

4.1 Oscillations

Question Paper

Course	DPIB Physics
Section	4. Waves
Topic	4.1 Oscillations
Difficulty	Easy

Time allowed: 20
Score: /10
Percentage: /100

Question 1

Identify the incorrect statement about the displacement of an object oscillating in simple harmonic motion.

- A. Displacement is a vector quantity
- B. Displacement and velocity act in opposite directions
- C. Displacement is proportional to the restoring force
- D. Displacement is proportional to acceleration

[1 mark]

Question 2

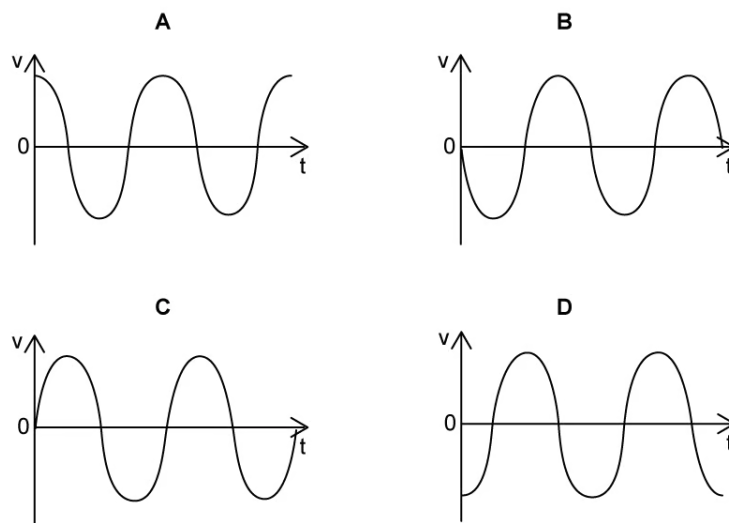
Identify the true statement about phase difference.

- A. Phase difference must be calculated from the crest of one wave to the crest on another wave
- B. When the same points on two different waves align, the waves are in anti-phase
- C. Phase difference is a measure of how much one point on a wave is in front or behind a different point on another wave
- D. Waves in phase have a phase difference of 2π radians

[1 mark]

Question 3

Select the graph that shows the oscillation beginning at positive amplitude x_0 .



[1 mark]

Question 4

The total energy E_T in system in simple harmonic motion reflects the energy transfers between the kinetic energy E_K store and the potential energy E_P store.

Identify the correct equation for the total energy of a system in simple harmonic motion.

A. $E_T = E_P - E_K$

B. $E_T = E_P \times E_K$

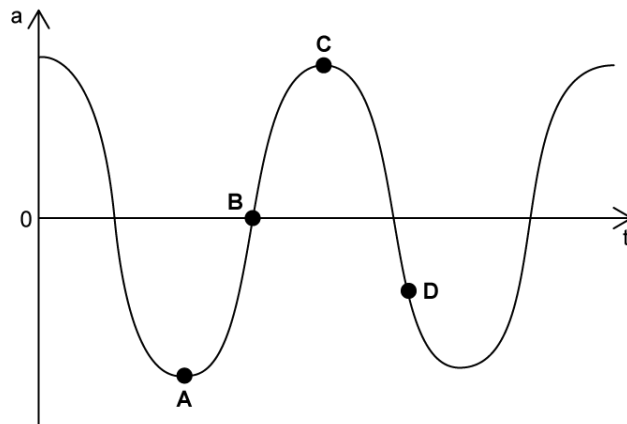
C. $E_T = \frac{E_K}{E_P}$

D. $E_T = E_P + E_K$

[1 mark]

Question 5

Select the position on the acceleration-time graph where displacement $x = 0$



[1 mark]

Question 6

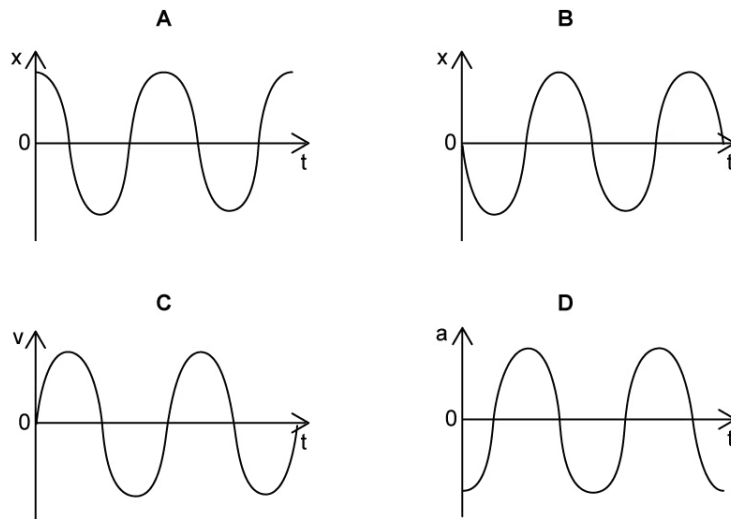
Identify the statement that is not a condition of simple harmonic motion.

- A. The restoring force is directed toward the amplitude x_0
- B. Acceleration is directed toward the equilibrium position
- C. The oscillations are isochronous
- D. The magnitude of the restoring force is proportional to the displacement

[1 mark]

Question 7

Choose the graph that shows an oscillation beginning at equilibrium.



[1 mark]

Question 8

Identify the correct equation for time period T with respect to frequency f .

A. $T = \frac{1}{2} \pi f$

B. $T = \frac{1}{f}$

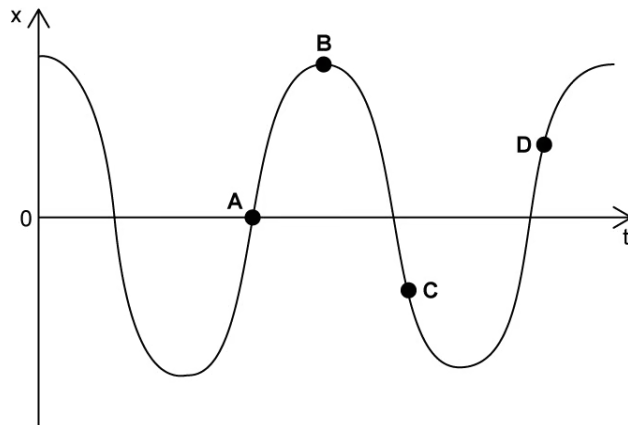
C. $T = \frac{1}{2} f$

D. $T = f$

[1 mark]

Question 9

Select the position on the displacement-time graph that shows when the velocity is zero.



[1 mark]

Question 10

As a mass-spring system oscillates in simple harmonic motion, the restoring force F is proportional to the displacement x .

$$F = -kx$$

Choose the line that shows the correct units for each quantity.

	Force F	Spring constant k	Displacement x
A.	N	N m^{-1}	m
B.	Nm	N	m^2
C.	N m^{-1}	Nm	ml
D.	N	N kg^{-1}	m

[1 mark]