

PHYSICS · JEE MAIN

Fluid Mechanics

Chapter-wise previous year questions, with answer key

47

PYQS

2020–2025

PAPERS

5

TOPICS

Viscosity and Stoke's Law

Equation of Continuity

Pressure and Pascal's Law

Bernoulli's Theorem

Buoyancy and Archimedes' Principle

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

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Viscosity and Stoke's Law · 23 PYQs

Q1 JEE Main 2025 · 3 Apr · Shift 2

A solid steel ball of diameter 3.6 mm acquired terminal velocity $2.45 \times 10^{-2} \text{ m/s}$ while falling under gravity through an oil of density 925 kg m^{-3} . Take density of steel as 7825 kg m^{-3} and g as 9.8 m/s^2 . The viscosity of the oil in SI unit is

- (A) 2.18 (B) 1.68
(C) 2.38 (D) 1.99

[Step-by-step solution ► prepwiser.in/questions/HoyYhq86ur](https://www.prepwiser.in/questions/HoyYhq86ur)

Q2 JEE Main 2025 · 28 Jan · Shift 1

In the experiment for measurement of viscosity ' η ' of given liquid with a ball having radius R , consider following statements.

- A. Graph between terminal velocity V and R will be a parabola.
B. The terminal velocities of different diameter balls are constant for a given liquid.
C. Measurement of terminal velocity is dependent on the temperature.
D. This experiment can be utilized to assess the density of a given liquid.
E. If balls are dropped with some initial speed, the value of η will change.

Choose the correct answer from the options given below:

- (A) C, D and E Only (B) A, B and E Only
(C) A, C and D Only (D) B, D and E Only

[Step-by-step solution ► prepwiser.in/questions/f50P_L6K4Q](https://www.prepwiser.in/questions/f50P_L6K4Q)

Q3 JEE Main 2025 · 28 Jan · Shift 1

Consider following statements:

- A. Surface tension arises due to extra energy of the molecules at the interior as compared to the molecules at the surface, of a liquid.
B. As the temperature of liquid rises, the coefficient of viscosity increases.
C. As the temperature of gas increases, the coefficient of viscosity increases
D. The onset of turbulence is determined by Reynold's number.
E. In a steady flow two stream lines never intersect.

Choose the correct answer from the options given below:

- (A) B, C, D Only (B) C, D, E Only
(C) A, D, E Only (D) A, B, C Only

[Step-by-step solution ► prepwiser.in/questions/Yy14w3TjbN](https://www.prepwiser.in/questions/Yy14w3TjbN)

Q4 JEE Main 2024 · 9 Apr · Shift 2

A spherical ball of radius $1 \times 10^{-4}\text{m}$ and density 10^5kg/m^3 falls freely under gravity through a distance h before entering a tank of water, If after entering in water the velocity of the ball does not change, then the value of h is approximately:

(The coefficient of viscosity of water is $9.8 \times 10^{-6}\text{Ns/m}^2$)

- (A) 2518 m (B) 2396 m
(C) 2249 m (D) 2296 m

Step-by-step solution ► [prepwiser.in/questions/1-e5-Mh2Pq](https://www.prepwiser.in/questions/1-e5-Mh2Pq)

Q5 JEE Main 2024 · 8 Apr · Shift 2

Small water droplets of radius 0.01mm are formed in the upper atmosphere and falling with a terminal velocity of 10cm/s . Due to condensation, if 8 such droplets are coalesced and formed a larger drop, the new terminal velocity will be _____ cm/s .

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/oU48cvVS8q](https://www.prepwiser.in/questions/oU48cvVS8q)

Q6 JEE Main 2024 · 6 Apr · Shift 1

A small ball of mass m and density ρ is dropped in a viscous liquid of density ρ_0 . After sometime, the ball falls with constant velocity. The viscous force on the ball is :

- (A) $mg \left(1 - \frac{\rho_0}{\rho}\right)$ (B) $mg \left(\frac{\rho_0}{\rho} - 1\right)$
(C) $mg (1 - \rho\rho_0)$ (D) $mg \left(1 + \frac{\rho}{\rho_0}\right)$

