B.E. (Electrical (Electronics & Power) Engineering) Third Semester (C.B.S.)

Network Analysis

P. Pages : 5 **NRJ/KW/17/4365**

Time : Three Hours *0507* Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Use of non programmable calculator is permitted.

1. A) Using source transformation convert the circuit shown in fig. 1 (A) to a single source in parallel with single element. **6**

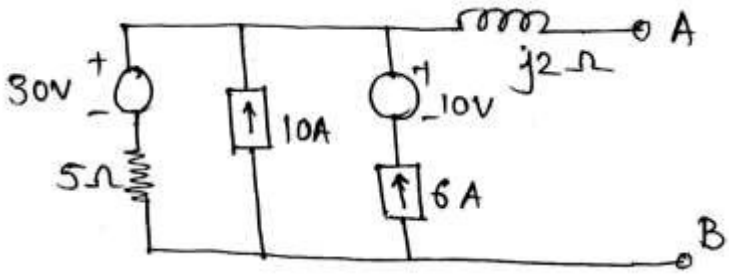


Fig. 1 (A)

B) Find the current flowing through 2Ω resistance for the network shown in fig. 1 (B). **7**

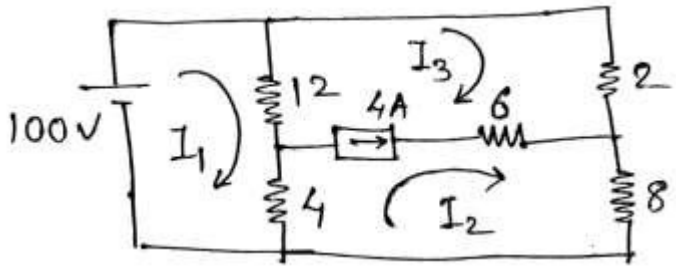


Fig. 1 (B)

OR

2. A) Write the mesh equilibrium equation in matrix form for the network shown in fig. 2 (A). **7**

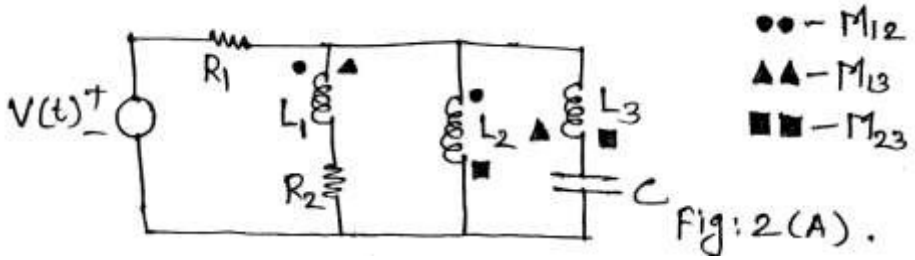


Fig: 2(A).

B) In the network given in fig. 2(B) determine the current flowing through the branch J2Ω using mesh analysis method. **6**

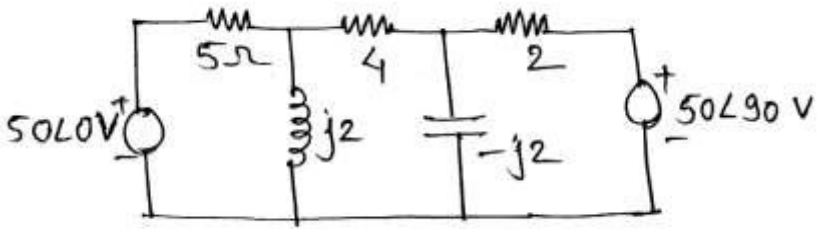


Fig. 2 (B)

3. A) In the network shown in fig. 3(A), determine the voltage $\overline{V}_b$ which result's in zero current through $(2+j3)\Omega$ impedance. Use Nodal Analysis. **7**

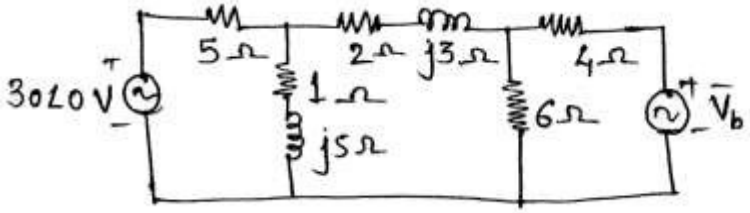


Fig. 3. (A).

