



		DPP – 2 (W	aves)	
Video Solution	n on Website:-	https://physics	aholics.com/hor	me/courseDetails/92
Video Solution	n on YouTube:-	https://youtu.b	e/9-tlSf-f7Kk	
Written Soluti	on on Website:-	https://physics	aholics.com/not	e/notesDetalis/38
Q 1.	A heavy uniform rope i end, then (a) the pulse will travel (b) the pulse will travel (c) the pulse will travel (d) the pulse cannot tra	is suspended from a rigi with uniform speed with increasing speed with decreasing speed vel through the rope	d support. A wave pulse	e is set up at the upper
Q 2.	A transverse wave desc stretched string having string. (a) 0.108 N	cribed by y = (0.02m) sin a linear mass density of (b) 1 N	n $[(1.0m^{-1}) x + (30 s^{-1}) x + (30 s^{-1$	b) t] propagates on a the tension in the (d) 2 N
Q 3.	Both the strings, shown The pulleys are light. T is V_2 . Then V_1 / V_2 is-	n in figure are made of s The wave speed of a tran A B B D	ame material and have s asverse wave in the strin	same cross-section. In AB is V_1 and in CD it
Q 4.	(a) 1 A progressive wave on $A \sin\left(\frac{2\pi}{\lambda}x - \omega t\right)$ when $t = 0$ to $t = \frac{\pi}{2\omega}$. [Take: $\rho = 3 \times 10^{-2}$ k (a) 6	(b) 2 a string having linear m re y is in mm. Find the t g/m , A = 1mm, $\omega = 100$ (b) 7	(c) √2 nass density ρ is represen otal energy (in μJ) passi) rad/s, λ = 16 cm] (c) 8	(d) $1/\sqrt{2}$ nted by $y =$ ng through origin from (d) 9
Q 5.	A uniform ring of radi produced on it. Speed of (a) ωR (b) ωR	ius R is rotating with contrast of pulse with respect to $1/2$ (c) ωF	onstant angular speed α ring is λ/4 (d) ω	o. A transverse pulse is R/3
Q 6.	Power of a transverse v one wavelength of strir (a) 1 mJ	wave on string is 10 mW ng is (b) 10mJ	and frequency of wave (c) .1 mJ	is 100 Hz. Energy of (d) .01mJ
Q 7.	In a gravity free space, about an axis perpendic	a wire of mass m and le cular to rod and passing	ength L is rotating with a through its one end. A	angular velocity ω Fransverse pulse is





produced near axis. Retardation of this pulse is R and distance from axis is x then

(a) $\mathbf{R} \propto \sqrt{x}$ (b) $\mathbf{R} \propto x$ (c) $\mathbf{R} \propto x^{3/2}$ (d) $\mathbf{R} \propto x^{5/2}$

Q 8. One end of string of length L is tied to ceiling of lift accelerating upwards with an acceleration 3g. The other end of the string is free. The linear mass density of string varies linearly from 0 to μ, from bottom to top. Then correct statement for wave travelling in string (a)Wave speed is increasing as it travels from bottom to top (b)Acceleration of wave on string is uniform

(c)Time taken by pulse to reach from bottom to top will be $\sqrt{\frac{2L}{a}}$

(d) All of these

- Q 9. A nonuniform rope is hanging vertically. A transverse pulse is produced at its bottom end and it is observed that pulse is moving up with constant velocity. If x is distance from lower end, then linear mass density of rope is directly proportional to
 (a) x (b) x^2 (c) \sqrt{x} (d) None of these
- Q 10. For a transverse wave propagating on string
 - (a) Kinetic energy per unit length is maximum at mean position.
 - (b) Kinetic energy per unit length is maximum at extreme position
 - (c) Potential energy per unit length is maximum at mean position
 - (d) Potential energy per unit length is maximum at mean position
- Q 11. At any instant, wave travelling along a string is shown in figure. Here point A is moving upwards. Which of following statement is true?

