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

Network Analysis

P. Pages : 5 **NJR/KS/18/4365**

Time : Three Hours *0128* 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. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) Find mesh currents I_1, I_2 & I_3 in the n/w of fig. 1 (a). Solve by mesh analysis. **7**

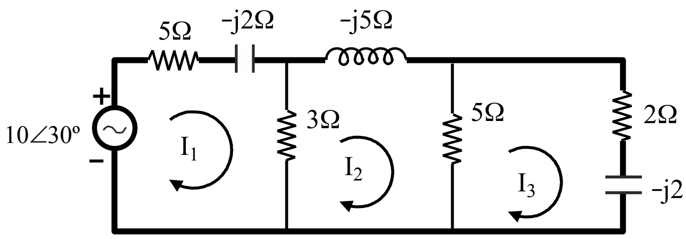

Fig.1(a)

b) Determine the current in the $10\,\Omega$ resistor of the n/w shown in fig 1 (b). **6**

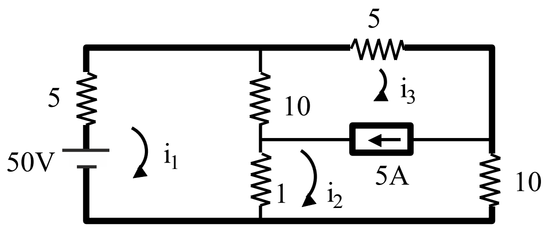

Fig. 1 (b)

OR

2. a) Write the equilibrium equation on mesh basis for the n/w of fig. 2 (a). **7**

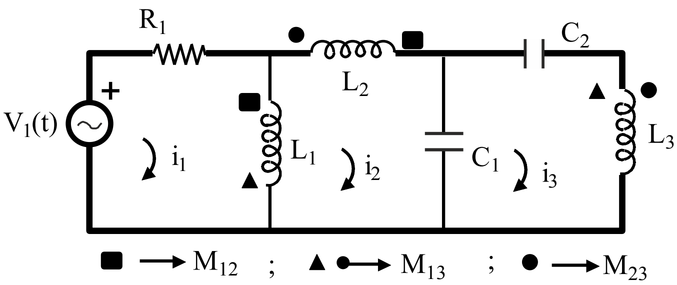

Fig. 2(a)

b) Find the currents I_1, I_2 & I_3 in fig. 2 (b). Solve by source transformation. **6**

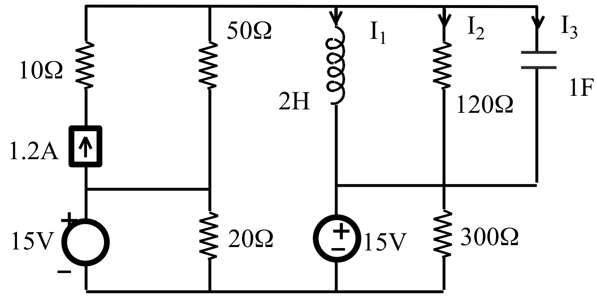

Fig. 2 (b)

3. a) For the network shown in fig. 3 (a) find the voltages V_1 & V_2. (Solve by Nodal analysis). **7**

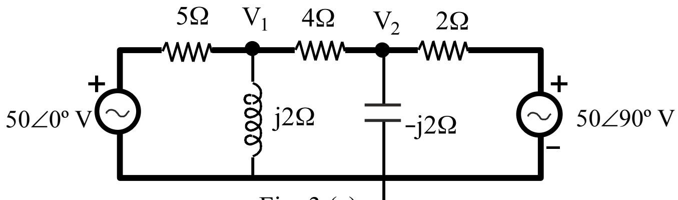

Fig. 3 (a)

b) Determine the current in the $5\,\Omega$ resistor for the n/w shown in fig 3 (b). **6**

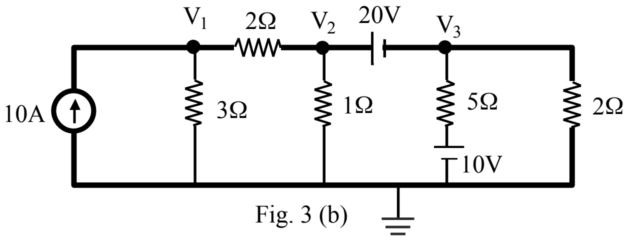

Fig. 3 (b)

Solve by nodal Analysis.

