

FLUID MECHANICS (FM)

QUESTION BANK

SHORT QUESTIONS:

Write short notes on :

1. Relative Density.
2. Hydrostatic law.
3. Surface tension.
4. Viscosity.
5. Centre of pressure
6. Define TEL.
7. What is a Flow net ?
8. Write the Euler's equation of motion .
9. What is the function of Orifice meter ?
10. Define Mach No. and write its significance.
11. Meta-Centre.
12. Archimedes Principle.
13. Write the expression for Centre of Pressure.
14. Name the hydrostatic forces acting on a fluid particle .
15. Centre of Buoyancy.
16. The intensity of pressure at a point in a fluid is given as 3.94 N/cm^2 find the corresponding height of fluid if the fluid is oil of relative density 0.9 .
17. What do you mean by Vacuum pressure?
18. State Hydrostatic Law.
19. Choose the correct options:
 - i) Viscosity _____ with respect to temperature in case of gases.
(a) decreases, (b) increases , (c) remain constant , (d) none of these
 - ii) The maximum speed reached by a turbine after removal of the external load is called _____ speed.
(a) runaway , (b) specific, (c) synchronous , (d) none of these
 - iii) The point through which force of buoyancy is supposed to act is called "center of _____".
(a) gravity , (b) pressure, (c) buoyancy, (d) none
 - iv) _____ formula is used to define major losses in pipes.
(a) Darcy-Weisbach , (b) Chezy, (c) both (a)&(b), (d) none of these
20. Fill in the blanks.
 - a) Compressibility is the reciprocal of _____.
 - b) Newton's law of viscosity states that _____ is proportional to the _____.
 - c) Kinematic viscosity is given by the ratio of _____ to the density of the fluid.
 - d) _____ law states that intensity of pressure for a fluid at rest is equal in all

direction.

- e) _____ manometers are used for measuring the difference of pressures between two points in a pipe or two different pipes.

LONG TYPE QUESTIONS:

1. Define Relative Density and Calculate specific weight, density and specific gravity of 1 liter of a liquid which weight is 7 N .
2. Describe different types of fluid.
3. Derive the expression for Pascal's Law.
4. Define Meta-Centre and derive its expression by experimental method.
5. Give the detail classification of Manometers with suitable examples.
6. Derive coefficient of discharge for Orifice-meter. What is the function of orifice meter.
7. Difference between :
 - a) Newtonian and Non Newtonian fluids,
 - b) Stable and unstable conditions for floating bodies.
8. A rectangular surface 12m x 12m lies in a vertical plane. Determine the force and centre of pressure on plate when its upper edge is 10m below the water surface?
9. What are the different Hydraulic Coefficients. Discuss ?
10. Derive the Bernoulli's equation from Euler's equation.
11. In a 3D incompressible flow field $\vec{V} = (x^2 + y^2 + z^2)\vec{i} - (xy + yz + zx)\vec{j} + wz\vec{k}$, Find w component of the velocity so that the case is possible for a steady incompressible fluid flow?
12. Find density of metallic body which floats at the interface of mercury ($S_1=13.6$) and oil ($S_2=0.8$), such that 40% of its volume submerged in mercury and 60% in the oil.
13. Discuss different types of losses in pipes and discuss the formula used to express it.
14. Difference between :
 - a) HGL and TEL
 - b) Rotational and Irrotational Flow.
15. A rectangular surface 6m x 12m lies in a vertical plane. Determine the force and centre of pressure on plate when its upper edge is 5m below the water surface?
16. Write different cases of submerged surfaces on which the total pressure force and centre of pressure is determined (only expressions or formula used).
17. Derive the expression for coefficient of impact for a jet striking a fixed flat plate.
18. Define Meta-Centre and derive its expression by analytical method.
19. Derive the position of center of pressure for an inclined plane immersed in a liquid..
20. Difference between :
 - a) Hydrostatic force and Buoyant Force
 - b) Stable and unstable conditions for submerged bodies.
21. The capillary rise in a glass tube is not to exceed 0.2 mm of water. Determine the minimum size of the tube , if surface tension for water in contact with air is 0.0725N/m
22. Explain Absolute pressure, Gauge Pressure and Vacuum Pressure and their relationship through a plot.
23. A solid cylinder of diameter 4m and height 3m .Find the metacentric height of the cylinder when it is floating in water with its axis vertical. The specific gravity of the cylinder is 0.6, State the condition of stability in this case .

