Physics 3204

Unit 2: Section 2 -Current Electricity

Worksheet 3: Electric Resistance

Part A : Multiple choice

1. Which feature of an electric circuit describes what slows down the flow of electrons?

   (A) Current
   (B) Potential difference
   (C) Resistance
   (D) Voltage

2. What is the part of a circuit that converts electricity into other forms of energy called?

   (A) Conductor
   (B) Control
   (C) Load
   (D) Source

3. What is the unit of measure for resistance?

   (A) Amps
   (B) Ohms
   (C) Volts
   (D) Watts

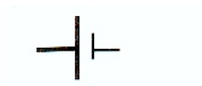
4. Which of the following symbols is used to represent resistance?

   (A) θ
   (B) μ
   (C) Ω
   (D) λ

5. Which symbol represents a resistor?

   (A)

   (B)



   (C)

   (D)

6. What is the resistance of a 1.0 m long copper wire of radius 0.0051 m ($\rho = 1.69 \text{ X } 10^{-8}\ \Omega$ m)?

(A) $1.1 \text{ x } 10^{-6}\ \Omega$
(B) $3.3 \text{ x } 10^{-6}\ \Omega$
(C) $2.1 \text{ x} 10^{-4}\ \Omega$
(D) $1.2 \text{ x} 10^{-3}\ \Omega$

7. How does the resistance of two copper wires compare if wire X has twice the length and twice the cross-sectional area of wire Y?

(A) Wire X has half the resistance of wire Y.
(B) Wire X has four times the resistance of wire Y.
(C) Wire X has the same resistance as wire Y.
(D) Wire X has twice the resistance of wire Y.

8. What will be the new resistance if the radius of a piece of copper wire having resistance R is doubled?

(A) ¼ R
(B) ½ R
(C) 2 R
(D) 4 R

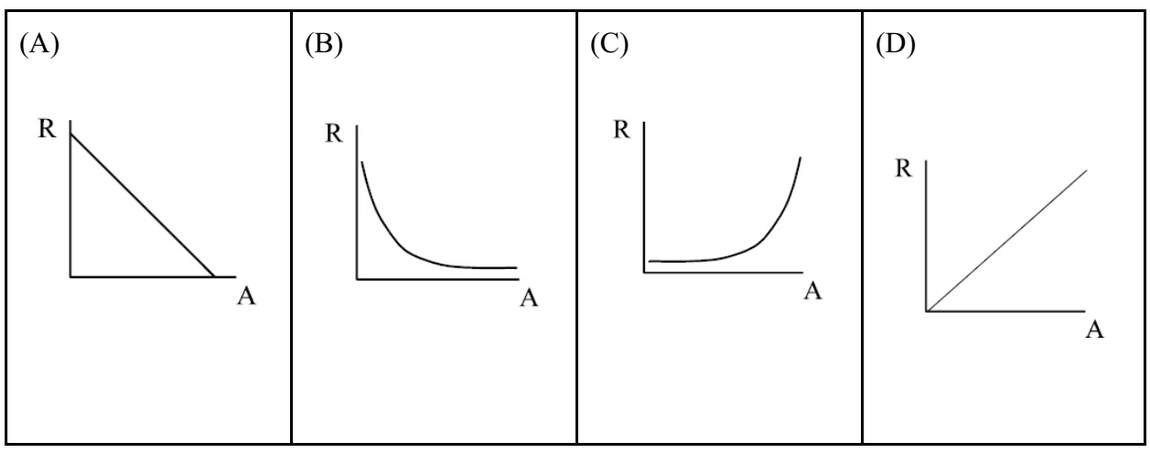
9. Copper has a resistivity of 1.7 × 10-8 Ωm. What is the resistance of a piece of copper wire of length 4.5 m and cross-sectional area $3.1 \times 10^{-6}\ m^2$?

(A) $1.2 \times 10^{-14}\ \Omega$
(B) $1.7 \times 10^{-8}\ \Omega$
(C) $2.5 \times 10^{-2}\ \Omega$
(D) $4.1 \times 10^{1}\ \Omega$

10. Wire A has a resistance of 12 Ω. Wire B, of the same material, is twice as long and has half the cross-sectional radius of wire A. What is the resistance of wire B?

(A) 1.5 Ω
(B) 12 Ω
(C) 48 Ω
(D) 96 Ω

11. Which best represents the relationship between resistance, R, and cross-sectional area, A, of copper wire?



12. Given the resisitivity of copper is 1.72 × 10-8 Ωm, what is the resistance of a 2.00 m long copper extension cord that has a diameter of 2.00×10^{-3} m?

(A) 1.72×10^{-11} Ω
(B) 6.88×10^{-11} Ω
(C) 1.72×10^{-5} Ω
(D) 1.10×10^{-2} Ω

13. A wire of length L and radius r has a resistance of R. A second wire, composed of the same material, has length 2L and radius 2r. What is the resistance of the second wire?

(A) ¼ R
(B) ½ R
(C) R
(D) 4R

14. A copper wire with a 24 Ω resistance is doubled in length. If the cross-sectional area remains constant, what is its new resistance?

(A) 12 Ω
(B) 24 Ω
(C) 48 Ω
(D) 96 Ω

15. The resistance of a uniform copper wire 50.0 meters long and 1.15 mm in diameter is 0.830 ohms at 20˚ C. What is the resistivity of the copper at this temperature? **[3]**

16. The resistivity of aluminium at $20\ ^{O}$ C is 2.82×10^{-8} Ω•m. What is the resistance of an aluminium wire 20 meters long and 0.81 mm in diameter at this temperature **[3]**