

**F 9295**

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Reg. No. 12 .....

Name.....

**B.TECH. DEGREE EXAMINATION, NOVEMBER 2011**

**Third Semester**

Branch : Electrical and Electronics Engineering

EE 010 303—ELECTRIC CIRCUIT THEORY (EE)

(Regular)

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions briefly.  
Each question carries 3 marks.*

1. Explain the necessary conditions to be satisfied by the driving point impedance function.
2. Show that the variation of current in a series RC circuit for a d.c. excitation is exponential.
3. Define : Graph, tree and tie set.
4. Explain dot convention in coupled circuits.
5. Three impedances  $z_1$ ,  $z_2$  and  $z_3$  are connected in delta. From basics, obtain the Y equivalent.

(5 × 3 = 15 marks)

**Part B**

*Answer all questions. Each question carries 5 marks.*

6. Show that a voltage source with an internal resistance  $R_{in}$  can be replaced by an equivalent current source and the power delivered to an external resistance in either case is the same.
7. A circuit of resistance  $20\ \Omega$  and inductance  $0.2\text{ H}$  in series has a direct voltage of  $250\text{ V}$  suddenly applied to it. Find the voltage drop across the inductor at the instant of switching on and at  $0.01\text{ sec}$  later.
8. Define Cut-set and basic cut-set. If  $e$  is the number of elements and  $n$ -the nodes, how many trees will be there in the graph ?
9. Two similar coupled coils of resistance  $5\ \Omega$  and self inductance  $1\text{ H}$  are in series. This is in series with a  $100\ \mu\text{F}$  capacitor. A  $220\text{ V}$ ,  $50\text{ Hz}$  source energises the circuit. Draw the circuit, place the dot markings and calculate the coupling coefficient so that the circuit behaves like a pure resistor.
10. Taking  $V_{BC}$  as reference, show all the line and phase voltages for ABC and CBA sequences in a 3-phase circuit.

(5 × 5 = 25 marks)

**Turn over**