

QUES 04:-

A simple pendulum has a time period  $T_1$  when on the earth's surface, and  $T_2$  when taken to a height  $R$  above the earth's surface, where  $R$  is the radius of the earth. The value of  $T_2/T_1$  is

- (a) 1
- (b) 3
- (c) 4
- (d) 2

**Solution**

The time period of a simple pendulum =  $2\pi\sqrt{\frac{l}{g}}$

On the surface of earth  $g_1 = GM/R^2$

At a height  $R$  above the earth  $g_2 = GM/(2R)^2$

$$(g_1/g_2) = (4/1)$$

$$T = 2\pi\sqrt{l/g}$$

The time period on the surface of the earth  $T_1 = 2\pi\sqrt{\frac{l(R)^2}{GM}}$

The time period on the surface of the earth  $T_2 = 2\pi\sqrt{\frac{l(2R)^2}{GM}}$

$$T_2/T_1 = 2$$