Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2017/2018

COURSE NAME	:	ELECTRIC CIRCUIT ANALYSIS I
COURSE CODE	:	BEF12403
PROGRAMME CODE	:	BEV
EXAMINATION DATE	:	DECEMBER 2017/JANUARY 2018
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 Differentiate the following concepts. Use an appropriate diagram or equation to support your explanation.

(a) Active and passive elements.

(5 marks)

(b) Kirchhoff current and voltage laws.

(5 marks)

Q2 Configuration of a resistance array for a black box is given in **Figure Q2**. Calculate the equivalent resistance between the following terminals.

(a) *A* and *B*.

(4 marks)

(b) *A* and *C*.

(4 marks)

(c) *B* and *D*.

(4 marks)

Q3 Device 1 and 2 are rated as shown in **Figure Q3**. Find the values of R_1 and R_2 to power the devices using a 20 V battery.

(15 marks)

Q4 A typical transistor amplifier is shown in **Figure Q4**. Determine the amplifier gain, which is the ratio of the output voltage, v_o to the input voltage, v_i.

(15 marks)

Q5 With mesh analysis, prove that the value of i = -5.33mA for the circuit in **Figure Q5.**

(10 marks)

Q6 The variable resistor, R_L in the circuit of **Figure Q6** is adjusted to achieve maximum power transfer to R_L.

(a) Calculate the value of R_L.

(19 marks)

(b) Find the maximum power transferred, P_{max} to R_L.

(3 marks)

Q7 Explain the superposition theorem. Justify why superposition principle can be applied to passive direct current (DC) circuits.

(6 marks)

Q8 Three (3) devices and each with *P1*, *P2* and *P3* watts are connected in parallel to a voltage source. Prove that the total power, $PT = P1 + P2 + P3$.

(10 marks)

- END OF QUESTIONS –

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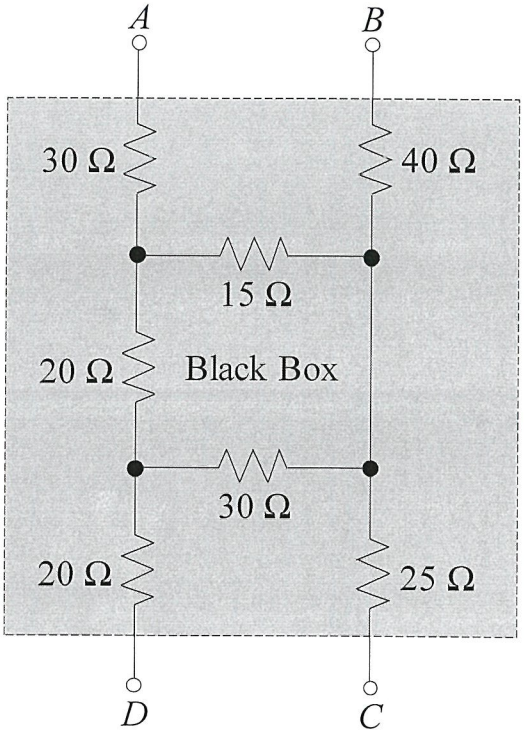

