



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

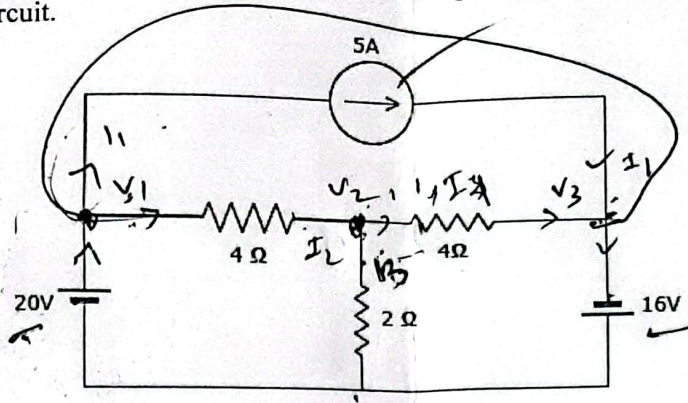
Time: 2 Hours

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.	<p>a) Explain the concept of super node.</p> <p>b) Illustrate the periodic waveform of sinusoidal voltage with peak amplitude and peak-to-peak value.</p> <p>c) Compare the phasor diagram and impedance diagram for the series circuit.</p> <p>d) Interpret the power factor of inductive network.</p> <p>e) Show the complex conjugate of a complex number in rectangular form.</p>	5x2=10	CO1
Q2.	<p>a) Solve the equivalent resistance and the value of the current through $10.4 \text{ k}\Omega$ of the following circuit.</p> <div style="text-align: center; margin: 10px 0;"> </div>	6x2=12	CO2

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:

6x3=18 CO3

- i. $i = 7\sin(377t - 70^\circ)$
- ii. $v = 263.9\sin(377t + 20^\circ)$

b) The current through a 0.2 H coil is provided.

$$i = 8.5\sin(377t - 55^\circ)$$

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:

