

Pg 447 # 2-6

2) FM radio band λ

$$\mu = 10^6$$

$$f = 88 \text{ MHz} - 108 \text{ MHz} \quad (88 \text{ E}6, 108 \text{ E}6)$$

$$\lambda_1 =$$

$$\lambda_2 =$$

$$c = 3.0 \times 10^8 \text{ m/s}$$

a) $c = f \cdot \lambda$

$$3.0 \times 10^8 = 88 \times 10^6 \cdot \lambda_1$$

$$\boxed{\lambda_1 = 3.4 \text{ m}}$$

b) $c = f \cdot \lambda$

$$3.0 \times 10^8 = 108 \times 10^6 \cdot \lambda_2$$

$$\boxed{\lambda_2 = 2.78 \text{ m}}$$

3) $f_1 = 3.5 \text{ MHz}$

$$\lambda_1 =$$

$$c = 3.0 \times 10^8 \text{ m/s}$$

$$c = f \lambda$$

$$3.0 \times 10^8 \text{ m/s} = 3.5 \times 10^6 \text{ Hz} \cdot \lambda$$

$$\boxed{\lambda = 85.7 \text{ m}}$$

$$f_2 = 29.7 \text{ MHz}$$

$$\lambda_2 =$$

$$c = 3.0 \times 10^8 \text{ m/s}$$

$$c = f \cdot \lambda$$

$$3.0 \times 10^8 \text{ m/s} = 29.7 \times 10^6 \text{ Hz} \cdot \lambda$$

$$\boxed{\lambda = 10.1 \text{ m}}$$

$$4) \quad c = 3.0 \times 10^8 \text{ m/s}$$

$$f = ?$$

$$\lambda = 1 \text{ km} = 1000 \text{ m}$$

$$c = f \cdot \lambda$$

$$3.0 \times 10^8 \text{ m/s} = f \cdot 1000 \text{ m}$$

$$f = 300000 = \boxed{3.0 \times 10^5 \text{ Hz}}$$

$$5) \quad c = 3.0 \times 10^8 \text{ m/s}$$

$$f = ?$$

$$\lambda = 560 \text{ nm} = 560 \times 10^{-9} \text{ m}$$

$$c = f \cdot \lambda$$

$$3.0 \times 10^8 \text{ m/s} = f \cdot 560 \times 10^{-9} \text{ m}$$

$$\lambda = \boxed{5.4 \times 10^{14} \text{ m}}$$

$$6) \quad c = 3.0 \times 10^8 \text{ m/s}$$

$$f = ?$$

$$\lambda = 125 \text{ nm} = 125 \times 10^{-9} \text{ m}$$

$$c = f \cdot \lambda$$

$$3.0 \times 10^8 \text{ m/s} = f \cdot 125 \times 10^{-9} \text{ m}$$

$$f = 2.4 \times 10^{15} \text{ Hz}$$