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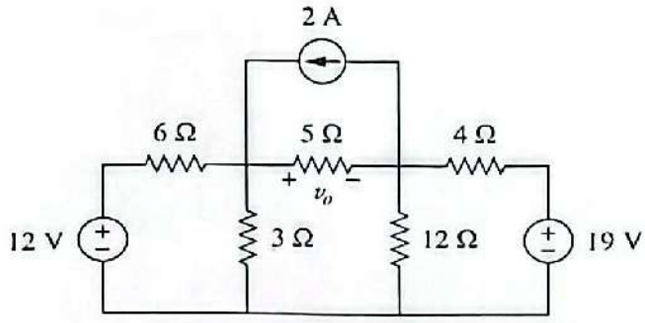
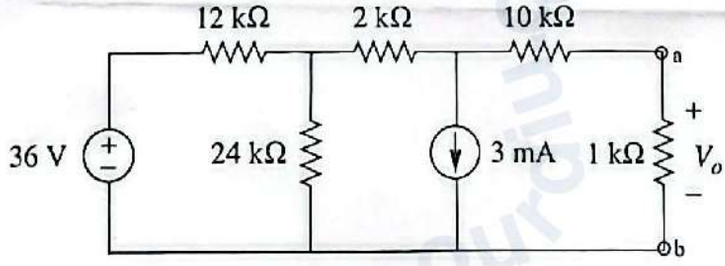
Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Summer 2025
Course Code: CSE121, Course Title: Electrical Circuits
Level:1 Term:3 Batch: 67

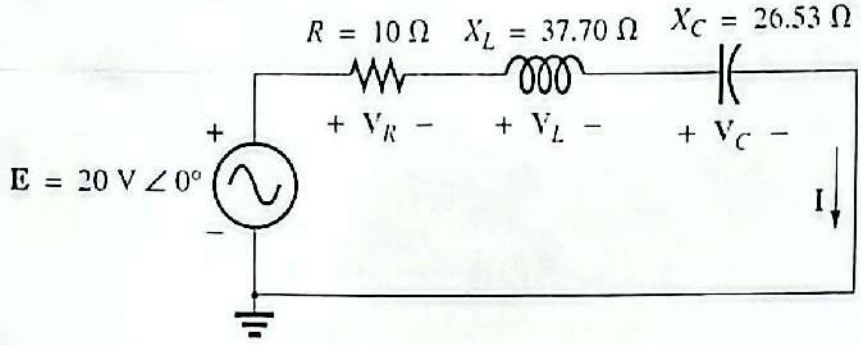
Time: 02:00 Hours **Marks: 40**

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)*	**Define** Peak Amplitude, waveform, Peak-to-peak value, and Frequency.	5x2=10	CO 1
	b)	**What** is the RMS value of a sinusoidal voltage, and why is it important?		
	c)	**Define** power factor. What does a leading or lagging power factor indicate?		
	d)	**Interpret the** frequency response of R, L, C elements.		
	e)	**Draw** a sinusoidal waveform of an AC source and indicate all the components.		
2.	*a)*	**Solve** this circuit to find V_0 by applying the superposition theorem. 	6	CO 2
	b)	**Solve** the following circuit to obtain the Thevenin equivalent circuit of the figure below. What is the difference between maximum power and the normal power delivered at the a-b node? 	6	

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3.	*a)*	For the following pairs of voltages and currents, **analyze** whether the element involved is a capacitor, an inductor, or a resistor. a) $V = 100 \sin(\omega t + 50^\circ)$ $I = 40 \sin(\omega t + 50^\circ)$ b) $V = 500 \sin(377t + 10^\circ)$ $I = 400 \sin(377t - 80^\circ)$ c) $V = 500 \sin(\omega t + 30^\circ)$ $I = 300 \sin(\omega t + 120^\circ)$	6	CO 3
	b)	**Analyze** the voltage-current relationship of an ideal capacitor and demonstrate, using appropriate mathematical reasoning, why the average power dissipated over a complete cycle is zero watts	6	
	c)	**Analyze** the circuit to- i. Find Z_T, I, V_R, and V_C in phasor form. ii. Calculate the total power factor, and indicate whether it is leading or lagging. iii. Draw the phasor diagram of the voltages E, V_R, and V_C, and the current I. 	3x2=6	