
Class 9th Science
Gravitation
Chapter 9
Lecture - 03

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FREE FALL

FREE FALL – THE CONCEPT

“It is a situation where the body experiences only gravitational force and no other force should be taken into consideration.”

FREE FALL – NUMERICAL (DOWNWARD MOTION)

Que : A ball is dropped from a building 120m tall, find
(i.) Time of Fall
(ii.) Velocity, when it touches the ground

FREE FALL – NUMERICAL (UPWARD MOTION)

Que : An object is projected upwards with a velocity of 25 m/s. Find :
(i.) Maximum Height achieved
(ii.) Time taken by the object to reach the ground again.

FREE FALL – NUMERICAL

Que : An object is projected upwards from a building of height 100 m with a velocity of 5 m/s. Find :

(i.) Time taken by the object to reach the ground.

(ii.) Velocity of the object while striking the ground.

(iii.) Maximum Height achieved.

MASS V/S WEIGHT

Q.no

An object has mass 60kg, find its

i. Weight on Earth

ii. Weight on Moon

(Given g on moon is $1/6^{th}$ times of g on earth)

Olympiad level

KEPLER'S LAW OF PLANETARY MOTION

1. **Kepler's First Law : Law of Orbits**
   The orbit of a planet is an ellipse with the Sun at one of the foci.

2. **Kepler's Second Law : Law of Areas**
   The line joining the planet and the Sun sweep equal areas in equal intervals of time.

3. **Kepler's Third Law : Law of Periods**
   The cube of the mean distance of a planet from the Sun is proportional to the square of its orbital period (T)
   $T^2 \propto r^3$