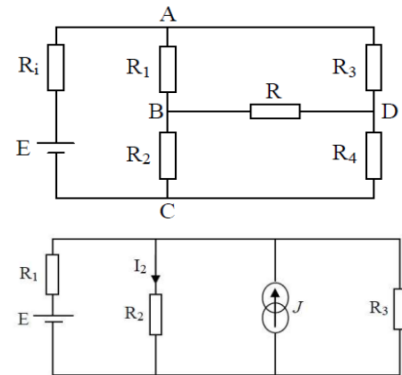




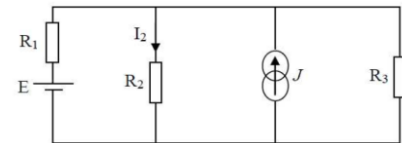
Exercise 1

In the following circuit, indicate the number of nodes, the number of branches, and the number of loops.



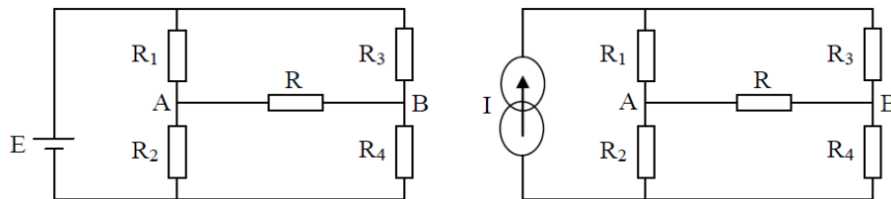
Exercise 2

Using the superposition theorem, determine the expression for the current I_2 .



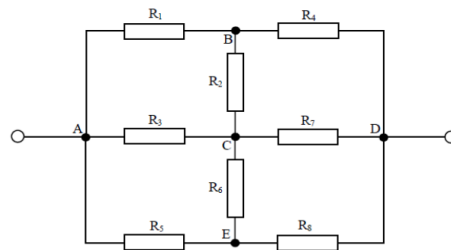
Exercise 3

Determine the Thévenin equivalent circuits of the two circuits shown above between points A and B.



Exercise 4

Determine the resistance of the two-terminal network shown in Figure 1.11 using the Kennelly transformation.



Exercise 5

Carbon, silicon, and germanium have the same crystal structure. The table below shows their atomic number Z and their energy band gap E_g .

Element	Z	E_g (eV)
C	6	7.0
Si	14	1.12
Ge	32	0.70

1. What conclusions can be drawn from these data?
2. Using energy band theory, explain the difference between a metal, a semiconductor, and an insulator.