CONFIDENTIAL

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014

COURSE NAME	:	ELECTRIC CIRCUIT ANALYSIS I
COURSE CODE	:	BEF 12403
PROGRAMME	:	BEV
EXAMINATION DATE	:	JUNE 2014
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 (a) Differentiate between supermesh and supernode.

(8 marks)

(b) Figure **Q1(b)(i)** and Figure **Q1(b)(ii)** show I-V characteristics and representation (circuit model) for an ideal dc current source, respectively. Produce I-V characteristics and representation for a practical dc current source.

(8 marks)

(c) Refer to Figure **Q1(c)**, using nodal analysis:
(i) Solve for V_2.

(7 marks)

(ii) Find the power of I_{S1}.

(2 marks)

Q2 (a) Differentiate between power and energy in an electrical circuit.

(4 marks)

(b) Using only a voltmeter and a 1Ω resistor, recommend how current I_O in Figure **Q2(b)** can be read directly with the voltmeter.

(6 marks)

(c) In Figure **Q2(c)**, determine I_x using superposition rule.

(15 marks)

Q3 (a) Relate the maximum power transfer theorem with efficiency in an electrical circuit.

(4 marks)

(b) Predict the efficiency of a system if,
(i) $R_{load} = R_{source}$

(2 marks)

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

(2 marks)

(iii) $R_{load} = 0$

(2 marks)

(c) The circuit shown in Figure **Q3(c)** is a model for a common-emitter bipolar junction transistor amplifier
(i) Determine a load resistance, R_L so that maximum power is transferred to it from the amplifier.

(7 marks)

(ii) Calculate the total power absorbed in part Q3(c)(i).

(8 marks)

Q4 Figure **Q4(a)** shows a resistive circuit whose voltage $v_s(t)$ has waveform as shown in Figure **Q4(b)**.

(a) Produce the time expression for voltage $v_o(t)$.

(14 marks)

(b) Sketch the waveform of $v_o(t)$.

(2 marks)

(c) Solve for the average and effective values of voltage $v_o(t)$.

(7 marks)

(d) Calculate the average power dissipated by the 2 Ω resistor.

(2 marks)

– END OF QUESTION –

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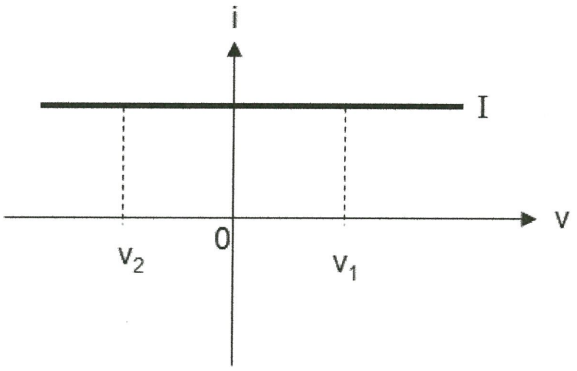

FIGURE Q1(b)(i)

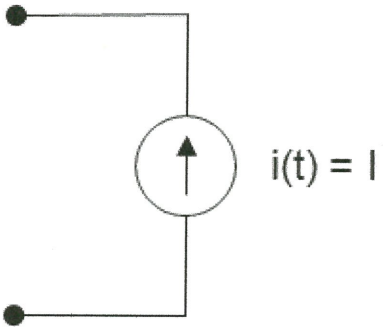

FIGURE Q1(b)(ii)

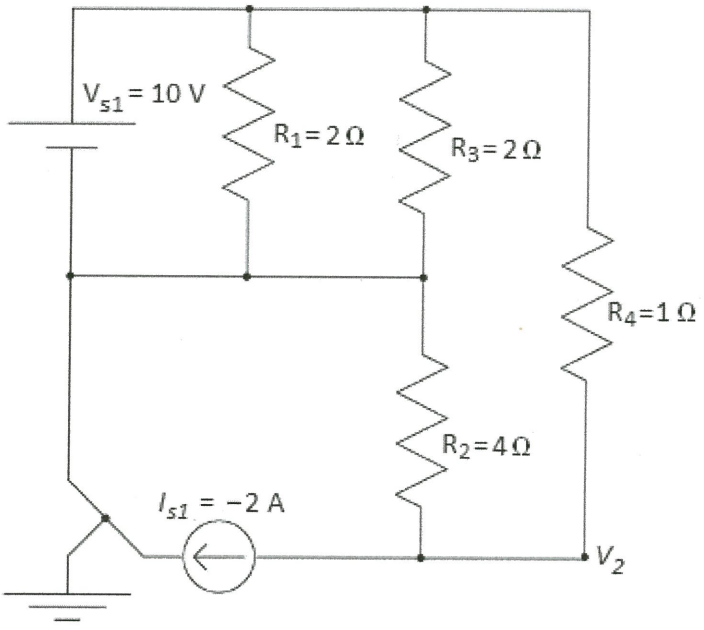

FIGURE Q1(c)

