

**Oscillations**

- Q.1.(i) Why the motion of a satellite around a planet cannot be taken as SHM? 1
- (ii) A man with a wrist watch on his hand falls from the top of a tower. Does the watch give the correct time during the free fall? 1
- Q.2. A simple pendulum of length ' $l$ ' and having a bob of mass  $m$  is suspended in a car. The car is moving on a circular track of radius ' $R$ ' with uniform speed  $v$ . If pendulum makes small oscillations in a radial direction about its equilibrium, what will be its time period? 2
- Q.3. (i) A particle is executing SHM with amplitude 10cm. At what distance from mean position the K.E. Of the particle is thrice of its P.E.? 2
- (ii) A pendulum clock is accurate at a place where  $g = 9.8\text{m/s}^2$ . Find the value of  $g$  at another place where the clock becomes slow by 24 seconds in a day (24 hours). 2
- Q.4. A particle moves with SHM in a straight line. If first  $\tau$  s, after starting from rest it travels a distance ' $a$ ' and in next  $\tau$  sec. it travels  $2a$ , in the same direction. Find time period of the oscillations. 2
- Q.5. Two particles A & B of equal masses are suspended from two mass less springs of spring constant  $K_1$  and  $K_2$  respectively. If the maximum velocities during oscillations are equal. Find the ratio of amplitudes of A & B. 2
- Q.6. A wooden cube (density =  $d$ ) of side ' $l$ ' floats in a liquid of density ' $\rho$ ' with its upper and lower surfaces horizontal. If the cube is pushed slightly down and released. Find the time period of it. 3