

Mechanical Properties of Fluids

NEET previous year questions · Physics

4 questions from the official papers: NEET 2026 (1), Re-NEET 2026 (2), NEET 2020 (1). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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1. NEET 2026 · Q44

A submarine is designed to withstand an absolute pressure of 100 atm. How deep can it go below the water surface? (Consider the density of water = 1000 kg m^{-3} , $1 \text{ atm} = 1 \times 10^5 \text{ Pa}$ and gravitational acceleration $g = 10 \text{ m/s}^2$)

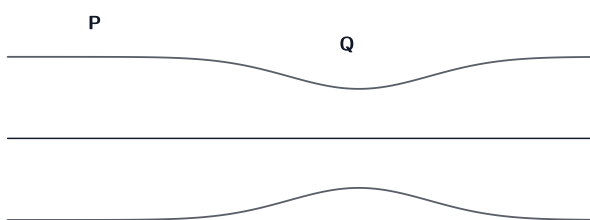
- (1) 990 m (2) 9900 m (3) 99 m (4) 9000 m

Answer (1)

Sol. Absolute pressure at depth h is $P = P_0 + \rho gh$. So
 $100 \times 10^5 = 1 \times 10^5 + 1000 \times 10 \times h$, giving
 $99 \times 10^5 = 10^4 h$, hence $h = 990 \text{ m}$.

2. Re-NEET 2026 · Q10

Water flows in a streamline motion through a horizontal pipe of circular cross-section as shown in the figure. The pressure difference of water between P and Q is 15 Nm^{-2} . The area of cross-section at P and Q are 40 cm^2 and 20 cm^2 , respectively. The rate of flow of water through the pipe, in cm^3s^{-1} , is: [Take density of water = 1000 kg m^{-3}]



- (1) 100 (2) 200 (3) 300 (4) 400

Answer (4)

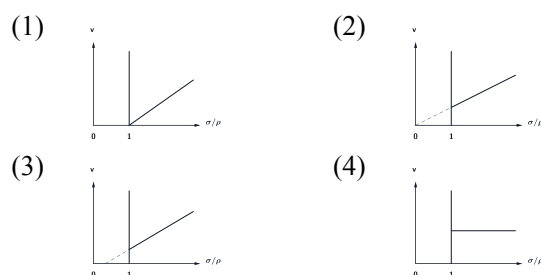
Sol. Continuity gives $A_P v_P = A_Q v_Q$, so halving the area doubles the speed: $v_Q = 2v_P$. For a horizontal pipe Bernoulli's equation reduces to $\Delta P = \frac{1}{2}\rho(v_Q^2 - v_P^2) = \frac{3}{2}\rho v_P^2$. Substituting $15 = 1500 v_P^2$ gives $v_P = 0.1 \text{ ms}^{-1} = 10 \text{ cm s}^{-1}$, and the volume flow rate is $A_P v_P = 40 \times 10 = 400 \text{ cm}^3\text{s}^{-1}$. NCERT Class 11, Mechanical Properties of Fluids.

Why the other options are wrong:

- (1) uses the narrow area A_Q with the wide-section speed v_P , mismatching the pair
- (2) drops the factor 3 from $v_Q^2 - v_P^2$, effectively using $\Delta P = \frac{1}{2}\rho v_Q^2$ alone
- (3) mixes SI and centimetre-gram-second (CGS) units partway through, most often by leaving ρ in kg m^{-3} alongside areas in cm^2

3. Re-NEET 2026 · Q12

In the measurement of viscosity of liquids using terminal velocity experiment, spherical balls of same radius but having different densities are used. The variation of the terminal velocity (v) with the ratio of density of spherical ball (σ) to density of the liquid (ρ), is best represented by:



Answer (1)

Sol. Stokes' law gives $v = \frac{2r^2 g}{9\eta}(\sigma - \rho)$, which can be rewritten as $v = \frac{2r^2 g \rho}{9\eta} \left(\frac{\sigma}{\rho} - 1 \right)$. With r fixed this is a STRAIGHT LINE in σ/ρ whose intercept on the horizontal axis is exactly at $\sigma/\rho = 1$. Below that value the ball is lighter than the liquid and does not sink at all, so the downward terminal velocity stays zero. NCERT Class 11, Mechanical Properties of Fluids (Stokes' law).

Why the other options are wrong:

- (2) takes $v \propto \sigma$ and lets the line pass through the

- origin, ignoring the buoyant term $-\rho$
- (3) places the zero-velocity crossing at some arbitrary density ratio rather than at the neutral-buoyancy point $\sigma = \rho$
 - (4) treats terminal velocity as a fixed property of the ball once it sinks, missing its linear dependence on excess density
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4. NEET 2020 · Q175

A capillary tube of radius r is immersed in water and water rises in it to a height h . The mass of the water in the capillary is 5 g. Another capillary tube of radius $2r$ is immersed in water. The mass of water that will rise in this tube is :

- (1) 5.0 g (2) 10.0 g (3) 20.0 g (4) 2.5 g

Answer (2)

Sol. Capillary rise h is inversely proportional to r . The risen mass is $\rho\pi r^2 h$, so it is proportional to r . Doubling the radius therefore doubles 5 g to 10 g.
Chapter: Mechanical Properties of Fluids.

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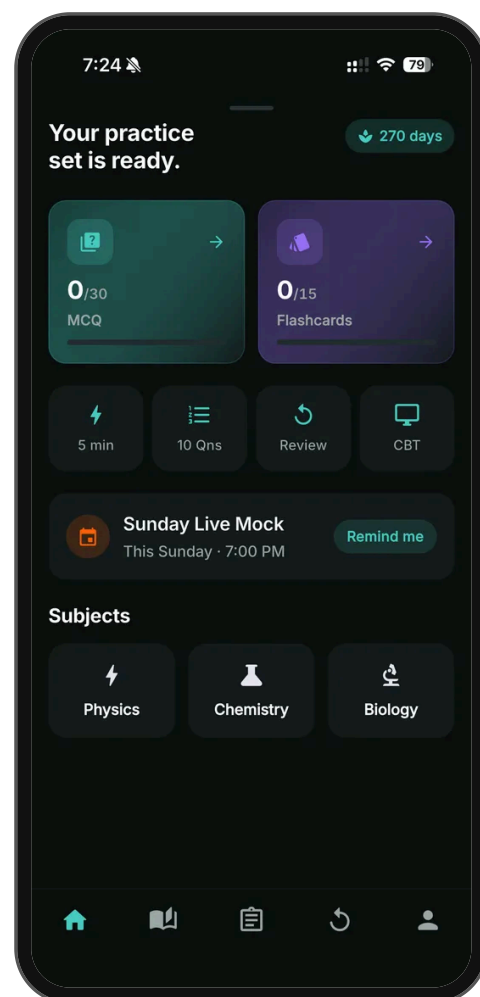
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