

Electric current, resistance and resistivity Assignment 1

Assertion and Reason Type Question

Following question consider two statements one labelled as statement-1 and another as statement-2. Study both statements and mark your answer using the codes given below.

- (A) Both Statement-1 and Statement-2 are true and Statement-2 is correct explanation of Statement-1.
- (B) Both Statement-1 and Statement-2 are true and Statement-2 is not a correct explanation of Statement-1.
- (C) Statement-1 is true but statement-2 is false.
- (D) Statement-1 is false and statement-2 is true.

Question-1

Statement-1

Free electrons in conductor are always in state of continuous random motion.

Statement-2

The random motion of free electrons is due to thermal energy of the conductor.

Question-2

Statement-1

Drift velocity of electrons in a conductor increase on increasing the temperature of the conductor.

Statement-2

On increasing the temperature of a conductor, resistivity of the conductor increases.

Question-3

Statement-1

For metals relaxation time for electrons decreases with increase in temperature.

Statement-2

With the increase in temperature, number of collision per unit time that electrons made with lattice ion also increases.

Objective Type Questions

Question-4

Resistivity of the material of a conductor having uniform area of cross-section varies along its length according to the relation

$$\rho = \rho_0 (a + bx)$$

if L is the length of the conductor and A be the area of cross-section then resistivity of the conductor given by relation

(A) $\frac{\rho_0}{A} \left[L + b \frac{L^2}{2} \right]$

(B) $\frac{\rho_0}{A} \left[aL + b \frac{L^2}{2} \right]$

(C) $\frac{\rho_0}{A} \left[L^2 + bL^2 \right]$

(D) $\frac{\rho_0}{A} \left[aL^2 + b \frac{L^3}{3} \right]$

Question-5

Given a current carrying wire of non-uniform cross-section. Which of the following is constant through out the wire.

- (A) Current only
 (B) Current and drift speed
 (C) Drift speed only
 (D) Current, drift speed and electric field

Question-6

When potential difference across a given copper wire is increase, drift velocity of charge carriers

- (A) Decreases
 (B) Increases
 (C) Remain same
 (D) Get reduced to zero

Question-7

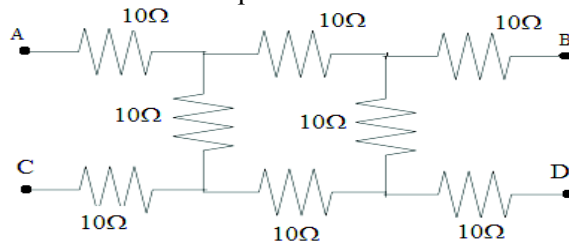
A material B has twice the specific resistance of the material A. A circular wire made of B has twice the diameter of the wire made of A. Then , for the two wires to have to have the same resistance, the ratio

L_a/L_b of their respective lengths must be

- (A) $\frac{1}{2}$
 (B) 2
 (C) $\frac{1}{4}$
 (D) 1

Question-8

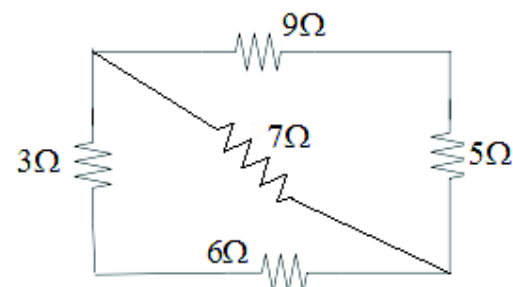
What will be the equivalent resistance between A and D



- (A) 40 Ω
 (B) 20 Ω
 (C) 30 Ω
 (D) 10 Ω

Question-9

In the given circuit below the equivalent resistance between points A and C

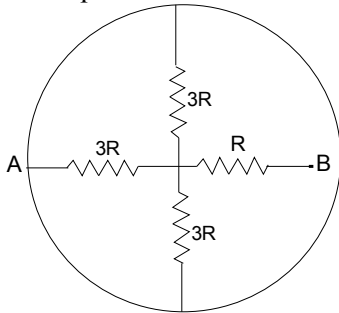


- (A) 32
 (B) 30.7
 (C) 33.07
 (D) 3.07

Question-10

A circular ring having negligible resistance is used to connect four resistors as shown below in the figure.

The equivalent resistance between point A and B is



- (A) $10R$
(C) $3R$

- (B) $2R$
(D) R

Answers**Assertion and Reason Type Question**

1. (A)
2. (D)
3. (B)

Objective Type Questions

4. (B)
5. (A)
6. (B)
7. (A)
8. (C)
9. (D)
10. (B)