SUBJECT:- PHYSICS   CLASS:- IXTH   DATE:28/06/XX

SUBJECT TEACHER:- MR. NEEL NIRANJAN

CHAPTER 3. (GRAVITATION)

Question 36:

What is the force of gravity on a body of mass 150 kg lying on the surface of the earth?
(Mass of earth = 6×10^{24} kg; Radius of earth = 6.4×10^{6} m; G = 6.7×10^{-11} Nm²/kg²)

Solution :

Force due to gravity, $F = G \times \dfrac{m \times M}{d^2}$

$F = 6.7 \times 10^{-11} \times \dfrac{6 \times 10^{24} \times 150}{(6.4 \times 10^{6})^2}$

$F = 1472N$

Question 37:

The mass of sun is 2×10^{30} kg and the mass of earth is 6×10^{24} If the average distance between the sun and the earth be 1.5×10^{8} km, calculate the force of gravitation between them.

Solution :

Distance d=1.5 x 10⁸km= 1.5 x 10¹¹ m
Mass of the sun, m=2×10³⁰kg
Mass of the earth,

Distance $d = 1.5 \times 10^{8}$ km $= 1.5 \times 10^{11}$ m
Mass of the sun, $m = 2 \times 10^{30}$ kg
Mass of the earth, $M = 6 \times 10^{24}$ kg
Force of gravitation, $F = G \times \dfrac{m \times M}{d^2}$

$F = 6.7 \times 10^{-11} \times \dfrac{2 \times 10^{30} \times 6 \times 10^{24}}{(1.5 \times 10^{11})^2}$

$F = \dfrac{6.7 \times 10^{-11} \times 12 \times 10^{54}}{1.5 \times 1.5 \times 10^{22}}$

$F = \dfrac{6.7 \times 12 \times 10^{21}}{1.5 \times 1.5} = 3.57 \times 10^{22}N$