**Code: R7100206**

**R07**

B.Tech I Year (R07) Supplementary Examinations December/January 2015/2016

**ELECTRICAL CIRCUIT ANALYSIS**

(Electrical Electronics Engineering)

(For 2008 regular admitted batch only)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) State and explain Kirchoff's laws.

(b) Resistors $R_1$ = 10 Ω, $R_2$ = 20 Ω, $R_3$ = 30 Ω are connected in star configuration. Find out the equivalent delta configuration.

2 (a) State and explain the Faraday's laws of electromagnetic induction.

(b) Two coupled coils, with $L_1$ = 20 mH, $L_2$ = 10 mH and k = 0.50 are connected four different ways: series aiding, series opposing and parallel with both arrangements of winding sense. Obtain the equivalent inductance of the four connections.

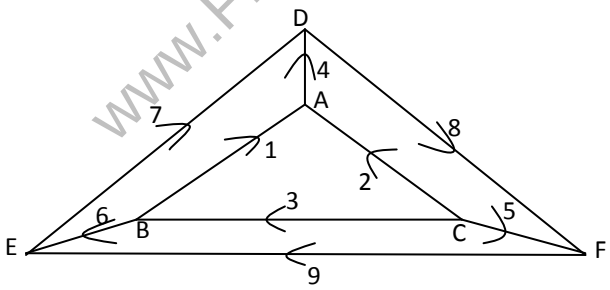
3 (a) The current in an RL circuit with R = 12 Ω and i(t) = 12sin(900t) + 7sin(2700t) + sin(4500t). Determine the effective applied voltage and average power.

(b) Define resonance and derive the resonant frequency and quality factor for RLC circuit.

4 (a) Explain the concept of complex power. Define power factor. What is its significance in electrical circuits?

(b) A balanced 3-phase star connected load 8+j6 ohms per phase is connected to a three phase 230 V supply. Find the line current, power factor, active power, reactive power and total volt-amperes.

5 (a) Select a suitable tree and find cut set and tie set matrices for the graph shown in figure below:




(b) Explain the principle of duality with an example.

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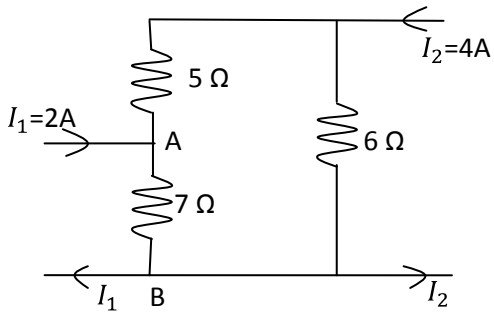
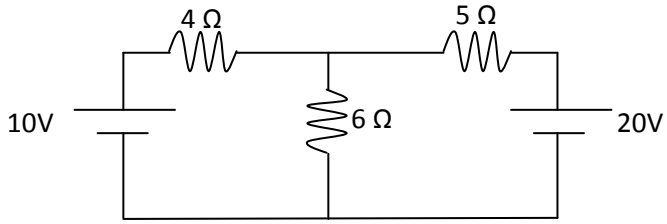
6 (a) State and explain super position theorem.

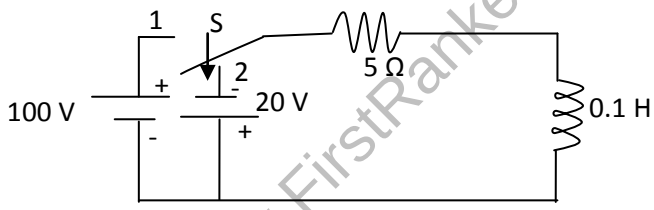
(b) Apply super position theorem to the network shown below and find voltage V AB.




(c) Verify reciprocity theorem for the network shown below.

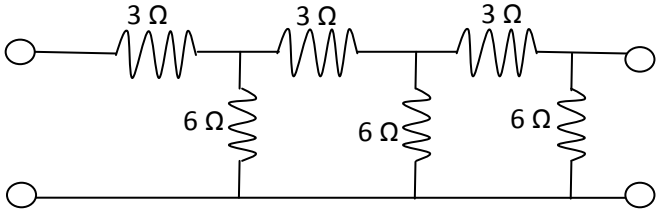



7 (a) In the circuit shown below, the switch S is in position 1 for 0.01 seconds and then changed to position 2. Find the time at which the current is zero.




(b) For an RC series circuit, a sinusoidal voltage v(t) = V m sinωt is applied at t = 0. Find the expression for transient current.

8 (a) Determine Y-parameters of the network shown below.




(b) The Z-parameters of a two port network are $Z_{11}$ = 15Ω, $Z_{22}$ = 24 Ω, $Z_{12}$ = $Z_{21}$ = 6 Ω. Determine ABCD parameters.

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