

JEE MAIN MECHANICAL PROPERTIES OF FLUIDS — ANGLE OF CONTACT, EXCESS PRESSURE IN DROPS AND BUBBLES — PYQS

Max. Marks: 32

Questions: 8

Section A (MCQ) — 4 questions

- Q.1** Two liquids A and B have θ_A and θ_B as contact angles in a capillary tube. If $K = \cos \theta_A / \cos \theta_B$, then identify the correct statement:

[JEE Main 2025 (Online) 4th April Morning Shift]

- (1) K is negative, then liquid A and liquid B have convex meniscus.
 (2) K is negative, then liquid A and liquid B have concave meniscus.
 (3) K is zero, then liquid A has convex meniscus and liquid B has concave meniscus.
 (4) K is negative, then liquid A has concave meniscus and liquid B has convex meniscus.

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- Q.2** An air bubble of radius 0.1 cm lies at a depth of 20 cm below the free surface of a liquid of density 1000 kg/m^3 . If the pressure inside the bubble is 2100 N/m^2 greater than the atmospheric pressure, then the surface tension of the liquid in SI unit is (use $g = 10 \text{ m/s}^2$)

[JEE Main 2025 (Online) 24th January Morning Shift]

- (1) 0.02 (2) 0.05 (3) 0.25 (4) 0.1

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- Q.3** The excess pressure inside a soap bubble is thrice the excess pressure inside a second soap bubble. The ratio between the volume of the first and the second bubble is:

[JEE Main 2024 (Online) 9th April Evening Shift]

- (1) 1:9 (2) 1:27 (3) 1:81 (4) 1:3

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- Q.4** Pressure inside a soap bubble is greater than the pressure outside by an amount : (given : R = Radius of bubble, S = Surface tension of bubble)

[JEE Main 2024 (Online) 6th April Evening Shift]

- (1) $\frac{S}{R}$ (2) $\frac{4S}{R}$ (3) $\frac{4R}{S}$ (4) $\frac{2S}{R}$

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Section B (Numerical) — 4 questions

- Q.5** The excess pressure inside a soap bubble A in air is half the excess pressure inside another soap bubble B in air. If the volume of the bubble A is n times the volume of the bubble B, then, the value of n is _____. [JEE Main 2025 (Online) 3rd April Evening Shift]

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- Q.6** An air bubble of radius 1.0 mm is observed at a depth 20 cm below the free surface of a liquid having surface tension 0.095 J/m^2 and density 10^3 kg/m^3 . The difference between pressure inside the bubble and atmospheric pressure is _____ N/m^2 . (Take $g = 10 \text{ m/s}^2$)

[JEE Main 2025 (Online) 23rd January Evening Shift]

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- Q.7** Two soap bubbles of radius 2 cm and 4 cm, respectively, are in contact with each other. The radius of curvature of the common surface, in cm, is _____.

[JEE Main 2025 (Online) 22nd January Morning Shift]

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- Q.8** A liquid column of height 0.04 cm balances excess pressure of a soap bubble of certain radius. If density of liquid is $8 \times 10^3 \text{ kg m}^{-3}$ and surface tension of soap solution is 0.28 N m^{-1} , then diameter of the soap bubble is _____ cm. (if $g = 10 \text{ m s}^{-2}$)

[JEE Main 2024 (Online) 8th April Morning Shift]

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ANSWER KEY

Section A (MCQ) — 4 questions

Ques.	1	2	3	4						
Ans.	4	2	2	2						

Section B (Numerical) — 4 questions

Ques.	5	6	7	8			
Ans.	8	2190	4	7			