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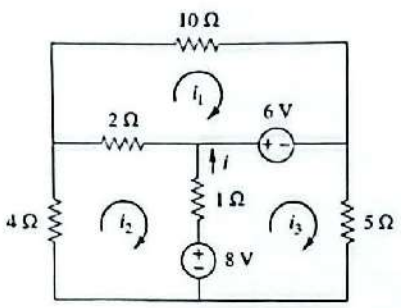
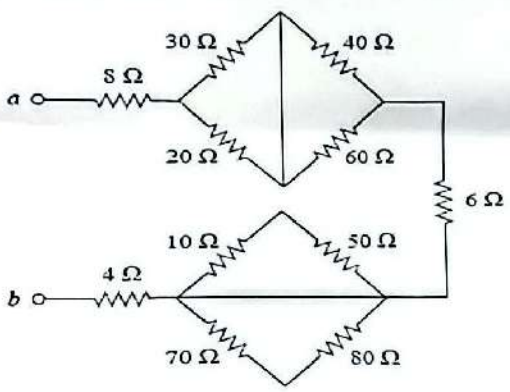
# Daffodil International University

**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**

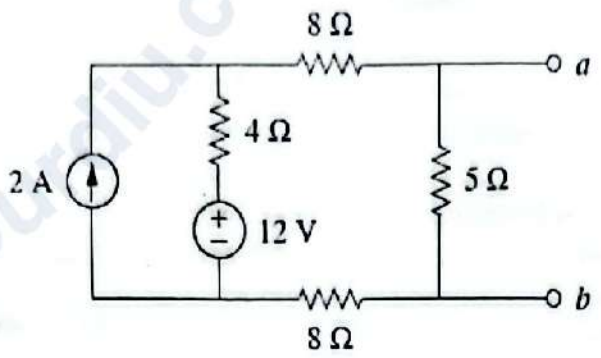
**Time: 1 Hour and 30 Minutes** **Marks: 25**

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

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| | | | | |
|---|---|---|---|---|
| 3. | *a)* | **Examine** the following circuit to obtain the Thevenin equivalent circuit at terminals a-b.<br><br> | 2×5=10 | CO3 |
| | *b)* | You are designing a fast-charging phone adapter with a 5V (Vs) output and an internal resistance (Rs) of 0.2 Ω. To achieve **maximum power transfer** for the fastest charging **Analize** the follwing:<br>1. What should be the **load resistance (RL)** of the smartphone's charging circuit?<br>2. Calculate the **maximum power (Pmax)** delivered to the phone.<br>3. If the phone's actual resistance is **0.3 Ω**, is the charger operating at peak efficiency? If not, how can you adjust the design to improve power transfer? | | |