INTERNATIONAL INDIAN SCHOOL BURAIDAH

Worksheet –PHYSICS

Chapter: GRAVITATION(Ch 8)

1. Define acceleration due to gravity. Derive an expression to find the same
2. State Universal Law of Gravitation. Also give the vector form of the force acting between any two bodies.
3. Derive an expression to find the value of acceleration due to gravity at a point below and above the surface of the earth
4. What is the value of acceleration due to gravity at the Centre of the earth
5. What is the relation between ‘g’ and ‘G’
6. What is geostationary and polar satellite

7. Calculate the velocity of escape of an artificial satellite projected from the earth. Given, the mass of the earth = 5.9 x 1024 kg. Radius of the earth = 6370 km. Gravitational constant, $G = 6.67 \times 10^{-11}$ Nm^2/kg^2. (11.11km/s)
8. Estimate the height above the earth at which the geostationary satellite is moving round the earth. Radius of earth = 6400 km. Mass of the earth = 6×10^{24} kg. [35912 km]
9. Determine the escape velocity of a body from the moon. Radius of the moon = 1.74×10^6 m. Mass of moon = 7.36×10^{22} kg. $G = 6.67 \times 10^{-11}$ Nm^2kg^{-2}. [2.38 km s^{-1}.]
10. Jupiter has a mass 318 times that of the earth, and its radius is 11.2 times the radius of the earth. Estimate the escape velocity of a body from the surface of Jupiter, given that the escape velocity form the earth’s surface is 11.2 km/s. [59.7 km/s]
11. Assuming the earth to be a perfect sphere of uniform mass density, how much would a body weigh half way down the center of the earth if it weighed 250 N on the surface? (125 N)
12. An artificial satellite of mass 200 kg revolves round the earth in an orbit of average radius 6670 km. Calculate the orbital KE, gravitational potential energy and total energy of the satellite in the orbit. Given mass of earth = 6.4×10^{34} kg; Gravitational constant = 6.67×10^{-11} Nm^2/kg^2 [6×10^{19} J, -12×10^{19} J, -6×10^{19} J]