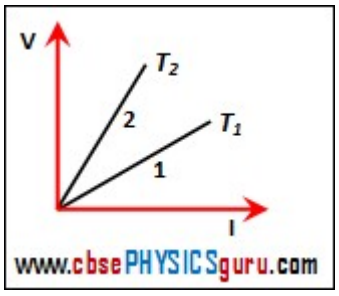
ELECTRIC CURRENT, DRIFT VELOCITY AND OHM'S LAW

1. In a circuit, the current I (in ampere) at an instant of time t (in seconds) is given by I = 3 — 0.04t. The number of electrons flowing in the time interval of t = 0 to t = 100 s through the cross-section of the conductor is:
   (a) 4.25 x 10^{19} **(b)** 6.25 x 10^{20} (c) 7.25 x 102^{20} (d) 9.55 x 10^{21}
2. 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:
   (a) v **(b)** v/2 (c) v/3 (d) v/4
3. The masses of three wires of copper are in the ratio 1: 3: 5 and lengths are in the ratio 5: 3: 1. Then the ratio of their electrical resistances is:
   (a) 1: 3: 5 (b) 5: 3: 1 (c) 1: 15: 25 **(d)** 125: 15: 1
4. Two wires that are made up of two different materials whose specific resistances are in the ratio 2: 3, length 3: 4 and area 4: 5. The ratio of their resistances is:
   (a) 7: 5 (b) 7: 8 **(c)** 5: 8 (d) 1: 3
5. A wire of resistance R is elongated n-fold to make a new uniform wire. The resistance of new wire:
   (a) R/n **(b)** n^2R (c) 2nR (d) n^2R
6. The resistance of a 10 m long wire is 10 Ω. Its length is increased by 20% by stretching the wire uniformly. Then the new resistance of the wire will be:
   (a) 14.4 Ω (b) 14.9 Ω (c) 15.8 Q (d) 16.6
7. A block has dimensions 1 cm, 2 cm and 3 cm. Ratio of the maximum resistance to minimum resistance between any pair of opposite faces of this block is:
   (a) 9: 1 (b) 1: 9 (c) 18: 1 (d) 1: 6
8. Two copper wires of lengths Land 2L have radii r and 2r respectively. What is the ratio of their specific resistances?
   (a) 1: 4 (b) 1: 2 **(c)** 1: 1 (d) 4: 1
9. The graph between resistivity and temperature, for a limited range of temperatures, is a straight line for a material like:
   (a) copper **(b)** nichrome (c) silicon (d) mercury
10. The voltage V and current I graphs for a conductor at two different temperatures T_1 and T_2 are shown in the figure. The relation between T_1 and T_2 is:
    (a) $T_1 > T_2$ **(b)** $T_1 < T_2$ (c) $T_1 = T_2$ (d) none of these.



11. Resistance of a wire at 20°C is 20 Ω and at 500°C is 60 Ω. At what temperature its resistance is 25 Ω?
    (a) 160°C (b) 250°C (c) 100°C **(d)** 80°C
12. The colour code for a resistor of resistance 3.5 kΩ with 5% tolerance is:
    (a) orange, green, orange and gold (b) orange, green, orange and silver (c) orange, green, red and silver **(d)** orange, green, red and gold