', such that 'PA' is atmospheric pressure and 'g' is acceleration due to gravity. Answer the following questions:
10. What is pressure on the free surface of liquid?
11. What is the pressure on the base of beaker?
12. What is the lateral pressure at the base on the inner walls of beaker?
13. State the law of transmission of pressure in liquids.
14. Calculate the hydrostatic pressure exerted by water at the bottom of beaker. Take the depth of water at the bottom of a beaker. Take the depth of water as 40cm, the density of water 1000 kgm^{-3} and g = 9.8 ms^{-2}.
15. State Pascal's law of transmission of pressure in a liquid.
16. State briefly, how and why the atmospheric pressure of a place varies with the altitude. Draw an approximate graph to illustrate this variation.
17. The blood pressure reading of a patient is recorded 160/100. Express the lower pressure in SI units. [Take density of mercury as 13.6 x 10^3 kgm^{-3} and the value of 'g' as 10ms^{-2}]
18. State two advantages of aneroid barometer
19. Explain why a gas bubble released at the bottom of a lake grows in size as it rises to the surface of the lake.

Pressure in Fluids DPP - 3

1. Calculate the pressure exerted by 75 cm of vertical length of water column in SI units.
2. Calculate pressure exerted by 0.8 m vertical length of alcohol of density 0.80 g cm^{-3} in SI units (Take g= 10 ms^{-2})
3. What is the pressure exerted by 75 cm vertical column of mercury of density 13600 kgm^{-3} in SI units? (Take g= 9.8 ms^{-2})
4. 0.96 m vertical heights of liquid exerts a pressure of 17310.72 Pa. If 'g' is 9.8 ms^{-2}, calculate the density of the liquid.
5. 66640 Pa pressure is exerted by 0.50 m vertical column of a liquid. If g = 9.8 N kg^{-1}, calculate density of the liquid.
6. What vertical height of water will exert pressure of 333200 Pa? Density of water is 1000kg m^{-3} and g = 9.8 ms^{-2}.
7. Pressure at bottom of sea at some particular place is 8968960 Pa. If density of sea water is 1040 kg m^{-3} calculate the depth of sea. Take g = 9.8 ms^{-2}. Neglect the pressure of the atmosphere.
8. Calculate the equivalent height of a water barometer, if the pressure recorded by mercury barometer is 60 cm of mercury. Density of mercury is 13600 kgm^{-3} and density of water is 1000 kgm^{-3}.
9. Atmospheric pressure at sea level is 76 cm of mercury. Calculate the vertical height of air column exerting above pressure. Assume the density of air 1.29 kg m^{-3} and that of mercury is 13600 kgm^{-3}. Why the height calculated by you is far less than actual height of atmosphere?
10. Calculate the equivalent height of mercury, which will exert as much pressure as 960 m of sea water of density 1040 kg m^{-3}. Density of mercury is 13600 kg m^{-3}.
11. The pressure in water pipe at the ground floor of a building is 120000 Pa, whereas the pressure on the third floor is 30000 Pa. Calculate the height of third floor. Take g =10 ms^{-2}.
12. The pressure of water on the ground floor, in a water pipe is 150000 Pa, whereas pressure on the fourth floor is 30000 Pa. calculate height of fourth floor. Take g = 10 ms^{-2}.
13. The pressure of water on ground floor is 160000 Pa. Calculate the pressure at the fifth floor, at a height of 15 m.

14. A hydraulic press is used to lift a load of 500kgf when the ratio of the diameters of pump plunger and press plunger is 1:5. Calculate the effort applied on the piston of pump plunger. If the mechanical advantage of the handle of pump plunger is 4, calculate the effort applied on the handle of pump plunger.

15. a) The area of cross –sections of the pump plunger and press plunger of a hydraulic press are 0.02 m^2 and 8 m^2 respectively. If the hydraulic press overcomes a load of 800 kgf, calculate the force acting on pump plunger.

b) If the mechanical advantage of the handle of pump plunger is 8, calculate the force applied at the end of the handle of pump plunger.

16. The radii of press plunger and pump plunger are in ratio of 50:4. If an effort of 20 kgf acts on the pump plunger, calculate the maximum effort which the press plunger can overcome.