ID:	Name:

Brac University
Semester: Spring 2023
Course Code: CSE250
Circuits And Electronics
Section: 05
Faculty: SHS

Set

A

Assessment: *Quiz 1*
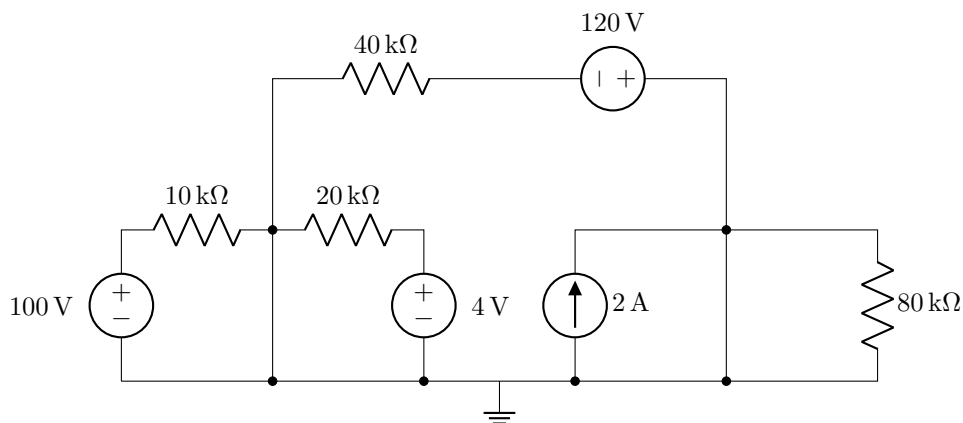Duration: 30 minutes
Date: February 8, 2023
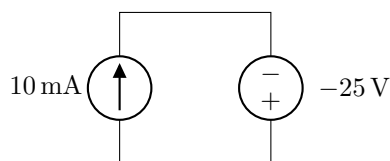Full Marks (incl. bonus 1½): 21

■ Question 1 of 5 *[CO1] [2 marks]*

How many nodes are there in this circuit (including the ground node)?

Solution: 4 nodes

■ Question 2 of 5 *[CO2] [6 marks]*

(a) *[2 marks]* What is the power of the current source (with appropriate $\pm$ sign and unit)?[†]

Solution: -250 mW

(b) *[1 mark]* Based on your answer in (a), is the current source supplying/consuming power?

Solution: Supplying

(c) *[2 marks]* What is the power of the voltage source (with appropriate $\pm$ sign and unit)?[†]

Solution: +250 mW

(d) *[1 mark]* Based on your answer in (c), is the voltage source supplying/consuming power?
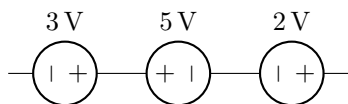
Solution: Consuming

[†]Mark distribution: 1 mark for the sign, 0.5 mark for the value and 0.5 mark for the unit
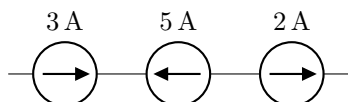
■ Question 3 of 5 *[CO2] [2 marks]*

Which of the following circuits are illegal connection? For each of the circuits below, put a checkmark (✓) on either "Legal" or "Illegal". Explain why in each case.

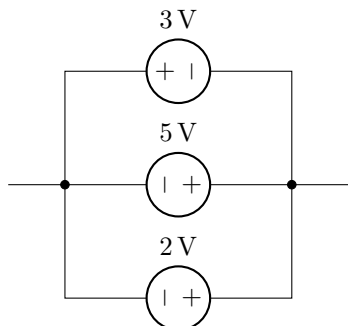(a) *[½ mark]* The following connection is: ✓ **Legal** ○ Illegal

Solution: Because voltage sources can be connected in series.

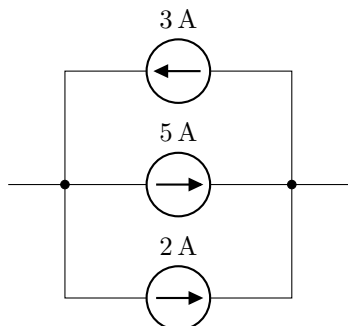(b) *[½ mark]* The following connection is: ○ Legal ✓ **Illegal**

Solution: Because current sources can **not** be connected in series.

