

B.Tech I Year II Semester (R15) Supplementary Examinations December 2018

NETWORK ANALYSIS

(Common to ECE & EIE)

Time: 3 hours

Max. Marks: 70

PART – A
 (Compulsory Question)

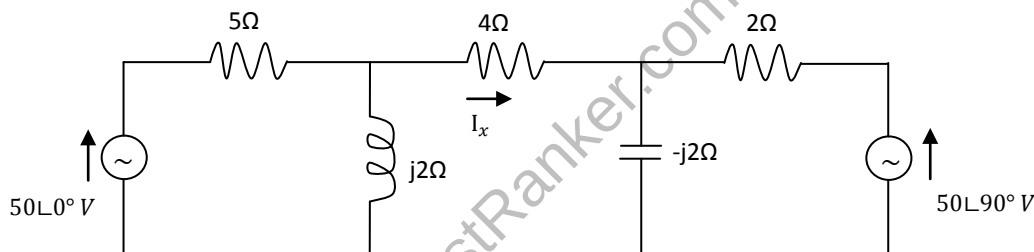
- 1 Answer the following: (10 X 02 = 20 Marks)
- Define tree of a graph.
 - Explain the concept of parallel conventions, two-port networks.
 - Explain the advantages of state variable analysis.
 - Write three limitations of superposition theorem.
 - Define resonant frequency.
 - Define quality factor and sensitivity of a series RLC circuit.
 - Define inductance.
 - Define poles and zeros of the system function.
 - Mention any two properties of symmetrical networks.
 - Mention the applications of different types of filters.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

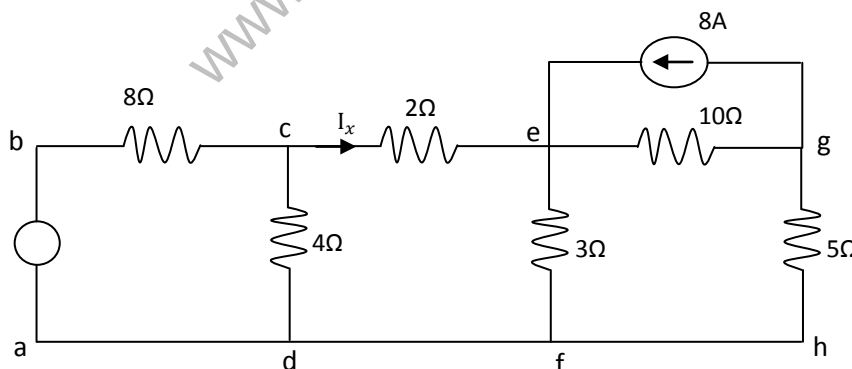
UNIT – I

- 2 In the circuit shown below, find I_x using superposition theorem.



OR

- 3 Use mesh analysis to find I_x in the circuit shown in below.



Contd. in page 2

UNIT – II

- 4 A series RLC circuit with $R = 300 \text{ ohms}$, $L = 1\text{H}$ and $C = 100\mu\text{F}$ has a constant voltage of 50 V applied to it at $t = 0$. Find the maximum current value. Assume zero initial conditions.

OR

- 5 Draw the pole zero diagram for the given network function and hence obtain $v(t)$.

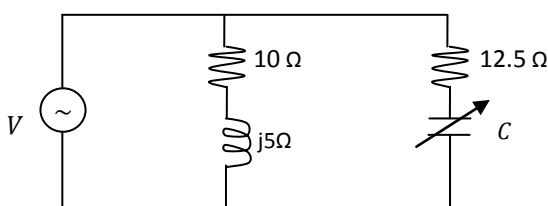
$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

UNIT – III

- 6 A series RLC circuit with $R = 30\Omega$, $L = 0.5\text{H}$ results in a leading phase angle of 60° at a frequency of 50 Hz . At what frequency will be resonant?

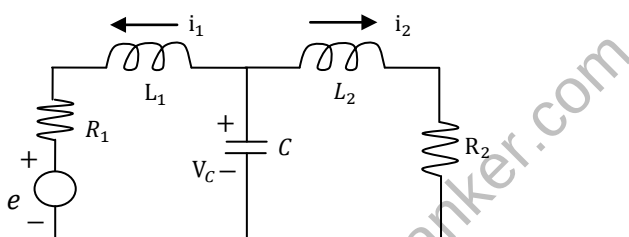
OR

- 7 (a) Derive the expression for energy stored in magnetic field.
(b) Determine the value of capacitance 'C' in order to resonant at 6366 Hz for the given circuit.



UNIT – IV

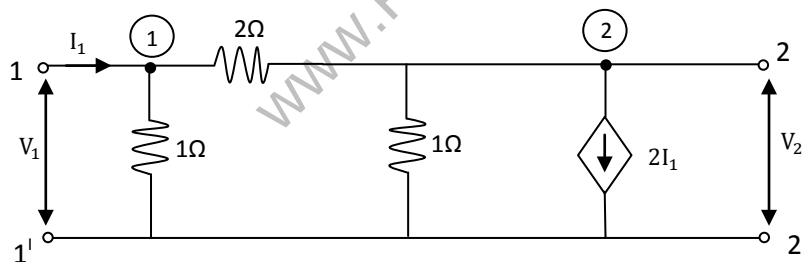
- 8 (a) Obtain the state space representation of RLC network.



- (b) Deduce the relation between bandwidth and resonant frequency.

OR

- 9 Find the Z and Y parameters of the circuit shown below.



UNIT – V

- 10 Design a prototype T-section high pass filter with cutoff frequency 10 kHz and nominal impedance 600Ω .

OR

- 11 Design a m-derived π section low pass filter having cut-off frequency of 1 kHz , design impedance of 400Ω and the resonant frequency of 1100 Hz .
