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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

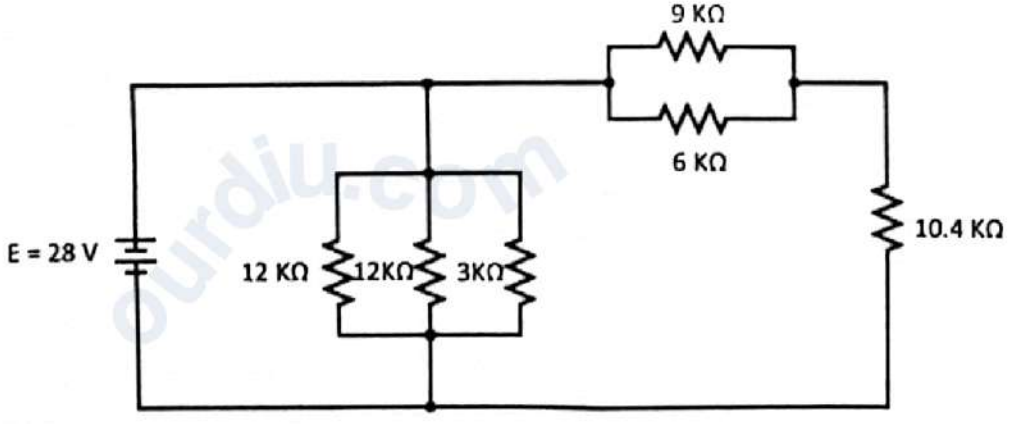
Final Examination, Spring-2024

Course Code: CSE121 Course Title: Electrical Circuits

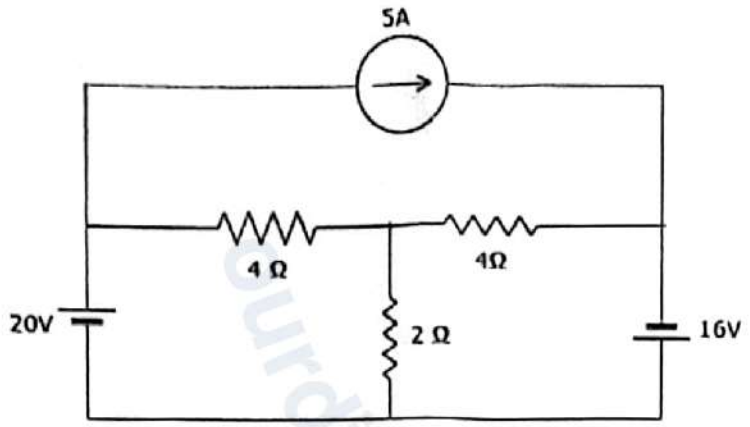
Level: 1 Term: 2 Batch: 65

Time: 2 Hours **Full Marks: 40**

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

Q1.	**a) Explain** the concept of super node.	**5x2=10**	**CO1**
	b) Illustrate the periodic waveform of sinusoidal voltage with peak amplitude and peak-to-peak value.		
	c) Compare the phasor diagram and impedance diagram for the series circuit.		
	d) Interpret the power factor of inductive network.		
	e) Show the complex conjugate of a complex number in rectangular form.		
Q2.	**a) Solve** the equivalent resistance and the value of the current through 10.4 kΩ of the following circuit. 	**6x2=12**	**CO2**

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	b) Apply nodal analysis to determine the voltage across 2Ω resistance in the following circuit. 		
Q3.	**a) Simplify** the following equation to determine the effective values of the waveforms followed by I-V plot and also the average power loss of the circuit whose input current and voltage are as follows: i. $i = 7sin\,(377t - 70^{\circ})$ ii. $v = 263.9sin\,(377t + 20^{\circ})$	**6x3=18**	**CO3**
	b) The current through a 0.2 H coil is provided. $i = 8.5sin\,(377t - 55^{\circ})$ Now **Simplify** the following equation to find: i. The sinusoidal expression for the voltage. ii. Sketch the v and i curves. iii. Power factor of the v and i and indicate they are leading or lagging.		
	c) Examine the following R-L circuit to determine the Z_T, I, V_R, V_L, P_T followed by phasor diagram: 