Code: R7 100206
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

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 $45^{\circ}$ 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.
(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.

$7 \quad$ Find the initial conditions for voltage across capacitor, the currents $\dot{i}_{1}, \dot{i}_{2}$ and the derivatives for the circuit shown when the switch is closed at $\mathrm{t}=0$.


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.

