

Home Assignment :-

- ① How much is the gravitational force that keeps an artificial satellite of mass 3500 kg in orbit around the Earth at an altitude of 4200 km -

Ans) Mass of satellite = 3500 kg
Altitude = 4200 km

Acceleration due to gravity =

$$g = \frac{9.8 \text{ m/s}^2}{6400} \times 6400 + 4200 = 3.57 \text{ m/s}^2$$

$$W = mg$$

$$= (3500 \text{ kg}) (3.57 \text{ m/s}^2)$$

$$= 12500 \text{ N}$$

- ② The value of g is maximum at :-

Ans) poles

- ③ A stone is thrown vertically upwards & caught at a point of projection after 10 seconds. Time taken by stone to reach the highest point is :-

Ans) $g = 9.8 \text{ m/s}^2$

$$T = 10 \text{ s}$$

$$v = 0$$

$$v = u + at$$

$$t_1 = -\frac{u}{g} \quad \text{--- (i)}$$

$$v = u + at_2$$

$$t_2 = \frac{v}{g} \quad \text{--- (ii)}$$

$$\therefore v = u$$

$$t_1 = t_2 = \frac{T}{2}$$

$$= \frac{10}{2}$$

$$= 5 \text{ sec.}$$

4) ~~The~~ The period of a satellite in a circular orbit of radius R is T , the period of another satellite in a circular orbit of radius $4R$ is :-

$$\text{Ans} > \frac{T_1}{T_2} = \frac{R_1}{R_2}$$

$$R_1 = R$$

$$R_2 = 4R$$

$$\frac{T_1}{T_2} = \frac{R}{4R} = \frac{1}{8}$$

$$\frac{T_1}{T_2} = \frac{1}{8}$$

$$T_2 = 8T$$