

Answers – Week 3

3-1 $I = 60 \text{ dB} = 10^{-6} \text{ watt/m}^2$
 Power on Ear $= 10^{-6} \times \pi \times r^2$
 $= 10^{-6} \times \pi \times (5 \times 10^{-3})^2 = 7.8 \times 10^{-11} \text{ watt}$
 Pressure Amplitude $= 0.028 \text{ N/m}^2$
 Displacement Amplitude $= 2.5 \times 10^{-8} \text{ m}$

3-3 $V_{\text{car}} = 60 \text{ mph} = 26.4 \text{ m/s}$, $f = 500 \text{ Hz}$ (Emitted Frequency)

Freq. Of Echo $f' = f \frac{\left[1 + \frac{V}{V_s}\right]}{\left[1 - \frac{V}{V_s}\right]} = 587 \text{ Hz}$

3-5 $n = \frac{10^{-9}}{1.6 \times 10^{-19}} = 6.25 \times 10^9 \text{ Electrons}$

3-7 $V = 2.26 \times 10^6 \text{ m/s}$

3-9 $q = 1.92 \times 10^{-8} \text{ C}$

3-11 The $-5 \mu\text{C}$ charge must be placed at a distance of 1 m from the $1 \mu\text{C}$ charge.

3-13 Frequency $f = 2.13 \text{ Hz}$

3-15

