UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2012/2013

COURSE NAME	:	ELECTRICAL PRINCIPLES II
COURSE CODE	:	DAR 11103
PROGRAMME	:	1 DAR
EXAMINATION DATE	:	MARCH 2013
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **FIVE(5)** QUESTIONS ONLY

THIS PAPER CONSISTS OF NINE (9) PAGES

Q1 (a) For the network of Figure Q1(a):

(i) Find the total impedance $\mathbf{Z}_T$. (4 marks)

(ii) Calculate the voltage $\mathbf{V}_2$ and the current $\mathbf{I}_L$. (4 marks)

(iii) Find the power factor of the network. (2 marks)

(b) For the network of Figure Q1(b):

(i) Find the currents $\mathbf{I}$. (4 marks)

(ii) Find the voltage $\mathbf{V}_C$. (4 marks)

(iii) Find the average power delivered to the network. (2 marks)

Q2 (a) For the circuits of Figure Q2(a), write the mesh equations for the network and determine the current through the 1kΩ and 2kΩ resistors.

(10 marks)

(b) Determine the nodal voltages $\mathbf{V}_1$ and $\mathbf{V}_2$ for the networks of Figure Q2(b)

(10 marks)

Q3 (a) Find the Thévenin equivalent circuit for the portions of the networks of Figure Q3(a) external to the elements between points *a* and *b*.

(10 marks)

(b) Find the load impedance $\mathbf{Z}_L$ for the networks of Figure Q3(b) for maximum power to the load, and find the maximum power to the load.

(10 marks)

Q4 For the network of Figure Q4:

(a) Find the average power delivered to each element. (2 marks)

(b) Find the reactive power for each element. (5 marks)

(c) Find the apparent power for each element. (3 marks)

(d) Find $\mathbf{P}_T$, $\mathbf{Q}_T$, $\mathbf{S}_T$, and Fp for the system. (8 marks)

(e) Find $\mathbf{I}_S$. (2 marks)

Q5 For the series circuit of Figure Q5:

(a) Find the value of $\mathbf{X}_L$ for resonance. (2 marks)

(b) Determine the magnitude of the current **I** at resonance. (2 marks)

(c) Find the voltages $\mathbf{V}_R$, $\mathbf{V}_L$, and $\mathbf{V}_C$ at resonance, and compare their magnitudes. (6 marks)

(d) Determine the quality factor of the circuit. Is it a high or low-Q circuit? (2 marks)

(e) If the resonant frequency is 5 kHz, determine the value of L and C. (4 marks)

(f) Find the bandwidth of the response if the resonant frequency is 5 kHz. (2 marks)

(g) What are the low and high cutoff frequencies? (2 marks)

Q6 For the transformer of Figure Q6, determine:

(a) the equivalent resistance **Re**. (2 marks)

(b) the equivalent reactance **Xe**. (2 marks)

(c) the equivalent circuit reflected to the primary. (6 marks)

(d) the primary current for $\mathbf{I}_P$ (2 marks)

(e) the load voltage $\mathbf{V}_L$. (2 marks)

(f) the phasor diagram of the reflected primary circuit. (2 marks)

(g) the new load voltage if we assume the transformer to be ideal with a 4 : 1 turns ratio. Compare the result with that of part (e). (4 marks)

Q7 The phase sequence for the Y-Δ system of Figure Q7 is *ABC*.

(a) Find the angles θ_2 and θ_3 for the specified phase sequence. (2 marks)

(b) Find the voltage across each phase impedance in phasor form. (6 marks)

(c) Draw the phasor diagram of the voltages found in part (b), and show that their sum is zero around the closed loop of the Δ load. (2 marks)

(d) Find the current through each phase impedance in phasor form. (6 marks)

(e) Find the magnitude of the line currents. (2 marks)

(f) Find the magnitude of the generator phase voltages. (2 marks)