B) Define the term duality. Construct the dual of network shown in fig. 3 (B). **7**

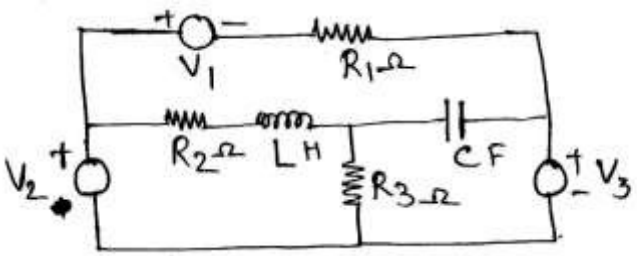


Fig. 3 (B)

OR

4. A) Using Nodal Analysis for the fig. 4 (A) find the current in branch A.B. **7**

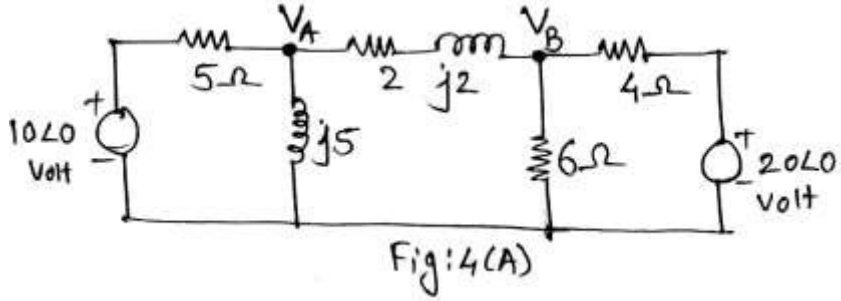


Fig: 4(A)

B) What are the conditions of Duality. Draw the dual network for fig. 4 (B). **7**

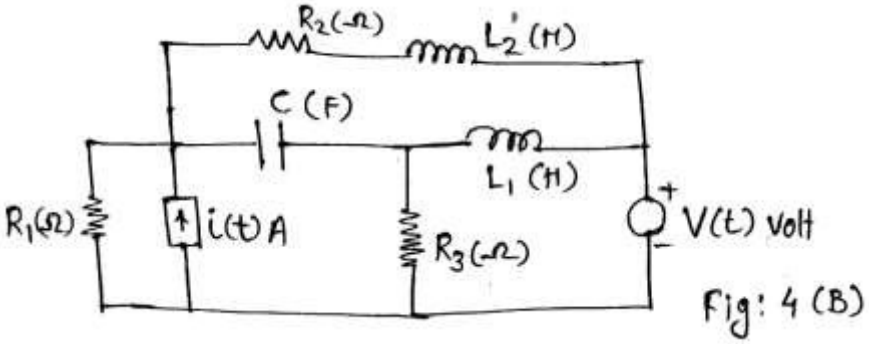


Fig: 4 (B)

5. A) What is the value of Z_L so as to transfer maximum power through it and hence find the maximum power transferred ref. fig. 5 (A). **7**

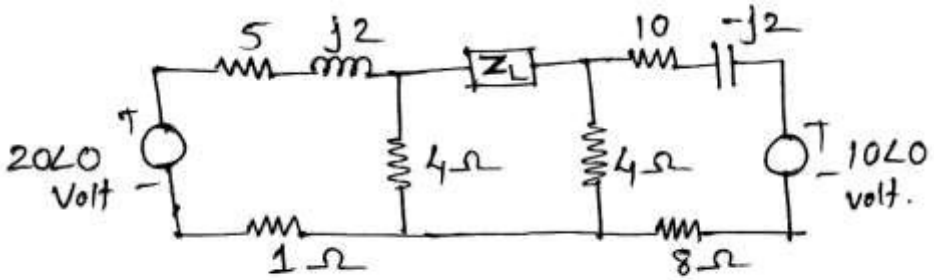


fig: 5.(A)

B) Find the current flowing through branch A.B for the network shown in fig. 5 (B) using Thevenin's theorem. **6**

