

Position: # (your seat #).....
Your Name: Last, First.....
Name of Workshop Instructor: Last, First.....
Exam: # (#1).....
Date:

Q1.(10pts) The equation of a wave is

$$y = 5.6 \sin [0.5\pi(x-56t)/3]$$

Here, both x and y are in centimeters. Also, t is in seconds. Find: a) the amplitude of the wave; b) the wavelength of the wave; c) the frequency of the wave; d) the speed of the wave; e) the period of the wave.

Q2. (6 pts) Write an equation for a traveling wave whose amplitude is 25 cm, wavelength is 45 cm, wave-speed is 10 meters per second, and which is traveling in the positive x direction.

Q3.(2pts) The lower the frequency of an electromagnetic wave in vacuum:

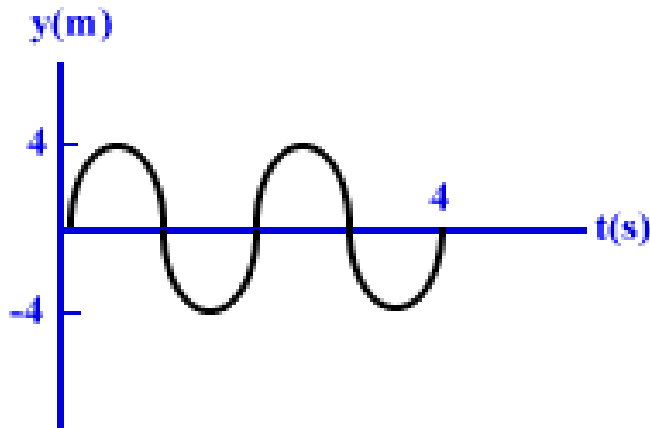
a) The smaller is its wave-speed; b) the larger is its wave-speed; c) the shorter is its wavelength; d) the longer is its wavelength; e) the longer is its period; f) the greater is its amplitude.

Pick up the best choice for the answer, and explain your reasoning.

Q4. (2pts) The unit for the product of wavelength and frequency is: a) ms; b) Hz; c) s/m; d) m/s.

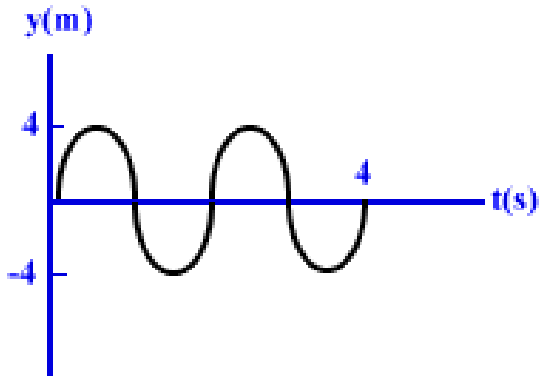
Pick the best choice for the answer, and explain your reasoning.

Q5. (3 pts) The amplitude of the wave in the figure is:
a) 6 m; b) 36 cm; c) 25 km; d) 4 miles; e) 81 nm; f) 4m.
Pick up the best choice for the answer, and
explain your reasoning. What is the wave number ?



Q6. (3 pts) The frequency of the wave shown below is:
a) 16 Hz; b) 0.7 Hz; c) 5 m/s; d) 0.5 Hz; e) 2 Hz; f) 1 Hz;
g) 4 Hz.

Pick the best choice for the answer, and explain your reasoning. What is the angular frequency ?



Q7. (4pts) What is the angle of the first minima (dark fringe) in the diffraction pattern produced by 300 nm light incident upon a 600 nm slit: a) 160° ; b) 120° ; c) 45° ; d) 90° ; e) 180° ; f) 0° ; g) 30° . Pick up the best choice for the answer, and explain your reasoning.

Q8. (2pts) If the wavelength of an electromagnetic wave is 200 nm (2×10^{-7} m) the wave is: a) a radio wave; b) a microwave; c) an infrared wave; d) a UV wave; e) a X-ray.

Q9. (8pts) Light of wavelength 650 nm is incident on two slits. The distance between successive bright fringes on a screen distant 1.2 m away is 0.5cm. What is the slit separation ? What approximation have you used to derive your result ? Check whether your final answer is consistent with this approximation

Q10. (4pts) Sound waves are excited in a pipe of length 0.5m. Both ends of the pipe are open. What is wavelength of the fundamental mode ? If the speed of sound is 300 m/s calculate the frequency of this mode.