

⑧

② PROBLEM # 2 :

$$f = 900 \text{ MHz} = 9 \times 10^8 \text{ s}^{-1}$$

$$c = 3 \times 10^8 \text{ m/s}$$

$$\lambda = ?, \kappa = ?, k = ?$$

Using the DISPERSION RELATION for the wave equation derived in class, we get:

$$\underline{\omega = ck} \Rightarrow \underline{k = \frac{\omega}{c}} \quad (2)$$

Then:

$$\bullet \omega = 2\pi f = 2\pi \times 9 \times 10^8 \text{ s}^{-1} \cong \underline{\underline{5.65 \times 10^9 \text{ rad/s}}}$$

$$\bullet k = \frac{\omega}{c} = \frac{5.65 \times 10^9 \text{ rad/s}}{3 \times 10^8 \text{ m/s}} \cong \underline{\underline{18.8 \text{ m}^{-1}}}$$

$$\bullet \kappa = \frac{k}{2\pi} = \frac{(6\pi) \text{ m}^{-1}}{2\pi} = \underline{\underline{3 \text{ m}^{-1}}}$$

$$\bullet \lambda = \frac{1}{\kappa} = \frac{1}{3 \text{ m}^{-1}} \approx 0.33 \text{ m} = \underline{\underline{33 \text{ cm}}}$$
