Excel Coaching Classes

Date: 05-Jul-2026
Time: 60min

Gravitation

Marks: 20

Q.1(A) Choose the correct alternative. **(2)**

i According to Newton's law of gravitation, for two objects kept at a distance d from each other, if the distance between the objects is doubled, then the force between the two objects _____.

(A) increases 4 times
(B) decreases 4 times
(C) decreases 2 times
(D) increases 2 times

ii When a feather and a heavy stone are dropped from a same height at the same time in vacuum,

(A) they both will reach the earth at the same time
(B) the feather will reach the earth first
(C) the stone will reach the earth first
(D) it cannot be predicted as the given data is insufficient

Q.1(B) Answer the following. **(3)**

i Complete the analogy:
Increase in altitude: value of g decreases :: at the centre of the earth: _____.

ii State True or False:
As we go above the earth's surface, the value of acceleration due to gravity increases.

iii Name the following:
Amount of matter present in an object

Q.2(A) Give scientific reasons. (Attempt any 1) **(2)**

i If the value of g suddenly becomes twice its value, it will become two times more difficult to pull a heavy object along the floor. Why?

ii Explain why the value of g is zero at the centre of the earth.

Q.2(B) Answer the following. (Attempt any 1) **(2)**

i(a) What is escape velocity?

(b) How would be the motion of the moon in absence of the constant force acting on it?

ii Let the period of revolution of a planet at a distance R from a star be T. Prove that if it was at a distance of 2R from the star, its period of revolution will be $\sqrt{8}T$.

iii There is one body in space which has mass thrice as that of the earth and a radius four times as that of the earth. If the weight of a book on earth is 80 N, what will be its weight on that body?

Q.3 Answer the following. (Attempt any 2) (6)

i An object thrown vertically upwards reaches a height of 500 m. What was its initial velocity? How long will the object take to come back to the earth? Assume g = 10 m/s^2.

ii(a) The mass and weight of an object on earth are 5 kg and 49 N respectively. What will be their values on the moon? Assume that the acceleration due to gravity on the moon is $1/6^{th}$ of that on the earth.

(b) What is centripetal force?

iii Explain the factors affecting the value of gravitational acceleration of the earth 'g'.

Q.4 Answer the following. (Attempt any 1) (5)

i(a) Calculate the maximum height attained by the body thrown vertically upward with a velocity of 9.8 m/s.

($g = 9.8\ m/s^2$)

(b) The radius of planet A is half the radius of planet B. If the mass of A is M_A, what must be the mass of B so that the value of g on B is half that of its value on A?

(c) What is free fall?

ii Write the three laws given by Kepler. How did they help Newton to arrive at the inverse square law of gravity?