

MLR INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)

B.Tech I Year I Sem Examinations , January-2016

NETWORK ANALYSIS

(ECE)

Time: 3 hours

Max. Marks: 75

- NOTE: 1.This paper contains two parts A and B.
 2. PART A is compulsory which carries 25 marks. Answer all the questions in PART A.
 3. Part B consists of 5 units. Answer any one full question from unit. Each Question carries 10 marks and may have a,b,c as sub questions.

PART-A (25 Marks)

- 1 (a) Define a voltage source. Compare independent and dependent sources. 2 M
- (b) Explain the concept of super node. 2 M
- (c) Define (i) RMF value (ii) average value for periodic waveforms. 2 M
- (d) State Thevenin's and Norton's theorems. 2 M
- (e) Draw the hybrid parameter model for a two-port network and write its characterizing equations. 2 M
- 2 (a) What are passive circuit elements? Write the voltage and current relationship in each element. 3 M
- (b) Consider a delta connected resistive network with R_A , R_B and R_C . Find its star equivalent network. 3 M
- (c) A parallel circuit has $R=10\Omega$, $L=10\text{mH}$ and $C=10\mu\text{F}$. 150A, 50Hz source is connected across it. Find admittance, voltage and power factor. 3 M
- (d) State and prove Tellegen's theorem. 3 M
- (e) Explain the concept of basic tieset with example. 3 M

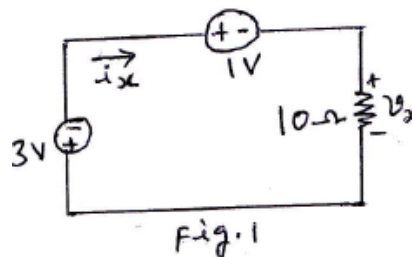
PART-B

50 Marks

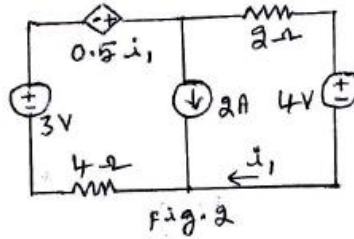
- 3 (a) Define Kirchhoff's current law. Explain with the help of a suitable circuit diagram. 5M
- (b) Explain the concept of source transformation with suitable example. 5M

OR

- 4 (a) Derive an expression for total inductance when connected in parallel. 4M
- (b) Determine i_x and v_x in the circuit of Fig. 1. 6M

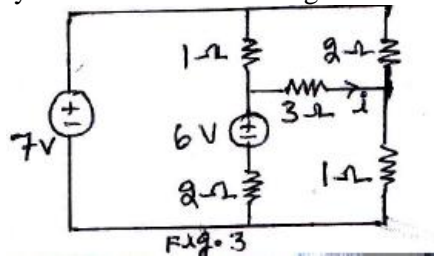


- 5 (a) For the circuit of Fig. 2, use nodal analysis to determine the current labeled i_1 . 6M
 (b) Find the power supplied by the 4V source in the Fig. 2. 4M

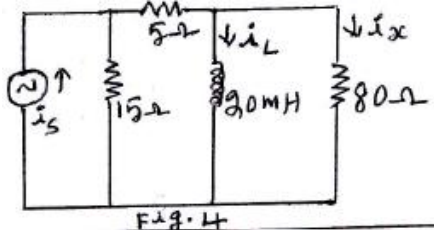


OR

- 6 (a) Use mesh analysis to determine the current i passing through 3Ω resistor in the circuit of Fig.3. 6M
 (b) Find the power supplied by the 6V source in the Fig. 3. 4M

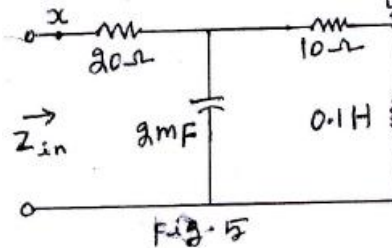


- 7 (a) If $i_s = 0.4\cos 500t$ A in the circuit shown in the Fig.4, find (i) $i_L(t)$ (ii) $i_x(t)$. 6M
 (b) Find the expression for the instantaneous power in the 5Ω resistor in Fig. 4. 4M



OR

- 8 (a) Let $\omega = 100\text{rad/s}$ in the circuit if the Fig.5. Find Z_{in} . 6M
 (b) Repeat part (a) if a short circuit is connected from x to y. 4M

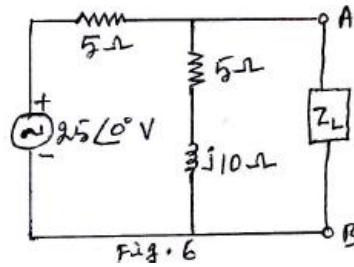


- 9 (a) Determine the value of Z_L to be connected across AB in Fig.6 for maximum power 5M

transfer.

- (b) Calculate the maximum power absorbed by Z_L in the Fig. 6.

5M



OR

- 10 (a) State and Explain Superposition Theorem

5M

- (b) Find the current in the 6 Ω resistor using superposition theorem shown in figure 7

5M

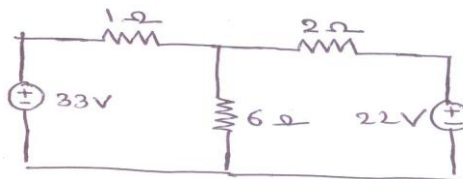


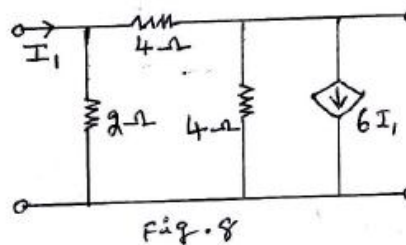
Fig.7

- 11 (a) Calculate the Z-parameters for the network shown in Fig.8.

6M

- (b) For the network of part (a), find transmission parameters using conversion formulas.

4M



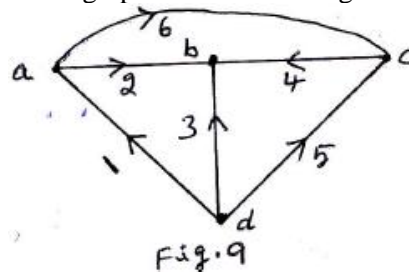
OR

- 12 (a) For the graph shown in the Fig.9, consider the tree formed by branches(2,3,4).Using this tree, find tie-set matrix.

6M

- (b) Find the cut-set matrix for the graph shown in the Fig. 9.

4M



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