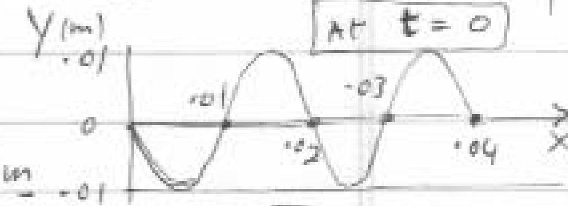
PHY 221 ch 16 Sharma

#4 $v = \frac{s}{t}$ and $\lambda = \frac{v}{f} = \frac{s}{ft} = \frac{2.5\,m}{3 s^{-1}(1.7 s)} = 0.49\,m$

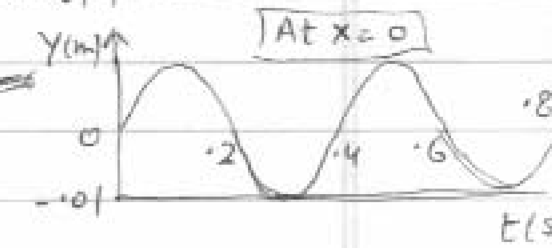
#24 From t=0 graph;

$\lambda = 0.02\,m$ and $A = .01\,m$



From x=0 graph

$T = 0.4\,s$ and $A = 0.01\,m$



$f = \frac{1}{T} = \frac{1}{0.4} = 2.5\,Hz$

Now $y = A \sin\left(2\pi f t - \frac{2\pi}{\lambda} x + \phi\right)$

From the two graphs: $y = 0$ when x and $t = 0$

$\Rightarrow \phi = 0$

Hence $y = 0.01 \sin\left(2\pi \times 2.5\,Hz\, t - \frac{2\pi}{0.02\,m} x + 0\right)$

$= (0.01\,m) \sin\left(5\pi \frac{t}{sec} - 100\pi \frac{x}{meter}\right)$

#30 $V_1 = \sqrt{\frac{\gamma k T_1}{m}}$ and $V_2 = \sqrt{\frac{\gamma k T_2}{m}}$

$\frac{V_2}{V_1} = \sqrt{\frac{T_2}{T_1}} \Rightarrow V_2 = V_1\sqrt{\frac{T_2}{T_1}} = 1220\sqrt{\frac{405K}{201K}}$

$= 1730\,m/s$

#~~42~~ (45) $v = \sqrt{\frac{\gamma k T}{m}} \Rightarrow m = \frac{\gamma k T}{v^2} = \frac{1.67(1.38\times10^{-23}\,J/K)\,300K}{(363\,m/s)^2} = 5.25\times10$ … kg

But $m = \frac{(39.9u)x + (20.2u)(100-x)}{100}$

or $(39.9-20.2)u\,x + 2020u = 100\,m$ ~~$\Rightarrow (19.7)\frac{1.8m}{6.022\times10^{23}} x = 5.25\times10 \ldots - 2020x$~~ contd.