GRAVITATION

New
17.8.21

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1Q) How does the force of gravitation between two objects change when the distance between them is reduced to half?

Ans. The force of gravitation between two objects is inversely proportional to the square of the distance between them therefore the gravity will become four times if distance between them is reduced to half.

2Q) Gravitational force acts on all objects in proportional to their masses. Why then, a heavy object does not fall faster than a light object?

Ans. In free fall of objects the acceleration in velocity due to gravity is independent of mass of these objects hence a heavy object does not fall faster than a light object.

3Q) The earth and the moon are attracted to each other by gravetational force. Does the earth attract the moon with a force between two objects, of that is greater, or smaller or same as the force with which the moon attracts the earth? Why?

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Ans. The earth and the moon are attracted to each other by same gravitational force because for both of them formula to calculate force of attraction is the same

$$F = G \frac{Me \times Mm}{d^2}$$

d is also same for both.

4Q) What happen to the force between two objects, if (i) the mass of one object is doubled?
(ii) the distance between the objects is doubled and tripled
(iii) the masses of both objects are doubled?

Ans. (i) the force between two objects will be doubled.
(ii) the force between two objects will become $\frac{1}{4}^{th}$ and $\frac{1}{9}^{th}$ of the present force.
(iii) the force between two objects will become four times the present force.

5Q) Assertion and Statement:-

Statement 1: When distance between two bodies is doubled and also mass of each body is also doubled, gravitational force between them remains the same.

Statement 2: According to Newton's law, force is directly proportional to mass of bodies.

Ans: Statement 1 and 2, are true. Statement-2 is a correct explanation for Statement-1.