

5. A satellite of mass  $M$ , launched into a circular orbit of radius  $R$ , has a time period  $T$ . If a second satellite of mass  $0.75M$  is launched into an orbit of radius  $\frac{4}{3}R$ , the time period of the second satellite will be given by

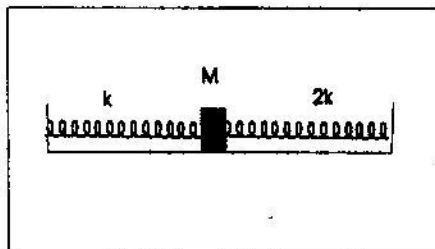
(A)  $T$ .  
 (B)  $0.65T$ .  
 (C)  $0.75T$ .  
 (D)  $1.54T$ .

6. The force acting on a particle in one dimension is  $F = -\alpha x - 2\beta x^3$ . The corresponding potential energy  $V(x)$ , assuming  $V(0) = 0$  is given by

(A)  $V(x) = \alpha x^2 - 2\beta x^4$ .  
 (B)  $V(x) = \frac{1}{2}\alpha x^2 + \frac{1}{2}\beta x^4$ .  
 (C)  $V(x) = \alpha x^2 + 2\beta x^4$ .  
 (D)  $V(x) = -\frac{1}{2}\alpha x^2 - \frac{1}{2}\beta x^4$ .

7. A block of mass  $M$  rests on a horizontal table and is connected to two fixed posts by springs having spring constants  $k$  and  $2k$ . If the block is displaced from its equilibrium position, the angular frequency of vibrations is given by

(A)  $\sqrt{3k/M}$ .  
 (B)  $\sqrt{k/M}$ .  
 (C)  $\sqrt{k/3M}$ .  
 (D)  $\sqrt{3k/2M}$ .



8. Sound waves do not exhibit

(A) interference.  
 (B) diffraction.  
 (C) refraction.  
 (D) polarisation