

CONFIDENTIAL



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017**

TERBUKA

COURSE NAME : ELECTRIC CIRCUITS
COURSE CODE : BEL 10103
PROGRAMME : BEJ
EXAMINATION DATE : JUNE 2017
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

CONFIDENTIAL

Q1 (a) Explain what is **passive sign convention**.

(6 marks)

(b) The numerical values of the voltages and currents in the interconnection seen in **Figure Q1(b)** are given in **Table Q1(b)**. Verify if the interconnection satisfy the power check.

(10 marks)

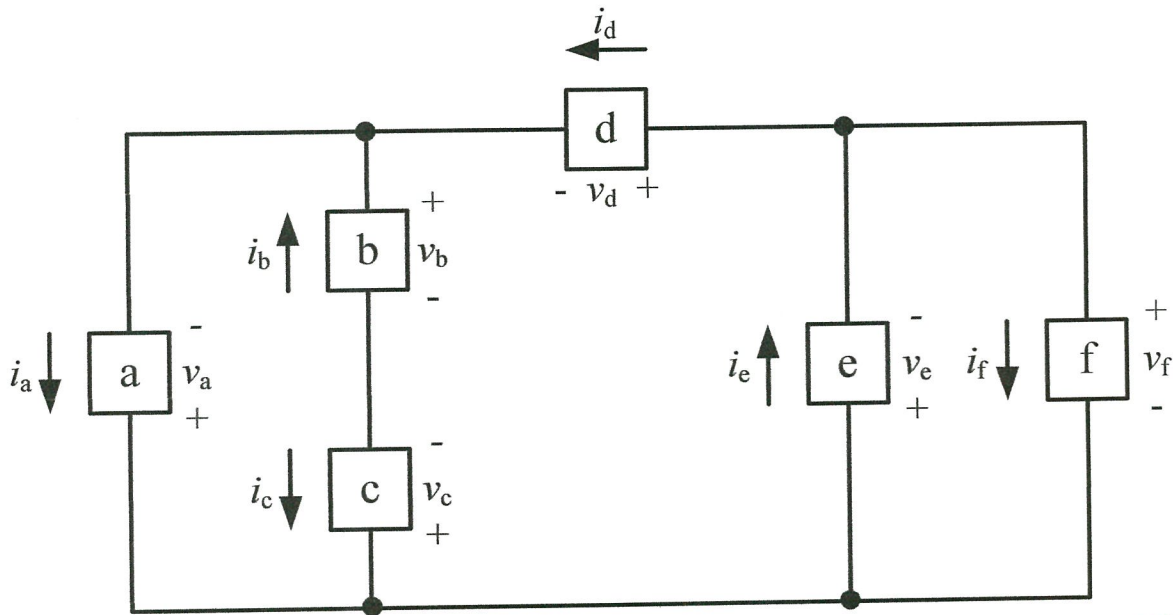


Figure Q1(b)

TERBUKA

Table Q1(b)

Element	Voltage (kV)	Current (μ A)
a	-3	-250
b	4	-400
c	1	400
d	1	150
e	-4	200
f	4	50

(c) An energy source forces a constant current of 1 A for 15 s flow through a light bulb. If 1.5 kJ is given off in the form of light and heat energy, calculate the voltage drop across the bulb.

(4 marks)

Faint blue text at the bottom of the page, possibly a watermark or footer information.

CONFIDENTIAL

BEL10103

Q2 (a) Briefly explain the current divider concept by the aid of diagram. (2 marks)

(b) Find equivalent R_{ab} of the circuit in **Figure Q2(b)**. (6 marks)

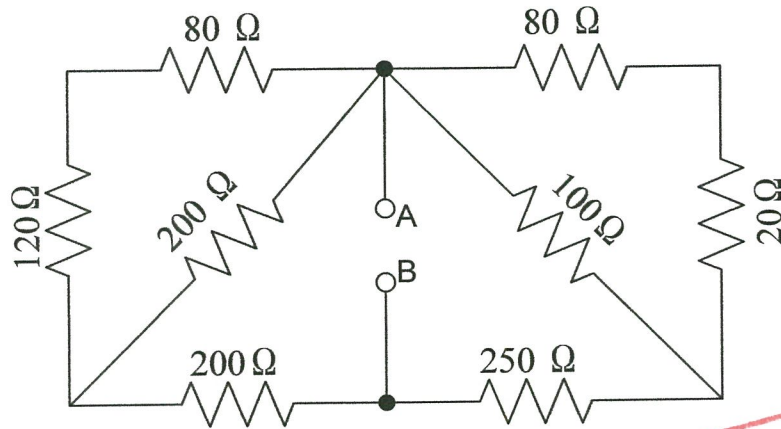


Figure Q2(b)