OR

4. a) Explain the term duality & construct the dual circuit for the circuit shown in fig 4 (a). **7**

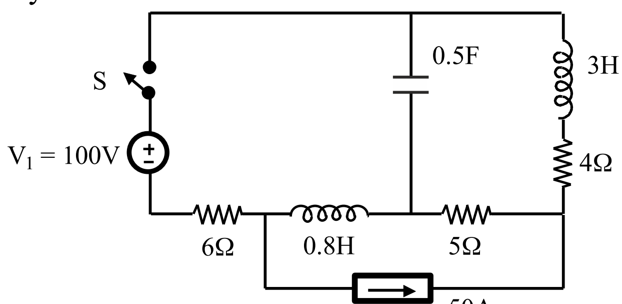

Fig. 4 (a)

b) Find the voltage across the $5\,\Omega$ resistor for the n/w shown in fig 4 (b). Solve by Nodal Analysis. **6**

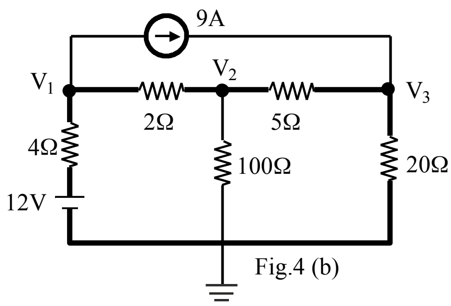

Fig.4 (b)

5. a) Evaluate the current through $10\,\Omega$ resister by Thevenin's theorem & confirm result by Norton's theorem. **7**

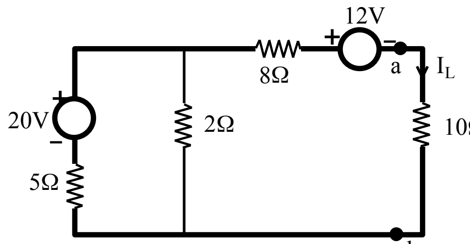

Fig. 5 (a)

b) Find the impedance Z_L, so that maximum power can be transferred to it in the n/w of fig 5 (b). find maximum power. **7**

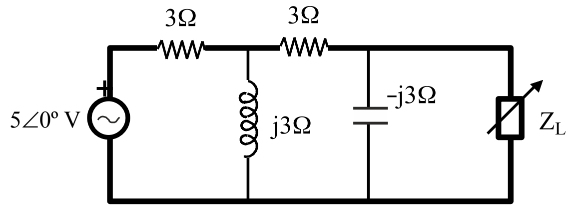

Fig. 5 (b)

OR

6. a) In the n/w of fig 6 (a) find the current through the $2\,\Omega$ resistor & verify the reciprocity theorem. **7**

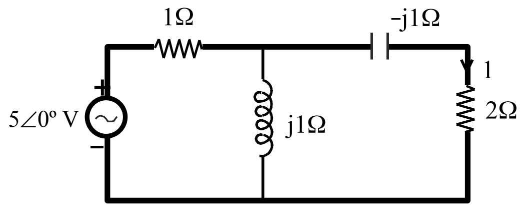

Fig. 6 (a)

b) In the n/w of fig 6 (b), the impedance $(5+j2)\Omega$ is changed to $(1+j1)\Omega$. Find the change in current drawn from the supply compensation theorem. **7**

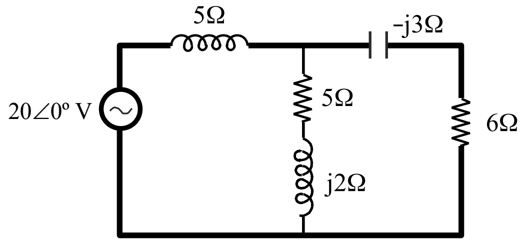

Fig. 6 (b)

7. a) Find the Laplace transform of the waveform shown in fig 7 (a). **5**

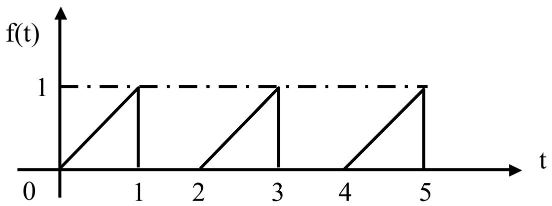

Fig. 7 (a)

b) Find the inverse Laplace transform of **8**

i) $\dfrac{s+2}{s\,(s+1)\,(s+3)}$ ii) $\dfrac{s+2}{s^2(s+3)}$

OR

8. a) In the n/w of fig 8(a), the switch is moved from the position 1 to 2 at t = 0, steady state condition having been established in the position 1. Determine i (t) for t > 0. **6**

