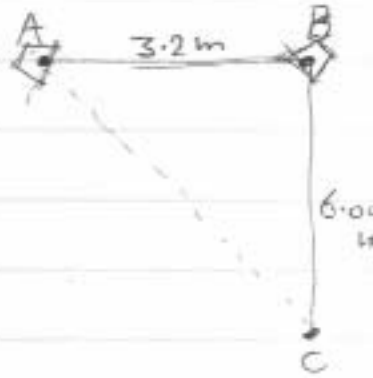
#4. $\lambda = \frac{v}{f} = \frac{343\ m/s}{214\ Hz} = 1.603\ m$

47



$S_{AC} = \sqrt{(6.00m)^2 + (3.20m)^2} = 6.80\ m$

Path length difference $= S_{AC} - S_{BC} =$

$= 6.80 - 6.00$

$= 0.800\ m$

$= \frac{0.800}{1.603}$ wavelengths

$= \frac{1}{2}\lambda \Rightarrow$ Destructive Interfere

#14 $f_1 = \frac{v}{\lambda_1} = \frac{343\ m/s}{0.769\ m} = 446\ Hz$

$f_2 = \frac{343\ m/s}{0.776\ m} = 442\ Hz$

$\Rightarrow f_B = f_1 - f_2 = 4\ Hz$

#24. $v = \lambda_1 f_1 = 2L_1 f_1$

25 $v = 2L_1 f_1 = 2L_2 f_2 \Rightarrow L_2 = \frac{f_1}{f_2} L_1$

$L_2 = \frac{196\ Hz}{262\ Hz}(0.62\ m) = 0.46\ m$

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30 a) string fixed at both ends $f_n = n f_1$, $n = 1, 2, 3, 4, 5 \ldots$

46 $f_2 = 800\ Hz$, $f_3 = 1200\ Hz$, $f_4 = 1600\ Hz$

b) Pipe with both ends open $f_n = n f_1$ $n = 1, 2, 3, 4, \ldots$

$f_2 = 800\ Hz$, $f_3 = 1200\ Hz$, $f_4 = 1600\ Hz$

c) Pipe with one end closed $f_n = n f_1$, $n = 3, 5, 7, 9, 11$

$f_3 = 3 \times 400 = 1200\ Hz$, $f_5 = 2000\ Hz$, $f_7 = 2800\ Hz$