(c) The current flow through 20 Ω resistor in the circuit as shown in **Figure Q2(c)** is 1A, calculate V_s . (12 marks)

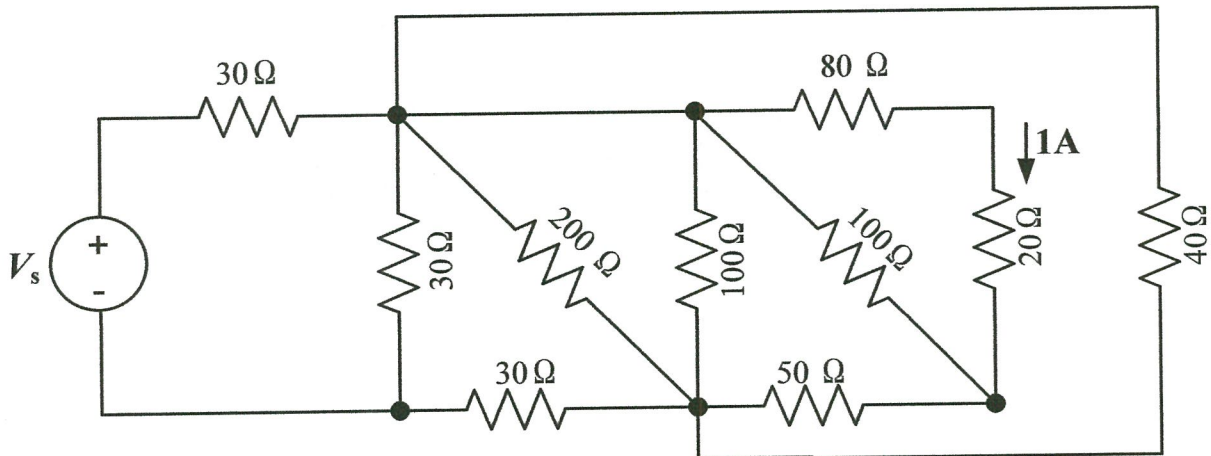


Figure Q2(c)

CONFIDENTIAL

BEL10103

Q3 (a) Explain the concept of **supermesh** in mesh analysis.

(5 marks)

(b) Find the v_o in **Figure Q3(b)**.

(15 marks)

