

NEET WAVES — DISPLACEMENT RELATION IN A PROGRESSIVE WAVE — PYQS

Max. Marks: 48

Questions: 12

Section A (MCQ) — 12 questions

- Q.1** For a travelling harmonic wave $y(x, t) = 2.0 \cos 2\pi(10t - 0.0080x + 0.35)$, where x and y are in cm and t in s. The phase difference between oscillatory motion of two points separated by a distance of 0.5 m is: [NEET (UG) 2026]
- (1) 0.08π rad (2) 0.008π rad
(3) 0.8π rad (4) 8π rad

Scan or tap for the full solution



- Q.2** The displacement of a travelling wave $y = C \sin \frac{2\pi}{\lambda}(at - x)$ where t is time, x is distance and λ is the wavelength, all in S.I. units. Then the frequency of the wave is [RE-NEET (UG) 2024]
- (1) $\frac{2\pi\lambda}{a}$ (2) $\frac{2\pi a}{\lambda}$ (3) $\frac{\lambda}{a}$ (4) $\frac{a}{\lambda}$

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- Q.3** A wave travelling in the +ve x -direction having displacement along y -direction as 1 m, wavelength 2π m and frequency of $\frac{1}{\pi}$ Hz is represented by [NEET 2013]
- (1) $y = \sin(10\pi x - 20\pi t)$ (2) $y = \sin(2\pi x + 2\pi t)$
(3) $y = \sin(x - 2t)$ (4) $y = \sin(2\pi x - 2\pi t)$

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- Q.4** The equation of a simple harmonic wave is given by $y = 3 \sin \frac{\pi}{2}(50t - x)$, where x and y are in metres and t is in seconds. The ratio of maximum particle velocity to the wave velocity is [AIPMT 2012 (Mains)]
- (1) 2π (2) $\frac{3}{2}\pi$ (3) 3π (4) $\frac{2}{3}\pi$

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- Q.5** Two waves are represented by the equations $y_1 = a \sin(\omega t + kx + 0.57)$ m and $y_2 = a \cos(\omega t + kx)$ m, where x is in metre and t in second. The phase difference between them is [AIPMT 2011 (Prelims)]

- (1) 1.0 radian (2) 1.25 radian
(3) 1.57 radian (4) 0.57 radian

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- Q.6** A transverse wave is represented by $y = A \sin(\omega t - kx)$. For what value of the wavelength is the wave velocity equal to the maximum particle velocity? [AIPMT 2010 (Prelims)]
- (1) $\pi A/2$ (2) πA (3) $2\pi A$ (4) A

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- Q.7** A wave in a string has an amplitude of 2 cm. The wave travels in the +ve direction of x axis with a speed of 128 m/s and it is noted that 5 complete waves fit in 4 m length of the string. The equation describing the wave is [AIPMT 2009]
- (1) $y = (0.02) \sin(15.7x - 2010t)$
(2) $y = (0.02) \sin(15.7x + 2010t)$
(3) $y = (0.02) \sin(7.85x - 1005t)$
(4) $y = (0.02) \sin(7.85x + 1005t)$

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- Q.8** The wave described by $y = 0.25 \sin(10\pi x - 2\pi t)$, where x and y are in metres and t in seconds, is a wave travelling along the [AIPMT 2008]
- (1) +ve x direction with frequency 1 Hz and wavelength $\lambda = 0.2$ m.
(2) -ve x direction with amplitude 0.25 m and wavelength $\lambda = 0.2$ m.
(3) -ve x direction with frequency 1 Hz.
(4) +ve x direction with frequency π Hz and wavelength $\lambda = 0.2$ m.

Scan or tap for the full solution



- Q.9** A transverse wave propagating along x -axis is represented by $y(x, t) = 8.0 \sin(0.5\pi x - 4\pi t - \pi/4)$ where x is in metres and t is in seconds. The speed of the wave is [AIPMT 2006]
- (1) 8 m/s (2) 4\pi m/s (3) 0.5\pi m/s (4) $\pi/4$ m/s

Scan or tap for the full solution



Q.10 The phase difference between two waves represented by

$$y_1 = 10^{-6} \sin[100t + (x/50) + 0.5] \text{ m}$$

$$y_2 = 10^{-6} \cos[100t + (x/50)] \text{ m},$$

where x is expressed in metres and t is expressed in seconds, is approximately [AIPMT 2004]

- (1) 1.07 radians (2) 2.07 radians
(3) 0.5 radians (4) 1.5 radians

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Q.11 A wave travelling in positive X -direction with $a = 0.2 \text{ m}$, velocity $= 360 \text{ m s}^{-1}$ and $\lambda = 60 \text{ m}$, then correct expression for the wave is [AIPMT 2002]

(1) $y = 0.2 \sin \left[2\pi \left(6t + \frac{x}{60} \right) \right]$

(2) $y = 0.2 \sin \left[\pi \left(6t + \frac{x}{60} \right) \right]$

(3) $y = 0.2 \sin \left[2\pi \left(6t - \frac{x}{60} \right) \right]$

(4) $y = 0.2 \sin \left[\pi \left(6t - \frac{x}{60} \right) \right]$

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Q.12 The equation of a wave is represented by

$$y = 10^{-4} \sin \left(100t - \frac{x}{10} \right) \text{ m}, \text{ then the velocity of wave will be [AIPMT 2001]}$$

- (1) 100 m/s (2) 4 m/s
(3) 1000 m/s (4) 10 m/s

Scan or tap for the full solution



ANSWER KEY

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