Step-by-step solution ► [prepwiser.in/questions/0pi_vxYsog](https://www.prepwiser.in/questions/0pi_vxYsog)

Q7 JEE Main 2024 · 31 Jan · Shift 2

A small spherical ball of radius r , falling through a viscous medium of negligible density has terminal velocity ' v '. Another ball of the same mass but of radius $2r$, falling through the same viscous medium will have terminal velocity:

- (A) $4v$ (B) $2V$
(C) $\frac{v}{4}$ (D) $\frac{v}{2}$

Step-by-step solution ► [prepwiser.in/questions/H5rzZRvz2Z](https://www.prepwiser.in/questions/H5rzZRvz2Z)

Q8 JEE Main 2024 · 27 Jan · Shift 1

Given below are two statements :

Statement (I) :Viscosity of gases is greater than that of liquids.

Statement (II) : Surface tension of a liquid decreases due to the presence of insoluble impurities.

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

- (A) Statement I is correct but statement II is incorrect
(B) Statement I is incorrect but Statement II is correct
(C) Both Statement I and Statement II are incorrect
(D) Both Statement I and Statement II are correct

Step-by-step solution ► [prepwiser.in/questions/u4c_Az8xCc](https://www.prepwiser.in/questions/u4c_Az8xCc)

Q9 JEE Main 2023 · 11 Apr · Shift 2

Eight equal drops of water are falling through air with a steady speed of 10cm/s. If the drops coalesce, the new velocity is:-

(A) 40cm/s

(B) 16cm/s

(C) 10cm/s

(D) 5cm/s

[Step-by-step solution ► prepwiser.in/questions/VrQNe-kI2n](#)

Q10 JEE Main 2023 · 8 Apr · Shift 1

An air bubble of diameter 6mm rises steadily through a solution of density 1750kg/m^3 at the rate of 0.35cm/s. The co-efficient of viscosity of the solution (neglect density of air) is _____ Pas (given, $g = 10\text{ms}^{-2}$).

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/TtiDPW8uhT](#)

Q11 JEE Main 2023 · 6 Apr · Shift 1

A small ball of mass M and density ρ is dropped in a viscous liquid of density ρ_0 . After some time, the ball falls with a constant velocity. What is the viscous force on the ball ?

(A) $F = Mg \left(1 - \frac{\rho_0}{\rho} \right)$

(B) $F = Mg \left(1 + \frac{\rho}{\rho_0} \right)$

(C) $F = Mg \left(1 + \frac{\rho_0}{\rho} \right)$

(D) $F = Mg (1 \pm \rho\rho_0)$

[Step-by-step solution ► prepwiser.in/questions/56PqKaA5Le](#)

Q12 JEE Main 2022 · 29 Jul · Shift 2

The velocity of a small ball of mass 0.3g and density 8g/cc when dropped in a container filled with glycerine becomes constant after some time. If the density of glycerine is 1.3g/cc, then the value of viscous force acting on the ball will be $x \times 10^{-4}\text{N}$, The value of x is _____. [use $g = 10\text{m/s}^2$]

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/FwoOKYnB5p](#)

Q13 JEE Main 2022 · 28 Jul · Shift 1

The diameter of an air bubble which was initially 2mm, rises steadily through a solution of density 1750kgm^{-3} at the rate of 0.35cms^{-1} . The coefficient of viscosity of the solution is _____ poise (in nearest integer). (the density of air is negligible).

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/kxjzGn_qKK](#)

Q14 JEE Main 2022 · 30 Jun · Shift 1

An air bubble of negligible weight having radius r rises steadily through a solution of density σ at speed v . The coefficient of viscosity of the solution is given by :

- (A) $\eta = \frac{4r\sigma g}{9v}$
(B) $\eta = \frac{2r^2\sigma g}{9v}$
(C) $\eta = \frac{2\pi r^2\sigma g}{9v}$
(D) $\eta = \frac{2r^2\sigma g}{3\pi v}$

[Step-by-step solution ► prepwiser.in/questions/G4o3_NTixY](https://www.prepwiser.in/questions/G4o3_NTixY)

Q15 JEE Main 2022 · 29 Jun · Shift 2

A small spherical ball of radius 0.1 mm and density 10^4 kg m^{-3} falls freely under gravity through a distance h before entering a tank of water. If, after entering the water the velocity of ball does not change and it continue to fall with same constant velocity inside water, then the value of h will be _____ m.

