

Seat No. **OCT-NOV 2025 WINTER EXAMINATION****11731 Bachelor of Technology (NEP-2.0)****Sub. Name: Network Analysis****Sub. Code: 114443/112433****Day and Date: Tuesday ,16-12-2025****Total Marks: 60****Time: 02:30 PM To 05:00 PM**

**Instructions:** 1. All questions are compulsory  
2. Assume suitable data wherever necessary and mention it boldly  
3. Draw neat labelled diagrams wherever necessary

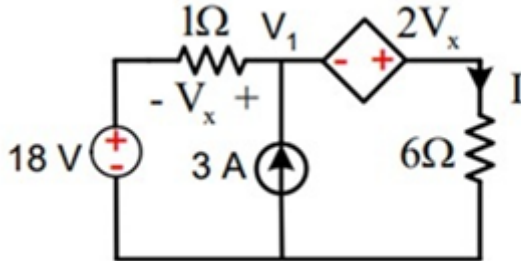
**Q1) Solve following MCQ.****[12]**

- i. In a series RLC circuit, the impedance at resonance is:
- A. Minimum
  - B. Maximum
  - C. Zero
  - D. Infinite
- ii. Kirchoff's Voltage Law (KVL) is based on the conservation of:
- A. Charge
  - B. Energy
  - C. Current
  - D. Power
- iii. The Thevenin equivalent voltage is measured across the:
- A. Load terminals
  - B. Open-circuited output terminals
  - C. Short-circuited input
  - D. Source terminals
- iv. At steady state with a DC source, an ideal capacitor behaves as:
- A. Short circuit
  - B. Voltage source
  - C. Open circuit
  - D. Inductor
- v. The attenuation constant ( $\alpha$ ) of a filter represents:
- A. The phase shift introduced by the filter
  - B. The rate at which the signal amplitude decreases per unit length
  - C. The characteristic impedance
  - D. The resonant frequency of the filter
- vi. A condition for resonance in an RLC series circuit is:

- A.  $X_L = X_C$
- B.  $X_L > X_C$
- C.  $X_L < X_C$
- D.  $R = X_L$

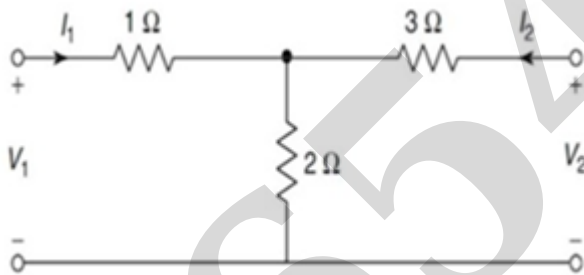
**Q2) Solve any two** **[12]**

- a. Using superposition theorem find current  $I$  provided to the circuit. **[6]**



- b. Define tree and co-tree of a graph. Mention their significance. **[6]**

- c. Find Y parameters of given network. **[6]**



**Q3) Solve any two** **[12]**

- a. Obtain expression for Characteristic impedance  $Z_0$  and propagation constant for T-network. **[6]**
- b. Design constant K-type LPF having a cut off frequency of 7kHz to operate with a terminated load resistance of 500Ω. **[6]**
- c. Design m-derived HPF with a cut off frequency of 15kHz, design impedance of 450 Ω and  $m=0.4$ . **[6]**

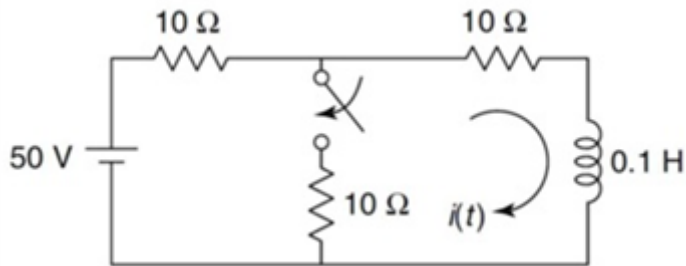
**Q4) Solve any two** **[12]**

- a. Define Resonance and explain its quality factor and bandwidth **[6]**
- b. Series RLC circuit having  $R=100 \Omega$ ,  $L=120\text{mH}$  &  $C=15 \text{ nF}$ . The applied voltage across circuit is 100V. Find i) Resonant frequency ( $f_0$ ) ii) Quality Factor at resonance (Q) **[6]**
- c. Discuss the Tank circuit. **[6]**

Q5) Solve any two

[12]

- a. In the network, the switch is open for a long time and it closes at  $t = 0$ . Evaluate the value of  $i(t)$ . [6]



- b. Implement DC or step voltage response for Series R-L circuit. [6]
- c. Discuss DC or step voltage response of Series R-C circuit. [6]

## End Of Question Paper

**Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -**

This Question Paper may be distributed for following Subjects as common code.

सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

- 1] (1154) B.Tech. CBCS (114443) Network Analysis Part 2 SEM 3
- 2] (11731) Bachelor of Technology (NEP-2.0) (112433) Network Analysis Part 2 SEM 3