Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015

COURSE NAME	:	ELECTRIC CIRCUIT ANALYSIS I
COURSE CODE	:	BEF 12403
PROGRAMME	:	BACHELOR OF ELECTRICAL ENGINEERING WITH HONOURS
EXAMINATION DATE	:	JUNE 2015 / JULY 2015
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

Q1 (a) With the aid of appropriate mathematical expression, describe electric current, electric potential different and energy for an element in a circuit.

(6 marks)

(b) A charge flowing in a wire is plotted in **Figure Q1(b).** Sketch the corresponding current in the wire.

(6 marks)

(c) Calculate the power supplied or power absorbed by each element in **Figure Q1(c)**.

(8 marks)

Q2 (a) Determine the equivalent static resistance, R_{eq} and current, I_o for the circuit in **Figure Q2(a).**

(6 marks)

(b) Solve the current flowing through the 8 Ω resistor in **Figure Q2(b).**

(6 marks)

(c) i) State the definition of *supernode* that is used in circuit analysis.

(2 marks)

ii) Calculate V_1 and V_2 in the circuit shown in **Figure Q2(c)** using nodal analysis.

(6 marks)

Q3 (a) In mesh analysis, explain the decision of using mesh currents instead of element currents as the circuit variables.

(2 marks)

(b) Evaluate currents I_1, I_2, and I_3 using mesh analysis for the circuit in **Figure Q3(b)**.

(8 marks)

(c) Establish the mesh-current equations by inspection for the circuit in by **Figure Q3(c).**

(10 marks)

Q4 (a) By using superposition method, determine i_o for the circuit in **Figure Q4(a)**.
(13 marks)

(b) Establish the Norton equivalent circuit at terminal *a-b* for circuit in **Figure Q4(b)**.
(7 marks)

Q5 (a) Define the meaning of '*maximum power transfer*'
(2 marks)

(b) Find the Thevenin equivalent circuit of the circuit in **Figure Q5(b)** to the left of terminal *a-b*. Hence, evaluate the current through the $R_L = 6\ \Omega$ and $R_L = 36\ \Omega$
(11 marks)

(c) Determine the value R_L that will draw the maximum power for the circuit in **Figure Q5(c).** Hence, calculate the maximum power.
(7 marks)

– END OF QUESTIONS –

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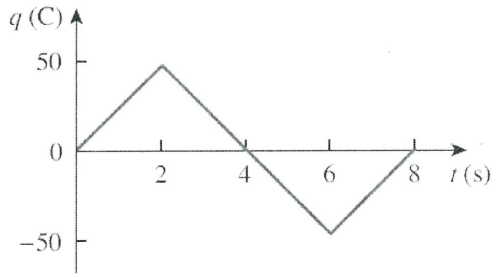

FIGURE Q1(b)

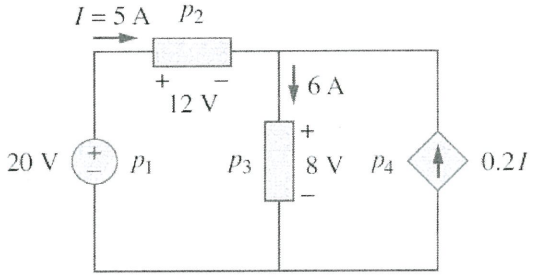

FIGURE Q1(c)

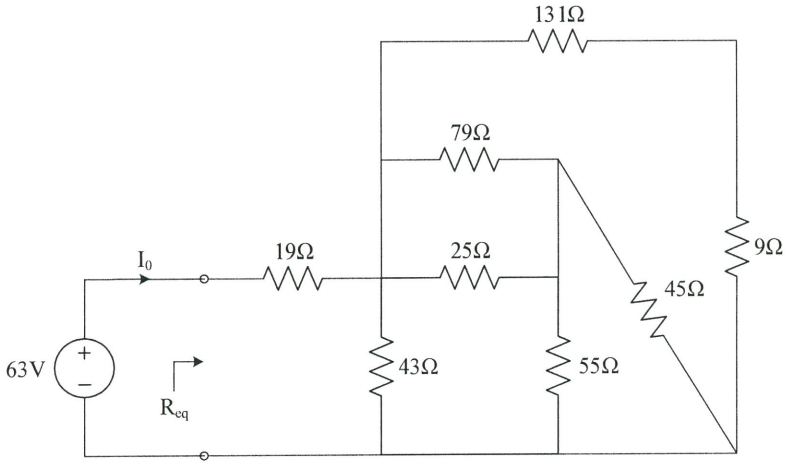

FIGURE Q2(a)

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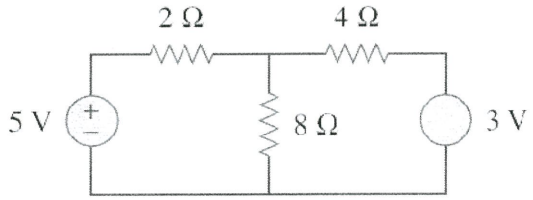

FIGURE Q2(b)

