



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

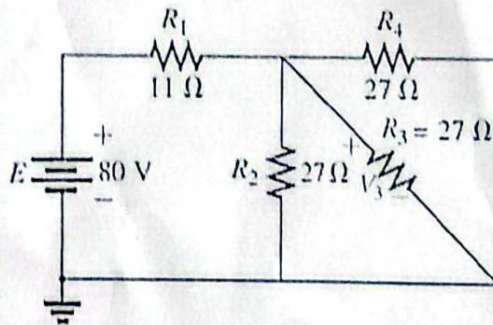
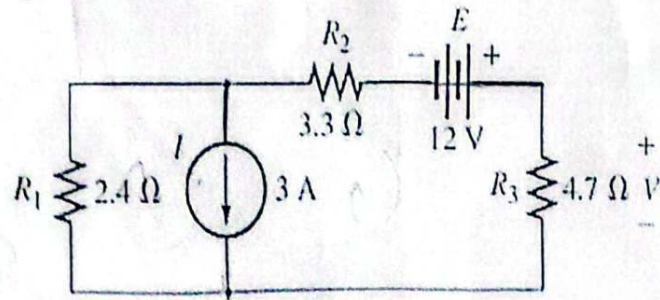
Batch: 69

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	[5]	CO2
		 Fig. 2(a)		
	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 $4.7\ \Omega$ resistor of Fig. 3(a)	[5]	CO3
		 Fig. 3(a)		

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) $v(t) = 550 \cos(377t + 50^\circ)$ $i(t) = 11 \cos(377t - 40^\circ)$ b) $v(t) = 36 \cos(754t - 80^\circ)$ $i(t) = 4 \cos(754t + 170^\circ)$ c) $v(t) = 10.5 \cos(300t - 60^\circ)$ $i(t) = 1.5 \cos(300t)$	[5]
c)	Analyze the circuit in Fig. 3(c) to: - Find the total impedance Z_T - Find the current I and the voltages V_R, V_L and V_C - Find the average power delivered to the circuit. - Draw the phasor diagram of the voltages E, V_R, V_L and V_C and the current I. - Draw the impedance diagram. - Find the power factor of the circuit, and indicate whether it is leading or lagging.	[10]

Fig. 3(c)