- END OF QUESTION -

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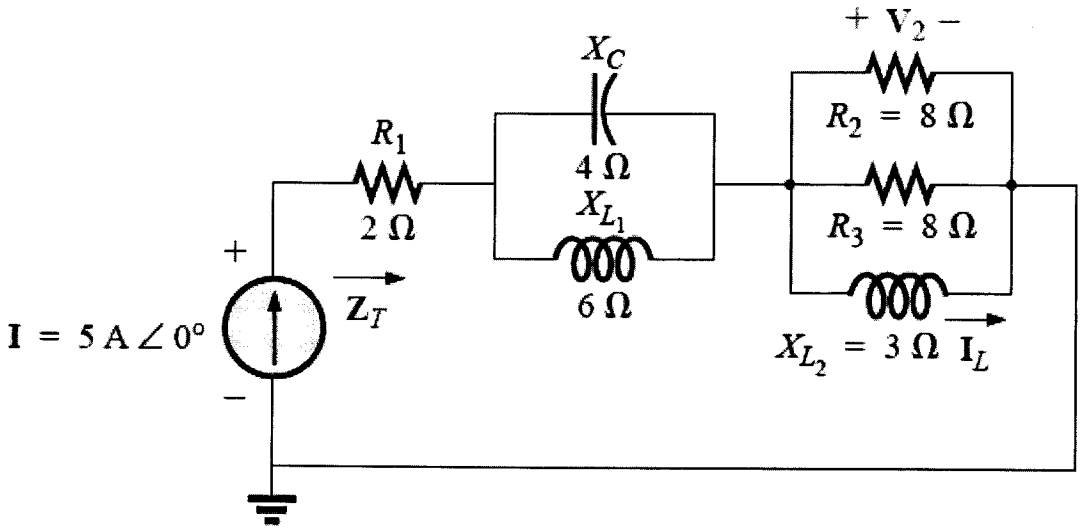

FIGURE Q1(a)

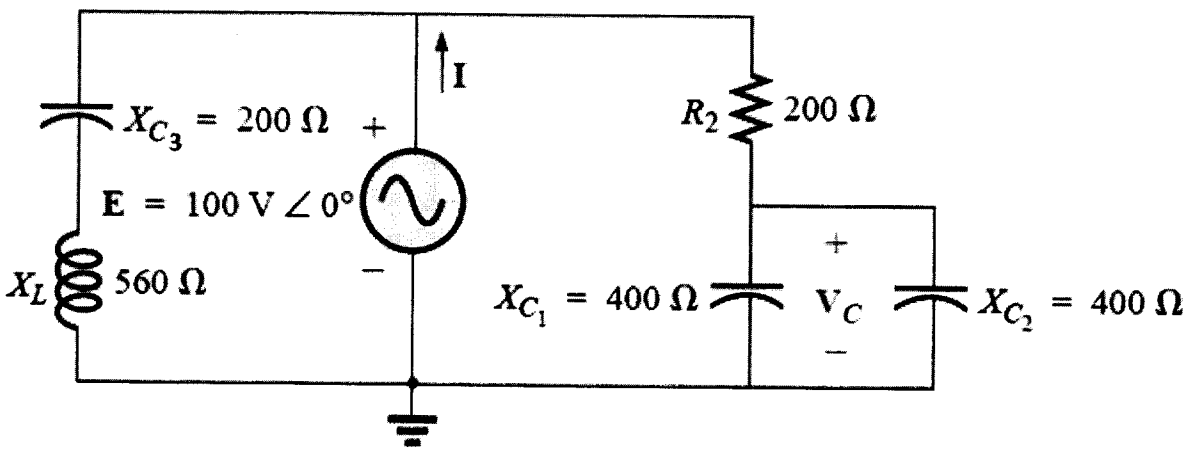

FIGURE Q1(b)