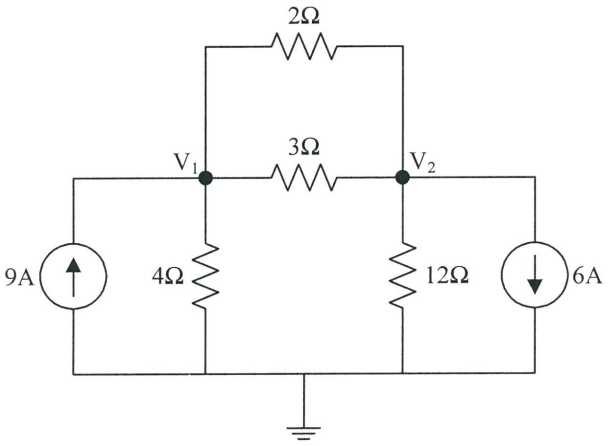

FIGURE Q2(c)

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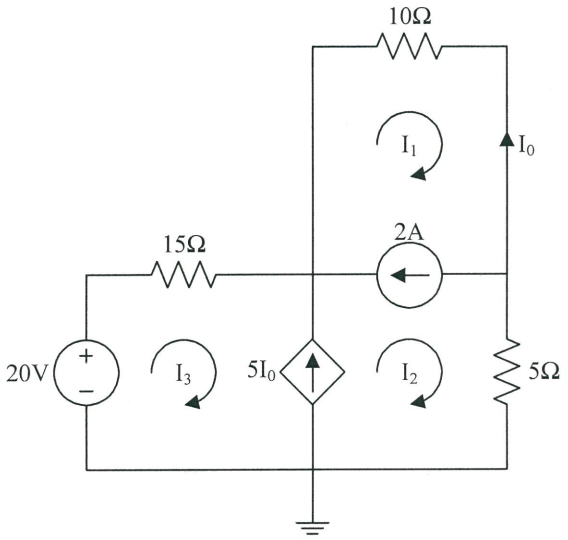

FIGURE Q3(b)

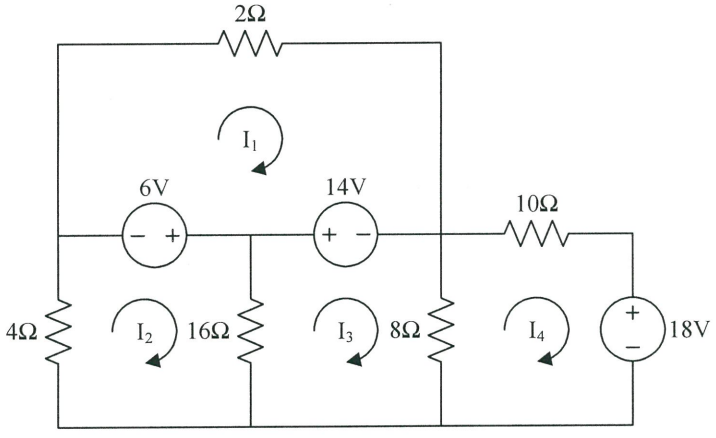

FIGURE Q3(c)

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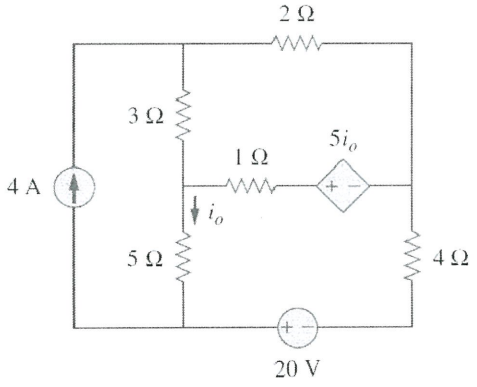

FIGURE Q4(a)

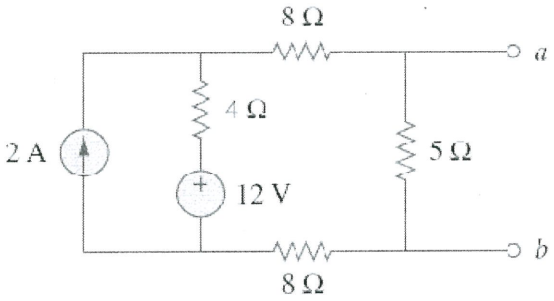

FIGURE Q4(b)

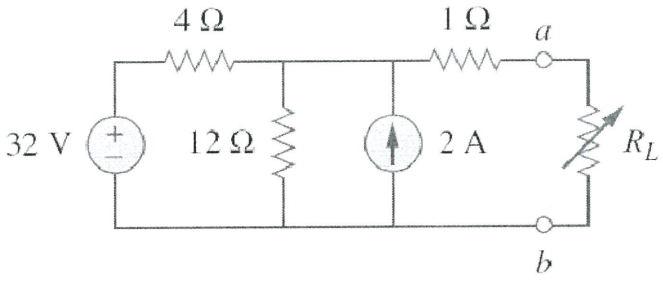

FIGURE Q5(b)

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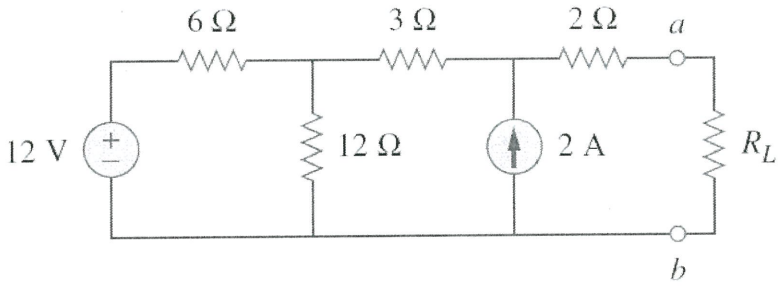

FIGURE Q5(c)