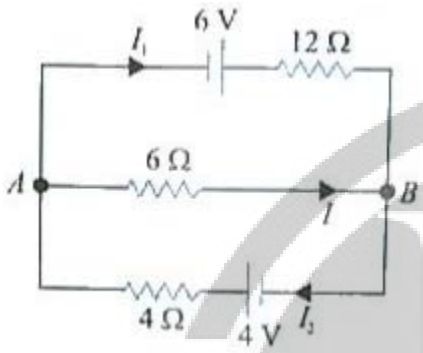
Ch—03 Current Electricity

Daily Practice Problem 08

Q1. In the circuit shown.



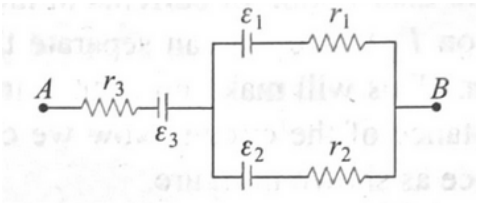
a. $V_A - V_B = \ldots\ldots\ldots$

b. $I_1 = \ldots\ldots\ldots\ldots$

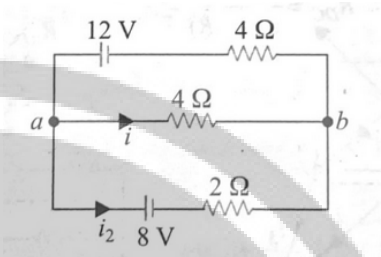
c. $I_2 = \ldots\ldots\ldots\ldots$

d. $I = \ldots\ldots\ldots\ldots$

Q2. Find the emf and internal resistance of the equivalent cell between A and B. Put ϵ_1 = 6 V, r_1 = 2 Ω, ϵ_2= 4 V, r_2 = 2Ω, and ϵ_3 = 3 V, r_3 = 3Ω,



Q3. In the given network, find the:



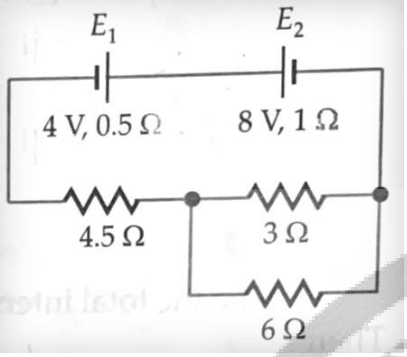
a. potential difference between a and b.

b. currents in each branch.

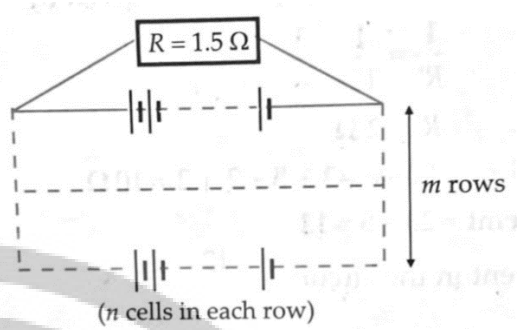
Q4. A cell of emf 1.1 V and internal resistance 0.5 Ω is connected to a wire of resistance 0.5 Ω. Another cell of the same emf is connected in series but the current in the wire remains the same. Find the internal resistance of the second cell.

Q5. Two identical cells of emf 1.5 V each joined in parallel provide supply to an external circuit consisting of two resistances of 17 Ω each joined in parallel. A very high resistance voltmeter reads the terminal voltage of cells to be 1.4 V. Calculate the internal resistance of each cell.

Q6. In the circuit diagram given in Fig., the cells E_1 and E_2 have emfs 4 V and 8 V and internal resistances 0.5 Ω and 1.0 Ω respectively. Calculate the current in each resistance.



Q7. 12 cells, each of emf 1.5 V and internal resistance of 0.5 Ω, are arranged in m rows each containing n cells connected in series, as shown. Calculate the values of n and m for which this combination would send maximum current through an external resistance of 1.5 Ω



Q8. Two identical cells, whether joined together in series or in parallel give the same current, when connected to an external resistance of 1 Ω. Find the internal resistance of each cell.

ANSWERS

1. a. V_A-V_B = 1 V

b. $I_1 = \frac{7}{12}A$

c. $I_2 = \frac{3}{4}A$

d. $I = \frac{1}{6}A$

2. 2V, 4Ω

3. a. $\frac{4}{3}V$, $i_1 = \frac{11}{4}A$,

$i_2 = 2.5\ A$

b. $\frac{11}{4}A$, $\frac{1}{4}A$ *and* $2.5\ A$

4. 1 Ω

5. 1.2 Ω

6. $i_{3\Omega} = \frac{1}{3}A$, $i_{6\Omega} = \frac{1}{6}A$

7. n = 6, m = 2

8. 1Ω