## 11-1)

L = 0.5m T = 1N

a)

The period P is exactly the time required to complete one cycle, or 0.096 seconds.

b) The frequency f = 1/P = 10.417 Hz

c)

The wavelength  $\lambda$  is, from the figure, the whole length of the string, 0.5 m.

d) Since we see three nodes, n = 2.

e) v =  $f\lambda$  = 10.417\*0.5 = 5.21 m/s

f)  

$$v = [T/\mu]^{1/2} = [TL/m]^{1/2} \rightarrow m = TL/v^2 = 1*0.5/5.21^2 = 0.018 \text{ kg}$$

g)

Each piece of the string moves as  $y(x, t) = A \sin(2\pi f t + \phi)$ , so the velocity is then

 $v(x, t) = dy/dt = 2\pi f A \cos(2\pi f t + \phi)$ 

 $v_{MAX} = 2\pi f A = 2\pi (10.417)0.015 = 0.98 \text{ m/s}$