QUES 05:-

A geostationary satellite orbits around the earth in a circular orbit of radius 36,000km. Then, the time period of a spy satellite orbiting a few hundred km above the earth's surface (R =6,400km) will approximately be

(a) (l/2)hr

(b) 1 hr

(c) 2 hr

(d) 4 hr

Solution

According to Kepler's law, $T^2 \propto R^3$

Therefore, $\left(\frac{T_2}{T_1}\right)^2 = \left(\frac{R_2}{R_1}\right)^3$

For a spy satellite time period is given by $T_1$

$R_1$ = 6400 km

For a geostationary satellite, $T_2$ = 24hour

$R_2$ = 36,000 km

$\left(\frac{24}{T_1}\right)^2 = \left(\frac{36000}{6400}\right)^3$

$(24/T_1)^2$= 178

$(24/T_1)$ = 13.34

$T_1$ = 24/13.34 ≈ 2hr

**Answer: (c) 2 hr**