Roll No. | | | | | | | | | | | | | |

**SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY, PRAYAGRAJ**

**Subject Code: BEE-101** **Subject: Fundamentals of Electrical Engineering**

**Course: B.Tech.** **SEMESTER: I**

**FIRST SESSIONAL EXAMINATION, ODD SEMESTER, (2024-2025)**

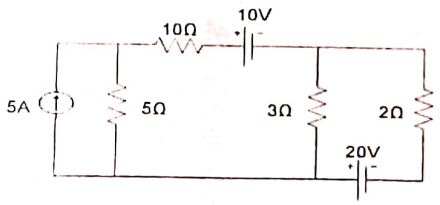
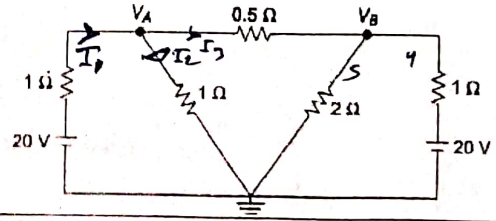
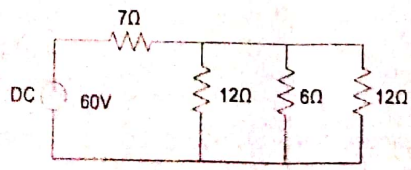
**Time –1hr 30 min** **Branch: CS** **Maximum Marks – 30**

*NOTE: (Attempt all questions)*

**1. Attempt any *FIVE* questions.**

| Q. N. | QUESTION | Marks | CO | BL |
|---|---|---|---|---|
| a. | Explain the followings.<br>(i) Active element (ii) Passive element | 2 | CO1 | BL2 |
| b. | State and explain Kirchhoff's voltage law. | 2 | CO1 | BL2 |
| c. | Distinguish between mesh and loop of network. | 2 | CO1 | BL4 |
| d. | Distinguish between node and junction of network. | 2 | CO1 | BL4 |
| e. | Explain the followings.<br>(i) Unilateral element (ii) Bilateral element | 2 | CO1 | BL2 |
| f. | Explain the followings.<br>(i) Ideal voltage source (ii) Ideal current source | 2 | CO1 | BL2 |

**2. Attempt any *ONE* of the following.**

| Q. N. | QUESTION | Marks | CO | BL |
|---|---|---|---|---|
| a. | Using mesh current method, find the current in, and voltage across the 2Ω resistance in the following figure.<br>  | 5 | CO1 | BL3 |
| b. | Determine the current by Nodal method, through 2 ohm resistor for the network shown below.<br>  | 5 | CO1 | BL3 |
| c. | In the network, find the power delivered by the source using the nodal analysis.<br>  | 5 | CO1 | BL3 |

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**3. Attempt any *FIVE* questions.**

| Q. N. | QUESTION | Marks | CO | BL |
|---|---|---|---|---|
| a. | What is the real power consumed by a pure capacitor? | 2 | CO2 | BL1 |
| b. | Define form factor and peak factor. | 2 | CO2 | BL1 |
| c. | What do you mean by alternation of sinusoidal quantity? | 2 | CO2 | BL1 |
| d. | Define average value of sinusoidal wave. | 2 | CO2 | BL1 |
| e. | Write the equation of voltage and current for pure inductive circuit. | 2 | CO2 | BL1 |
| f. | Draw and define impedance triangle of R-L series circuit. | 2 | CO2 | BL1 |

**4. Attempt any *ONE* of the following.**

| Q N | QUESTION | Marks | CO | BL |
|---|---|---|---|---|
| a. | Determine the mathematical relationship between phase and line quantities in a 3-phase star configuration with the help of phasor diagram. | 5 | CO2 | BL5 |
| b. | Determine the mathematical expression for instantaneous power and average power in the case of R and L elements connected in series across a single phase Ac supply of voltage $v = V_m \sin\omega t$. | 5 | CO2 | BL5 |
| c. | A coil of resistance 40 Ω and inductance 0.75 H forms part of a series circuit for which resonant frequency is 55 Hz. If the supply is 250 V, 50 Hz, find-<br>(i) Line current<br>(ii) Power factor<br>(iii) Power consumed | 5 | CO2 | BL3 |

**Bloom's Taxonomy Level (BL) :-**
Remember (L1), Understanding (L2), Apply (L3), Analyze (L4), Evaluating (L5), Creating (L6)

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