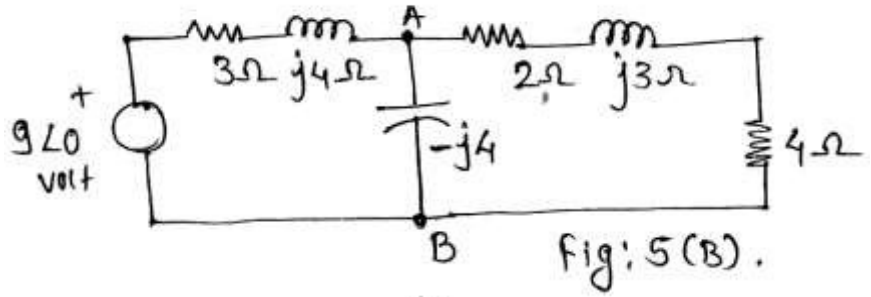


fig: 5(B).

OR

6. A) Calculate current 'I' & verify the reciprocity theorem for the network shown in fig. 6 (A). **6**

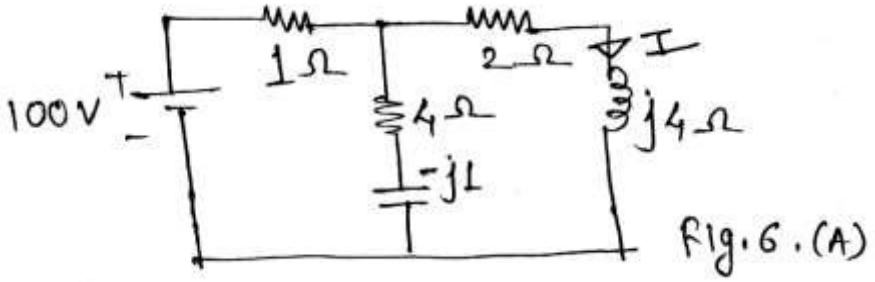


fig. 6. (A)

B) Find the change in current 'I' in the network shown in fig. 6 (B). When reactance j2Ω is increased to j5Ω. Use compensation theorem. **7**

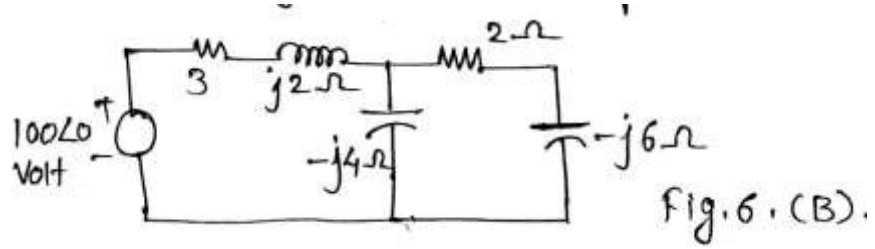


fig. 6. (B).

7. A) In the network shown in fig. 7(A), a steady state is reached with 'K' opened. At t = 0, switch 'K' is closed. Find $V_a(0^-)$, $V_b(0^-)$, $V_a(0^+)$, $V_b(0^+)$. **7**

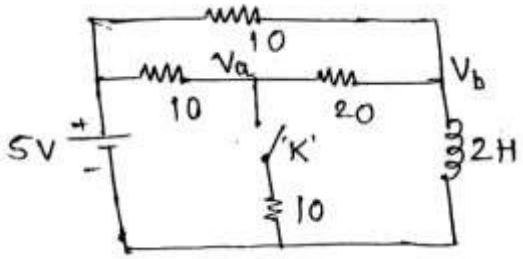
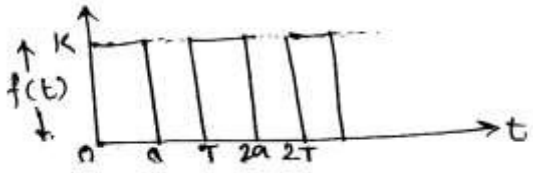


Fig. 7.(A).