(c) *[½ mark]* The following connection is: ○ Legal ✓ **Illegal**

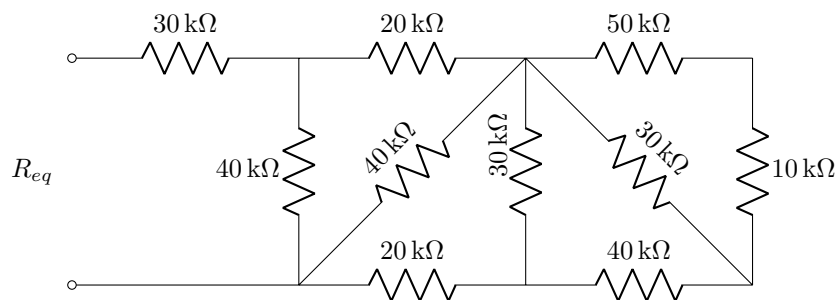**Solution:** Because voltage sources can **not** be connected in parallel.

(d) *[½ mark]* The following connection is: ✓ **Legal** ○ Illegal

Solution: Because current sources can be connected in parallel.
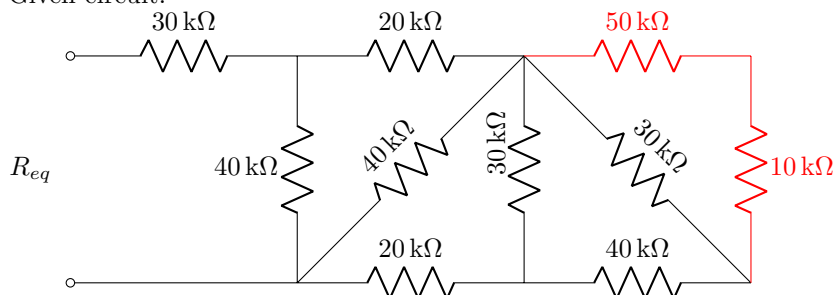
■ Question 4 of 5 *[CO3] [10 marks]*

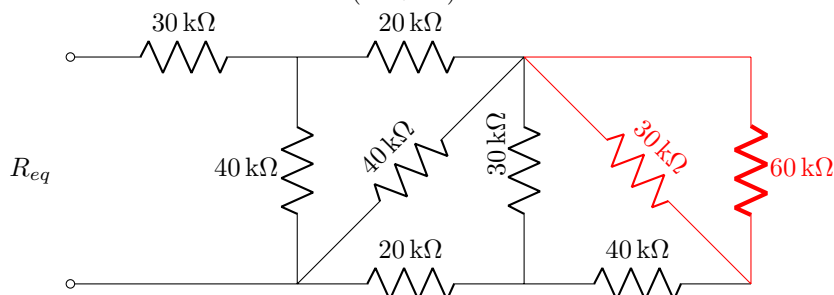What is the value of equivalent resistance R_{eq}? *[Must show step by step procedure of finding R_{eq}]*
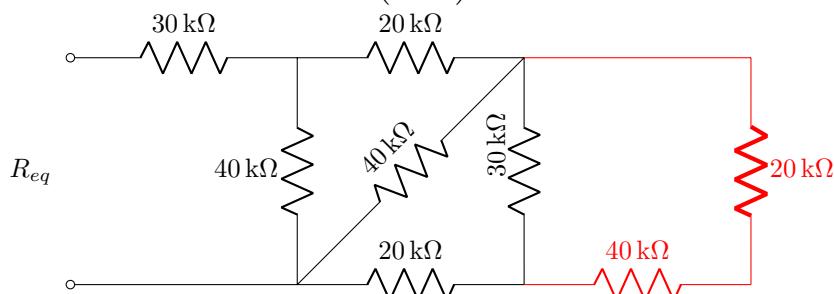

Solution: $50\,\text{k}\Omega$

Solution:

- Given circuit:

