CBSE Class 9 Science – Chapter: Gravitation

Maximum Marks: 40
Time: 1.5 Hours

Section A (1 Mark Each)

1. Define **gravitational force**.
2. What is the SI unit of **gravitational constant (G)**?
3. Why does a stone fall towards the Earth, but the Earth does not move towards the stone?
4. What happens to the weight of an object as it moves away from the Earth's surface?
5. Write the formula for **Buoyant Force**.

Section B (2 Marks Each)

6. State **Newton's Universal Law of Gravitation** and write its mathematical expression.
7. How is the gravitational force between two objects affected if the distance between them is tripled?
8. Why does an object float on water but sink in mercury?
9. Define mass and weight. How are they related?
10. Differentiate between **thrust** and **pressure** with examples.

Section C (3 Marks Each)

11. A stone is dropped from a height of 20m. Calculate the time taken to reach the ground. (Take $\mathbf{g = 9.8\ m/s^2}$)
12. A body weighs 50 N on the surface of the Earth. What will be its weight on the Moon? (Acceleration due to gravity on Moon is **1/6th** of that on Earth.)
13. Explain the concept of **relative density**. How is it measured?
14. Why does an iron nail sink in water while a wooden block floats?
15. Derive the equation $\mathbf{v^2 = u^2 + 2as}$ using equations of motion.

Section D (5 Marks Each)

16. Derive the formula for acceleration due to gravity $\mathbf{(g = GM/R^2)}$.
17. Explain **Archimedes' Principle**. Describe an experiment to verify it.
18. Calculate the force of gravitation between two objects of mass 50 kg and 100 kg kept 2 m apart. ($\mathbf{G = 6.67 \times 10^{-11}\ Nm^2/kg^2}$)