



# Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Midterm Examination, Summer-2025

Course Code: CSE121, Course Title: Electrical Circuits

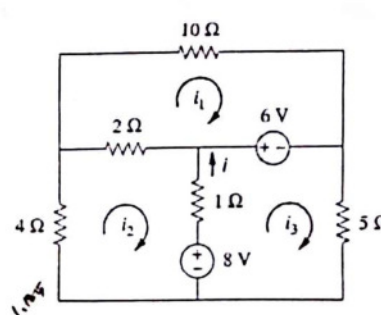
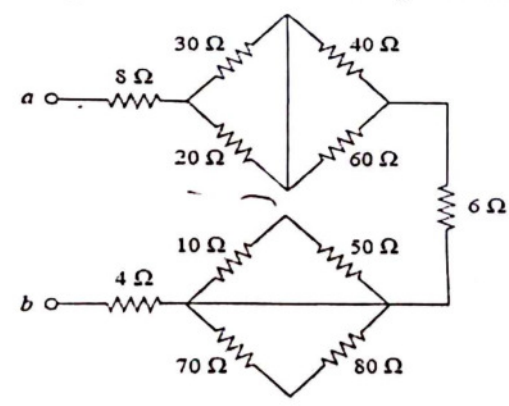
Level: 1 Term: 3 Batch: 67

Time: 1 Hour and 30 Minutes

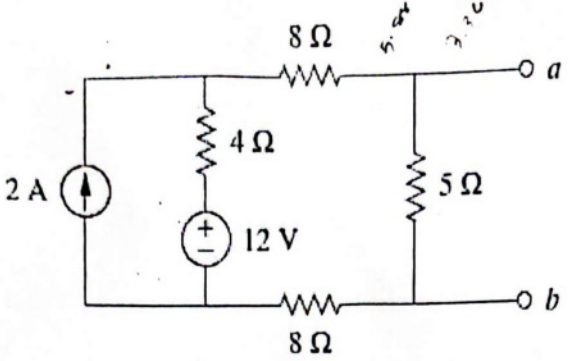
Marks: 25

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.	<p>a) Define the terms 'KVL &amp; KCL.</p> <p>b) State the term 'Superposition Theorem.</p> <p>c) Illustrate the Norton equivalent circuit.</p> <p>d) What do you mean by Current Divider Rule (CDR)?</p> <p>e) What are the factors on which the resistance of a material depends?</p>	5×1=5	CO1
2.	<p>a) Solve the following circuit using mesh analysis to obtain <math>i</math> in the circuit below.</p> 	2×5=10	CO2
	<p>b) Solve the following circuit to determine the equivalent resistance.</p> 		



3.	<p>a) Examine the following circuit to obtain the Thevenin equivalent circuit at terminals a-b.</p> 	2×5=10	CO3
b)	<p>You are designing a fast-charging phone adapter with a 5V (Vs) output and an internal resistance (<math>R_s</math>) of <math>0.2\ \Omega</math>. To achieve <b>maximum power transfer</b> for the fastest charging Analyze the following:</p> <ol style="list-style-type: none"> <li>1. What should be the <b>load resistance (<math>R_L</math>)</b> of the smartphone's charging circuit?</li> <li>2. Calculate the <b>maximum power (<math>P_{max}</math>)</b> delivered to the phone.</li> <li>3. If the phone's actual resistance is <math>0.3\ \Omega</math>, is the charger operating at peak efficiency? If not, how can you adjust the design to improve power transfer?</li> </ol>		