

QUES 03:-

If you compare the gravitational force on the earth due to the sun to that due to the moon, you would find that the sun's pull is greater than the moon's pull. However, the tidal effect of the moon's pull is greater than the tidal effect of the sun. Why?

Sol. The tidal effect depends inversely on the cube of the distance unlike force which depends inversely on the square of the distance. Since the distance of moon from the ocean water is very small as compared to the distance of sun from the ocean water on earth. Therefore, the tidal effect of Moon's pull is greater than the tidal effect of the sun. The ratio of these two effects is

$$\frac{T_m}{T_s} = \left(\frac{d_s}{d_m} \right)^3 = \left(\frac{1.5 \times 10^{11}}{3.8 \times 10^8} \right)^3 = 61.5 \times 10^6$$