Code: 15A04201

R15

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)

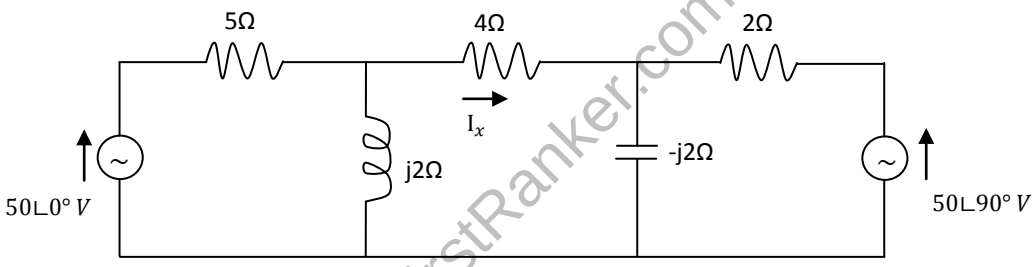
(a) Define tree of a graph.
(b) Explain the concept of parallel conventions, two-port networks.
(c) Explain the advantages of state variable analysis.
(d) Write three limitations of superposition theorem.
(e) Define resonant frequency.
(f) Define quality factor and sensitivity of a series RLC circuit.
(g) Define inductance.
(h) Define poles and zeros of the system function.
(i) Mention any two properties of symmetrical networks.
(j) Mention the applications of different types of filters.

PART – B

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

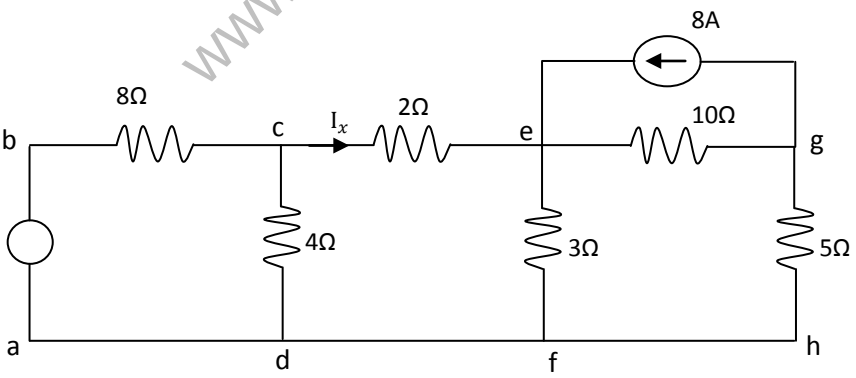
UNIT – I

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

Code: 15A04201 **R15**

UNIT – II

4 A series RLC circuit with R = 300 ohms, L = 1H and C = 100μF 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).

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

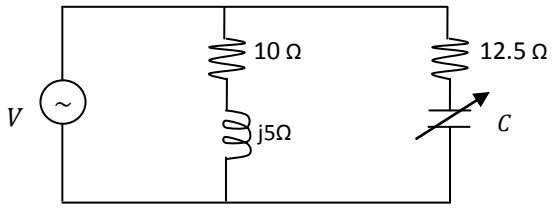
UNIT – III

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

OR

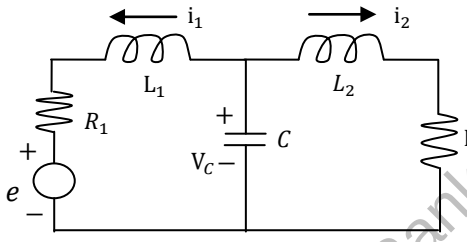
7 (a) Derive the expression for energy stored in magnetic field.

(b) Determine the value of capacitance 'C' in order to resonant at 6366 Hz for the given circuit.



UNIT – IV

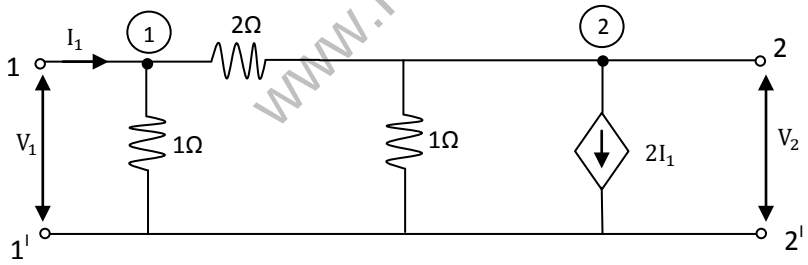
8 (a) Obtain the state space representation of RLC network.



(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 600 Ω.

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.

*****