

# ASSIGNMENT#03

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1:25 PM

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ZBK-0914

Q1.  $J = 440 \text{ A/cm}^2$   
d when  $I = 0.552 \text{ A}$ ?

$$J = \frac{I}{A}$$

$$440 = \frac{0.552}{\frac{\pi d^2}{4}}$$

$$= 0.04 \text{ cm}$$

$$= 4 \times 10^{-4} \text{ m}$$

Q2.  $I = 115 \text{ A}$   
 $A = 31.2 \text{ mm}^2$   
 $L = 85.5 \text{ cm}$   
 $n = 8.49 \times 10^{28} \text{ m}^3$

Q:  $Ne$   $V = A \times L$

$$Q = nVe$$

$$It = nVe$$

$$t = \frac{nVe}{I}$$

$$t = \frac{(8.49 \times 10^{28})(31.2 \times 10^{-6})(85.5 \times 10^{-2})(1.6 \times 10^{-19})}{115}$$

$$t = 3151 \text{ s}$$

Q3.  $P = 9.4 \text{ W}$   
 $C = 110 \text{ pF}$   
 $\epsilon_0 = 8.85 \text{ pF/m}$

$$C = \frac{\epsilon_0 A}{d}$$

$$\frac{d}{A} = \frac{\epsilon_0}{C}$$

$$R = \frac{\rho d}{A}$$

$$R = \frac{\rho \epsilon_0}{C}$$

$$R = \frac{(9.4)(8.85 \times 10^{-12})}{C(110 \times 10^{-12})}$$

$$R = 0.756 \text{ } \Omega$$

Q4.  $V = 3.55 I^2$  ( $I$  in mA)

a)  $I = 2.4 \text{ mA}$ ,  $R = ?$   
 $V = 3.55 I^2$   
 $V = 3.55 (2.4)^2$   
 $V = 20.448 \text{ V}$

$$R = \frac{V}{I}$$

$$R = \frac{20.448}{2.4}$$

$$R = 8.52 \text{ m}\Omega$$

b)  $R = 16 \text{ } \Omega$ ,  $I = ?$

$$R = \frac{V}{I}$$

$$R = \frac{3.55 I^2}{I}$$

$$R = 3.55 I$$

$$16 = 3.55 I$$

$$I = 4.507 \text{ mA}$$

Q5.  $V = 9 \text{ V}$   
 $P = 7.5 \text{ W}$   
9PM — 3AM  $\rightarrow 6 \text{ hours} = 21600 \text{ s}$

$$P = IV$$

$$P = \frac{QV}{t}$$

$$Q = \frac{Pt}{V}$$

$$Q = \frac{(7.5)(21600)}{9}$$

$$Q = 18000 \text{ C}$$