B) Obtain Laplace transform of a train of pulses of height 'K' and a width 'a' time period is 'T' seconds. **6**



OR

8. A) Find the Laplace transform of the isosceles triangular wave shown in fig. 8 A. **7**

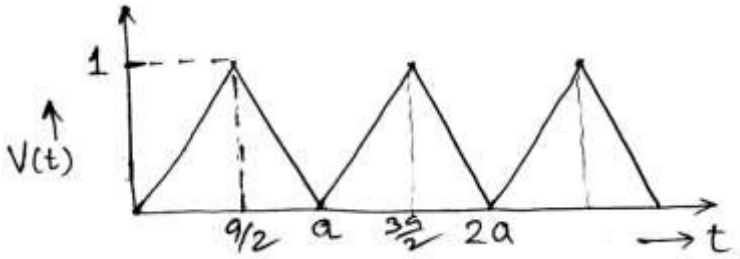
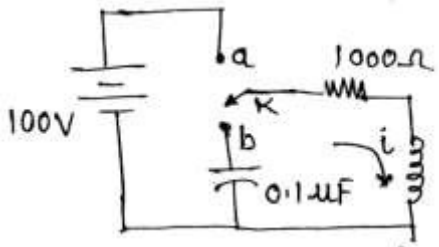


Fig:8(A)

B) For the network shown in fig. 8 (B), switch 'k' is changed from position-a to position-b at t = 0. Find i, $\frac{di}{dt}$ at $t = 0^+$. **6**



9. A) Define poles and zeros of a network function. Plot 'pole-zero' diagram in s-plane for the function $V(S) = \frac{3S}{(S+2)(S^2+2S+2)}$ Hence find V(t) from the 'Pole-zero' diagram. **8**

B) Obtain the current transfer ratio for the network shown in fig. 9 (B). **6**

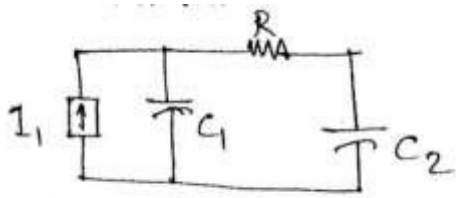


Fig. 9.(B).

OR

10. A) Find the driving point admittance function of the network shown in fig. 10 A. **4**

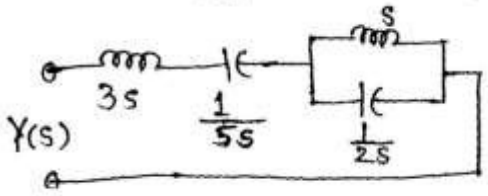


Fig: 10.(A)

B) Define the following terms : **4**

i) Driving point function ii) Transfer function

iii) Current gain iv) Voltage gain

C) Determine the voltage transfer function $\frac{V_2}{V_1}$ for the network shown in fig. 10 (C). **6**

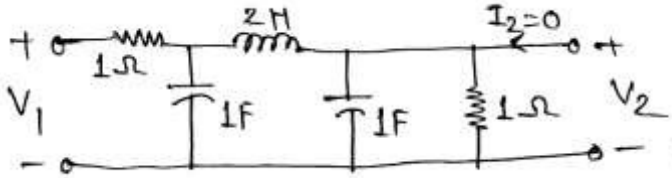
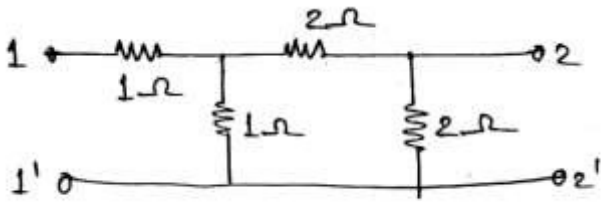


Fig. 10.(C)

11. A) Define ABCD parameter's and derive the condition for reciprocity in terms of ABCD parameter's. **6**

B) Obtain Z-parameters of a two-port network shown in fig. 11 (B). **7**

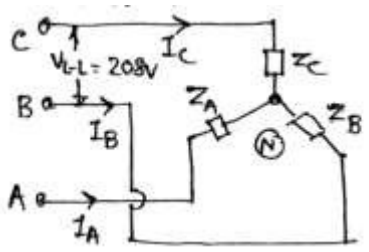


Fig; 11(B)

OR

12. A) Compare series and parallel Resonant circuit (minimum 6 points). **6**

B) A three phase 4-wire, 208V, CBA system as shown in fig. 12 (B) has a star connected load with $Z_A = 5\angle 0^\circ\Omega$, $Z_B = 5\angle 30^\circ\Omega$, $Z_C = 10\angle -60^\circ\Omega$. Obtain phase currents, line currents and current through neutral wire, with $Z_N = 4\angle 50^\circ\Omega$. **7**



fig; 12 (B)

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