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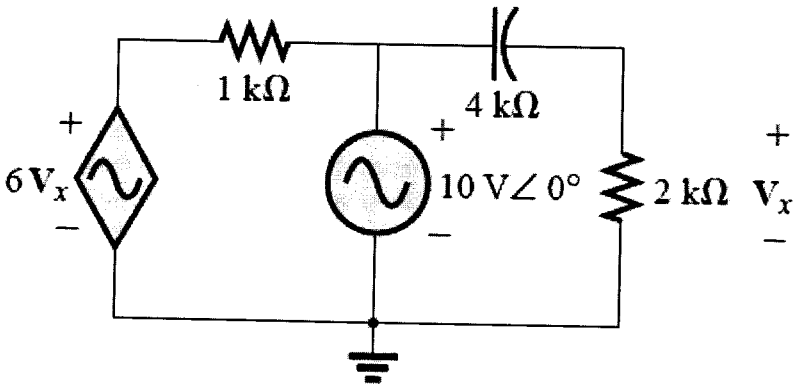

FIGURE Q2(a)

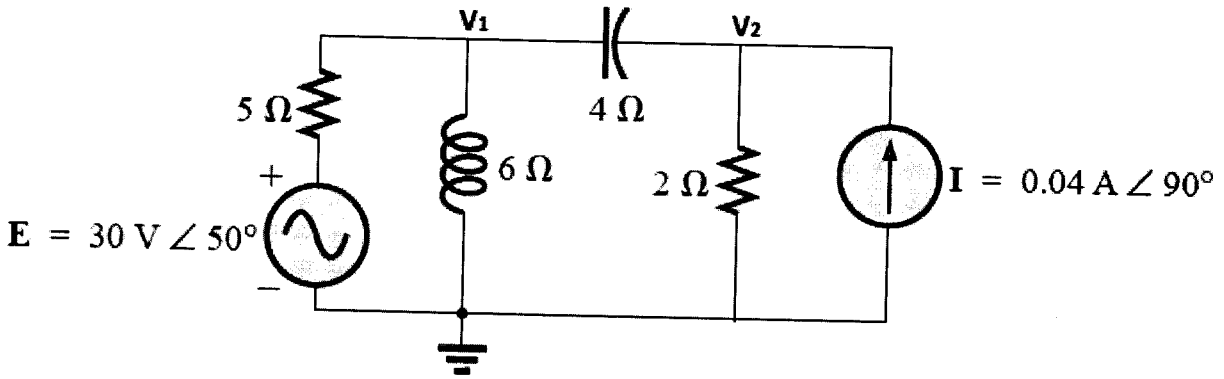

FIGURE Q2(b)

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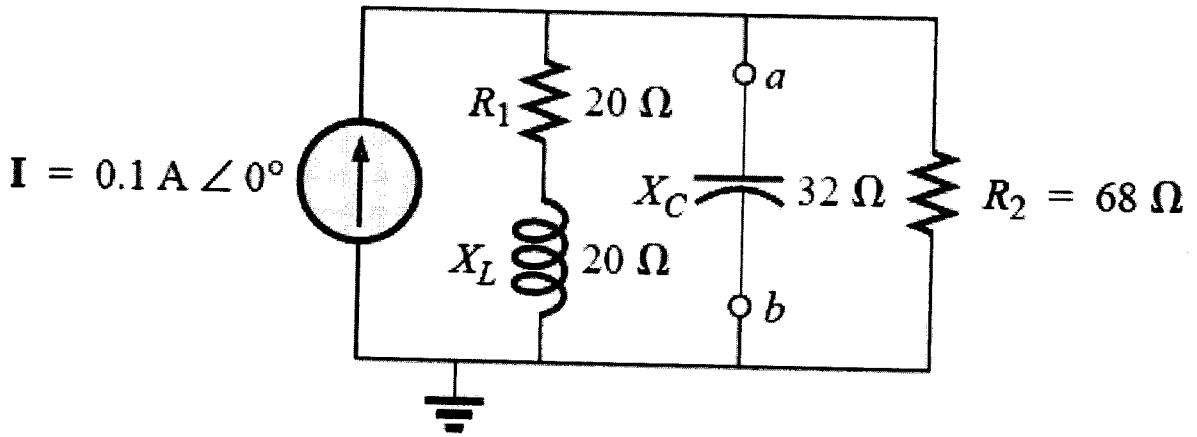

FIGURE Q3(a)

