

P14 q1

1) a) $v = f\lambda \Rightarrow f = \frac{v}{\lambda} = \frac{3 \times 10^8}{600 \times 10^{-9}} = 5.00 \times 10^{14} \text{ Hz}$

b) ~~$\lambda = \frac{\lambda_0}{n} = \frac{600 \times 10^{-9}}{1.5}$~~

$n = \frac{\text{speed in air}}{\text{Speed in glass}} = \frac{3 \times 10^8}{2 \times 10^8} = 1.5$

$\lambda_{\text{glass}} = \frac{\lambda_{\text{air}}}{n} = \frac{600 \times 10^{-9}}{1.5} = 400 \times 10^{-9} \text{ m}$

2) a) $\lambda = 2 \times 0.25 = 0.5 \text{ m}$

$v = f\lambda \Rightarrow f = \frac{v}{\lambda} = \frac{3 \times 10^8}{0.5} = 6 \times 10^8 \text{ m/s}$

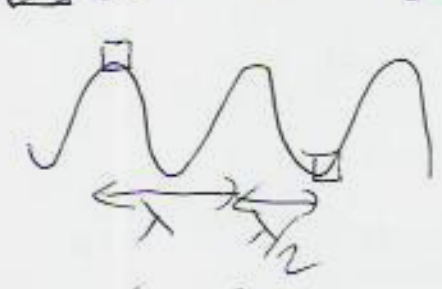
b) $v = f\lambda \Rightarrow \lambda = \frac{v}{f}$

$\lambda_{\text{max}} = \frac{340}{20} = 17 \text{ m}$

$\lambda_{\text{min}} = \frac{340}{20,000} = 0.017 \text{ m}$

c) ??

3) a)



Since one boat is at crest when other is in trough.

$\lambda + \lambda/2 = 4.5 \Rightarrow \frac{3\lambda}{2} = 4.5 \Rightarrow \lambda = 3 \text{ m}$