Class IX

Science

Gravitation

Assignment

1.State the significance of universal law of gravitation.
2.The value of gravitational constant G on earth
is 6.67×10−11 Nm2/kg26.67×10−11 Nm2/kg2. What is its value on the surface of moon?
3. Two objects of masses m1m1 and m2m2 are dropped in vacuum from a height above the surface of earth (m1 is greater than m2). Which one will reach the ground first and why?
4.Suppose gravity of earth suddenly becomes zero, then which direction will the moon begin to move if no other celestial body affects it?
5.State the name and type of force which is responsible for holding the solar system together.

6.The factors associated with the motion of an object are: Force, Velocity, Acceleration and Momentum. Out of these four factors which one remains constant for all bodies large or small undergoing a free fall?
7.Which force is responsible for acceleration of a body in free fall?
8.What will be the acceleration of free fall?
9.A cricket ball thrown vertically upwards, reaches a maximum height of 5 metres. Find the initial speed of the ball. (g=9.8 m/s2g=9.8 m/s2)
10.What will be the mass of a body at the centre of the earth as compared to other places on the earth?
11.If the weight of a body on the earth is 6 N, what will it be on the moon? (Given that acceleration due to gravity on moon is one sixth of that on the earth.)
12.State universal law of gravitation. How the force between the two bodies is affected if the distance between them is tripled?

13.A stone resting on the ground has a gravitational force of 20 N acting on it. What is the weight of the stone? Find its mass. (g=10 ms−2g=10 ms−2)
14. It is said that the mass of an object remains constant at all places while weight may change. Why?
15.How does weight of an object change on moving from equator to poles? When can the weight of an object be zero?

16.(a) Differentiate between acceleration due to gravity and universal gravitational constant. Derive a relation between 'g' and 'G'.
(b) State universal law of Gravitation.
17.How does the weight of an object vary with respect to mass and radius of the earth? In a hypothetical case, if the diameter of the earth becomes half of its present value and its mass becomes four times of its present value, then how would the weight of any object on the surface of the earth be affected?
18.How does the gravitational force between two onjects change when the distance between them is reduced to 1414th?
19.(a) Write the formula to find the magnitude of gravitational force between earth and an object on earth﷽s surface.
(b) Derive how does the value of gravitational force 'F' change between two objects when the
(i) distance between them is reduced to half, and
(ii) mass of one object is increased four times?
20.If the distance between masses of two objects is increased by five units, by what facto would the mass of one of them have to be altered to maintain the same gravitational force? Would there be an increases or a decrease in the mass?