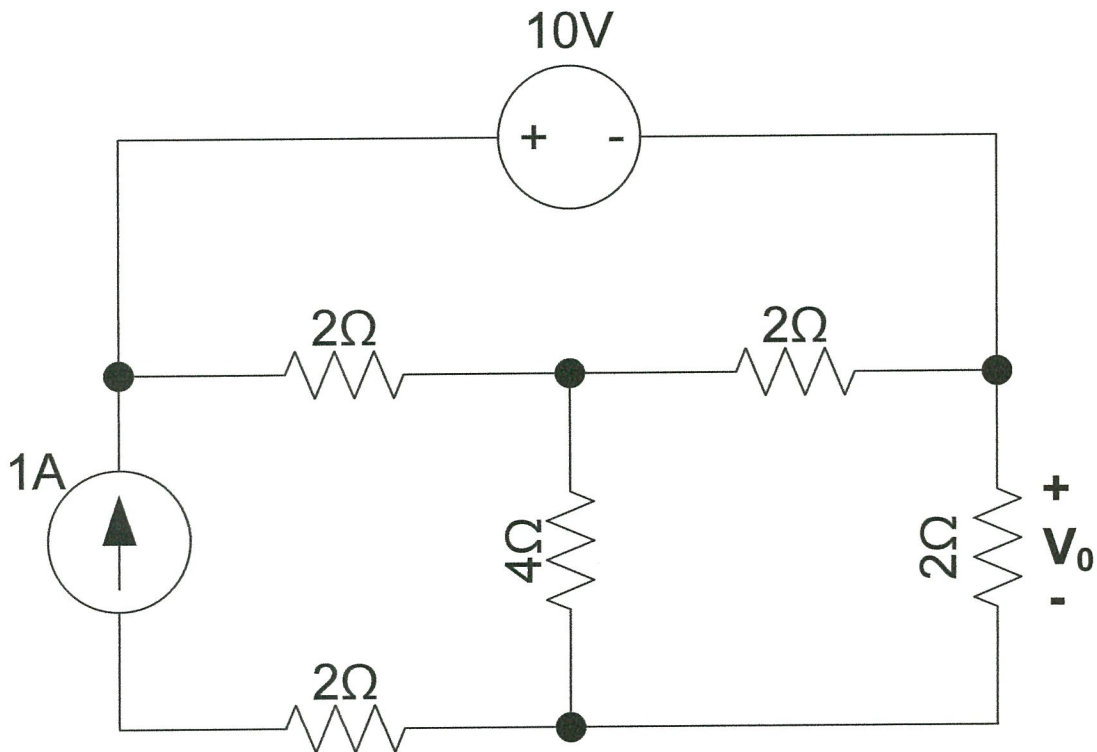


Figure Q3(b)

TERBUKA

CONFIDENTIAL

BEL10103

Q4 (a) List down steps for synthesizing a Thevenin equivalent circuit.

(3 marks)

(b) For the circuit in **Figure Q4(b)**,

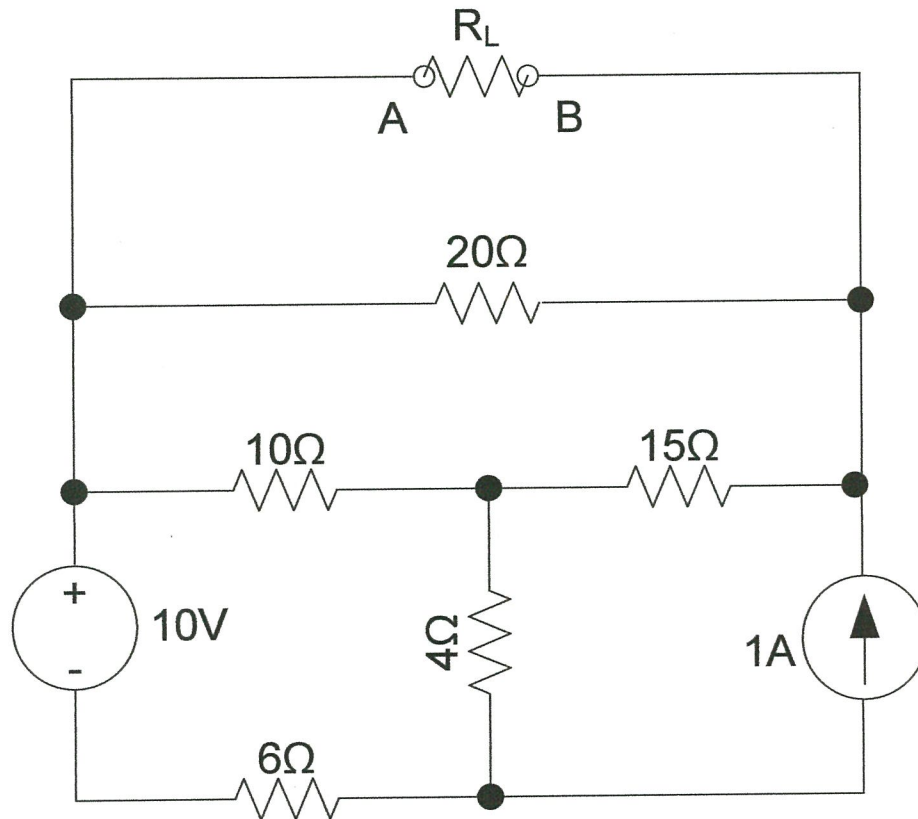


Figure Q4(b)

(i) Obtain the value of R_L for maximum power transfer, P_{max} to occur.

(5 marks)

(ii) Calculate the P_{max} .

(12 marks)

TERBUKA

CONFIDENTIAL

BEL10103

Q5 (a) Consider the circuit shown in **Figure Q5(a)**, determine the equivalent capacitance between terminal A-B

(4 marks)

