



Exercise 1: (01 point)

- 1- Draw a full-wave bridge rectifier (جسر الديود) and show the current direction (اتجاه التيار) for both half-cycles.

Exercise 2: (02 points)

$r_1 = r_2 = r_3 = r_4 = r_5 = 90 \Omega$, $E = 45 \text{ v}$. **Figure 2**

Using the **Kennelly** transformation, calculate the current flowing through each branch of the circuit (branches after **Kennelly** transformation).

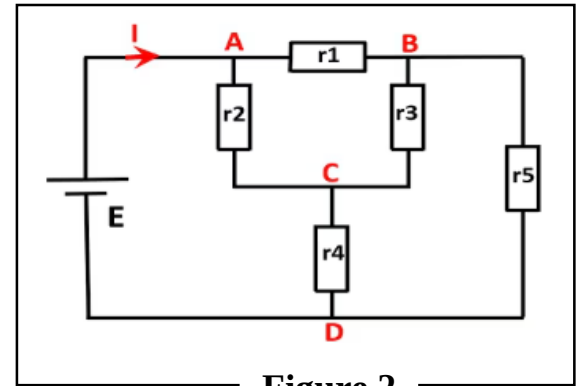


Figure 2

Exercise 3: (03 points)

For the circuit shown in **Figure 3**, use the **superposition theorem** to calculate the voltage V across the 3Ω resistor.

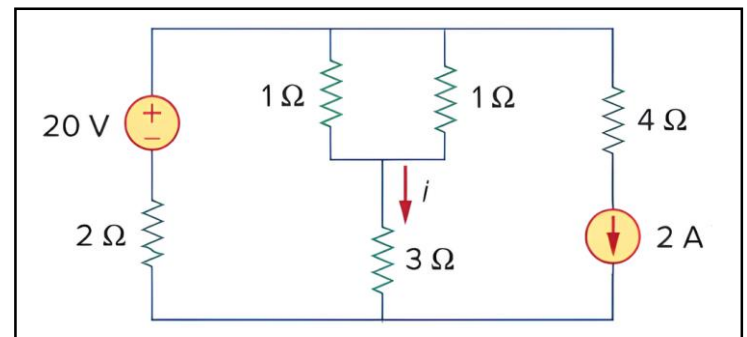


Figure 3

Exercise 4: (04 points)

$E_1 = 100 \text{ v}$, $J = 7 \text{ A}$, $R_a = 5 \Omega$, $R_b = R = 3 \Omega$, $R_L = 6 \Omega$.

Determine the **Norton** equivalent circuits of the circuit shown in **Figure 4** between points **A** and **B**.

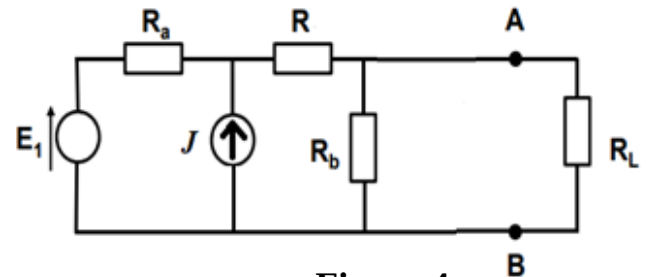


Figure 4

Exercise 5: (03 points)

Consider the following circuit:

1. Replace the circuit seen between **A** and **B** with its equivalent Thévenin generator, and calculate **E_{th}** and **R_{th}**.
2. Using the ideal diode (الديود المثالي) and the perfect diode (الديود الكامل) approximations, calculate in each case the current I delivered by the generator.

$E = 12\text{V}$, $R_1 = 6\text{K}\Omega$, $R_2 = 3\text{K}\Omega$, $R_c = 1\text{K}\Omega$, $V_{th} = 0.6\text{V}$

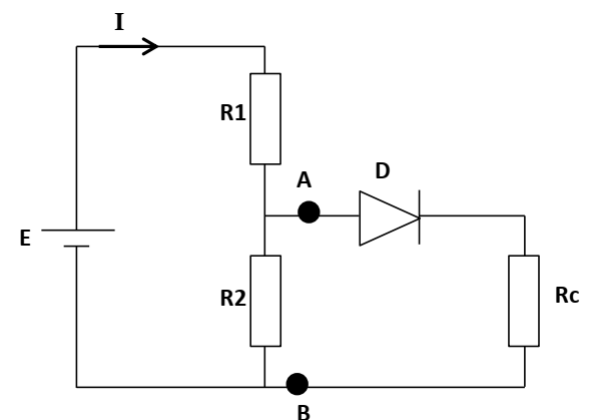


Figure 5

Exercise 6 : (03 point)

A silicon diode operates at temperature $T = 300 \text{ K}$. Its characteristic is described by an exponential current–voltage law. Given:

- $I_s = 2 \times 10^{-9} \text{ A}$
- $K = 1,38 \times 10^{-23} \text{ J/K}$, $e = 1,6 \times 10^{-19} \text{ C}$

1. Determine the voltage V_d required to obtain a current $I = 2 \text{ mA}$.

Exercise 7: (04 points)

Consider the collector-feedback biasing circuit with emitter resistor R_E shown in the **Figure 7**.

1. Determine the collector current I_C of the transistor
2. Discuss the stability of the circuit. هل الدارة مستقرة ولماذا

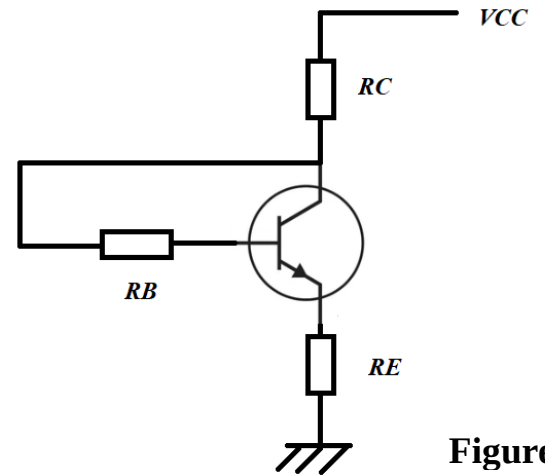


Figure 7

GOOD LUCK. ELBAHI . Z