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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : ELECTRIC CIRCUIT I

COURSE CODE : BEV 10303

PROGRAMME CODE : BEV

EXAMINATION DATE : JULY 2022

DURATION : 3 HOURS

INSTRUCTION

1. ANSWER ALL QUESTIONS.
2. THIS FINAL EXAMINATION IS AN **ONLINE ASSESSMENT AND CONDUCTED VIA OPEN BOOK.**

THIS QUESTION PAPER CONSISTS OF **SEVEN (7) PAGES**

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- Q1** (a) The current entering the positive terminal of a device is $i(t) = 10e^{3t}$ mA and the voltage across the device is $v(t) = 10 \, di/dt$ V.
- (i) Determine the charge delivered to the device between $t = 0$ and $t = 2$ s. (4 marks)
 - (ii) Calculate the power absorbed at $t = 2$ s. (4 marks)
 - (iii) Find the energy absorbed in 2 s. (4 marks)
- (b) By using passive sign convention and Kirchhoff's Laws, determine I_s in **Figure Q1(b)**. (4 marks)
- Q2** (a) Find the voltage and the current values across each resistance for the circuit shown in **Figure Q2(a)** if the power dissipated by R_1 is 30 W. (12 marks)
- (b) Referring to **Figure Q2(b)**,
- (i) Find the value of I_a and I_b . (6 marks)
 - (ii) Calculate the power of each resistor in the circuit and classify whether each resistor is absorbing or delivering power. (4 marks)

- Q3** (a) For the circuit shown in **Figure Q3(a)**,
- (i) Determine the total current supplied by the dependent source that exists in the circuit. (3 marks)
 - (ii) Calculate the current flowing through the $20\text{ k}\Omega$ resistor using the current divider rule. (2 marks)
 - (iii) Analyze the power, P , dissipated in the $20\text{ k}\Omega$ resistor. (2 marks)
- (b) Based on the circuit in **Figure Q3(b)**,
- (i) Determine the value of node voltages of V_1 , V_2 and V_3 by using nodal analysis. (13 marks)
 - (ii) Calculate the value of v_o and i_o . (6 marks)
- Q4** (a) Based on the circuit in **Figure Q4(a)**,
- (i) Compute the value of i_B and V_o . (9 marks)
 - (ii) Determine the voltage drop across the $200\ \Omega$ resistor. (5 marks)
 - (iii) Find the power supplied by the 25 V source. (4 marks)

- (b) The full-wave rectified sine wave shown in **Figure Q4(b)** is supplied to a load with a resistance value, $R = 6 \Omega$.
- (i) Determine the Root Mean Square (RMS) value of this waveform. (15 marks)
- (ii) Calculate the average power dissipated in the 6Ω resistor. (3 marks)

- END OF QUESTIONS -

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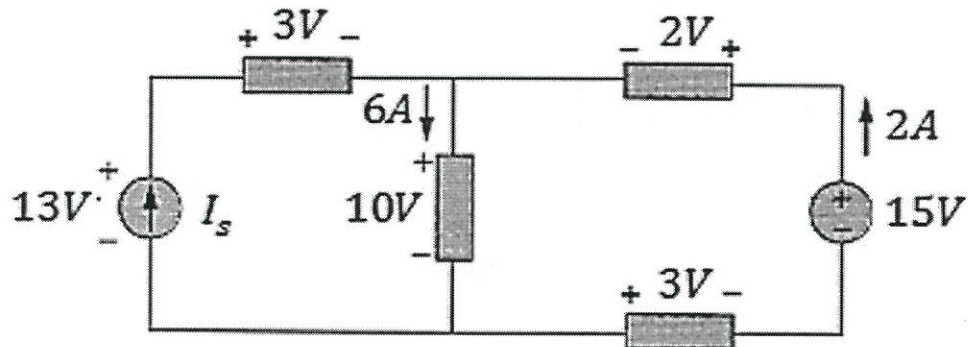


Figure Q1(b)

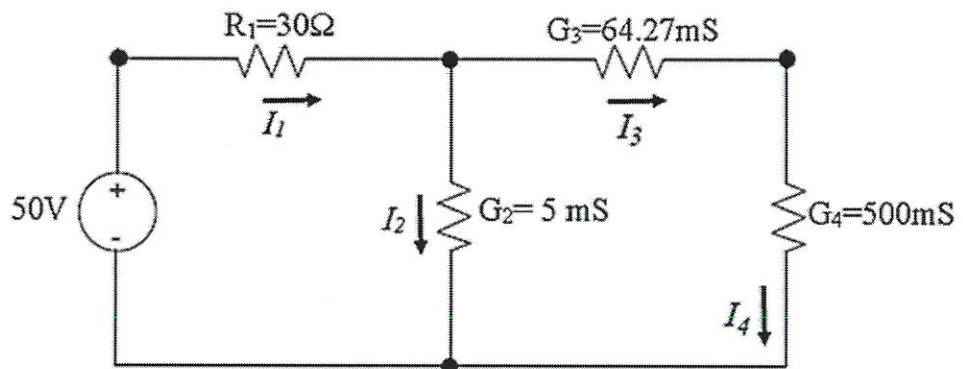


Figure Q2(a)

