

Gravitation Class 11 Topic Tree



Here is a detailed topic tree for the **Gravitation** chapter from Class 11 NCERT Physics:

1. Introduction to Gravitation

- Concept of Gravity
- Historical Background (Newton's Law of Gravitation)

2. Newton's Law of Universal Gravitation

- Statement of Newton's Law
- Mathematical Expression
- Gravitational Constant (G)
- Dimensional Formula and Units of G
- Importance of Universal Law

3. Gravitational Force Between Two Bodies

- Derivation of Force Between Two Point Masses
- Dependence on Distance and Mass

4. Superposition Principle

- Principle of Superposition for Gravitational Forces
- Applications in Multiple Bodies

5. Gravitational Field

- Definition of Gravitational Field
- Gravitational Field Intensity
- Relation Between Gravitational Force and Field
- Gravitational Field Due to a Point Mass

6. Gravitational Potential Energy

- Concept of Gravitational Potential Energy
- Expression for Potential Energy Between Two Masses
- Concept of Zero Potential Energy
- Gravitational Potential Due to a Point Mass

7. Acceleration Due to Gravity (g)

- Concept of Acceleration Due to Gravity
- Variation of g with Altitude
- Variation of g with Depth
- Effect of Earth's Rotation on g

- Calculation of g on the Surface of Earth

8. Kepler's Laws of Planetary Motion

- Statement and Explanation of Kepler's Three Laws
- Derivation of the Law of Areas and Law of Periods

9. Motion of Planets and Satellites

- Orbital Velocity of a Satellite
- Time Period of a Satellite
- Escape Velocity
- Energy of an Orbiting Satellite (Kinetic, Potential, and Total Energy)
- Geostationary and Polar Satellites
- Weightlessness in Space

10. Escape Velocity

- Definition and Expression for Escape Velocity
- Derivation Using Energy Conservation
- Escape Velocity of Earth

11. Earth's Satellites

- Natural and Artificial Satellites
- Conditions for Stable Orbits

12. Gravitational Potential Energy at Large Distances

- Gravitational Potential at Infinity
- Energy Calculations for Escape

13. Interplanetary Travel

- Basic Concepts of Interplanetary Travel
- Energy Considerations for Interplanetary Missions

This topic structure provides a logical flow of the gravitation chapter's key concepts and principles. Each topic is foundational to the next, offering a comprehensive understanding of gravitation as covered in the Class 11 Physics NCERT textbook.