CLASS 11 PHYSICS EXTRA QUESTIONS

Class 11 Physics Chapter 9 Mechanical Properties of Fluids – Extra Questions with Answers

Extra practice questions for Class 11 Physics Chapter 9 (Mechanical Properties of Fluids), beyond the textbook. These Class 11 Physics Chapter 9 important questions are handy for last-minute exam practice.

Contents

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Very Short Answer Questions (1 mark)

Q1. What is the SI unit of pressure?
Ans: Pascal (Pa), equal to N/m^2.

Q2. State the equation of continuity.
Ans: A1v1=A2v2 for incompressible flow.

Q3. What device works on Pascal's law?
Ans: Hydraulic lift/hydraulic brake.

Q4. What is the SI unit of viscosity coefficient?
Ans: Pascal-second (Pa·s) or poiseuille (Pl).

Q5. Why do small insects like water striders float on water without sinking?
Ans: Due to the surface tension of water, which supports their weight.

Short Answer Questions (2–3 marks)

Q6. Find the pressure at a depth of 5 m in water (ρ=1000 kg/m^3, g=10 m/s^2), ignoring atmospheric pressure.
Ans: P=ρgh=1000(10)(5)=50000 Pa=5×10&sup4; Pa.

Q7. Water flows through a pipe of area 2 cm^2 at 3 m/s. It enters a narrower section of area 1 cm^2. Find the velocity there.
Ans: A1v1=A2v2; 2(3)=1(v2); v2=6 m/s.

Q8. A block of density 800 kg/m^3 and volume 0.002 m^3 is fully submerged in water (density 1000 kg/m^3). Find the buoyant force (g=10 m/s^2).
Ans: Buoyant force = $\rho_{water}Vg$ = 1000(0.002)(10) = 20 N.

Higher-Order Thinking / Application Questions

Q9. Water flows through a horizontal pipe that narrows from area 4 cm^2 to 2 cm^2. If the pressure in the wider section is 2×10&sup4; Pa and the velocity there is 2 m/s, find the pressure in the narrower section (ρ_{water}=1000 kg/m^3), and explain the physical reasoning using Bernoulli's principle.
Ans: By continuity, A1v1=A2v2; 4(2)=2(v2); v2=4 m/s. By Bernoulli's equation (horizontal, so gh terms cancel): P1+½ρv1^2=P2+½ρv2^2. 2×10&sup4;+½(1000)(4)=P2+½(1000)(16). 2×10&sup4;+2000=P2+8000. P2=20000+2000−8000=14000 Pa. This shows that as the pipe narrows, the fluid speeds up (continuity), and since Bernoulli's equation requires the sum of pressure and kinetic energy terms to stay constant, the pressure must drop to compensate for the increased kinetic energy.

Q10. A steel ball is dropped into a tall column of glycerine (a viscous fluid) and eventually reaches a constant terminal velocity. Explain, in terms of the forces acting on the ball, why it does not keep accelerating indefinitely.
Ans: As the ball falls through the viscous fluid, three forces act on it: gravity (downward, driving the fall), the buoyant force (upward, from Archimedes' principle, constant since it depends on displaced volume), and

the viscous drag force (upward, opposing motion, given by Stokes' law $F=6\pi\eta rv$, which increases with velocity). Initially, gravity exceeds the sum of buoyant and drag forces, so the ball accelerates downward. As its velocity increases, the viscous drag force (proportional to v) increases too. Eventually, the ball reaches a velocity at which the net force becomes zero (weight = buoyant force + viscous drag), at which point it moves at constant velocity called the terminal velocity, and stops accelerating.

Class 11 Physics Chapter 9 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the Class 11 Physics Chapter 9 Solutions and Class 11 Physics Chapter 9 Revision Notes.

See also: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8 | Chapter 9

Practice more: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8

Quick revision: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8