Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2022/2023

COURSE NAME	:	ELECTRIC CIRCUIT 1
COURSE CODE	:	BEV10303
PROGRAMME CODE	:	BEV
EXAMINATION DATE	:	FEBRUARY 2023
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS
		2.THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSE BOOK**
		3.STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) Consider the charge, $q(t)$ entering a certain electric element given in **Figure Q1(a)**.

(i) Find the current values at $t = 1$ ms, $t = 6$ ms and $t = 10$ ms.

(6 marks)

(ii) Sketch the corresponding current for $t = 0$ ms until $t = 12$ ms.

(2 marks)

(b) (i) Explain the concept of power absorbed and power delivered by circuit elements with consideration of the passive sign convention using an appropriate diagram and equation.

(4 marks)

(ii) Find V_o and the power absorbed by each element in the circuit of **Figure Q1(b)**.

(13 marks)

Q2 (a) Discuss relationship between an electric potential and power.

(5 marks)

(b) The circuit shown in **Figure Q2(b)** is operated using two voltage supplies. For this circuit;

(i) Determine the node voltages, V_A and V_B.

(12 marks)

(ii) Calculate the power dissipated in each resistor.

(8 marks)

Q3 (a) For the circuit shown in **Figure Q3(a)**,

(i) Find the Thevenin equivalent circuit between terminals A and B.

(17 marks)

(ii) Determine the maximum power that can be delivered to R.

(2 marks)

(b) In an electrical circuit, there is a relationship between the maximum power transfer theorem and its efficiency. Predict the efficiency of a circuit if:

(i) $R_{load} = R_{source}$

(2 marks)

(ii) $R_{load} = \infty\ \Omega$. or $R_{source} = 0\ \Omega$

(2 marks)

(iii) $R_{load} = 0\ \Omega$

(2 marks)

Q4 (a) For the circuit shown in **Figure Q4(a),** determine the node voltages V_a, V_b, V_c, V_d using the voltage divider rule and find the current i_1.

(16 marks)

(b) For the circuit shown in **Figure Q4(b),** produce its equivalent Norton equivalent circuit between terminal a and b by obtaining the Norton resistance (R_N) and Norton current (I_N).

(9 marks)

- END OF QUESTIONS -

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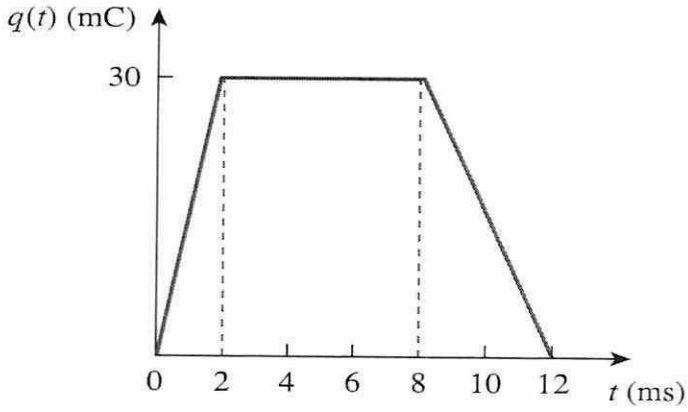

Figure Q1(a)

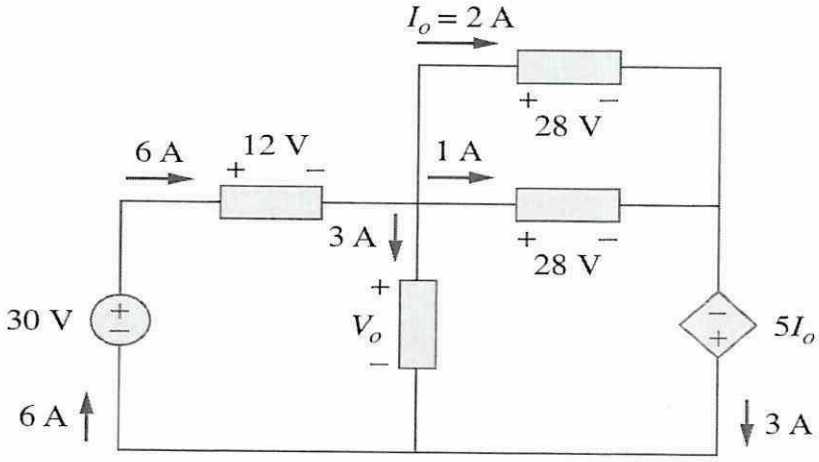

Figure Q1(b)