- $50\,\text{k}\Omega$ and $10\,\text{k}\Omega$ in series $\Rightarrow (50+10)\,\text{k}\Omega\ = 60\,\text{k}\Omega$:
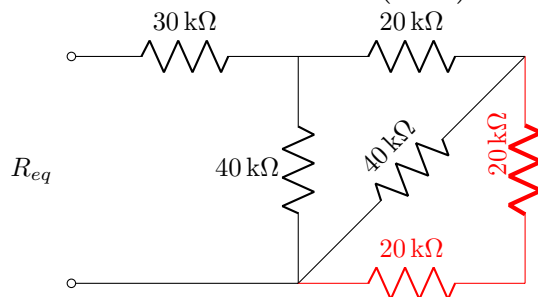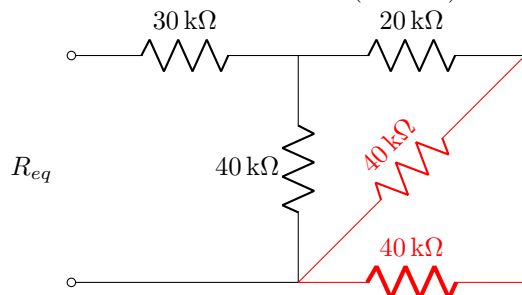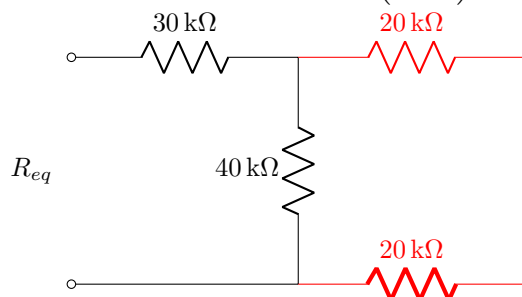

- $60\,\text{k}\Omega$ and $30\,\text{k}\Omega$ in parallel $\Rightarrow \left(\frac{60\times30}{60+30}\right)\,\text{k}\Omega\ = 20\,\text{k}\Omega$:
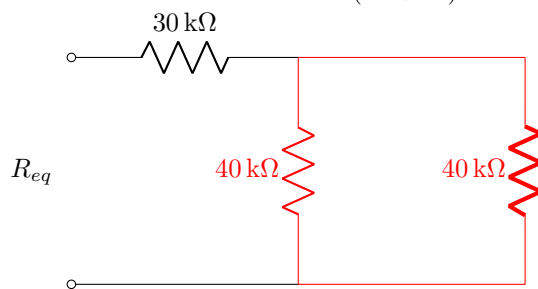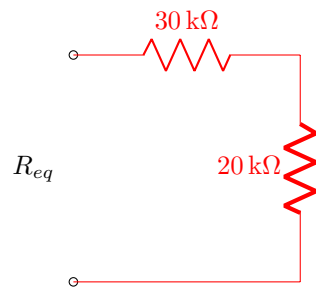
- 40 kΩ and 20 kΩ in series $\Rightarrow$ (40 + 20) kΩ = 60 kΩ :

- 60 kΩ and 30 kΩ in parallel $\Rightarrow \left(\frac{60 \times 30}{60 + 30} \right)$ kΩ = 20 kΩ :

- 20 kΩ and 20 kΩ in series $\Rightarrow$ (20 + 20) kΩ = 40 kΩ :

- 40 kΩ and 40 kΩ in parallel $\Rightarrow \left(\frac{40 \times 40}{40 + 40} \right)$ kΩ = 20 kΩ :
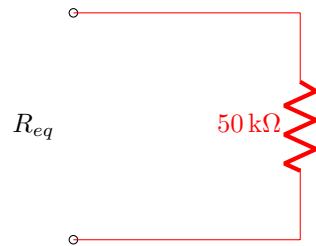

- 20 kΩ and 20 kΩ in series $\Rightarrow$ (20 + 20) kΩ = 40 kΩ :

- 40 kΩ and 40 kΩ in parallel $\Rightarrow \left(\frac{40 \times 40}{40 + 40} \right)$ kΩ $= 20$ kΩ :

30 kΩ

R_{eq} 20 kΩ

- 20 kΩ and 30 kΩ in series $\Rightarrow (20 + 30)$ kΩ $= 50$ kΩ :

R_{eq} 50 kΩ

■ Question 5 of 5 *[1 marks+ 1½ marks (bonus)]*

My name is Shawon

(a) *[1 mark]* Why?

(b) *[1½ marks (bonus)]* Why not?