(Given $g = 10 \text{ ms}^{-2}$, viscosity of water = $1.0 \times 10^{-5} \text{ N-sm}^{-2}$).

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/kRIRct5Z06](https://www.prepwiser.in/questions/kRIRct5Z06)

Q16 JEE Main 2022 · 28 Jun · Shift 2

A water drop of radius $1 \mu\text{m}$ falls in a situation where the effect of buoyant force is negligible. Co-efficient of viscosity of air is $1.8 \times 10^{-5} \text{ Nsm}^{-2}$ and its density is negligible as compared to that of water 10^6 gm^{-3} . Terminal velocity of the water drop is :

(Take acceleration due to gravity = 10 ms^{-2})

- (A) $145.4 \times 10^{-6} \text{ ms}^{-1}$
(B) $118.0 \times 10^{-6} \text{ ms}^{-1}$
(C) $132.6 \times 10^{-6} \text{ ms}^{-1}$
(D) $123.4 \times 10^{-6} \text{ ms}^{-1}$

[Step-by-step solution ► prepwiser.in/questions/-eQgsa4obX](https://www.prepwiser.in/questions/-eQgsa4obX)

Q17 JEE Main 2022 · 27 Jun · Shift 1

The velocity of a small ball of mass ' m ' and density d_1 , when dropped in a container filled with glycerin, becomes constant after some time. If the density of glycerin is d_2 , then the viscous force acting on the ball, will be :

- (A) $mg \left(1 - \frac{d_1}{d_2}\right)$
(B) $mg \left(1 - \frac{d_2}{d_1}\right)$
(C) $mg \left(\frac{d_1}{d_2} - 1\right)$
(D) $mg \left(\frac{d_2}{d_1} - 1\right)$

[Step-by-step solution ► prepwiser.in/questions/9lIO-SXtvl](https://www.prepwiser.in/questions/9lIO-SXtvl)

Q18 JEE Main 2022 · 26 Jun · Shift 2

If ρ is the density and η is coefficient of viscosity of fluid which flows with a speed v in the pipe of diameter d , the correct formula for Reynolds number R_e is :

(A) $R_e = \frac{\eta d}{\rho v}$

(B) $R_e = \frac{\rho v}{\eta d}$

(C) $R_e = \frac{\rho v d}{\eta}$

(D) $R_e = \frac{\eta}{\rho v d}$

[Step-by-step solution ► prepwisser.in/questions/_tP0WCJnyk](https://www.prepwisser.in/questions/_tP0WCJnyk)

Q19 JEE Main 2022 · 25 Jun · Shift 1

The terminal velocity (v_t) of the spherical rain drop depends on the radius (r) of the spherical rain drop as :

(A) $r^{1/2}$

(B) r

(C) r^2

(D) r^3

[Step-by-step solution ► prepwisser.in/questions/6injDMh-Es](https://www.prepwisser.in/questions/6injDMh-Es)

Q20 JEE Main 2022 · 25 Jun · Shift 1

The velocity of upper layer of water in a river is 36 kmh^{-1} . Shearing stress between horizontal layers of water is 10^{-3} Nm^{-2} . Depth of the river is _____ m. (Co-efficient of viscosity of water is 10^{-2} Pa.s)

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/dYYzLd6jUN](https://www.prepwisser.in/questions/dYYzLd6jUN)

Q21 JEE Main 2021 · 27 Aug · Shift 1

In Millikan's oil drop experiment, what is viscous force acting on an uncharged drop of radius $2.0 \times 10^{-5} \text{ m}$ and density $1.2 \times 10^3 \text{ kgm}^{-3}$? Take viscosity of liquid = $1.8 \times 10^{-5} \text{ Nsm}^{-2}$. (Neglect buoyancy due to air).

