

13. A ball is dropped from a height of 10 meters onto a hard surface so that the collision at the surface may be assumed elastic. Under such conditions the motion of the ball is

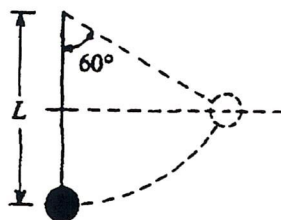
- (A) simple harmonic with a period of about 1.4 s
 (B) simple harmonic with a period of about 2.8 s
 (C) simple harmonic with an amplitude of 5 m
 (D) periodic with a period of about 2.8 s but not simple harmonic
 (E) motion with constant momentum

Questions 14-15

An object moving in a straight line has a velocity v in meters per second that varies with time t in seconds according to the following function.

$$v = 4 + 0.5 t^2$$

14. The instantaneous acceleration of the object at $t = 2$ seconds is
- (A) 2 m/s^2
 (B) 4 m/s^2
 (C) 5 m/s^2
 (D) 6 m/s^2
 (E) 8 m/s^2
15. The displacement of the object between $t = 0$ and $t = 6$ seconds is
- (A) 22 m
 (B) 28 m
 (C) 40 m
 (D) 42 m
 (E) 60 m



16. A pendulum consists of a ball of mass m suspended at the end of a massless cord of length L as shown above. The pendulum is drawn aside through an angle of 60° with the vertical and released. At the low point of its swing, the speed of the pendulum ball is

- (A) \sqrt{gL}
 (B) $\sqrt{2gL}$
 (C) $\frac{1}{2} gL$
 (D) gL
 (E) $2gL$

17. A rock is lifted for a certain time by a force F that is greater in magnitude than the rock's weight W . The change in kinetic energy of the rock during this time is equal to the
- (A) work done by the net force ($F - W$)
 (B) work done by F alone
 (C) work done by W alone
 (D) difference in the momentum of the rock before and after this time
 (E) difference in the potential energy of the rock before and after this time