

JEE MAIN MECHANICAL PROPERTIES OF FLUIDS — BERNOULLI'S PRINCIPLE AND ITS APPLICATIONS — PYQS

Max. Marks: 40

Questions: 10

Section A (MCQ) — 7 questions

- Q.1** A liquid of density 600 kg/m^3 flowing steadily in a tube of varying cross-section. The cross-section at a point A is 1.0 cm^2 and that at B is 20 mm^2 . Both the points A and B are in same horizontal plane, the speed of the liquid at A is 10 cm/s . The difference in pressures at A and B points is _____ Pa.

[JEE Main 2026 (Online) 8th April Evening Shift]

- (1) 18 (2) 144 (3) 36 (4) 72

 Scan or tap for the
full solution


- Q.2** A cylindrical vessel of 40 cm radius is completely filled with water and its capacity is 528 dm^3 (dm : decimeter). The vessel is placed on a solid block of exactly same height as vessel. If a small hole is made at 70 cm below the top of water level, then horizontal range of water falling on the ground in the beginning is _____ cm.

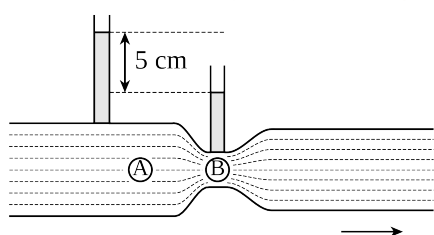
[JEE Main 2026 (Online) 6th April Evening Shift]

- (1) $120\sqrt{2}$ (2) $140\sqrt{2}$
(3) $140\sqrt{3}$ (4) $120\sqrt{3}$

 Scan or tap for the
full solution


- Q.3** Water flows through a horizontal tube as shown in the figure. The difference in height between the water columns in vertical tubes is 5 cm and the area of cross-sections at A and B are 6 cm^2 and 3 cm^2 respectively. The rate of flow will be _____ cm^3/s . (take $g = 10 \text{ m/s}^2$)

[JEE Main 2026 (Online) 21st January Morning Shift]



- (1) $100\sqrt{3}$ (2) $\frac{200}{\sqrt{3}}$
(3) $200\sqrt{6}$ (4) $200\sqrt{3}$

 Scan or tap for the
full solution


- Q.4** Consider a completely full cylindrical water tank of height 1.6 m and of cross-sectional area 0.5 m^2 . It has a small hole in its side at a height 90 cm from the bottom. Assume, the cross-sectional area of the hole to be negligibly small as compared to that of the water tank. If a load 50 kg is applied at the top surface of the water in the tank then the velocity of the water coming out at the instant when the hole is opened is:
($g = 10 \text{ m/s}^2$)

[JEE Main 2025 (Online) 3rd April Morning Shift]

- (1) 2 m/s (2) 5 m/s (3) 3 m/s (4) 4 m/s

 Scan or tap for the
full solution


- Q.5** Water flows in a horizontal pipe whose one end is closed with a valve. The reading of the pressure gauge attached to the pipe is P_1 . The reading of the pressure gauge falls to P_2 when the valve is opened. The speed of water flowing in the pipe is proportional to

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

- (1) $(P_1 - P_2)^2$ (2) $\sqrt{P_1 - P_2}$
(3) $P_1 - P_2$ (4) $(P_1 - P_2)^4$

 Scan or tap for the
full solution


- Q.6** Correct Bernoulli's equation is (symbols have their usual meaning) :

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

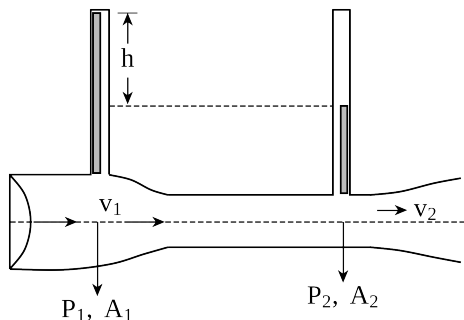
- (1) $P + \frac{1}{2}\rho gh + \frac{1}{2}\rho v^2 = \text{constant}$ (2) $P + mgh + \frac{1}{2}mv^2 = \text{constant}$
(3) $P + \rho gh + \rho v^2 = \text{constant}$ (4) $P + \rho gh + \frac{1}{2}\rho v^2 = \text{constant}$

 Scan or tap for the
full solution


- Q.7** Given below are two statements :

Statement-I: When speed of liquid is zero everywhere, pressure difference at any two points depends on equation $P_1 - P_2 = \rho g(h_2 - h_1)$.

Statement-II: In venturi tube shown $2gh = v_1^2 - v_2^2$



In the light of the above statements, choose the most appropriate answer from the options given below.

[JEE Main 2024 (Online) 4th April Morning Shift]

- (1) Statement-I is correct but Statement-II is incorrect.
- (2) Both Statement-I and Statement-II are correct.
- (3) Both Statement-I and Statement-II are incorrect.
- (4) Statement-I is incorrect but Statement-II is correct.

Scan or tap for the full solution



Section B (Numerical) — 3 questions

- Q.8** A plane is in level flight at constant speed and each of its two wings has an area of 40 m^2 . If the speed of the air is 180 km/h over the lower wing surface and 252 km/h over the upper wing surface, the mass of the plane is _____ kg.
(Take air density to be 1 kg m^{-3} and $g = 10 \text{ m s}^{-2}$)

[JEE Main 2024 (Online) 1st February Morning Shift]

Scan or tap for the full solution



- Q.9** In a test experiment on a model aeroplane in wind tunnel, the flow speeds on the upper and lower surfaces of the wings are 70 ms^{-1} and 65 ms^{-1} respectively. If the wing area is 2 m^2 , the lift of the wing is _____ N.
(Given density of air = 1.2 kg m^{-3})

[JEE Main 2024 (Online) 29th January Morning Shift]

Scan or tap for the full solution



- Q.10** The reading of pressure metre attached with a closed pipe is $4.5 \times 10^4 \text{ N/m}^2$. On opening the valve, water starts flowing and the reading of pressure metre falls to $2.0 \times 10^4 \text{ N/m}^2$. The velocity of water is found to be $\sqrt{V} \text{ m/s}$. The value of V is _____.

[JEE Main 2024 (Online) 27th January Evening Shift]

Scan or tap for the full solution



ANSWER KEY

Section A (MCQ) — 7 questions

Ques.	1	2	3	4	5	6	7				
Ans.	4	2	4	4	2	4	1				

Section B (Numerical) — 3 questions

Ques.	8	9	10				
Ans.	9600	810	50				