C

(a) At point A power is transferred by string left to a to string right to A

- (b) At point A power is transferred by string right to a to string left to A
- (c) Power is zero at A
- (d) None of these

Answer Key

Q.1 c	Q.2 a	Q.3 d	Q.4 a	Q.5 a
Q.6 c	Q.7 b	Q.8 d	Q.9 d	Q.10 a, c
Q.11 b				

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Written Solution

DPP-2 Waves: Waves on String & Energy related to Travelling wave By Physicsaholics Team

Q1) A heavy uniform rope is suspended from a rigid support. A wave pulse is set up at the upper end, then

(a) the pulse will travel with uniform speed
(b) the pulse will travel with increasing speed
(c) the pulse will travel with decreasing speed
(d) the pulse cannot travel through the rope

Tension is decreasing V Q JT V 18 decreasing Q2) A transverse wave described by $y = (0.02m) \sin [(1.0m^{-1}) x + (30 s^{-1}) t]$

propagates on a stretched string having a linear mass density of 1.2×10^{-4}

(b) 1 N

(d) 2 N

kg/m. Find the tension in the string.

(a) 0.108

(c) .02 ľ

Q3) Both the strings, shown in figure are made of same material and have same cross-section. The pulleys are light. The wave speed of a transverse wave in the string AB is V_1 and in CD it is V_2 . Then V_1 / V_2 is–



Q4) A progressive wave on a string having linear mass density
$$\rho$$
 is represented by
 $y = A \sin\left(\frac{2\pi}{\lambda}x - \omega t\right)$ where y is in mm. Find the total energy (in µJ) passing
through origin from t = 0 to t = $\frac{\pi}{2\omega}$.
[Take: $\rho = 3 \times 10^{-2}$ kg/m, A = 1mm, $\omega = 100$ rad/s, $\lambda = 16$ cm]
 $\sqrt{=} \frac{\omega}{K} = \frac{100 \times 16}{2 \Pi} = 8/\pi$
(a) 6 (b) 7
(c) 8 (d) 9
 $4x = \sqrt{+}$
 $= \frac{50}{K} \times \frac{\pi}{2\pi} = \frac{\pi}{2} \times \frac{5}{2\pi} = \frac{5}{4}$
 $= \frac{50}{K} \times \frac{\pi}{2\pi} = \frac{\pi}{2} \times \frac{5}{2\pi} = \frac{5}{4}$
 $= \frac{5}{4} \times \frac{10^{-2} \times 10^{-2} \times$

Q5) A uniform ring of radius R is rotating with constant angular speed ω . A transverse pulse is produced on it . Speed of pulse with respect to ring is

mass

 $Z_T = 2 \Delta R^2 U^2$ $T_{\ell} = R^2 U^2$

(c) $\omega R/4$

OC M

ZR W

VW

(b) $\omega R/2$

Tht half ring

RD

(d) $\omega R/3$

mass per unit length.

Valocity of bulse w & + ving



Q7) In a gravity free space a wire of mass m and length L is rotating with angular velocity ω about an axis perpendicular to rod and passing through its one end. A Transverse pulse is produced near axis. Retardation of this pulse is R and distance from axis is x then

b) $\mathbf{R} \propto x$

(d) $\mathbf{R} \propto x^{5/2}$

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(a) $R \propto$ (c) $R \propto$ ugal force on x=x to x=L

L+X

 $L^{2} - \lambda^{2} J \omega^{2}$

Q8) One end of string of length L is tied to ceiling of lift accelerating upwards with an acceleration 3g. The other end of the string is free. The linear mass density of a=39 string varies linearly from 0 to μ , from bottom to top. Then correct statement for wave travelling in string linear mass density tansion at X=X, T= Spang = hay x dx (a)Wave speed is increasing as it travels from bottom to top (b)Acceleration of wave on string is uniform Jiff-<u>2</u>*L* (c)Time taken by pulse to reach from bottom to top will be Wave speed of these

Q9) A nonuniform rope is hanging vertically. A transverse pulse is produced at its bottom end and it is observed that pulse is moving up with constant velocity. If x is distance from lower end, then linear mass density of rope is directly proportional to



Q10) For a transverse wave propagating on string

Vmay

(a) Kinetic energy per unit length is maximum at mean position
(b) Kinetic energy per unit length is maximum at extreme position
(c) Potential energy per unit length is maximum at mean position
(d) Potential energy per unit length is maximum at mean position

max Slope = max elongation = max PE

Q11) At any instant, wave travelling along a string is show is moving upwards. Which of following statement is true?

Power by left postion on right postion = TV = -Ve > right postion is transferring power to left postion

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(a) At point A power is transferred by string left to a to string right to A
(b) At point A power is transferred by string right to a to string left to A
(c) Power is zero at A
(d) None of these

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