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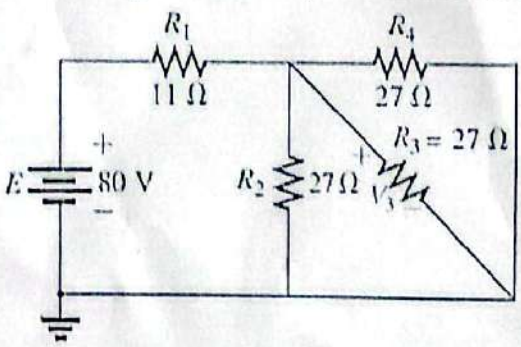
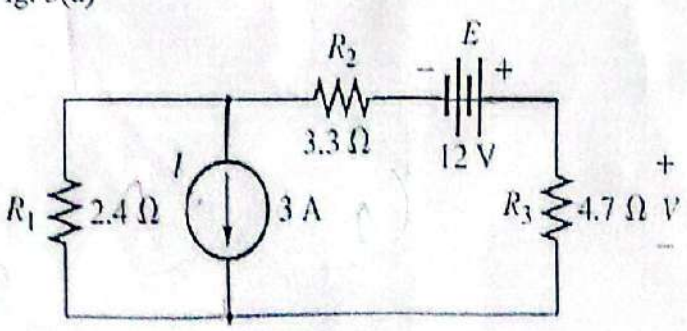
Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Spring 2026
Course Code: CSE121 Course Title: Electrical Circuits
Level: 1 Term: 3 Batch: 69

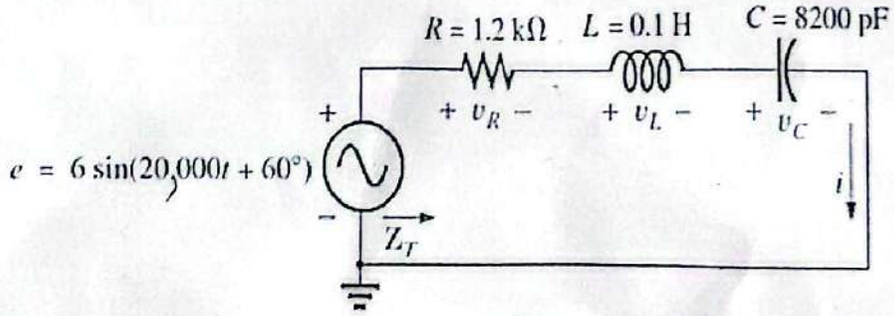
Time: 02:00 Hrs. **Marks: 40**

Answer ALL Questions

*[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered **sequentially**.]*

1.	*a)*	Explain the steps of Super Node analysis.	[2]	CO1
	b)	Illustrate the periodic waveform of sinusoidal voltage with peak amplitude and peak-to-peak value.	[2]	
	c)	Show the high frequency responses of the ideal inductor and capacitor.	[2]	
	d)	Compare the power factors of the inductive and resistive network.	[2]	
	e)	Define the average value and r.m.s value.	[2]	
2.	*a)*	Solve for the value of voltage V_3 and the power absorbed by the resistor R_3  Fig. 2(a)	[5]	CO2
	b)	Develop an expression for average power in an AC system. Further, show that the average power consumed by an ideal capacitor is zero.	[5]	
3.	*a)*	Utilizing the superposition theorem, determine the voltage across the 4.7 Ω resistor of Fig. 3(a)  Fig. 3(a)	[5]	CO3

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b)	For the following pairs of voltages and currents, classify whether the element involved is a capacitor, an inductor, a resistor or combination of those, and find the value of C, L, or R if sufficient data are given: a) $v(t) = 550 \cos(377t + 50°)$ $i(t) = 11 \cos(377t - 40°)$ b) $v(t) = 36 \cos(754t - 80°)$ $i(t) = 4 \cos(754t + 170°)$ c) $v(t) = 10.5 \cos(300t - 60°)$ $i(t) = 1.5 \cos(300t)$	[5]	
c)	Analyze the circuit in Fig. 3(c) to: a) Find the total impedance Z_T b) Find the current I and the voltages V_R, V_L and V_C c) Find the average power delivered to the circuit. d) Draw the phasor diagram of the voltages E, V_R, V_L and V_C and the current I. e) Draw the impedance diagram. f) Find the power factor of the circuit, and indicate whether it is leading or lagging.  Fig. 3(c)	[10]	