Reg. No. : | | | | | | | | | | | |

S 4030

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Second Semester

(Regulation 2004)

Electronics and Communication Engineering

EC 1151 — CIRCUIT ANALYSIS

(Common to (B.E. (Part-Time) First Semester) Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State KCL and KVL.

2. Derive the formula for I_1 in terms of I_t for the circuit shown in figure No.2

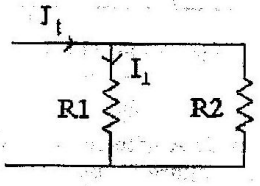

Figure Qn. 2

3. Find the equivalent network for the circuit shown in figure no. 3

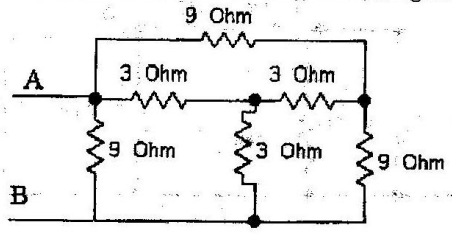

Figure Qn. 3

4. What is meant by Linear and Bilateral networks?

5. Draw the phasor diagram for pure inductance, Pure capacitance and Resistance.

6. Define power factor.

7. When the current is maximum in the series resonance circuit? Why?

8. Define Time constant for RC circuit.

9. What are the characteristics of Ideal transformer?

10. Define the following related to network topology. Tree and Branch.

PART B — (5 × 16 = 80 marks)

11. (a) Find the voltage V, and current I_2 and I_3, when loop current I_1 = 0.5 A. For the circuit shown in Figure 11 (a) by mesh analysis. (16)

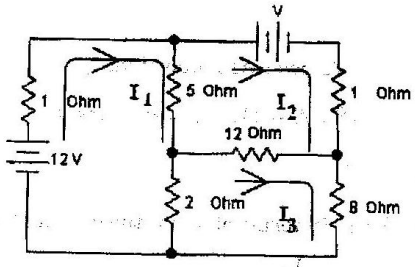

Figure Qn. 11 (a)

Or

(b) Find the voltage at node A with respect to node B using nodal analysis for the circuit shown in figure 11 (b). (16)

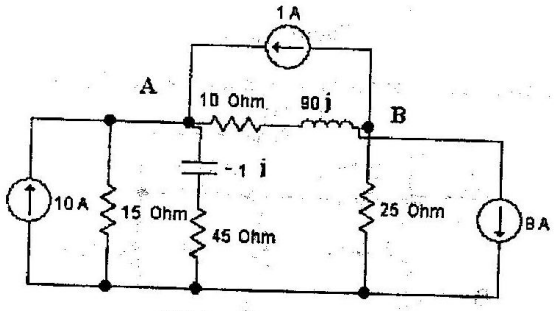

Figure Qn. 11 (b)

12. (a) Thevenin's equivalent circuit of the network shown in figure when 25 Ohm resistance is considered as a Load resistance. (16)

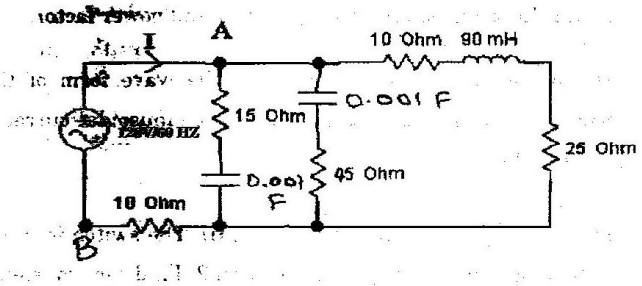

Figure Qn. 12 (a)

Or

(b) Derive the formula for star to delta conversion and find out the equivalent impedance across A and B for the circuit shown in the figure 12 (b). (16)

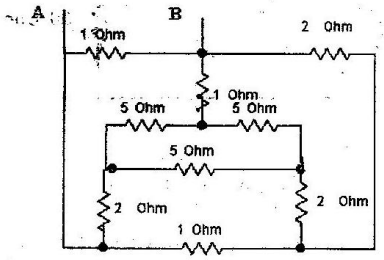

Figure Qn. 12 (b)

13. (a) (i) Draw the phasor and impedance diagram and determine the circuit constant (resistance and Inductance) for the following voltage and current $v = 150 \sin (5000\ t + 50°)V$, $i = 5 \sin (5000\ t - 25°)A$ (8)

(ii) Draw the phasor diagram of the circuit shown in figure 13 (a) (ii), assume that E1 = E3 and end E2 = E4. (8)

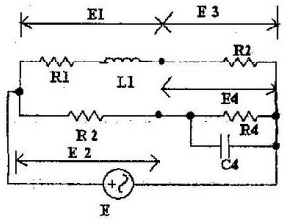

Figure Qn. 13 (a) (ii)

Or

(b) (i) A voltage V = 240 $\angle -30^\circ$ V has three parallel impedance $Z_1 = 25 \angle 10^\circ \Omega$, $Z_2 = 10 \angle 60^\circ \Omega$, $Z_3 = 15 \angle 90^\circ \Omega$. Find the Real power, Reactive power, complex power and power factor. (10)

(ii) Define instantaneous power. Draw the wave form of the power when the sinusoidal voltage V, lags the sinusoidal current I by an angle of 45°. (6)

14. (a) (i) In the circuit shown in figure 14 (a) (i). The switch is in position 1 for a long time then moved to position 2. Find the transient current and derive the necessary equation. (8)

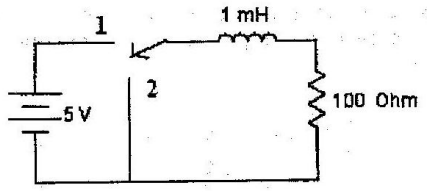

Figure Qn. 14 (a) (i)

(ii) Determine v_1 and dv_1/dt at $t = 0^+$ for the circuit shown in figure 14 (a) (ii) with switch 1 operated at t = 0. (8)

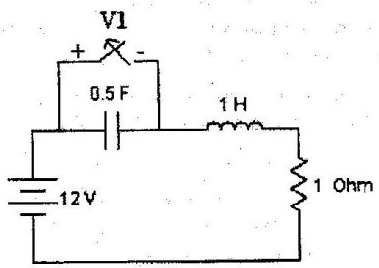

Figure Qn. 14 (a) (ii)

Or

(ii) In the circuit shown in figure 15 (b) (ii), draw the graph of the network write the tie set matrix and obtain the equilibrium equations on the basis and solve for the mesh currents. (12)

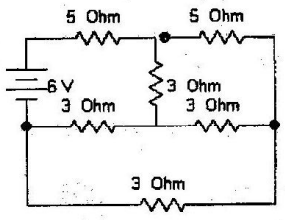

Figure Qn. 15 (b) (ii)

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