(A) $3.8 \times 10^{-11} \text{ N}$

(B) $3.9 \times 10^{-10} \text{ N}$

(C) $1.8 \times 10^{-10} \text{ N}$

(D) $5.8 \times 10^{-10} \text{ N}$

[Step-by-step solution ► prepwisser.in/questions/MX3jvNgo1w](https://www.prepwisser.in/questions/MX3jvNgo1w)

Q22 JEE Main 2021 · 27 Jul · Shift 2

A raindrop with radius $R = 0.2 \text{ mm}$ falls from a cloud at a height $h = 2000 \text{ m}$ above the ground. Assume that the drop is spherical throughout its fall and the force of buoyance may be neglected, then the terminal speed attained by the raindrop is :

[Density of water $\rho_w = 1000 \text{ kg m}^{-3}$ and Density of air $\rho_a = 1.2 \text{ kg m}^{-3}$, $g = 10 \text{ m/s}^2$, Coefficient of viscosity of air $= 1.8 \times 10^{-5} \text{ Nsm}^{-2}$]

(A) 250.6 ms^{-1}

(B) 43.56 ms^{-1}

(C) 4.94 ms^{-1}

(D) 14.4 ms^{-1}

[Step-by-step solution ► prepwisser.in/questions/UYd-VrnOAq](https://www.prepwisser.in/questions/UYd-VrnOAq)

Q23 JEE Main 2021 · 16 Mar · Shift 2

What will be the nature of flow of water from a circular tap, when its flow rate increased from 0.18 L/min to 0.48 L/min ? The radius of the tap and viscosity of water are 0.5 cm and 10^{-3} Pa s , respectively.

(Density of water : 10^3 kg/m^3)

(A) Steady flow to unsteady flow

(B) Unsteady to steady flow

(C) Remains turbulent flow

(D) Remains steady flow

[Step-by-step solution ► prepwisser.in/questions/asIz9H7eYS](https://www.prepwisser.in/questions/asIz9H7eYS)

Equation of Continuity · 3 PYQs

Q24 JEE Main 2023 · 1 Feb · Shift 2

The surface of water in a water tank of cross section area 750 cm^2 on the top of a house is $h \text{ m}$ above the tap level. The speed of water coming out through the tap of cross section area 500 mm^2 is 30 cm/s . At that instant, $\frac{dh}{dt}$ is $x \times 10^{-3} \text{ m/s}$. The value of x will be _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/K6XU2Nvybm](https://www.prepwisser.in/questions/K6XU2Nvybm)

Q25 JEE Main 2022 · 28 Jul · Shift 2

A pressure-pump has a horizontal tube of cross sectional area 10 cm^2 for the outflow of water at a speed of 20 m/s . The force exerted on the vertical wall just in front of the tube which stops water horizontally flowing out of the tube, is :

[given: density of water $= 1000 \text{ kg/m}^3$]

(A) 300 N

(B) 500 N

(C) 250 N

(D) 400 N

[Step-by-step solution ► prepwisser.in/questions/t5znQlaV5k](https://www.prepwisser.in/questions/t5znQlaV5k)

Q26 JEE Main 2020 · 7 Jan · Shift 2

An ideal fluid flows (laminar flow) through a pipe of non-uniform diameter. The maximum and minimum diameters of the pipes are 6.4 cm and 4.8 cm, respectively. The ratio of the minimum and the maximum velocities of fluid in this pipe is :

- (A) $\frac{3}{4}$ (B) $\frac{9}{16}$
(C) $\frac{\sqrt{3}}{2}$ (D) $\frac{81}{256}$

[Step-by-step solution](#) ► [prepwiser.in/questions/7yyaBxpiSc](https://www.prepwiser.in/questions/7yyaBxpiSc)

Pressure and Pascal's Law · 9 PYQs

Q27 JEE Main 2025 · 3 Apr · Shift 2

Two cylindrical vessels of equal cross sectional area of 2m^2 contain water upto heights 10 m and 6 m , respectively. If the vessels are connected at their bottom then the work done by the force of gravity is (Density of water is 10^3kg/m^3 and $g = 10\text{m/s}^2$)

- (A) $1 \times 10^5\text{J}$ (B) $4 \times 10^4\text{J}$
(C) $8 \times 10^4\text{J}$ (D) $6 \times 10^4\text{J}$

[Step-by-step solution](#) ► [prepwiser.in/questions/tIVqMnZApk](https://www.prepwiser.in/questions/tIVqMnZApk)

Q28 JEE Main 2024 · 4 Apr · Shift 2

Mercury is filled in a tube of radius 2cm up to a height of 30cm. The force exerted by mercury on the bottom of the tube is _____ N.

