

Objective Questions

(For Complete Chapter)

Multiple Choice Questions (MCQs)

- Which of the following has negative temperature coefficient of resistivity?
 (a) Metal CBSE 2021 (Term-I)
 (b) Metal and semiconductor
 (c) Semiconductor
 (d) Metal and alloy
- A potential difference of 200 V is maintained across a conductor of resistance 100 Ω . The number of electrons passing through it in 1s is CBSE 2021 (Term-I)
 (a) 1.25×10^{19} (b) 2.5×10^{18}
 (c) 1.25×10^{18} (d) 2.5×10^{16}
- If n , e , τ and m have their usual meanings, then the resistance of a wire of length l and cross-sectional area A is given by CBSE 2021 (Term-I)
 (a) $\frac{ne^2A}{2m\tau l}$ (b) $\frac{ml}{ne^2\tau A}$
 (c) $\frac{m\tau A}{ne^2l}$ (d) $\frac{ne^2\tau A}{2ml}$
- Kirchhoff's first rule, $\Sigma I = 0$ and second rule, $\Sigma IR = \Sigma E$ (where the symbols have their usual meanings) are respectively based on CBSE 2021 (Term-I)

- (a) conservation of momentum and conservation of charge
- (b) conservation of energy and conservation of charge
- (c) conservation of charge and conservation of momentum
- (d) conservation of charge and conservation of energy

5. In a DC circuit the direction of current inside the battery and outside the battery respectively are **CBSE 2021 (Term-I)**

- (a) positive to negative terminal and negative to positive terminal
- (b) positive to negative terminal and positive to negative terminal
- (c) negative to positive terminal and positive to negative terminal
- (d) negative to positive terminal and negative to positive terminal

6. A car battery is charged by a 12 V supply and energy stored in it is $7.20 \times 10^5 \text{ J}$. The charge passed through the battery is

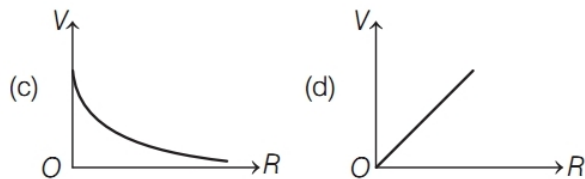
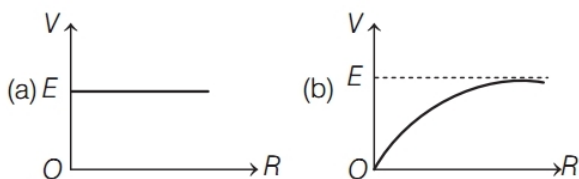
CBSE 2021 (Term-I)

- (a) $6.0 \times 10^4 \text{ C}$
- (b) $5.8 \times 10^3 \text{ J}$
- (c) $8.64 \times 10^6 \text{ J}$
- (d) $1.6 \times 10^5 \text{ C}$

7. Two sources of equal emf are connected in series. This combination is in turn connected to an external resistance R . The internal resistance of two sources are r_1 and r_2 ($r_2 > r_1$). If the potential difference across the source of internal resistance r_1 is zero, then R equals to **CBSE 2021 (Term-I)**

- (a) $\frac{r_1 + r_2}{r_2 - r_1}$
- (b) $r_2 - r_1$
- (c) $\frac{r_1 r_2}{r_2 - r_1}$
- (d) $\frac{r_1 + r_2}{r_1 r_2}$

8. A cell of emf E and internal resistance r is connected across a variable external resistance R . The graph of terminal potential difference V as a function of R is **All India 2020**



9. The electric power consumed by a 220V-100 W bulb, when operated at 110 V is

CBSE 2021 (Term-I)

- (a) 25 W
- (b) 30 W
- (c) 35 W
- (d) 45 W

10. The dimensions of mobility of charge carriers are

- (a) $[M^{-2}T^2A]$
- (b) $[M^{-1}T^2A]$
- (c) $[M^{-2}T^3A]$
- (d) $[M^{-1}T^3A]$
- (e) $[M^{-1}T^3A^{-1}]$

