Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014

COURSE NAME	:	ELECTRIC CIRCUIT ANALYSIS II
COURSE CODE	:	BEF 12503
PROGRAMME	:	BEV
EXAMINATION DATE	:	JUNE 2014
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 (a) DC and AC power generations are the common sources for power generation. For AC generation it is involved the amplitude, frequency and phase parameters.

(i) State the **TWO (2)** differences between the frequency and phase for AC generation.

(5 marks)

(ii) Explain **TWO (2)** advantages of AC generation compared to DC generation.

(5 marks)

(b) The time function is a important parameter in a circuit analysis. This function can be informed of voltage or current source. This function will determine the operating point of a source,

(i) State and sketch the time function for unit step, unit impulse and unit ramp.

(7 marks)

(ii) Explain the response of the circuit if the time function is not given at the source.

(3 marks)

Q2 (a) Sketch the characteristics between voltage and current load when a AC source is connected in series with the R-L load.

(3 marks)

(b) The sinusoidal current source in the circuit shown in Figure **Q2(b)** produces the current $i_s = 8\,cos200{,}000t\ A$,

(i) Construct the frequency domain equivalent circuit.

(2 marks)

(ii) Find the steady state expression for v , $i_1, i_2 and\ i_3$.

(12 marks)

(c) Differentiate between the impedance $\boldsymbol{Z}$ and admittance $\boldsymbol{Y}$ in a AC circuit analysis.

(3marks)

Q3 (a) Determine the voltages of V_1, $V_2\ and\ V_3$ in the circuit shown in Figure **Q3(a)**

(10 marks)

(b) The circuit in Figure **Q(3)b** has a load consisting the parallel combination of the resistor and inductor. Draw the phasor diagram of the circuit with and without the capacitor place in parallel with the R_2 and L_2

(7 marks)

(c) Explains the advantages of adding the capacitor in Figure **Q3(b)** with responded

to the voltage and current input.

(3 marks)

Q4 (a) The AC power analysis contains several elements. Explain,

(i) The instantaneous power.

(1 mark)

(ii) The average power.

(2 marks)

(iii) Reactive power

(2 marks)

(iv) Power factor

(2 marks)

(b) An AC source supply 120Vrms output is connected in series to the load which drawn 12kVA at 0.856 power factor lagging. Calculate,

(i) The average and reactive power delivered to the load.

(4 marks)

(ii) The peak current.

(3 marks)

(iii) The load impedance.

(1 mark)

(c) Calculate the maximum power that can be transferred to the load Z_L in Figure **Q4(c)**

(5 marks)

Q5 (a) The dot marking procedures are important in order to determine the polarity of the transformer. Explain every procedures that use for dot marking and determine the dot marking for Figure **Q5(a).**

(5 marks)

(b) Figure **Q5(a)** shows the linear transformer operation. The parameters are given by R1=200Ω, R2=100Ω, L1=9H, L2=4H and k=0.5. The transformer couples an impedance consisting of an 800Ω resistor in series with a 1uF capacitor to a sinusoidal voltage source. The 300Vrms source has an internal impedance of 500+j100 Ω and a frequency of 400 rad/s.

(i) Construct a frequency domain equivalent circuit of the system.

(3 marks)

(ii) Calculate the self impedance of the primary and secondary circuit.

(2 marks)

(iii) Calculate the impedance reflected into primary winding.

(2 marks)

(iv) Calculate the impedance seen looking into primary terminal of the transformer .

(1 mark)

(v) Calculate the rms value of the primary and secondary current.

(2 marks)

(vi) Calculate the rms value of the voltage at the terminals of the load and source.

(2 marks)

(vii) Find the average value of the power delivered to the 800Ω resistor.

(1 mark)

(viii) Determine the efficenecy of the power delivered from the transformer to the load.

(2 marks)

- END OF QUESTION -

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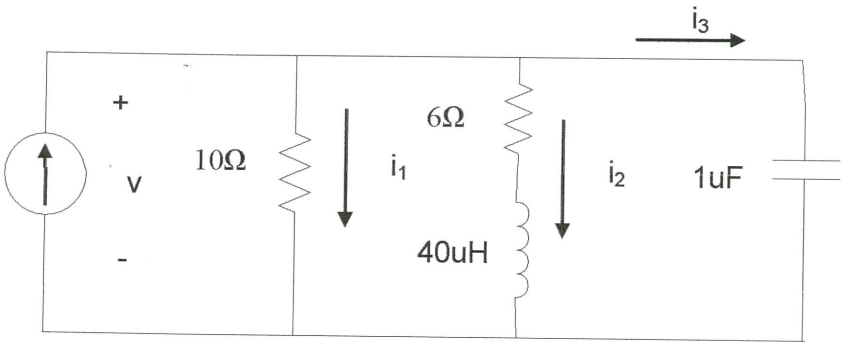

