

PHY 15.1 #s 24, 27, 30, 32, 34, 38
 $v = 343 \text{ m/s}$ $t = 6.0 \text{ s}$

24) $d = vt = (343 \text{ m/s})(6.0 \text{ s}) = 2100 \text{ m}$



27) $d_t = d_1 + d_2 = (343 \text{ m/s})\left(\frac{4.0 \text{ s}}{2}\right) + (343 \text{ m/s})\left(\frac{2.0 \text{ s}}{2}\right) = 1029 \text{ m} = 1.0 \times 10^3 \text{ m}$

30) $F = 4.40 \times 10^2 \text{ Hz}$ $v = \lambda f = (3.30 \text{ m})(4.40 \times 10^2 \text{ Hz}) = 1450 \text{ m/s}$
 $v = ?$ $\lambda = 3.30 \text{ m}$

32) $v = 343 \text{ m/s}$ $\lambda = 3.5 \text{ nm} = 0.0035 \text{ m}$ $f = \frac{v}{\lambda} = \frac{343 \text{ m/s}}{0.0035 \text{ m}} = 9.8 \times 10^4 \text{ Hz}$
 $f = ?$

34) $f_d = f_s \left(\frac{v + v_d}{v - v_s} \right) = 305 \text{ Hz} \left(\frac{343 \text{ m/s} + 0 \text{ m/s}}{343 \text{ m/s} - 31 \text{ m/s}} \right)$

A) $f_s = 305 \text{ Hz}$ $v_s = 31 \text{ m/s}$ $v_d = 0 \text{ m/s}$

$f_d = 335 \text{ Hz}$

B) $f_d = 305 \text{ Hz} \left(\frac{343 \text{ m/s} + 21 \text{ m/s}}{343 \text{ m/s} - 31 \text{ m/s}} \right) = 356 \text{ Hz}$

38) $122.5 \text{ m} = d$ $v = 343 \text{ m/s}$
 $d = d_0 + v_0 t + \frac{1}{2} a t^2$ $t_{\text{total}} = t_{\text{fall}} + t_{\text{sound}} = \sqrt{\frac{2d}{a}} + \frac{d}{v}$
 $t = \sqrt{\frac{2d}{a}}$ $= \sqrt{\frac{2(122.5 \text{ m})}{9.80 \text{ m/s}^2}} + \frac{122.5 \text{ m}}{343 \text{ m/s}} = 5.36 \text{ s}$