



**Chapter : MECHANICAL PROPERTIES OF FLUIDS**

**Assignment 1**

**Class 11**

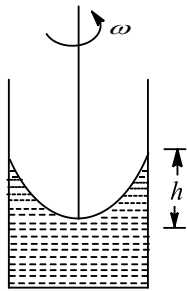
CLASS : XI<sup>TH</sup>  
DATE :

SUBJECT : PHYSICS  
DPP NO. :1

## Topic :- MECHANICAL PROPERTIES OF FLUIDS

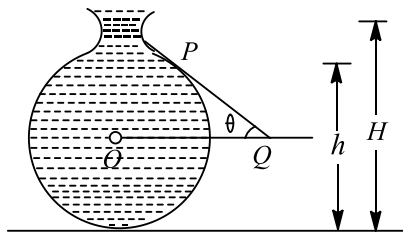
- A body floats in a liquid contained in a beaker. If the whole system falls under gravity, then the upthrust on the body due to liquids is
  - equal to the weight of the body in air
  - equal to the weight of the body in liquid
  - zero
  - equal to the weight of the immersed part of the body
- The working of venturimeter is based on
  - Torricelli's law
  - Pascal's law
  - Bernoulli's theorem
  - Archimede's principle
- A rain drop of radius 1.5 mm, experiences a drag force  $F = (2 \times 10^{-5} v)$  N, while falling through air from a height 2 km, with a velocity  $v$ . The terminal velocity of the rain drop will be nearly (use  $g = 10 \text{ ms}^{-2}$ )
  - $200 \text{ ms}^{-1}$
  - $80 \text{ ms}^{-1}$
  - $7 \text{ ms}^{-1}$
  - $3 \text{ ms}^{-1}$
- A weightless bag is filled with 5 kg of water and then weighed in water. The reading of spring balance is
  - 5 kgf
  - 2.5 kgf
  - 1.25 kgf
  - Zero
- A rain drop of radius 0.3 mm has a terminal velocity in air  $= 1 \text{ ms}^{-1}$ . The viscous force on it is
  - $101.73 \times 10^{-4} \text{ dyne}$
  - $101.73 \times 10^{-5} \text{ dyne}$
  - $16.95 \times 10^{-4} \text{ dyne}$
  - $16.95 \times 10^{-5} \text{ dyne}$
- A rectangular vessel when full of water, takes 10 min to be emptied through an orifice in its bottom. How much time will take to be emptied when half filled with water?
  - 9 min
  - 7 min
  - 5 min
  - 3 min

7. A liquid is kept in a cylindrical vessel which is rotated along its axis. The liquid rises at the sides (figure). If the radius of the vessel is 0.05 m and the speed of rotation is  $2 \text{ rad s}^{-1}$ , find the difference in the height of the liquid at the centre of the vessel and its sides



- a) 20 cm                      b) 4 cm                      c) 2 cm                      d) 0.2 cm

8. Figure shows the vertical cross section of a vessel filled with a liquid of density  $\rho$ . The normal thrust per unit area on the walls of the vessel at point  $P$ , as shown will be



- a)  $h \rho g$                       b)  $H \rho g$                       c)  $(H - h) \rho g$                       d)  $(H - h) \rho g \cos \theta$

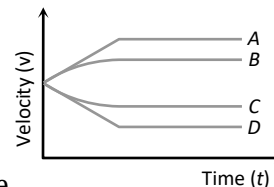
9. The density  $\rho$  of water of bulk modulus  $B$  at a depth  $y$  in the ocean is related to the density at surface  $\rho_0$  by the relation

a)  $\rho = \rho_0 \left[ 1 - \frac{\rho_0 g y}{B} \right]$     b)  $\rho = \rho_0 \left[ 1 + \frac{\rho_0 g y}{B} \right]$     c)  $\rho = \rho_0 \left[ 1 + \frac{B}{\rho_0 h g y} \right]$     d)  $\rho = \rho_0 \left[ 1 - \frac{B}{\rho_0 g y} \right]$

10. A large ship can float but a steel needle sinks because of

- a) Viscosity                      b) Surface tension                      c) Density                      d) None of these

11. A small spherical solid ball is dropped from a great height in a viscous liquid. Its journey in the



liquid is best described in the diagram given below by the

- a) Curve A                      b) Curve B                      c) Curve C                      d) Curve D

12. Two cubes each weighing 22 g exactly are taken. One is of iron ( $d = 8 \times 10^3 \text{ kg m}^{-3}$ ) and the other is of marble ( $D = 3 \times 10^3 \text{ kg m}^{-3}$ ). They are immersed in alcohol and then weighed again

- a) Iron cube weighs less                      b) Iron cube weighs more  
c) Both have equal weight                      d) Nothing can be said

13. A liquid is allowed into a tube of truncated cone shape. Identify the correct statement from the following.
- The speed is high at the wider end and low at the narrow end
  - The speed is low at the wider end and high at the narrow end
  - The speed is same at both end in a streamline flow
  - The liquid flows with uniform velocity in the tube
14. An ice block contains a glass ball when the ice melts within the water containing vessel, the level of water
- Rises
  - Falls
  - Unchanged
  - First rises and then falls
15. An ice berg of density  $900 \text{ kg/m}^3$  is floating in water of density  $1000 \text{ kg/m}^3$ . The percentage of volume of ice-cube outside the water is
- 20%
  - 35%
  - 10%
  - 25%
16. A small spherical ball falling through a viscous medium of negligible density has terminal velocity  $v$ . Another ball of the same mass but of radius twice that of the earlier falling through the same viscous medium will have terminal velocity
- $v$
  - $\frac{v}{4}$
  - $\frac{v}{2}$
  - $2v$
17. The relative velocity of two consecutive layers is  $8 \text{ cm/s}$ . If the perpendicular distance between the layers is  $0.1 \text{ cm}$ , then the velocity gradient will be
- $8 \text{ sec}^{-1}$
  - $80 \text{ sec}^{-1}$
  - $0.8 \text{ sec}^{-1}$
  - $0.08 \text{ sec}^{-1}$
18. A block of aluminium of mass  $1 \text{ kg}$  and volume  $3.6 \times 10^{-4} \text{ m}^3$  is suspended from a string and then completely immersed in a container of water. The decrease in tension in the string after immersion is
- $9.8 \text{ N}$
  - $6.2 \text{ N}$
  - $3.6 \text{ N}$
  - $1.0 \text{ N}$
19. A wooden lock is taken to the bottom of a deep calm lake of water and then released. It rises up with a
- constant acceleration
  - decreasing acceleration
  - constant velocity
  - decreasing velocity
20. If the work done in blowing a bubble of volume  $V$  is  $W$ , then the work done in blowing a soap bubble of volume  $2V$  will be
- $W$
  - $2W$
  - $\sqrt{2} W$
  - $4^{1/3} W$