Code: 15A02201 **R15**

B.Tech I Year II Semester (R15) Regular & Supplementary Examinations May/June 2017

**ELECTRICAL CIRCUITS – I**

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

**PART – A**

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Three arms of star network has 6 Ω resistance. What is the equivalent delta network arm resistance?
(b) Define Faradays laws of electromagnetic induction.
(c) Draw voltage current and power waveforms for pure inductive circuit.
(d) Draw phasor diagram for simple RC series circuit.
(e) Define resonance in electrical circuits.
(f) Draw locus diagram for series RL circuit with 'L" as the variable parameters.
(g) Define compensation theorem.
(h) State Norton's theorem.
(i) Define z-parameters.
(j) What is the condition of reciprocity and symmetry in ABCD parameters?

**PART – B**

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

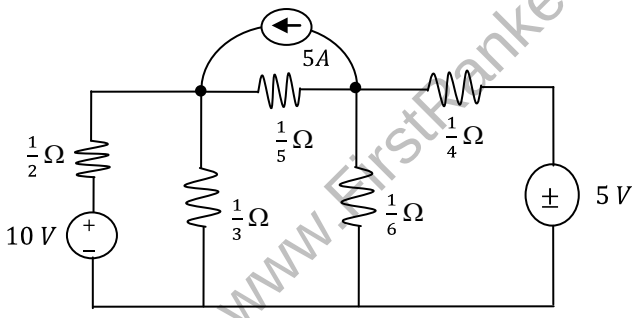
**UNIT – I**

2 (a) Define coefficient of coupling.

(b) An iron ring of 30 cm in diameter and 10 $cm^2$ cross-section is wound with 300 turns of wire. For a flux density of 1 $Wb/m^2$ and a permeability of 600. Find the exciting current and inductance when there is a 1 mm air-gap.

**OR**

3 Using node voltage analysis for the circuit shown in figure below. Find all the node voltages and currents in all the branches.






**UNIT – II**

4 (a) Show that the power through pure inductor when excited with $e = E_m \, Sin \, \omega t$ is zero.

(b) In a series parallel circuit, the two parallel branches A and B are in series with C. The impedances are $Z_a = 10 + j8$, $Z_b = 9 - j6$ and $Z_c = 3 + j2\ \Omega$, voltage across $Z_c$ is $100 + j0\ V$. Find the currents and phase angles.

**OR**

5 (a) A resistor R is connected in series with a capacitor C and the combination is connected across a 100 V, 50 Hz supply. The voltage drop across the resistor is 60 V, the power dissipated in the resistor is 108 W. Find R and C.

(b) Define RMS value and Average value.

Contd. in page 2

**UNIT – III**

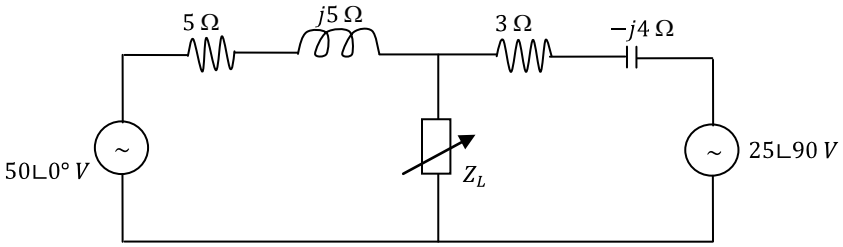
6 Draw locus diagrams for series RLC circuit with all parameter variations.

**OR**

7 A circuit consists of a 4 $\mu F$ capacitor in parallel with a coil of resistance 40 Ω and inductance of 0.25H. If the voltage applied to the circuit at this frequency is 250 V. Calculate the current in each branch, supply current and current magnification.

**UNIT – IV**

8 In the network shown in figure below, what load $Z_L$ will receive maximum power.




**OR**

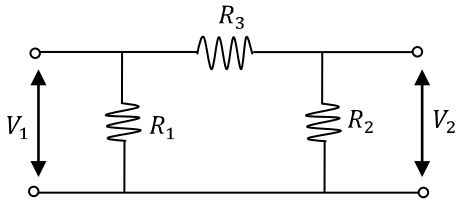
9 State and prove Norton's theorem for both AC and DC networks.

**UNIT – V**

10 Derive the relation between transmission parameters and admittance parameters.

**OR**

11 Determine z-parameters for the given network.

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