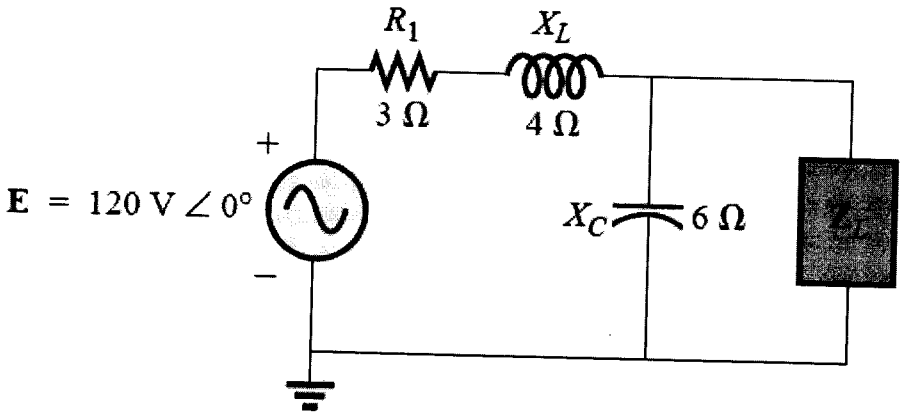

FIGURE Q3(b)

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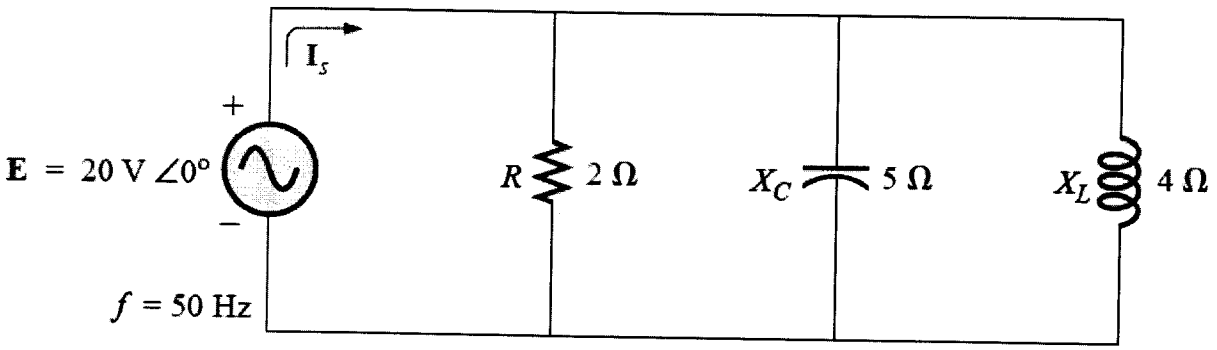

