

Question 3217-06
0.33-42%

The tension in a 60 m telephone wire is 800 N. A pulse initiated at one end of the wire is found to reach the other end in 1.5 s. What is the mass of the wire?

- (a) 15 kg.
- (b) 50 kg.
- (c) 30 kg.
- (d) 60 kg.
- (e) 40 kg.

Question 3317-06
0.34-17%

The equation of a transverse wave on an 80 cm long stretched string is given by:

$$y(x, t) = 2.0 \sin [10\pi x - 50\pi t]$$

where x and y are in meters and t is in seconds. If the mass of the string is 160 g, find the tension in the string.

- (a) 5.0 N.
- (b) 3.5 N.
- (c) 25 N.
- (d) 55 N.
- (e) 15 N.

17-7 Energy and Power of a Traveling String Wave**Question 34**

A wave of wavelength 0.6 m is sent along a horizontal rope of linear density 13 g/cm, under a tension of 750 N. If the amplitude of the wave is 5.2 cm, then the average power transmitted along the rope is given by:

- (a) 2.7 kW.
- (b) 9.5 kW.
- (c) 5.2 kW.
- (d) 4.6 kW.
- (e) 1.3 kW.

Question 3517-07
0.41-38%

A transverse wave in a 3.0 m long string is given by the harmonic wave equation: $y = 0.4 \cos[\pi(x/4 + 6t)]$ (SI units). If the string is kept under a constant tension of 70 N, find the power transmitted to the wave.

- (a) 44 W
- (b) 25 W
- (c) 72 W
- (d) 83 W
- (e) 58 W

Question 3617-07
0.45-37%

Any point on a string carrying a sinusoidal wave will move with its maximum speed when the magnitude of its:

- (a) displacement is maximum
- (b) displacement is twice the amplitude
- (c) displacement is minimum
- (d) acceleration is maximum
- (e) displacement is half the amplitude

17-07

Question 37

A transverse sinusoidal wave travels along a string of linear mass density 5.00 g/m . The amplitude of the wave is 2.00 cm , its frequency is 60.0 Hz , and the tension in the string is 20.0 N . What is the power transmitted by this wave?

- (a) 8.99 W
 - (b) 90.0 W
 - (c) 512 W
 - (d) 2.54 W
 - (e) 285 W
-

17-07

0.38-31%

Question 38

The speed of a transverse wave on a string is 170 m/s when the tension in the string is 120 N . What must be the tension to produce waves with a speed of 180 m/s if the amplitude is doubled?

- (a) 240 N
 - (b) 540 N
 - (c) 127 N
 - (d) 270 N
 - (e) 135 N
-

17-07

0.32-43%

Question 39

A harmonic wave is traveling in a string of mass density 10 g/m . The amplitude of the wave is 1 milli-m , its frequency is 100 Hz , and the tension in the string is 20 N . What is the average power required to maintain the vibration?

- (a) 88 milli-W
 - (b) 8.8 milli-W
 - (c) 4.4 milli-W
 - (d) 44 milli-W
 - (e) 17 milli-W
-

17-07

Question 40

Transverse waves are being generated on a rope under constant tension. By what factor does the required power change if the length of the rope is doubled?

- (a) $1/2$.
 - (b) 1 .
 - (c) 2 .
 - (d) 4 .
 - (e) $1/4$.
-

17-07

Question 41

The power transmitted by a sinusoidal wave on a string does not depend on:

- (a) the amplitude of the wave.
 - (b) the length of the string.
 - (c) the frequency of the wave.
 - (d) the tension in the string.
 - (e) the wavelength of the wave.
-

Question 4217-07
0.50-32%

A string under a tension of 15 N, is set into vibration to produce a wave of speed 20 m/s, and a maximum transverse speed of 8 m/s. For this wave, the average power is:

- (a) 44 W.
 - (b) 30 W.
 - (c) 24 W.
 - (d) 15 W.
 - (e) 11 W.
-

Question 43

17-07

A string has a linear mass density of 0.10 kg/m and it is under tension of 10.0 N. What must be the frequency of traveling waves of amplitude 10.0 mm for the average power to be 0.5 W?

- (a) 32 Hz
 - (b) 0.01 Hz
 - (c) 16 Hz
 - (d) 100 Hz
 - (e) 10 Hz
-

Question 4417-07
0.36-76%

Sinusoidal waves are generated on a string under constant tension by a source vibrating at a constant frequency. If the power delivered by the vibrating source is reduced to one half of the initial value, what is the ratio of the final amplitude to the initial amplitude?

- (a) 1.0
 - (b) 2.0
 - (c) 0.50
 - (d) 0.71
 - (e) 1.4
-

Question 45

17-07

A sinusoidal wave, given by the equation:

$$y(x,t) = 0.07 \cos(6.0x - 30t)$$

where x and y are in meters and t is in seconds, is moving in a string of linear density = 1.2 g/m. At what rate is the energy transferred by the wave?

- (a) $1.32 \cdot 10^{(-2)}$ W.
 - (b) No enough information is given to solve this question.
 - (c) $3.02 \cdot 10^{(-2)}$ W.
 - (d) $1.05 \cdot 10^{(-2)}$ W.
 - (e) $2.21 \cdot 10^{(-2)}$ W.
-

Question 4617-07
0.61-34%

A sinusoidal wave travels along a string whose mass per unit length is 5.00 g/m. The amplitude of the wave is 2.00 cm, its wavelength is 105 cm, and the tension in the string is 20.0 N. What is the average power transported by this wave?

- (a) 9.06 W
 - (b) 4.5 W
 - (c) 7.26 W
 - (d) 3.01 W
 - (e) 8.1 W
-