(Given, atmospheric pressure = 10^5Nm^{-2} , density of mercury

$$= 1.36 \times 10^4\text{kgm}^{-3}, g = 10\text{ms}^{-2}, \pi = \frac{22}{7})$$

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/udogeciOrz](https://www.prepwiser.in/questions/udogeciOrz)

Q29 JEE Main 2023 · 10 Apr · Shift 1

Given below are two statements:

Statement I : Pressure in a reservoir of water is same at all points at the same level of water.

Statement II : The pressure applied to enclosed water is transmitted in all directions equally.

In the light of the above statements, choose the correct answer from the options given below:

- (A) Both Statement I and Statement II are false
(B) Statement I is false but Statement II is true
(C) Statement I is true but Statement II is false
(D) Both Statement I and Statement II are true

[Step-by-step solution](#) ► [prepwiser.in/questions/jLOiO9lqnD](https://www.prepwiser.in/questions/jLOiO9lqnD)

Q30 JEE Main 2023 · 8 Apr · Shift 1

An air bubble of volume 1cm^3 rises from the bottom of a lake 40m deep to the surface at a temperature of 12°C . The atmospheric pressure is $1 \times 10^5\text{Pa}$ the density of water is 1000kg/m^3 and $g = 10\text{m/s}^2$. There is no difference of the temperature of water at the depth of 40m and on the surface. The volume of air bubble when it reaches the surface will be:

- (A) 4cm^3 (B) 3cm^3
(C) 2cm^3 (D) 5cm^3

[Step-by-step solution ► prepwisar.in/questions/w0rMq1TLDe](https://www.prepwisar.in/questions/w0rMq1TLDe)

Q31 JEE Main 2023 · 8 Apr · Shift 2

A hydraulic automobile lift is designed to lift vehicles of mass 5000kg . The area of cross section of the cylinder carrying the load is 250cm^2 . The maximum pressure the smaller piston would have to bear is [Assume $g = 10\text{m/s}^2$]

- (A) $20 \times 10^{+6}\text{Pa}$ (B) $200 \times 10^{+6}\text{Pa}$
(C) $2 \times 10^{+5}\text{Pa}$ (D) $2 \times 10^{+6}\text{Pa}$

[Step-by-step solution ► prepwisar.in/questions/aE8b4pNETe](https://www.prepwisar.in/questions/aE8b4pNETe)

Q32 JEE Main 2023 · 6 Apr · Shift 2

Given below are two statements: one is labelled as Assertion **A** and the other is labelled as Reason **R**
Assertion A: When you squeeze one end of a tube to get toothpaste out from the other end, Pascal's principle is observed.

Reason R: A change in the pressure applied to an enclosed incompressible fluid is transmitted undiminished to every portion of the fluid and to the walls of its container.

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

- (A) Both A and R are correct but R is NOT the correct explanation of A
(B) A is not correct but R is correct
(C) A is correct but R is not correct
(D) Both A and B are correct and R is the correct explanation of A

[Step-by-step solution ► prepwisar.in/questions/iH3CK-7sSg](https://www.prepwisar.in/questions/iH3CK-7sSg)

Q33 JEE Main 2021 · 16 Mar · Shift 1

The pressure acting on a submarine is $3 \times 10^5\text{Pa}$ at a certain depth. If the depth is doubled, the percentage increase in the pressure acting on the submarine would be :

(Assume that atmospheric pressure is $1 \times 10^5\text{Pa}$ density of water is 10^3kg m^{-3} , $g = 10\text{ms}^{-2}$)

- (A) $\frac{200}{5}\%$ (B) $\frac{200}{3}\%$
(C) $\frac{3}{200}\%$ (D) $\frac{5}{200}\%$

[Step-by-step solution ► prepwisar.in/questions/OJCwQIVt1D](https://www.prepwisar.in/questions/OJCwQIVt1D)