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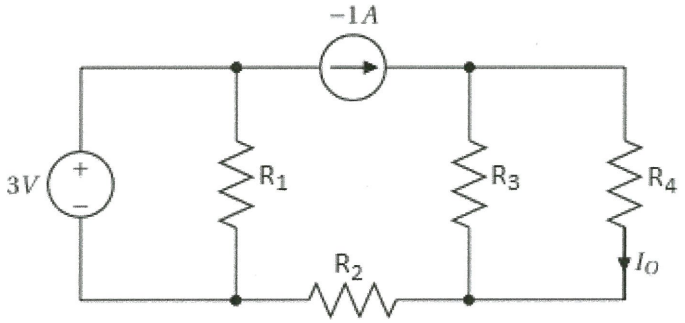

FIGURE Q2(b)

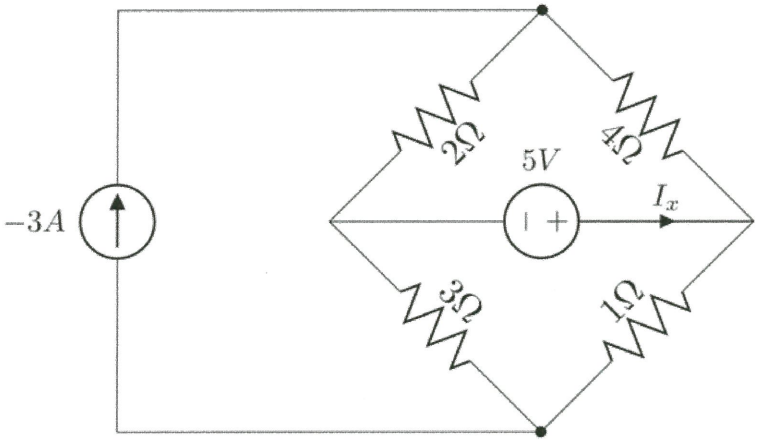

FIGURE Q2(c)

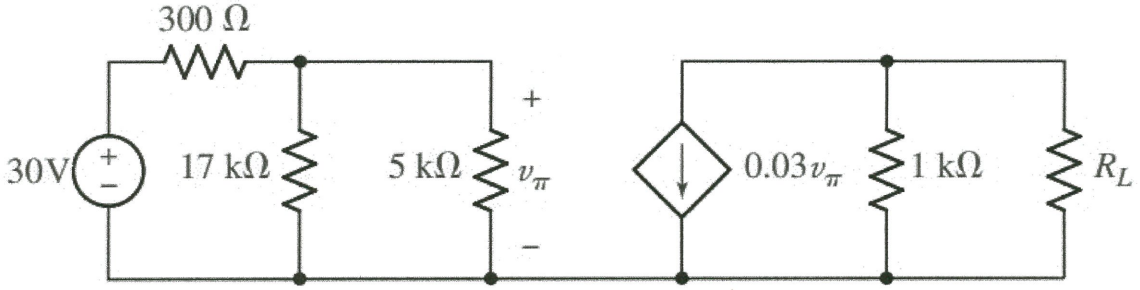

FIGURE Q3(c)

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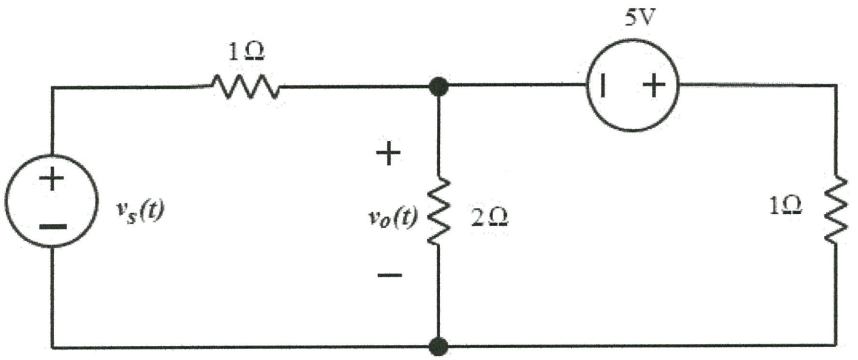

FIGURE Q4(a)

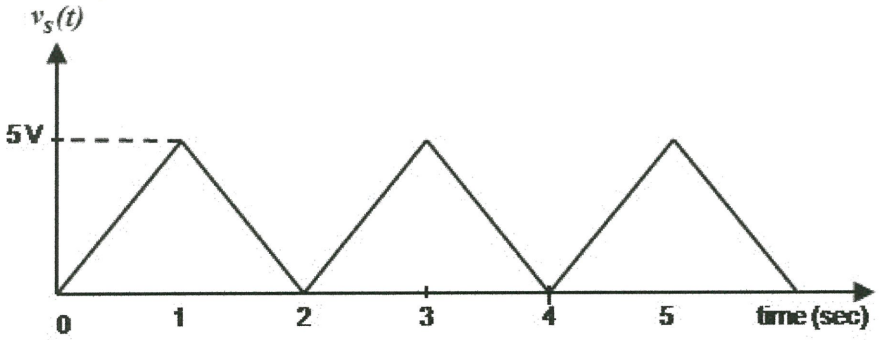

FIGURE Q4(b)