JEE

Prayas JEE (2025)

Physics

DPP: 3

Waves

Q1 A travelling wave pulse is given by $y = \frac{20}{4+(x+4t)^2}(m)$, then

(A) The pulse is travelling along negative x axis

(B) The speed of pulse is $4\ \mathrm{m/s}$

(C) The amplitude of pulse is $5\ \mathrm{m}$

(D) All of these

Q2 The equation of a wave pulse is given as $y = \frac{A}{4+(2t+0.5x)}$, where t is in seconds and x in metres. The speed of the pulse is

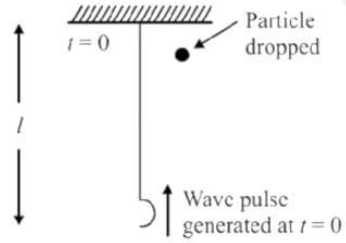
(A) $8\ \mathrm{m/s}$

(B) $4\ \mathrm{m/s}$

(C) $2\ \mathrm{m/s}$

(D) $0.5\ \mathrm{m/s}$

Q3 A uniform rope of length l is suspended from a ceiling as shown. A particle is dropped from the ceiling at the instant a wave pulse is formed at the lower end. Where will the particle meet the pulse?



(A) $\frac{l}{3}$ distance from the top

(B) $\frac{l}{3}$ distance from the bottom

(C) $\frac{l}{4}$ distance from the bottom

(D) At mid-point of the rope

Q4 A transverse wave is described by the equation

$$y = y_0 \sin 2\pi\left(ft - \frac{x}{\lambda}\right)$$

The maximum particle velocity is equal to four times the wave velocity if

(A) $\lambda = \pi\frac{y_0}{4}$

(B) $\lambda = \pi\frac{y_0}{2}$

(C) $\lambda = \pi y_0$

(D) $\lambda = 2\pi y_0$

Q5 Given equation is related to

$$y = \cos\left(\frac{2\pi}{\lambda}x\right)\cos(2\pi vt)$$

(A) Transverse progressive

(B) Longitudinal progressive

(C) Longitudinal stationary wave

(D) Transverse stationary wave

Q6 In a standing wave particle at the positions A and B, have a phase difference of

(A) 0

(B) $\frac{\pi}{2}$

(C) $\frac{5\pi}{6}$

(D) π

Q7 In a standing wave on a string

(A) In one time period all the particles are simultaneously at rest twice

(B) All the particles must be at their positive extremes simultaneously once in a time period

(C) All the particles may be at their positive extremes simultaneously twice in a time period

(D) All the particles are never at rest simultaneously

Q8 Stationary waves

(A) Transport energy

(B) Does not transport energy
(C) Have nodes and antinodes
(D) Both (B) and (C)

Q9 In a stationary wave all the particles
(A) On either side of a node vibrate in same phase
(B) In the region between two nodes vibrate in same phase
(C) In the region between two antinodes vibrate in same phase
(D) Of the medium vibrate in same phase

Q10 A string vibrates according to the equation $y = 5\sin\left(\frac{2\pi x}{3}\right)\cos 20\pi t$, where x and y are in cm and t in sec The distance between two adjacent nodes is
(A) $3\ \mathrm{cm}$
(B) $4.5\ \mathrm{cm}$
(C) $6\ \mathrm{cm}$
(D) $1.5\ \mathrm{cm}$

Answer Key

Q1	(D)	Q6	(D)
Q2	(B)	Q7	(A)
Q3	(B)	Q8	(D)
Q4	(B)	Q9	(B)
Q5	(D)	Q10	(D)