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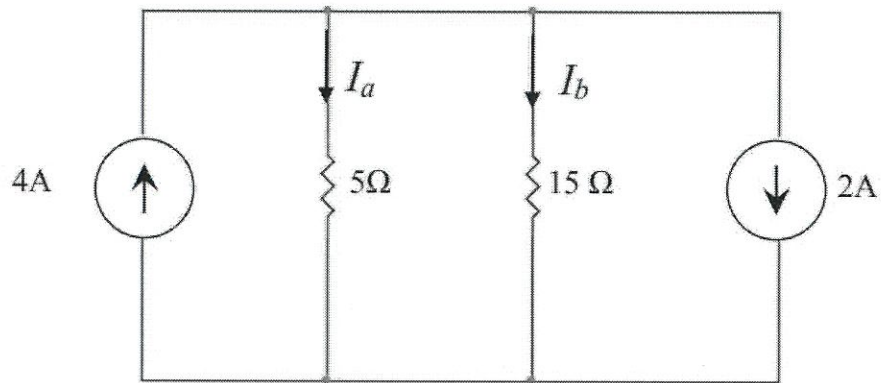


Figure Q2(b)

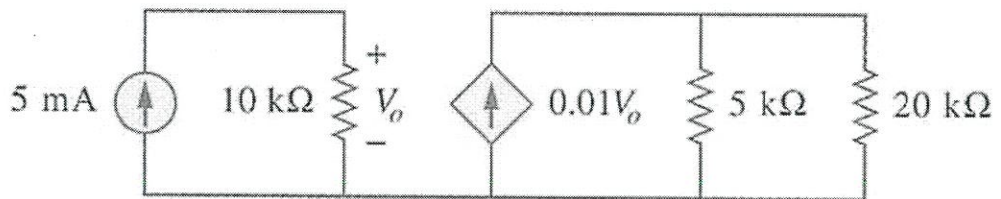


Figure Q3(a)

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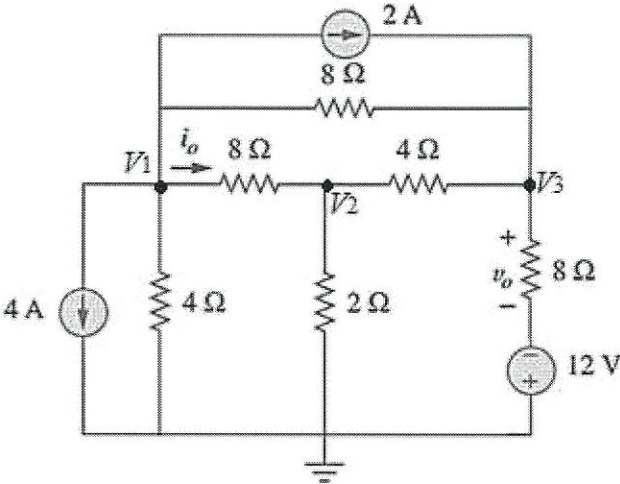


Figure Q3(b)

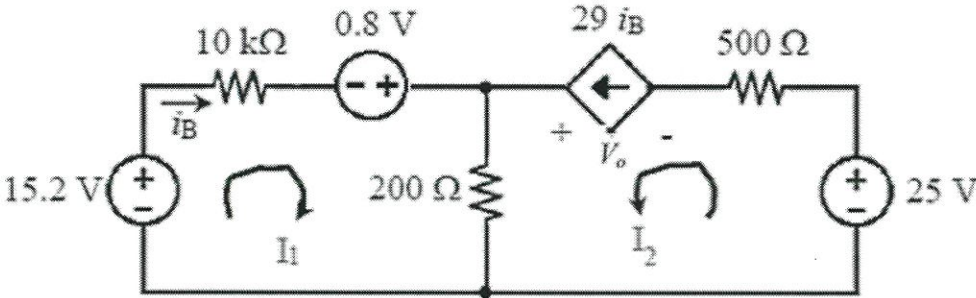


Figure Q4(a)

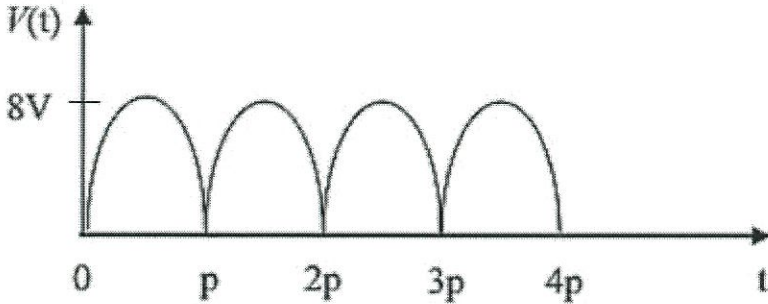


Figure Q4(b)

