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4.1 Oscillations

Easy

PHYSICS

IB HL

EXAM PAPERS PRACTICE

4.1 Oscillations

Question Paper

Course	DP IB Physics
Section	4. Waves
Topic	4.1 Oscillations
Difficulty	Easy

Time allowed: 20

Score: /10

Percentage: /100

Question 1

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. $E_T = E_P \times E_K$

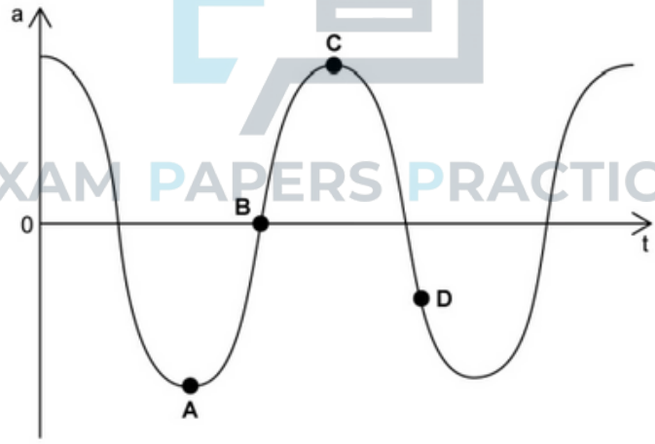
C. $E_T = \frac{E_K}{E_P}$

D. $E_T = E_P + E_K$

[1 mark]

Question 2

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



[1 mark]

Question 3

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 4

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

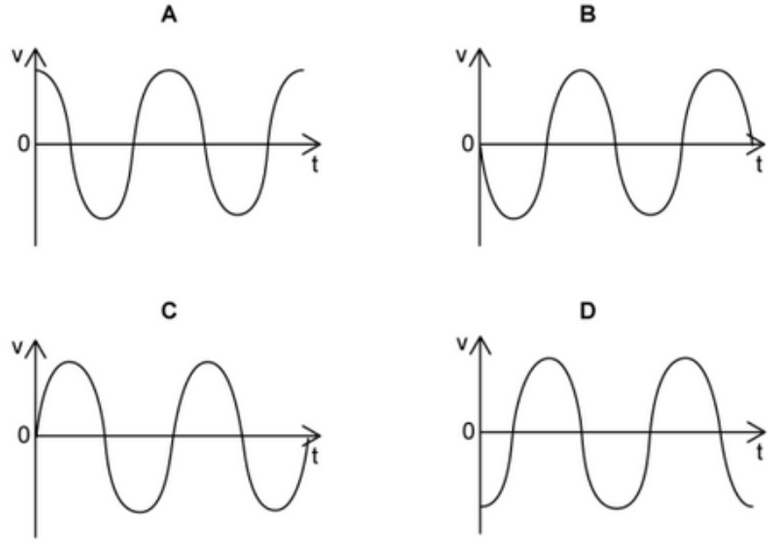
C. Phase difference is a measure of how much one point on a wave is in front or behind a different point on another wave

D. Waves in phase have a phase difference of 2π radians

[1 mark]

Question 5

Select the graph that shows the oscillation beginning at positive amplitude 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

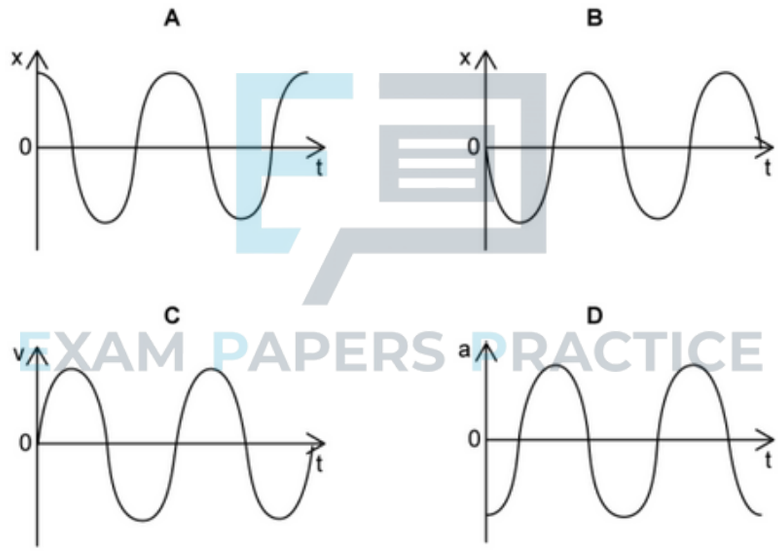
C. The oscillations are isochronous

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

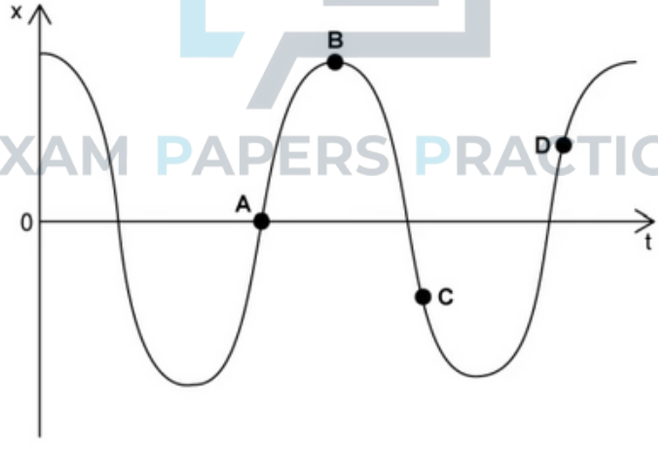
C. $T = \frac{1}{2}f$

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]