Excel Coaching Classes

Date: 28-Jun-2026
Time: 60min

Mechanical Properties of Fluid

Marks: 20

SECTION A

Q.1 **Select and write the correct answer for the following multiple choice type of questions:** **(3)**

i The pressure exerted by column of liquid on the base depends only on the

(A) height of the liquid.
(B) shape of the vessel.
(C) material of the vessel.
(D) viscosity of the liquid.

ii Absorption of water by filter paper is due to _____.

(A) cohesion
(B) capillarity
(C) adhesion
(D) elasticity

iii Two small spheres of radii r and 3r fall through a viscous liquid with the same constant speed. The viscous forces experienced by them are in the ratio

(A) 1 : 9
(B) 1 : 3
(C) 9 : 1
(D) 3 : 1

Q.2 **Answer the following questions:** **(3)**

i State if the relation P = hρg holds true for gases.

ii At what temperature the surface tension of a liquid becomes zero?

iii Define the following term: Sphere of influence.

SECTION B

Attempt any TWO questions of the following: **(4)**

Q.3 What is capillarity? Give any two applications of capillarity.

Q.4 Define coefficient of viscosity. State its formula and S.I. units.

Q.5 How much amount of work is done in forming a soap bubble of radius r?

Q.6 A drop of water of radius 6 mm breaks into number of droplets, each of radius 1 mm. How many droplets will be formed?

SECTION C

Attempt any TWO questions of the following: **(6)**

Q.7 State Pascal's law of fluid pressure. Describe the experimental proof for the same.

Q.8 **(A)** Two soap bubbles have radii in the ratio 2 : 3. Compare the excess of pressure inside these bubbles.

(B) State the properties of an ideal fluid.

Q.9 A spherical drop of oil falls at a constant speed of 4 cm/s in steady air. Calculate the radius of the drop. The density of the oil is 0.9 g/cm^3, density of air is 0.0013 g/cm^3 and the coefficient of viscosity of air is 1.8×10^{-4} poise. (g = 980 cm/s^2)

SECTION D

Attempt any ONE question of the following: **(4)**

Q.10 **(A)** The pressure of water inside the closed pipe is 3×10^5 N/m^2. This pressure reduces to 2×10^5 N/m^2 on opening the valve of the pipe. Calculate the speed of water flowing through the pipe. (Density of water = 1000 kg/m^3).

(B) Calculate the rise of water inside a clean glass capillary tube of radius 0.1 mm, when immersed in water of surface tension 7×10^{-2} N/m. The angle of contact between water and glass is zero, density of water = 1000 kg/m^3, g = 9.8 m/s^2.

Q.11 Derive Bernoulli's equation.