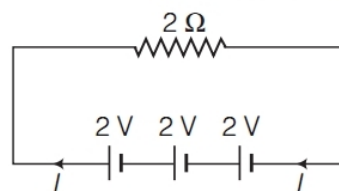
11. The temperature coefficient of resistance of an alloy used for making resistors is

- (a) small and positive
- (b) small and negative
- (c) large and positive
- (d) large and negative
- (e) zero

12. A 220 V main supply is connected to a resistance of $100 \text{ k}\Omega$. The effective current is

- (a) 2.2 mA
- (b) $2.2\sqrt{2} \text{ mA}$
- (c) $\frac{2.2}{\sqrt{2}} \text{ mA}$
- (d) None of these

13. In the electric circuit shown, each cell has an emf of 2 V and internal resistance is 1Ω . The external resistance is 2Ω . The value of the current I is (in ampere)



- (a) 2
- (b) 1.25
- (c) 0.4
- (d) 1.2

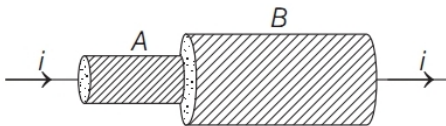
14. Two batteries of emfs 2 V and 1 V of internal resistances 1Ω and 2Ω respectively are connected in parallel. The effective emf of the combination is

- (a) $\frac{3}{2} \text{ V}$
- (b) $\frac{5}{3} \text{ V}$
- (c) $\frac{3}{5} \text{ V}$
- (d) 2 V
- (e) 5 V

Assertion-Reason Questions

Directions (Q. Nos. 15-19) In the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

- (a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
- (b) If both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
- (c) If Assertion is correct but Reason is incorrect.
- (d) If both Assertion and Reason are incorrect.
- 15. Assertion** The average time of collisions τ decreases with increasing temperature.
Reason At increased temperature, average speed of the electrons, which act as the carriers of current increases, resulting in more frequent collisions.
- 16. Assertion** Charge carriers do not move with acceleration but with a steady drift velocity.
Reason Charge carriers undergo collisions with ions and atoms during transit.
- 17. Assertion** Potential difference across the terminals of a battery is always less than the emf of the battery.
Reason During charging of a battery, potential difference across terminals of a battery is $V = E - ir$
- 18. Assertion** Current between two points in an electrical circuit always flows from higher potential to lower potential.
Reason During charging of a battery, current inside the battery flows from negative terminal to positive terminal.
- 19. Assertion** Two resistance wires shown in figure are of same material. They have equal length. More heat is generated in wire A.



Reason In series $H \propto R$ and resistance of wire A is more.

Case Based Questions

Directions (Q.No. 20) These questions are case study based questions. Attempt any 4 sub-parts from each question. Each question carries 1 mark.

20. Potential Difference

Two identical cells of emf 1.5 V each joined in parallel provide supply to an external circuit consisting of two resistances of $17\ \Omega$ each joined in parallel. A very high resistance voltmeter reads the terminal voltage of cells to be 1.4 V.

- (i) Total resistance of external circuit is
(a) $17\ \Omega$ (b) $25.5\ \Omega$
(c) $8.5\ \Omega$ (d) $4.25\ \Omega$
- (ii) Total internal resistance of two cells is
(a) $1\ \Omega$ (b) $0.6\ \Omega$
(c) $1.2\ \Omega$ (d) $0.2\ \Omega$
- (iii) Internal resistance of each cell is
(a) $0.6\ \Omega$ (b) $0.3\ \Omega$
(c) $1.2\ \Omega$ (d) $1.5\ \Omega$
- (iv) For what value of internal resistance of each cell, power transferred to the load is maximum?
(a) $17\ \Omega$ (b) $8.5\ \Omega$
(c) $0.6\ \Omega$ (d) $1.2\ \Omega$
- (v) Total resistance of the circuit will be
(a) $8.5\ \Omega$ (b) $34\ \Omega$
(c) $25.5\ \Omega$ (d) $9.1\ \Omega$