

Quiz

Chapter # 26 (current & Resistance)

Topics Included:

- ① Electric Current
- ② current Density
- ③ Drift + speed
- ④ Resistance & Resistivity
- ⑤ Ohm's Law.

National University of Computer and Emerging Sciences

Department of Computer Science

Chiniot-Faisalabad Campus

QUIZ 7

Name: Muhammad Taha ... Roll no. 2SF-0755 ... Date 27 Nov, 25

Semester 01 Class BCS-1B Section 1B A.P

CLO 4 | explain the interaction between electric & magnetic fields with different applications.

Q1: A cylindrical wire has a radius r and length l . If both r and l are doubled, does the resistance of the wire (a) increase, (b) decrease, or (c) remain the same? Reasoning?

$$R = \rho \frac{L}{A} = \rho \frac{2L}{\pi r^2} - \frac{\rho L}{\pi r^2} \times \frac{2}{2} = \frac{\rho L}{2\pi} \Rightarrow R' = \frac{R}{2}$$

[4 Marks]

Answers Resistance of the wire will decrease to half.

Reason: As we know that:

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

$$R' = \rho \frac{2L}{\pi (2r)^2} = \frac{\rho L}{\pi r^2} \times \frac{2}{4} = \frac{\rho L}{\pi r^2} \cdot \frac{1}{2} = \frac{R}{2}$$

$R' = \frac{R}{2}$

Q2: The radius of 22-gauge Nichrome wire is 0.321 mm ($\rho = 1.5 \times 10^{-6} \Omega m$).

(A) Calculate the resistance per unit length of this wire.

(B) If a potential difference of 10 V is maintained across a 1.0-m length of the Nichrome-wire, what is the current in the wire?

(A) $R = \frac{\rho L}{A} = \frac{\rho (1)}{\pi r^2}$

$$R = \frac{(1.5 \times 10^{-6})}{\pi \cdot (0.321 \times 10^{-3})^2}$$

$$R = \frac{(1.5 \times 10^{-6})}{3.2371 \times 10^{-7}}$$

$$R = \frac{4.6337}{10^{-9}} \Omega$$

$R = 4.6337 \Omega$

(B) $V = IR$

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

$$I = \frac{10}{4.6337}$$

$I = 2.158 \text{ ampere}$

[6 Marks]