Q34 JEE Main 2021 · 24 Feb · Shift 1

A hydraulic press can lift 100 kg when a mass 'm' is placed on the smaller piston. It can lift _____ kg when the diameter of the larger piston is increased by 4 times and that of the smaller piston is decreased by 4 times keeping the same mass 'm' on the smaller piston.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/resimNNDgF](https://www.prepwiser.in/questions/resimNNDgF)

Q35 JEE Main 2020 · 4 Sep · Shift 2

Two identical cylindrical vessels are kept on the ground and each contain the same liquid of density d . The area of the base of both vessels is S but the height of liquid in one vessel is x_1 and in the other, x_2 . When both cylinders are connected through a pipe of negligible volume very close to the bottom, the liquid flows from one vessel to the other until it comes to equilibrium at a new height. The change in energy of the system in the process is:

- (A) $gdS(x_2 + x_1)^2$
- (B) $gdS(x_2^2 + x_1^2)$
- (C) $\frac{1}{4}gdS(x_2 - x_1)^2$
- (D) $\frac{3}{4}gdS(x_2 - x_1)^2$

[Step-by-step solution ► prepwiser.in/questions/V7TgwTtweJ](https://www.prepwiser.in/questions/V7TgwTtweJ)

Bernoulli's Theorem · 9 PYQs

Q36 JEE Main 2025 · 23 Jan · Shift 2

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

- (A) $(P_1 - P_2)^2$
- (B) $\sqrt{P_1 - P_2}$
- (C) $P_1 - P_2$
- (D) $(P_1 - P_2)^4$

[Step-by-step solution ► prepwiser.in/questions/0i7V6H9vCd](https://www.prepwiser.in/questions/0i7V6H9vCd)

Q37 JEE Main 2024 · 8 Apr · Shift 1

Correct Bernoulli's equation is (symbols have their usual meaning) :

- (A) $P + \frac{1}{2}\rho gh + \frac{1}{2}\rho v^2 = \text{constant}$
- (B) $P + mgh + \frac{1}{2}mv^2 = \text{constant}$
- (C) $P + \rho gh + \rho v^2 = \text{constant}$
- (D) $P + \rho gh + \frac{1}{2}\rho v^2 = \text{constant}$

[Step-by-step solution ► prepwiser.in/questions/qws3eZQ0EK](https://www.prepwiser.in/questions/qws3eZQ0EK)

Q38 JEE Main 2024 · 1 Feb · Shift 1

A plane is in level flight at constant speed and each of its two wings has an area of 40m^2 . If the speed of the air is 180km/h over the lower wing surface and 252km/h over the upper wing surface, the mass of the plane is _____ kg.

(Take air density to be 1kgm^{-3} and $g = 10\text{ms}^{-2}$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/TI6WseVHsR](https://www.prepwisser.in/questions/TI6WseVHsR)

Q39 JEE Main 2024 · 29 Jan · Shift 1

In a test experiment on a model aeroplane in wind tunnel, the flow speeds on the upper and lower surfaces of the wings are 70ms^{-1} and 65ms^{-1} respectively. If the wing area is 2m^2 , the lift of the wing is _____ N.

(Given density of air = 1.2kgm^{-3})

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/NpSWpuyi6s](https://www.prepwisser.in/questions/NpSWpuyi6s)

Q40 JEE Main 2024 · 27 Jan · Shift 2

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 _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/r_mdzRONKQ](https://www.prepwisser.in/questions/r_mdzRONKQ)

Q41 JEE Main 2023 · 12 Apr · Shift 1

Glycerin of density $1.25 \times 10^3\text{kgm}^{-3}$ is flowing through the conical section of pipe. The area of cross-section of the pipe at its ends are 10cm^2 and 5cm^2 and pressure drop across its length is 3Nm^{-2} . The rate of flow of glycerin through the pipe is $x \times 10^{-5}\text{m}^3\text{s}^{-1}$. The value of x is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/hhjseks25w](https://www.prepwisser.in/questions/hhjseks25w)

Q42 JEE Main 2023 · 29 Jan · Shift 2

A fully loaded boeing aircraft has a mass of $5.4 \times 10^5\text{kg}$. Its total wing area is 500m^2 . It is in level flight with a speed of 1080km/h . If the density of air ρ is 1.2kg m^{-3} , the fractional increase in the speed of the air on the upper surface of the wing relative to the lower surface in percentage will be. ($g = 10\text{m/s}^2$)