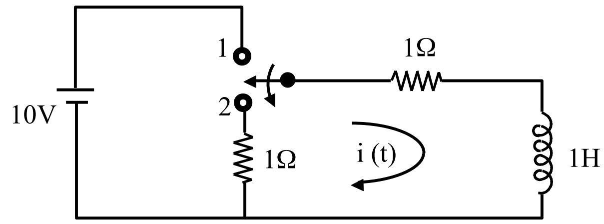

Fig. 8 (a)

b) Determine the current i(t) in the n/w shown in fig 8 (b) when the switch is closed at t = 0. **7**

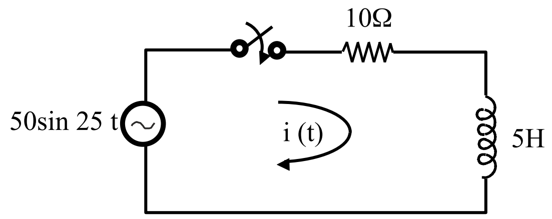

Fig. 8 (b)

9. a) Find the n/w f^n $\dfrac{V_1}{I_1}, \dfrac{V_2}{V_1}$ & $\dfrac{V_2}{I_1}$ for the n/w in fig 9 (b). **8**

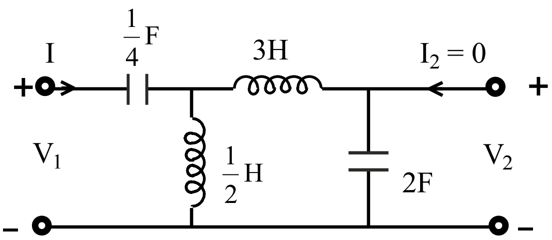

Fig. 9 (b)

b) For the n/w shown in fig 9 (c). Compute $\alpha_{12}(s) = \dfrac{I_2}{I_1}$ & $Z_{12}(s) = \dfrac{V_2}{I_1}$. **6**

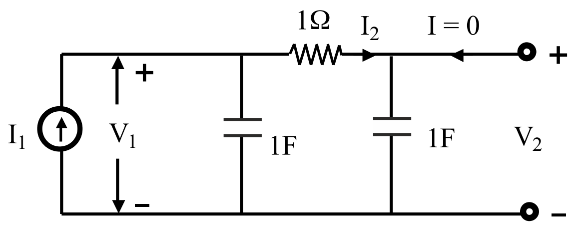

Fig. 9 (c)

OR

10. a) For the resistive bridged T-n/w shown in fig 10 (a) find $\frac{V_2}{V_1}, \frac{V_2}{I_1}, \frac{I_2}{V_1}$ & $\frac{I_2}{I_1}$. **7**

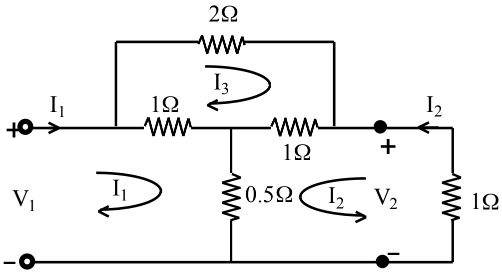

Fig. 10 (a)

b) The voltage V(s) of a n/w is given by **7**

$$V(s) = \frac{3s}{(s+2)(s^2+2s+2)}.$$

plot its pole zero diagram & obtain V(t) from pole-zero diagram.

11. a) Find the Z-parameter for the n/w shown in fig. 11 (a). **6**

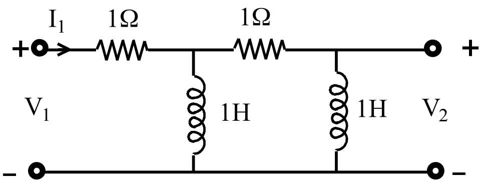

Fig. 11 (a)

b) Obtain the Reciprocity & symmetry condition in terms of ABCD parameter. **7**

OR

12. a) Networks shown in fig 12 (a) is to be analyzed as an interconnection of two identical networks. Obtain ABCD Parameters of the resultant combination. **7**

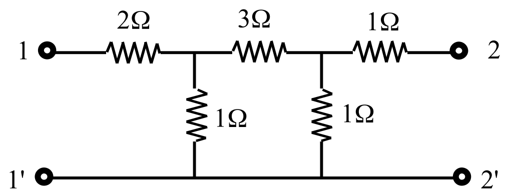

Fig. 12 (a)

b) For series resonance show the variation of R, X_L, X_C, (X_L-X_C), Z and I with frequency on a single graph. **6**

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