FIGURE Q4

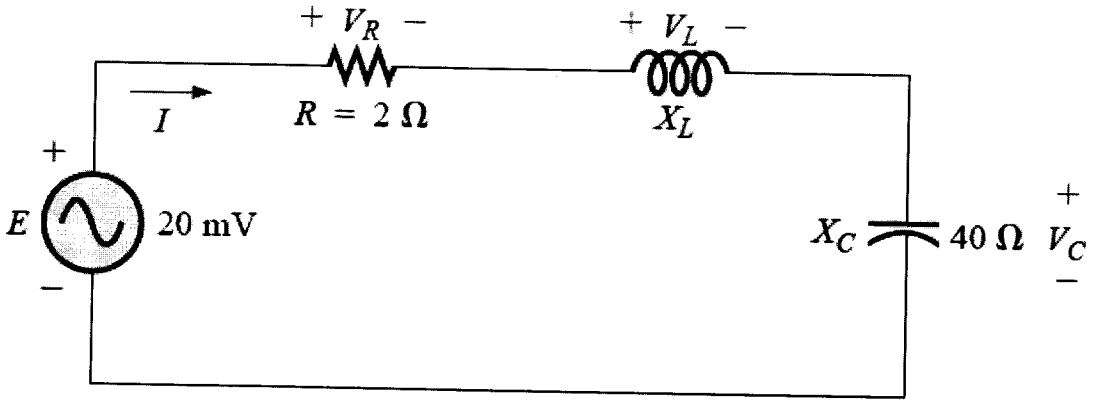

FIGURE Q5

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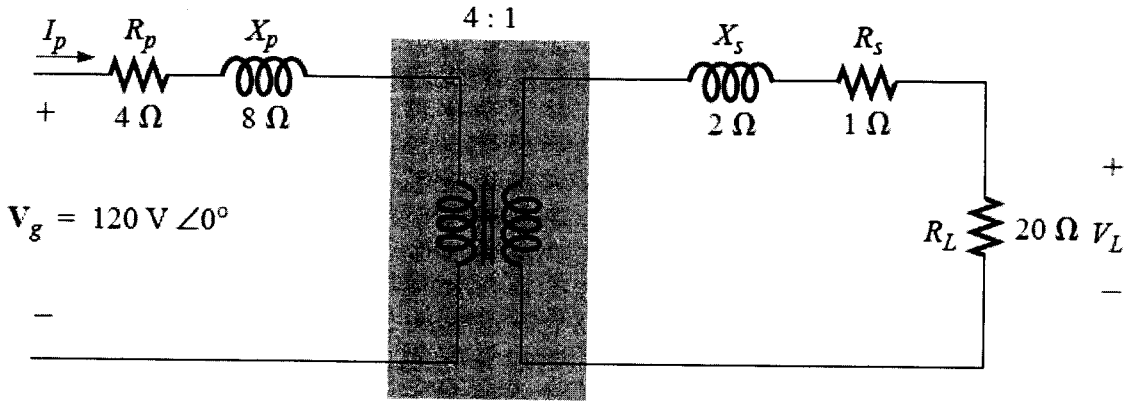

FIGURE Q6

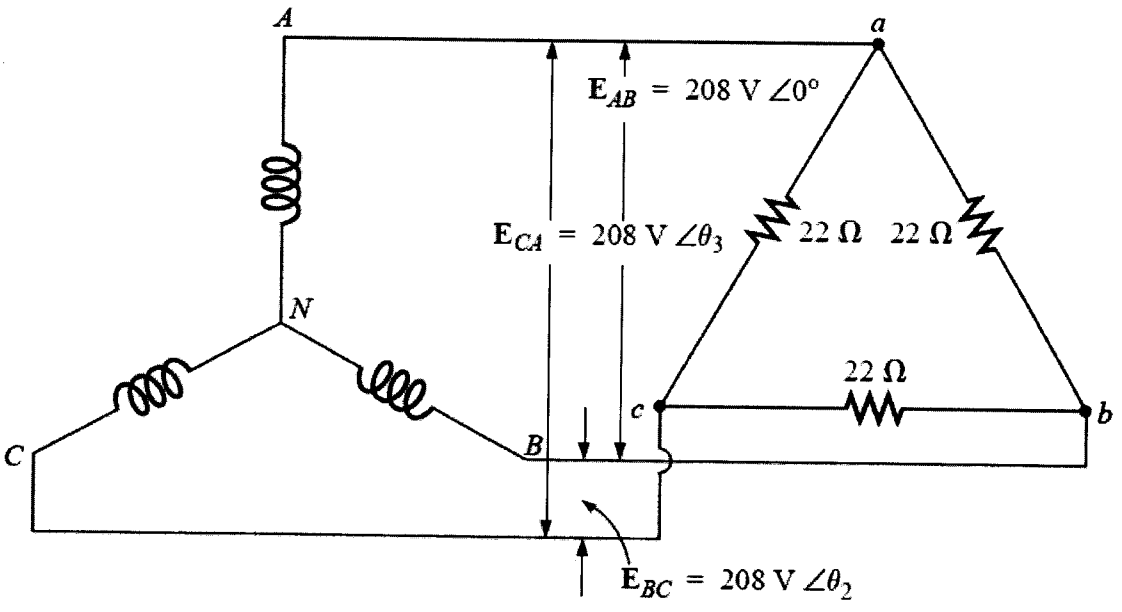

FIGURE Q7