(A) 16

(B) 8

(C) 6

(D) 10

[Step-by-step solution ► prepwisser.in/questions/fgetXhLxWU](https://www.prepwisser.in/questions/fgetXhLxWU)

Q43 JEE Main 2022 · 27 Jun · Shift 1

The area of cross-section of a large tank is 0.5 m^2 . It has a narrow opening near the bottom having area of cross-section 1 cm^2 . A load of 25 kg is applied on the water at the top in the tank. Neglecting the speed of water in the tank, the velocity of the water, coming out of the opening at the time when the height of water level in the tank is 40 cm above the bottom, will be _____ cms^{-1} . [Take $g = 10 \text{ ms}^{-2}$]

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/0g43gvB5gq](https://www.prepwiser.in/questions/0g43gvB5gq)

Q44 JEE Main 2020 · 6 Sep · Shift 2

A fluid is flowing through a horizontal pipe of varying cross-section, with speed $v \text{ ms}^{-1}$ at a point where the pressure is P pascal. At another point where pressure is $\frac{P}{2}$ Pascal its speed is $V \text{ ms}^{-1}$. If the density of the fluid is $\rho \text{ kg m}^{-3}$ and the flow is streamline, then V is equal to :

(A) $\sqrt{\frac{P}{2\rho} + v^2}$

(B) $\sqrt{\frac{P}{\rho} + v^2}$

(C) $\sqrt{\frac{2P}{\rho} + v^2}$

(D) $\sqrt{\frac{P}{\rho} + v}$

[Step-by-step solution ► prepwiser.in/questions/En4hEjR_-c](https://www.prepwiser.in/questions/En4hEjR_-c)

Buoyancy and Archimedes' Principle · 3 PYQs

Q45 JEE Main 2025 · 28 Jan · Shift 2

A 400 g solid cube having an edge of length 10 cm floats in water. How much volume of the cube is outside the water?

(Given: density of water = 1000 kg m^{-3})

(A) 400 cm^3

(B) 600 cm^3

(C) 1400 cm^3

(D) 4000 cm^3

[Step-by-step solution ► prepwiser.in/questions/O7Urcf4DIA](https://www.prepwiser.in/questions/O7Urcf4DIA)

Q46 JEE Main 2024 · 9 Apr · Shift 1

A sphere of relative density σ and diameter D has concentric cavity of diameter d . The ratio of $\frac{D}{d}$, if it just floats on water in a tank is :

(A) $\left(\frac{\sigma-2}{\sigma+2}\right)^{1/3}$

(B) $\left(\frac{\sigma+1}{\sigma-1}\right)^{1/3}$

(C) $\left(\frac{\sigma-1}{\sigma}\right)^{1/3}$

(D) $\left(\frac{\sigma}{\sigma-1}\right)^{1/3}$

[Step-by-step solution ► prepwiser.in/questions/IXisSJLAv4](https://www.prepwiser.in/questions/IXisSJLAv4)

A balloon carries a total load of 185 kg at normal pressure and temperature of 27°C . What load will the balloon carry on rising to a height at which the barometric pressure is 45 cm of Hg and the temperature is -7°C . Assuming the volume constant?

(A) 181.46 kg

(B) 214.15 kg

(C) 219.07 kg

(D) 123.54 kg

[Step-by-step solution ► prepwisser.in/questions/DSPEgmiiidT](https://www.prepwisser.in/questions/DSPEgmiiidT)

Answer key — Fluid Mechanics

Numbers match the question numbers above. For full working, open the solution link under each question.

1	D	2	C	3	B	4	A	5	40	6	A	7	D	8	B
9	A	10	10	11	A	12	25	13	11	14	B	15	20	16	D
17	B	18	C	19	C	20	100	21	B	22	C	23	A	24	2
25	D	26	B	27	C	28	177	29	D	30	D	31	D	32	D
33	B	34	25600	35	C	36	B	37	D	38	9600	39	810	40	50
41	4	42	D	43	300	44	B	45	B	46	D	47	D		

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