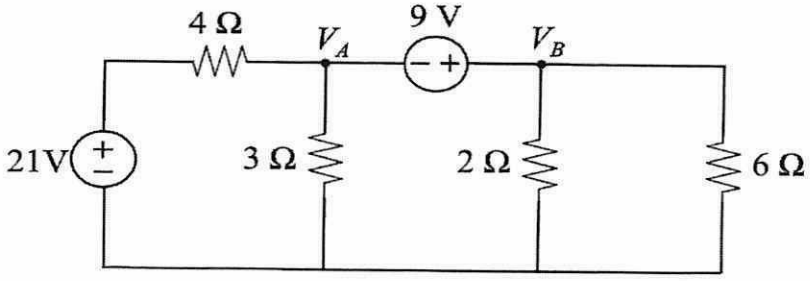

Figure Q2(b)

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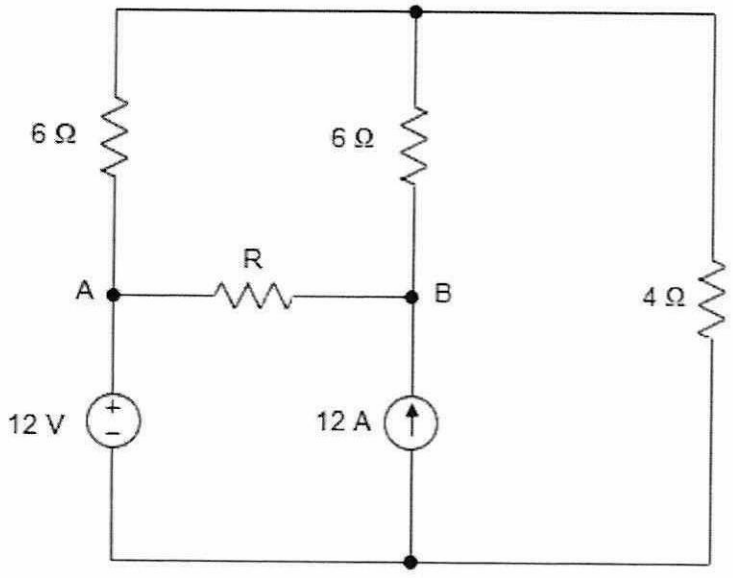

Figure Q3(a)

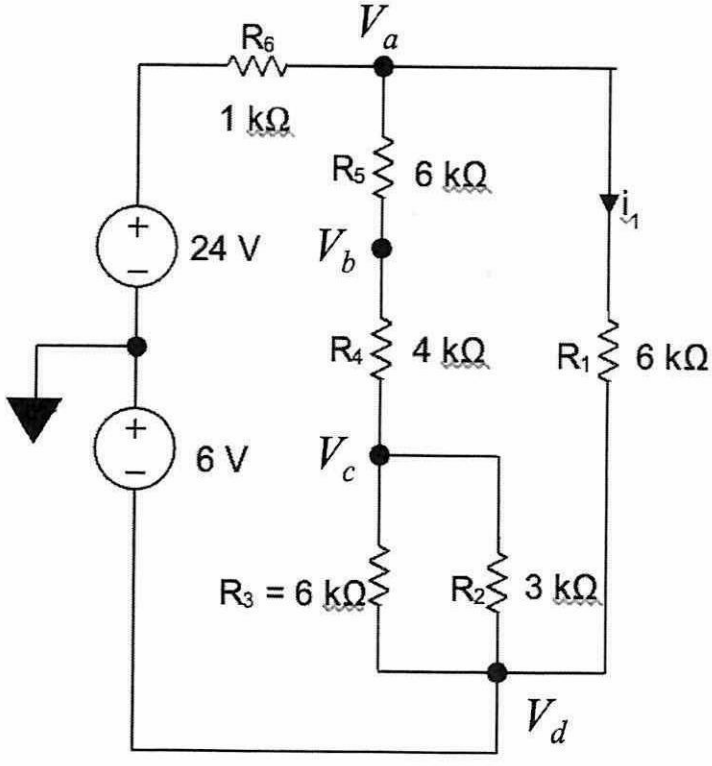

Figure Q4(a)

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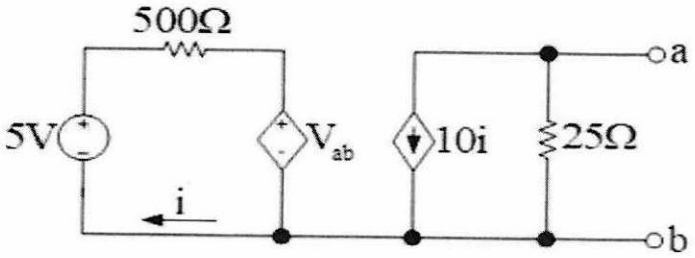

Figure Q4(b)