Figure Q2

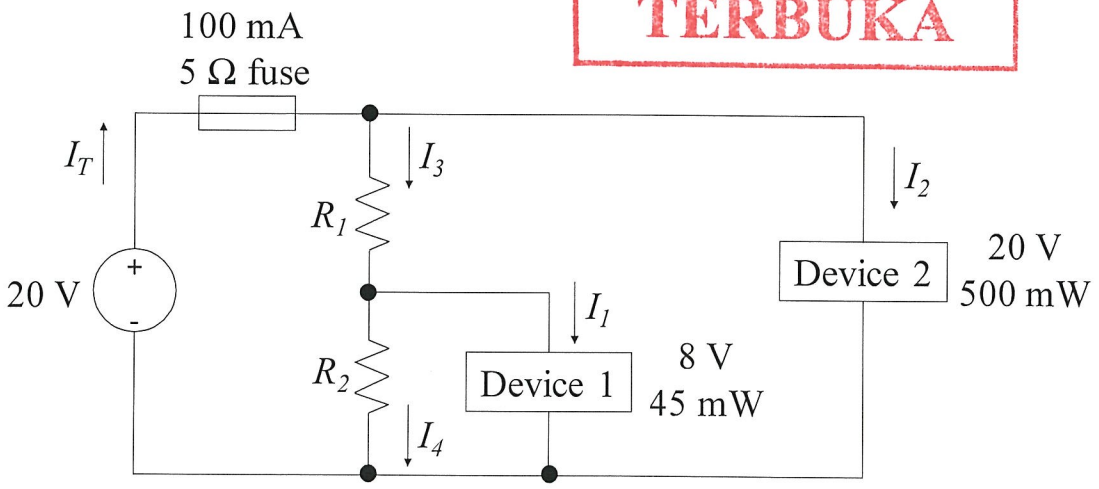

Figure Q3

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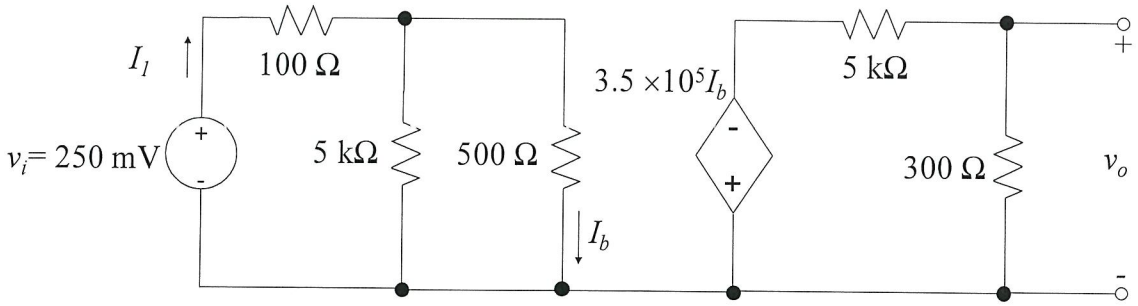

Figure Q4

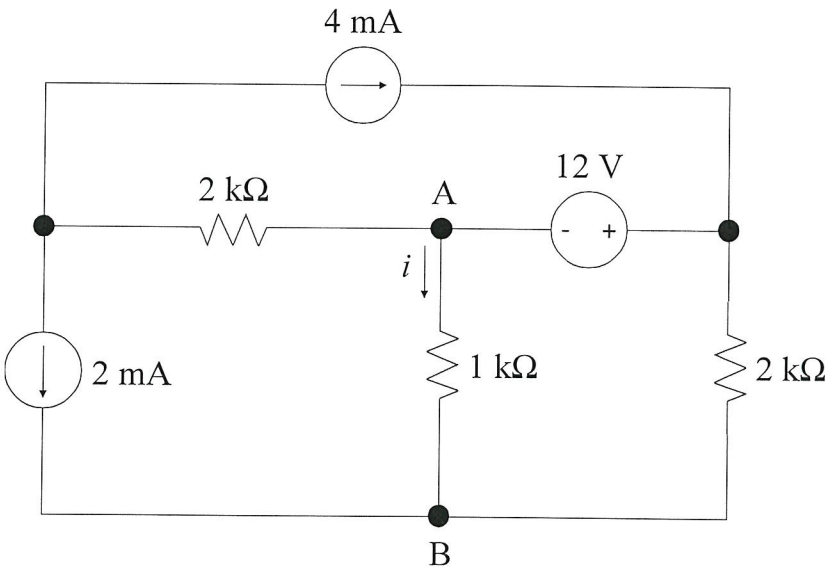

Figure Q5

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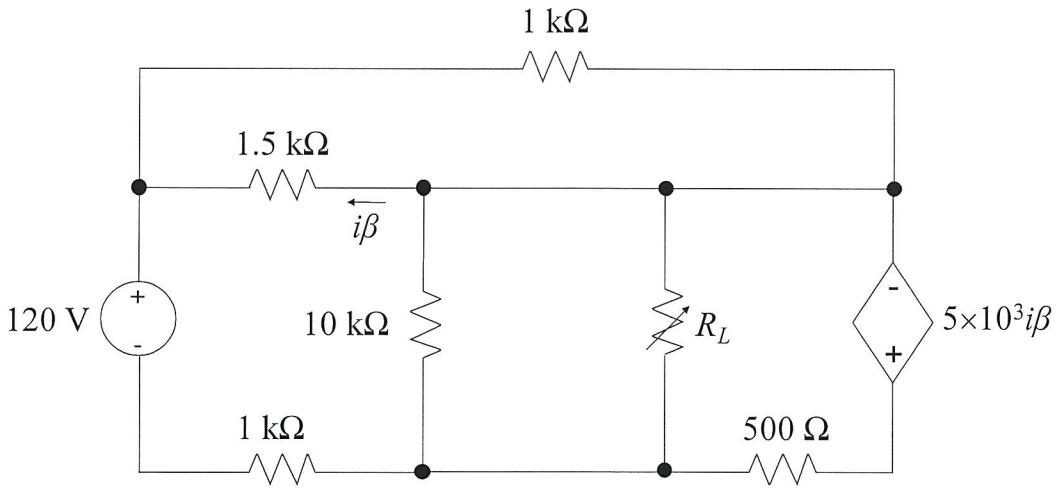

Figure Q6