17-05

Question 20
●.26-69%

Any point on a string carrying a sinusoidal traveling wave is moving with its maximum transverse speed when:
(a)   the magnitude of its displacement is half the amplitude.
(b)   the magnitude of its displacement is one fourth the amplitude.
(c)   the magnitude of its displacement is zero.
(d)   the magnitude of its acceleration is a maximum.
(e)   the magnitude of its displacement is a maximum.

17-05

Question 21
).28-81%

A wave in a string, is given by the equation:
$$y(x,t) = 0.24*\sin(3.0*x-24*t),$$
where x and y are in meters and t is in seconds. Calculate the magnitude of the transverse speed at $x = 2.0$ m and $t = 1.0$ s.
(a)   1.8   m/s.
(b)   5.5   m/s.
(c)   3.8   m/s.
(d)   2.1   m/s.
(e)   8.0   m/s.

17-05

Question 22
0.56-44%

A transverse sinusoidal wave of frequency 100 Hz is traveling along a stretched string with a speed of 20.0 m/s. What is the shortest distance between a crest and a point of zero transverse acceleration?
(a)   1.20 m.
(b)   0.15 m.
(c)   0.05 m.
(d)   0.10 m.
(e)   0.20 m.

17-6	Wave Speed on a Stretched String

17-06

Question 23

A 100-Hz oscillator is used to generate a sinusoidal wave, on a string, of wavelength 10 cm. When the tension in the string is doubled, the oscillator produces a wave with a frequency and wavelength of:
(a)   50 Hz and 14 cm.
(b)   200 Hz and 20 cm.
(c)   100 Hz and 20 cm.
(d)   200 Hz and 14 cm.
(e)   100 Hz and 14 cm.

17-06

Question 24

The linear density of a vibrating string is 1 g/m. A transverse wave is propagating on the string and is given by the equation:
$$y(x,t) = 2.0*\sin(x - 40*t),$$
where x and y are in meters and t is in seconds. What is the tension in the string?
(a)   1.6 N.
(b)   1.9 N.
(c)   0.9 N.
(d)   2.1 N.
(e)   5.2 N.

Quest on 25
Figure (1) shows two different wires, joined together end to end, and are driven by a vibrator of frequency 120 Hz. Wire(2) has a linear density four times that of wire(1). If a wave has a wavelength of 1 m in wire(1), what is the wavelength of the wave in wire(2)?

Figure 1
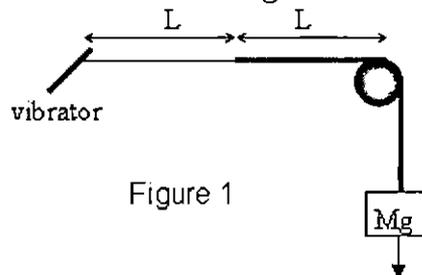
(a)   2.0 m.
(b)   0.5 m.
(c)   0.3 m.
(d)   1.5 m.
(e)   4.0 m.

Question 26   0.46-22%

The equation for a transverse wave on a string is:

$$y(x,t) = 0.025*[\sin(25*x-500*t)]$$

where x and y are in meters and t is in seconds. The tension in the string is 20 N. Find the linear density of this string.
(a)   0.02 kg/m
(b)   0.13 kg/m
(c)   0.05 kg/m
(d)   0.50 kg/m
(e)   0.25 kg/m

Question 27   0.40-42%

If a sinusoidal transverse wave is traveling on a string, then any point on the string
(a)   moves in the same direction as the wave.
(b)   moves in uniform circular motion with a different angular speed than that of the wave.
(c)   moves in simple harmonic motion with the same frequency as that of the wave.
(d)   moves in simple harmonic motion with a different frequency than that of the wave.
(e)   moves in uniform circular motion with the same angular speed as that of the wave.

Question 28
A wave in a string, of linear density 0.13 g/m, is given by the equation:

$$y(x,t) = 0.018 \sin(3.0x-24.0t),$$

where x and y are in meters and t is in seconds. the tension in the string is:
(a) $3.32*10^{**}(-3)$ N.
(b) $3.90*10^{**}(-3)$ N.
(c) $3.12*10^{**}(-2)$ N.
(d) $2.34*10^{**}(-4)$ N.
(e) $2.43*10^{**}(-5)$ N.

17-06

Question 29
4.43-28%

A string 180 cm long has a fundamental frequency of vibration of 300 Hz. What length of the same string, under the same tension, will have a fundamental frequency of 200 Hz?
(a)   147 cm.
(b)   900 cm.
(c)   270 cm.
(d)   220 cm.
(e)   120 cm.

17-06

Question 30
0.57-57%

A steel wire of mass 0.400 kg and length 0.640 m supports a 102-kg block (see figure 2). The wire is struck exactly at the midpoint generating a pulse on the wire. How long does it take the peak of the pulse to reach the top of the wire?
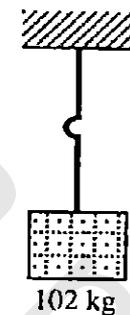

102 kg

Figure 2

(a) $2.00*10**-3$ s
(b) $8.00*10**-3$ s
(c) $1.60*10**-2$ s
(d) $6.00*10**-3$ s
(e) $4.00*10**-3$ s

17-06

Question 31
0.36-34%

In figure 2, two equivalent pulses, Pulse 1 and Pulse 2, are sent from points A and B at the same time, respectively. Which pulse reaches point C first?
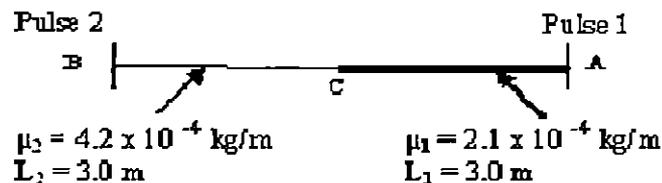

Pulse 2   Pulse 1
B   C   A
$\mu_2 = 4.2 \times 10^{-4}$ kg/m $\mu_1 = 2.1 \times 10^{-4}$ kg/m
$L_2 = 3.0$ m $L_1 = 3.0$ m

Figure 2

(a)   Not enough information.
(b)   Pulse 1.
(c)   312 Hz.
(d)   Both at the same time.
(e)   Pulse 2.