

Electrical Power Engineering Fundamentals

Departamento de Ingeniería Eléctrica. Universidad Carlos III de Madrid

Module 1. Basic Concepts. Week 1

Exercise 1. In the following circuit:

- Find U_{AB} and U_R when $I_g = 2 \text{ A}$ and $U_g = -5 \text{ V}$
- Find U_{AB} and U_R when $I_g = -1 \text{ A}$ and $U_g = -2 \text{ V}$

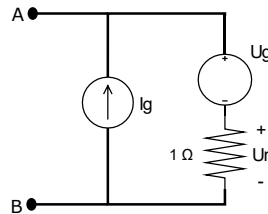


Figure 1 DC circuit 1

Solution: a) $U_{AB} = -3 \text{ V}$; $U_r = 2 \text{ V}$ b) $U_{AB} = -3 \text{ V}$; $U_r = -1 \text{ V}$

Exercise 2. In the following circuit:

- Find U_{BA} and U_R when $I_g = 2 \text{ A}$ and $U_g = 2 \text{ V}$
- Find U_X and U_R when $I_g = -2 \text{ A}$ and $U_g = 2 \text{ V}$

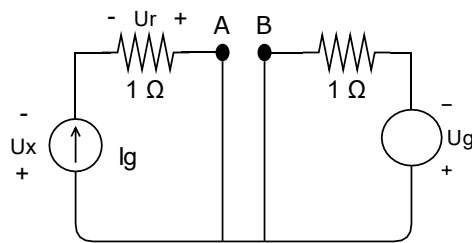


Figure 2 DC circuit 2

Solution: a) $U_{BA} = 0 \text{ V}$; $U_r = -2 \text{ V}$ b) $U_X = 2 \text{ V}$; $U_r = 2 \text{ V}$

Exercise 3. In the circuit below:

- Find U_X and U_{AB} when $I_g = 2 \text{ A}$ and $U_g = 5 \text{ V}$
- Find U_X and U_{BA} when $I_g = -2 \text{ A}$ and $U_g = -5 \text{ V}$

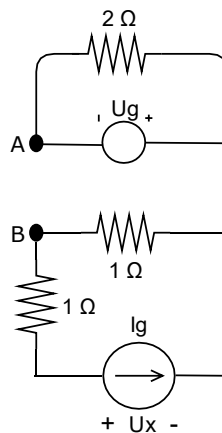


Figure 3. DC circuit 3

Solution: a) $U_X = -4 \text{ V}$; $U_{AB} = -3 \text{ V}$ b) $U_X = 4 \text{ V}$; $U_{BA} = -3 \text{ V}$

Exercise 4. In the circuit below:

- a) Find U_X and U_{AB} when $I_g = 2 \text{ A}$ and $U_g = 2 \text{ V}$
- b) Find U_X and U_{BA} when $I_g = -1 \text{ A}$ and $U_g = 0 \text{ V}$

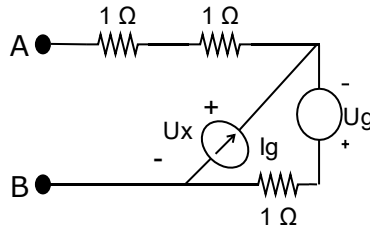


Figure 4. DC circuit 4

Solution: a) $U_X = 0\text{V}; U_{AB} = 0\text{V}$ b) $U_X = -1\text{V}; U_{BA} = 1\text{V}$

Exercise 5. In the circuit below:

- a) Find I_{AB} and U_{AB} when $I_g = 5 \text{ A}$ and $U_g = 2 \text{ V}$
- b) Find I_{AB} and U_{AB} when $I_g = -2 \text{ A}$ and $U_g = -5 \text{ V}$

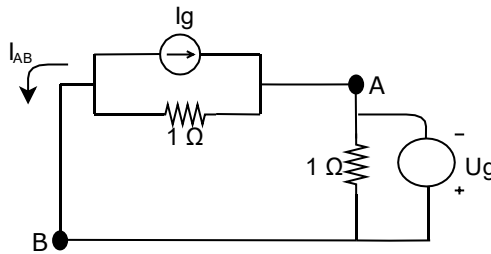


Figure 5. DC circuit 5

Solution: a) $I_{AB} = -7\text{A}; U_{AB} = -2\text{V}$ b) $I_{AB} = 7\text{A}; U_{AB} = 5\text{V}$

Exercise 6. In the circuit below, calculate the currents I_1 and I_2 .

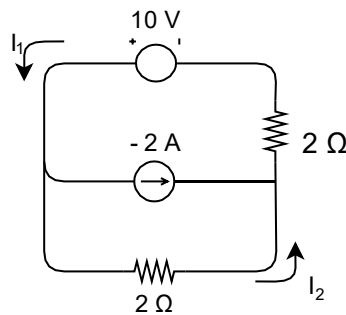


Figure 2. DC circuit 6

Solution: $I_1 = 1.5 \text{ A}; I_2 = 3.5 \text{ A}$