Week 06

Group: _____

1. (20 points)   A wave in a string is described by the following function:

$$y(x, t) = (0.34 \, \text{mm}) \cos((24 \, \text{rad/m})x - (960 \, \text{rad/s})t)$$

The mass per unit length of the string is $1.2 \, \text{g/m}$. Identify or calculate the following (include correct units).

a. (1 point)   Amplitude:

b. (1 point)   Wavenumber:

c. (1 point)   Wavelength:

d. (1 point)   Angular frequency:

e. (1 point)   Cycle frequency:

f. (1 point)   Period:

g. (1 point)   Wave velocity (include direction):

h. (2 points)   Tension in the string:

i. (2 points)   Maximum speed of some specific part of the string:

j. (2 points)  Kinetic energy density (per unit length), time-averaged:

k. (1 point)  Potential energy density, time-averaged:

l. (2 points)  Rate of energy transfer across some specific point, time-averaged:

m. (2 points)  Total energy in a $100\,\mathrm{m}$-long section:

n. (2 points)  How much time does it take for the amount of energy calculated in part m to cross a specific point in the string?