PHYSICS

Section A

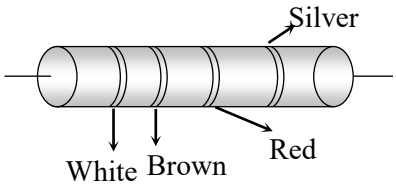
1. If n, e, τ and m respectively represent the density, charge relaxation time and mass of the electron, then the resistance of a wire of length l and area of cross-section A will be

(1) $\frac{ml}{ne^2\tau A}$ (2) $\frac{m\tau^2 A}{ne^2 l}$

(3) $\frac{ne^2\tau A}{2ml}$ (4) $\frac{ne^2 A}{2m\tau l}$

2. In the figure a carbon resistor has bands of different colours on its body as mentioned in the figure. The value of the resistance is

(1) 2.2 kΩ
(2) 3.3 kΩ
(3) 5.6 kΩ
(4) 9.1 kΩ



3. The drift velocity of free electrons in a conductor is 'v' when a current 'i' is flowing in it. If both the radius and current are doubled, then drift velocity will be

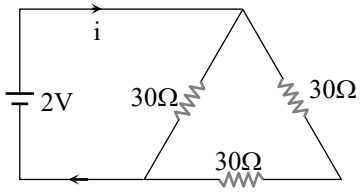
(1) v
(2) $\frac{v}{2}$
(3) $\frac{v}{4}$
(4) $\frac{v}{8}$

4. The following four wires are made of the same material and are at the same temperature. Which one of them has highest electrical resistance

(1) Length = 50 cm, diameter = 0.5 mm
(2) Length = 100 cm, diameter = 1 mm
(3) Length = 200 cm, diameter = 2 mm
(4) Length = 300 cm, diameter = 3 mm

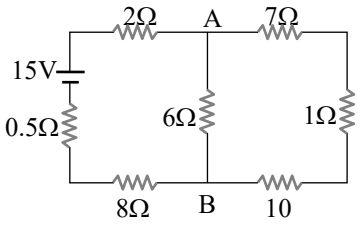
5. The current in the adjoining circuit will be

(1) $\frac{1}{45}$ ampere
(2) $\frac{1}{15}$ ampere
(3) $\frac{1}{10}$ ampere
(4) $\frac{1}{5}$ ampere



6. The current from the battery in circuit diagram shown is

(1) 1 A
(2) 2 A
(3) 1.5 A
(4) 3 A



7. n equal resistors are first connected in series and then connected in parallel. What is the ratio of the maximum to the minimum resistance

(1) n (2) $\frac{1}{n^2}$

(3) n^2 (4) $\frac{1}{n}$

8. Two wires of the same dimensions but resistivities ρ_1 and ρ_2 are connected in series. The equivalent resistivity of the combination is

(1) $\rho_1 + \rho_2$ (2) $\frac{\rho_1 + \rho_2}{2}$

(3) $\sqrt{\rho_1\rho_2}$ (4) $2(\rho_1 + \rho_2)$

9. A cell ofe.m.f. E is connected with an external resistance R, then p.d. across cell is V. The internal resistance of cell will be

(1) $\frac{(E-V)R}{E}$ (2) $\frac{(E-V)R}{V}$

(3) $\frac{(V-E)R}{V}$ (4) $\frac{(V-E)R}{E}$

10. The figure below shows currents in a part of electric circuit. The current i is

(1) 1.7 amp
(2) 3.7 amp
(3) 1.3 amp
(4) 1 amp