CHAPTER 12

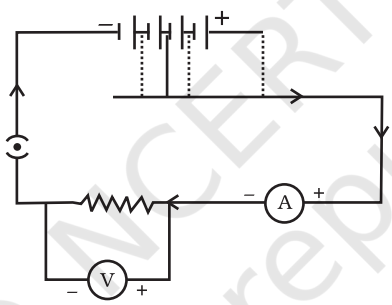
ANSWERS

Multiple Choice Questions

1.	(d)	**2.**	(a)	**3.**	(d)	**4.**	(a)
5.	(b)	**6.**	(d)	**7.**	(b)	**8.**	(a)
9.	(a)	**10.**	(c)	**11.**	(c)	**12.**	(c)
13.	(c)	**14.**	(c)	**15.**	(c)	**16.**	(d)
17.	(b)	**18.**	(a)				

Short Answer Questions

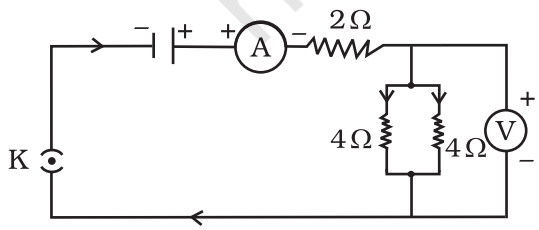
19.



20. Maximum current through resistor A = $\sqrt{\frac{18}{2}}$ A = 3 A.

Thus the maximum current through resistors B and C each $3 \times \frac{1}{2}$ A = 1.5 A.

21. **Hint—** It should be as close to zero as possible. Ideally it should be zero ohm. If it is non-zero and substantial it will affect the true current.



22. **Hint—** Yes. Total resistance of the parallel combination is also 2 ohm (2 Ω).

23. **Hint—** If a current larger than a specified value flows in a circuit, temperature of fuse wire increases to its melting point. The fuse wire melts and the circuit breaks.

24. **Hint—** Use the formula $R = \rho \frac{l}{A}$. Also, $V = RI$. R is doubled while V remains unchanged. Hence current becomes $\frac{I}{2}$.

25. kW h. 1 kW h = 1000 W × 60 × 60s = 3.6×10^6 J

26. (i) 5 Ω (ii) **Hint—** Calculate the total resistance of the circuit. There will be no change in current flowing through 5 Ω conductor. Also there will be no change in potential difference across the lamp either.

27. **Hint—** Provide the same potential difference across each electrical appliance.

28. **Hint—** (i) The glow of the bulbs B_2 and B_3 will remain the same.

(ii) A_1 shows 1 ampere, A_2 shows zero, A_3 shows 1 ampere and A shows 2 ampere

(iii) $P = V \times I = 4.5 \times 3 = 13.5$ W

Long Answer Questions

29. (a) No. The resistance of the bulbs in series will be three times the resistance of single bulb. Therefore, the current in the series combination will be one-third compared to current in each bulb in parallel combination. The parallel combination bulbs will glow more brightly.

(b) The bulbs in series combination will stop glowing as the circuit is broken and current is zero. However the bulbs in parallel combination shall continue to glow with the same brightness.

30. **Hint—** Define Ohm's law. Give details of experiment using a labelled circuit diagram. Support your answer giving relation between V and I and a graph depicting Ohm's law. Ohm's law does not hold under all conditions. Mention the conditions.

31. **Hint—** Resistivity is numerically equal to the resistance of a wire of unit length having an unit area of cross-section. Its unit is ohm metre (Ω m). Mention the dependence of resistance on length and area of cross section of the wire giving details of experiment using a circuit diagram.

32. **Hint—** Describe the experiment using a circuit diagram. Give details showing that same current flows through each component in a series circuit.

33. **Hint—** Describe the experiment using a circuit diagram. Give details showing that same potential difference exists across each resistance in a parallel circuit.

34. **Hint—** Joule's heating effect, $H = I^2Rt$. Describe the experiment using a circuit diagram. Applications: electric heater, geyser, laundry iron, electric oven, bulb, toaster, kettle etc.

35. (a) 4 Ω. **Hint—** $R = R_1 R_2 / (R_1 + R_2) = \left(\frac{8 \times 8}{8 + 8}\right) = 4\ \Omega$

(b) 1 A. **Hint—** $I = V/R = 8/(4) + \left(\frac{8 \times 8}{8 + 8}\right) = 8/8 = 1\text{A}$

(c) 4 V. **Hint—** $V = IR = 1 \times 4 = 4$ V

(d) 4 W. **Hint—** $P = I^2R = 1^2 \times 4 = 4$ W

(e) No difference.

Hint— Same current flows through each element in a series circuit.