

Code: R7 100206

**R7** 

B.Tech I Year (R07) Supplementary Examinations, May 2012

## ELECTRICAL CIRCUIT ANALYSIS

## (Electrical and Electronics Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

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- 1 (a) State and explain Kirchhoff's laws
  - (b) Find the power supplied by the battery by using star-delta transformation.



- 2 (a) State and explain Faraday's laws of electromagnetic induction.
  - (b) An iron ring of mean length 50 cm has an air gap of 1 mm and a winding of 200 turns. If the relative permeability of iron is 400, when a current of 1 A flows in the winding, determine the flux density. Neglect leakage and fringing.
- 3 (a) Derive the expression for RMS value of a sinusoidal wave form.
  - (b) Obtain the current locus for the given circuit and find the value of Rc which results in a phase angle of 45<sup>°</sup> between V and I.



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4 (a) Derive the relation between phase and line values of a 3-phase balanced delta connected system.

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- (b) Three impedances each of (3-j4) ohm are connected in delta to a 230 V, 3-phase, 50 Hz supply. Calculate the real power, reactive power and total power delivered to the load.
- 5 (a) Define and explain (i) Graph (ii) Tree (iii) Basic cutset (iii) Basic Tie set.
  - (b) For a given network draw the graph and choose a possible tree. Construct the basic Tie set schedule. Write the equations for the branch currents in terms of link current and write separately the independent equations



- 6 (a) State and explain Tellegen's theorem.
  - (b) Determine the current flowing through the capacitor using super position theorem.



7 Find the initial conditions for voltage across capacitor, the currents  $i_1$ ,  $i_2$  and the derivatives for the circuit shown when the switch is closed at t=0.



- 8 (a) Define and obtain ABCD parameters by taking any one example.
  - (b) A two part network has the following parameters.  $Z_{11} = 20 \Omega$ ,  $Z_{12} = 5 \Omega$ ,  $Z_{21}$ ,  $20 \Omega$  and  $Z_{22} = 15 \Omega$ . Calculate hybrid parameters.

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