

PYQSide

NEET OSCILLATIONS — VELOCITY AND ACCELERATION IN SHM — PYQS

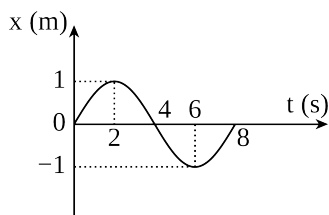
Max. Marks: 60

Questions: 15

Section A (MCQ)

- Q.1** The x - t graph of a particle performing simple harmonic motion is shown in the figure. The acceleration of the particle at $t = 2$ s is :

[NEET (UG) 2023]



- (1) $-\frac{\pi^2}{8} \text{ m s}^{-2}$ (2) $\frac{\pi^2}{16} \text{ m s}^{-2}$
(3) $-\frac{\pi^2}{16} \text{ m s}^{-2}$ (4) $\frac{\pi^2}{8} \text{ m s}^{-2}$

Scan or tap for the full solution



- Q.2** The phase difference between displacement and acceleration of a particle in a simple harmonic motion is :

[NEET (UG) 2020]

- (1) $\frac{3\pi}{2}$ rad (2) $\frac{\pi}{2}$ rad (3) zero (4) π rad

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- Q.3** Average velocity of a particle executing SHM in one complete vibration is :

[NEET (UG) 2019]

- (1) $A\omega$ (2) $\frac{A\omega^2}{2}$ (3) $\frac{A\omega}{2}$ (4) zero

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- Q.4** A pendulum is hung from the roof of a sufficiently high building and is moving freely to and fro like a simple harmonic oscillator. The acceleration of the bob of the pendulum is 20 m s^{-2} at a distance of 5 m from the mean position. The time period of oscillation is

[NEET 2018]

- (1) 2π s (2) π s (3) 2 s (4) 1 s

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- Q.5** A particle executes linear simple harmonic motion with an amplitude of 3 cm. When the particle is at 2 cm from the mean position, the magnitude of its velocity is equal to that of its acceleration. Then its time period in second is

[NEET 2017]

- (1) $\frac{\sqrt{5}}{2\pi}$ (2) $\frac{4\pi}{\sqrt{5}}$ (3) $\frac{2\pi}{\sqrt{3}}$ (4) $\frac{\sqrt{5}}{\pi}$

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- Q.6** A particle is executing a simple harmonic motion. Its maximum acceleration is α and maximum velocity is β . Then, its time period of vibration will be

[AIPMT 2015]

- (1) $\frac{\beta^2}{\alpha}$ (2) $\frac{2\pi\beta}{\alpha}$ (3) $\frac{\beta^2}{\alpha^2}$ (4) $\frac{\alpha}{\beta}$

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- Q.7** A particle is executing SHM along a straight line. Its velocities at distances x_1 and x_2 from the mean position are V_1 and V_2 respectively. Its time period is

[AIPMT 2015 (Cancelled)]

- (1) $2\pi\sqrt{\frac{V_1^2 + V_2^2}{x_1^2 + x_2^2}}$ (2) $2\pi\sqrt{\frac{V_1^2 - V_2^2}{x_1^2 - x_2^2}}$
(3) $2\pi\sqrt{\frac{x_1^2 + x_2^2}{V_1^2 + V_2^2}}$ (4) $2\pi\sqrt{\frac{x_2^2 - x_1^2}{V_1^2 - V_2^2}}$

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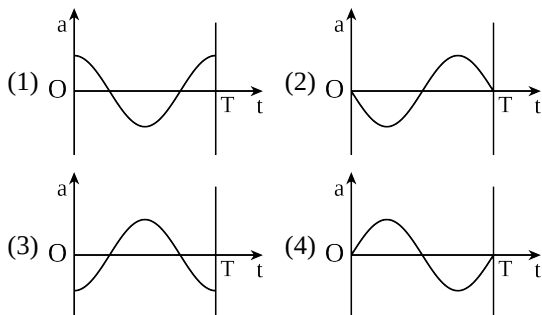


- Q.8** The oscillation of a body on a smooth horizontal surface is represented by the equation,

$$X = A\cos(\omega t)$$

where X = displacement at time t ω = frequency of oscillationWhich one of the following graphs shows correctly the variation of a with t ?Here a = acceleration at time t T = time period

[AIPMT 2014]



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- Q.9** A particle of mass m oscillates along x -axis according to equation $x = a \sin \omega t$. The nature of the graph between momentum and displacement of the particle is [NEET 2013 (Karnataka)]
- (1) Circle
 - (2) Hyperbola
 - (3) Ellipse
 - (4) Straight line passing through origin

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- Q.10** A simple pendulum performs simple harmonic motion about $x = 0$ with an amplitude a and time period T . The speed of the pendulum at $x = a/2$ will be [AIPMT 2009]
- (1) $\frac{\pi a}{T}$
 - (2) $\frac{3\pi^2 a}{T}$
 - (3) $\frac{\pi a \sqrt{3}}{T}$
 - (4) $\frac{\pi a \sqrt{3}}{2T}$

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- Q.11** Two simple harmonic motions of angular frequency 100 and 1000 rad s^{-1} have the same displacement amplitude. The ratio of their maximum acceleration is [AIPMT 2008]
- (1) $1:10^3$
 - (2) $1:10^4$
 - (3) $1:10$
 - (4) $1:10^2$

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- Q.12** A point performs simple harmonic oscillation of period T and the equation of motion is given by $x = a \sin(\omega t + \pi/6)$. After the elapse of what fraction of the time period the velocity of the point will be equal to half of its maximum velocity? [AIPMT 2008]

- (1) $T/3$
- (2) $T/12$
- (3) $T/8$
- (4) $T/6$

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- Q.13** The phase difference between the instantaneous velocity and acceleration of a particle executing simple harmonic motion is [AIPMT 2007]
- (1) π
 - (2) 0.707π
 - (3) zero
 - (4) 0.5π

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- Q.14** A particle executing simple harmonic motion of amplitude 5 cm has maximum speed of 31.4 cm/s. The frequency of its oscillation is [AIPMT 2004]
- (1) 4 Hz
 - (2) 3 Hz
 - (3) 2 Hz
 - (4) 1 Hz

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- Q.15** Which one of the following statements is true for the speed v and the acceleration a of a particle executing simple harmonic motion? [AIPMT 2003]
- (1) When v is maximum, a is maximum
 - (2) Value of a is zero, whatever may be the value of v .
 - (3) When v is zero, a is zero
 - (4) When v is maximum, a is zero.

Scan or tap for the full solution 

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	3	4	4	2	2	2	4	3	3	3	4
Ques.	12	13	14	15							
Ans.	2	4	4	4							