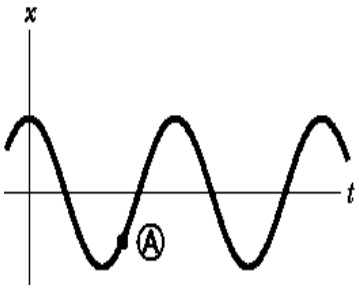
Chapter: Oscillations (EE117)
Short Logical Questions

Q1. A block on the end of a spring is pulled to position $x = A$ and released. In one full cycle of its motion, through what total distance does it travel?

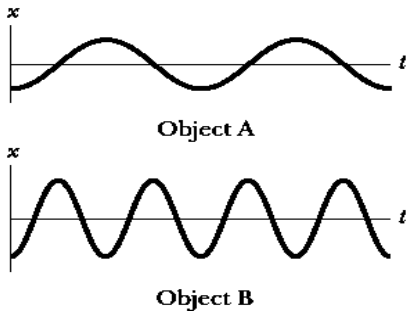
(a) $A/2$ **(b)** A **(c)** $2A$ **(d)** $4A$

Q2. Consider a graphical representation figure below of simple harmonic motion, as described mathematically in eq. $x(t) = A\cos(\omega t+\phi)$. When the object is at point A on the graph, its **(a)** position and velocity are both positive **(b)** position and velocity are both negative **(c)** position is positive and its velocity is zero **(d)** position is negative and its velocity is zero **(e)** position is positive and its velocity is negative **(f)** position is negative and its velocity is positive.



An *x-t* graph for an object undergoing simple harmonic motion. At a particular time, the object's position is indicated by A in the graph.

Q3. Figure below shows two curves representing objects undergoing simple harmonic motion. The correct description of these two motions is that the simple harmonic motion of object B is **(a)** of larger angular frequency and larger amplitude than that of object A **(b)** of larger angular frequency and smaller amplitude than that of object A **(c)** of smaller angular frequency and larger amplitude than that of object A **(d)** of smaller angular frequency and smaller amplitude than that of object A.



Two x-t graphs for objects undergoing simple harmonic motion. The amplitudes and frequencies are different for the two objects

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Q4. Consider a graphical representation (Fig. of Q2) of simple harmonic motion, as described mathematically in eq. $x(t) = A\cos(\omega t+\phi)$. When the object is at position A on the graph, its **(a)** velocity and acceleration are both positive **(b)** velocity and acceleration are both negative **(c)** velocity is positive, and its acceleration is zero **(d)** velocity is negative and its acceleration is zero **(e)** velocity is positive and its acceleration is negative **(f)** velocity is negative and its acceleration is positive.

Q5. An object of mass m is hung from a spring and set into oscillation. The period of the oscillation is measured and recorded as T. The object of mass m is removed and replaced with an object of mass 2m. When this object is set into oscillation, the period of the motion is

(a) 2T **(b)** $\sqrt{2}$T **(c)** T **(d)** T/$\sqrt{2}$ **(e)** T/2.

Q6. Is a bouncing ball an example of simple harmonic motion? Is the daily movement of a student from home to school and back simple harmonic motion? Why or why not?

Q7. Determine whether or not the following quantities can be in the same direction for a simple harmonic oscillator:

(a) position and velocity, **(b)** velocity and acceleration, **(c)** position and acceleration.

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