

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

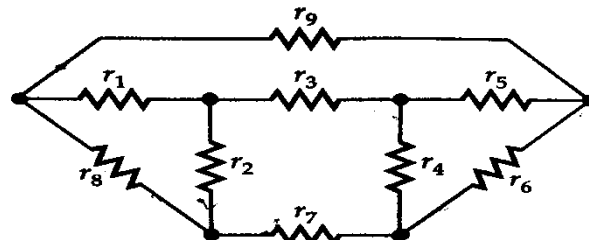
(Level/CO) Marks

**Q. 1 Solve Any Two of the following.**

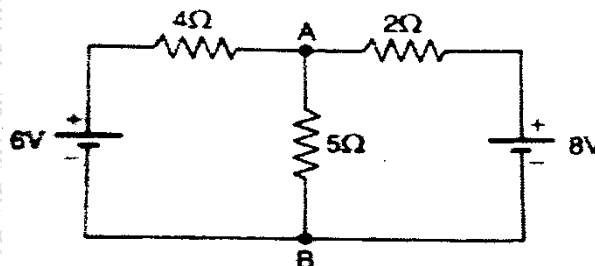
- |   |                         |   |
|---|-------------------------|---|
| A) Explain the difference between short circuit (SC) and open circuit (OC) with an example.                                       | Understand              | 6 |
| B) Explain the following terms with suitable example<br>1. Linear and non linear elements<br>2. Unilateral and bilateral elements | Understand              | 6 |
| C) Explain two types of energy source. Distinguish between ideal and non-ideal sources.   | Understand/<br>Analysis | 6 |

**Q.2 Solve Any Two of the following.**

- |   |                   |   |
|---|-------------------|---|
| A) State and Explain KVL and KCL with example   | Knowledge         | 6 |
| B) Following figure represents a resistive network. Draw its graph. Select a suitable tree and obtain the tie-set matrix. | Comprehen<br>sion | 6 |



- |  |                                   |   |
|--|-----------------------------------|---|
| C) State the Thevenin's theorem and find current through branch AB using Thevenin's theorem. Refer following figure. | Comprehen<br>sion /<br>Evaluation | 6 |
|--|-----------------------------------|---|

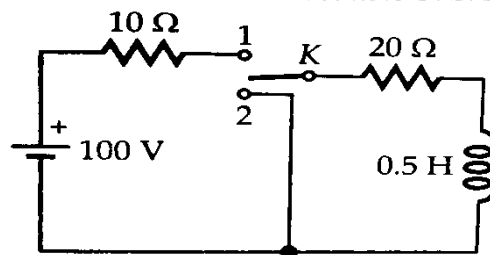


**Q. 3 Solve Any Two of the following.**

- |  |            |   |
|--|------------|---|
| A) Explain first order and second order RC and RL circuit.   | Understand | 6 |
| B) Explain various properties of a capacitor.  | Understand | 6 |
| C) An inductor with initial current $I_0$ is connected to a resistor of $R$ ohms at $t = 0$ . Derive the expression for the current through inductor and voltage across inductor at any time $t > 0$ . | Evaluation | 6 |

**Q.4 Solve Any Two of the following.**

- |  |            |   |
|--|------------|---|
| A) Derive the symmetry and reciprocity condition of z-parameters.  | Evaluation | 6 |
| B) Explain Z-Parameters in terms of Y-parameter & h-parameters.  | Understand | 6 |
| C) In following figure the switch K is kept first at position 1 and steady state condition is reached. At $t=0$ , the switch is moved to position 2. Find the current in both the cases. | Evaluation | 6 |



**Q. 5 Solve Any Two of the following.**

- |  |           |   |
|--|-----------|---|
| A) Derive the expression for resonant frequency $f_r$ of a series resonant circuit.  | Synthesis | 6 |
| B) Derive the expression for Q factor of parallel resonating circuit.  | Synthesis | 6 |
| C) Design a constant K LPF with $f_c = 1\text{KHz}$ and $R_0 = 600\Omega$ At what frequency $\alpha$ will be 10 Db?<br>To calculate (i) L, C (filter Elements)<br>(ii) Frequency at which $\alpha = 10\text{dB}$ | Synthesis | 6 |

\*\*\* End \*\*\*