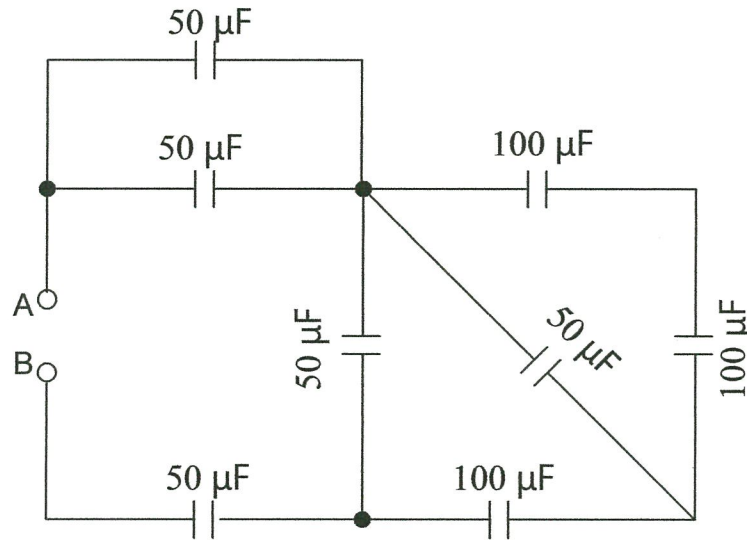
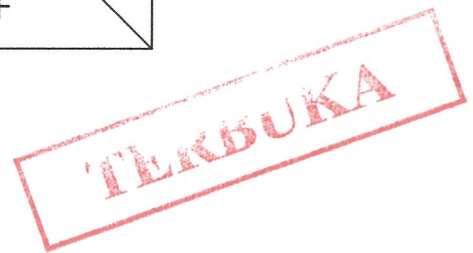


Figure Q5(a)



(b) For the circuit in **Figure Q5(b)**,

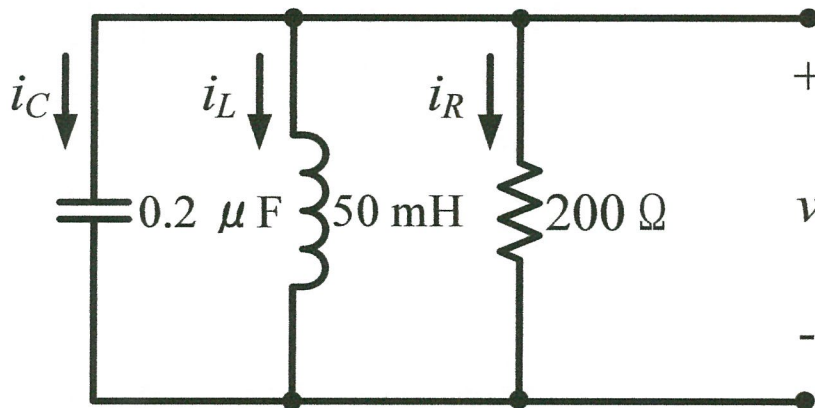


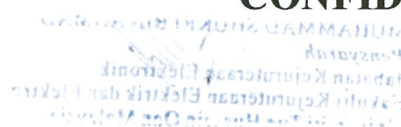
Figure Q5(b)

(i) Obtain the root of the characteristic s_1 and s_2 .

(4 marks)

(ii) State the type of response.

(2 marks)



CONFIDENTIAL

BEL10103

- (c) The switch in the circuit shown in **Figure Q5(c)** has been in position **a** for a long time. At $t = 0$, the switch is moved to position **b**.

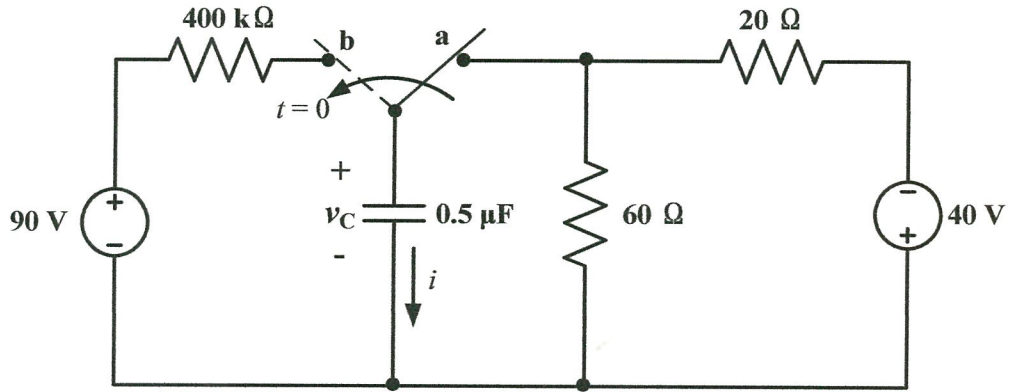


Figure Q5(c)

- (i) Analyse the expression for $v_C(t)$ for $t \geq 0$. (6 marks)
- (ii) Analyse the expression for $i(t)$ for $t \geq 0$. (4 marks)

- END OF QUESTIONS -

TERBUKA