Ch 16 Prob 75

AM Radio $f = 540 - 1600$ kHz

a) Find the wavelength range

$$\lambda \cdot f = c \longrightarrow \lambda = \frac{c}{f}$$

for $f = 540 \times 10^3$ Hz $\quad \lambda = \dfrac{3.0 \times 10^8 \text{ m/s}}{540 \times 10^3 \text{ Hz}} = 555 \text{ m}$

for $f = 1600 \times 10^3$ Hz $\quad \lambda = \dfrac{3.0 \times 10^8 \text{ m/s}}{1600 \times 10^3 \text{ Hz}} = 188 \text{ m}$

AM wavength between

188 m – 555 m

b) Find the wavelength range for FM

$f = 88.0 - 108$ MHz

for $f = 88.0 \times 10^6$ Hz $\quad \lambda = \dfrac{3.0 \times 10^8 \text{ m/s}}{88 \times 10^6 \text{ Hz}} = 3.41 \text{ m}$

for $f = 108 \times 10^6$ Hz $\quad \lambda = \dfrac{3.0 \times 10^8 \text{ m/s}}{108 \times 10^6 \text{ Hz}} = 2.78 \text{ m}$

FM wavelength between

2.78 m – 3.41 m