FIGURE Q2(b)

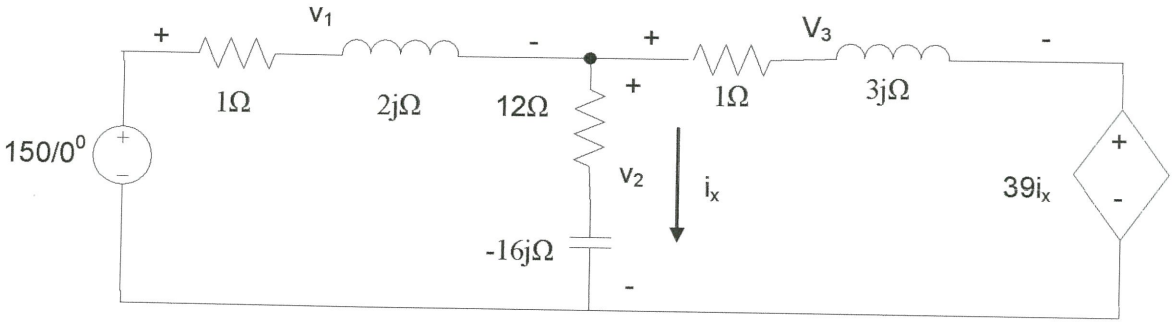

FIGURE Q3(a)

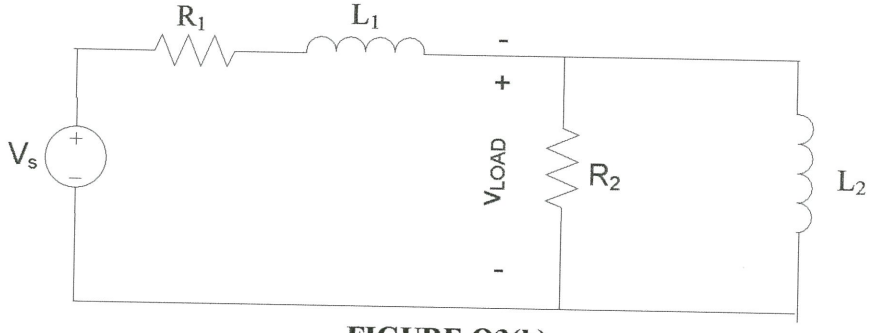

FIGURE Q3(b)

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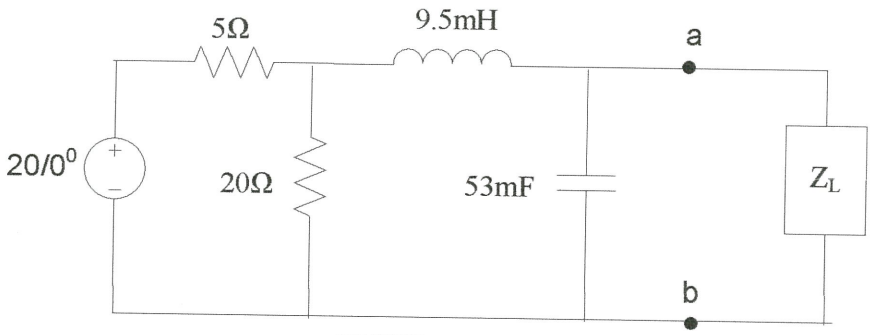

FIGURE Q4(c)

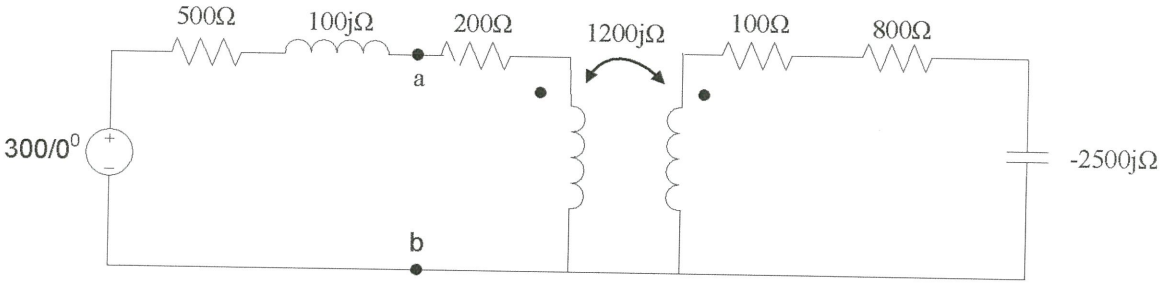

FIGURE Q5(a)