(b) Find transfer function $\frac{I_2}{V_1}$ for the Network shown in Fig. 10(b). 7

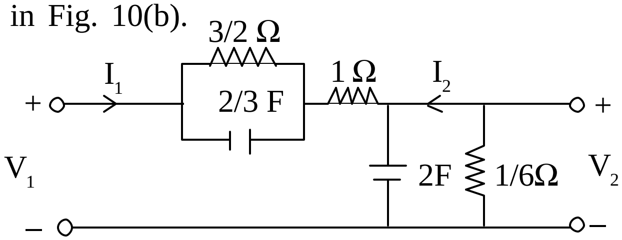

Fig. 10(b)

11. (a) Define ABCD parameters and derive the condition for reciprocity in terms of ABCD parameters. 7

(b) Find the Z-parameter of the Network shown in Fig. 11(b). 7

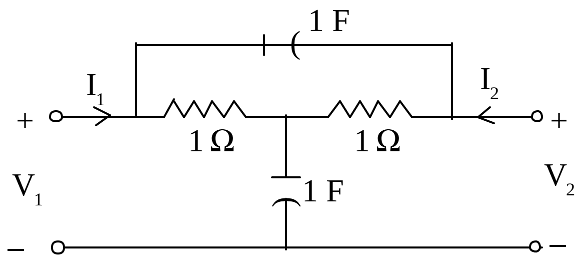

Fig. 11(b)

OR

12. (a) Compare series and parallel resonant circuit. 6

(b) A 400 V, 3 phase supply feeds an unbalanced three wire star-connected load. The branch impedances of the load are $Z_R = (4 + j8)\Omega$. $Z_Y = (3 + j4)\Omega$ and $Z_B = (15 + j20)\Omega$. Find the line current and voltage across each phase impedance. Assume RBY as phase sequence. 8

Faculty of Engineering & Technology

Third Semester B.E. (Electrical Engg.) (C.B.S.) Examination

NETWORK ANALYSIS

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Due credit will be given to neatness and adequate dimensions.

(3) Assume suitable data wherever necessary.

(4) Illustrate your answers wherever necessary with the help of neat sketches.

(5) Use of non-programmable calculator is permitted.

1. (a) Using source transformation, convert the ckt. shown in Fig. 1(a) into single voltage source and single resistance. 6

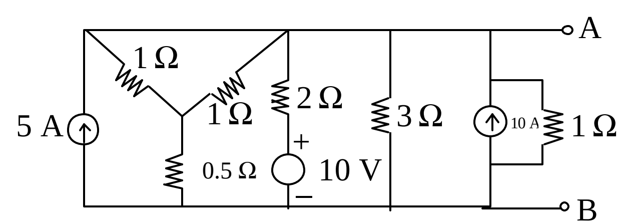

Fig. 1(a)

(b) Determine the Mesh current I_1, I_2 and I_3 in the Network of Fig. 1(b). 7

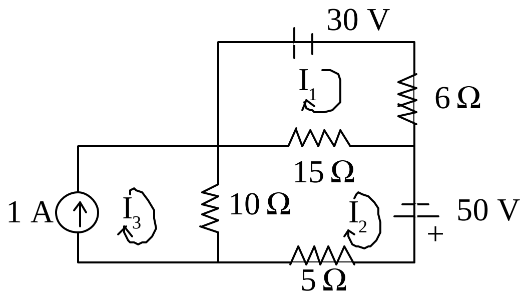

Fig. 1(b)

OR

2. (a) Determine the magnitude of voltage source $V_1(t)$ which results of 20 volt across 5 Ω resistance as shown in Fig. 2(a). 7

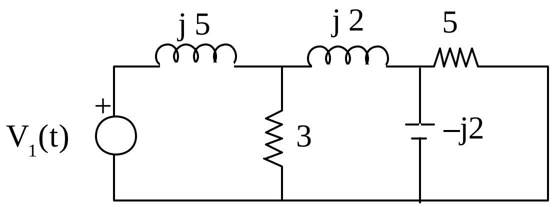

Fig. 2(a)

(b) For the Network shown in Fig. 2(b), write Mesh equations in matrix form. 6

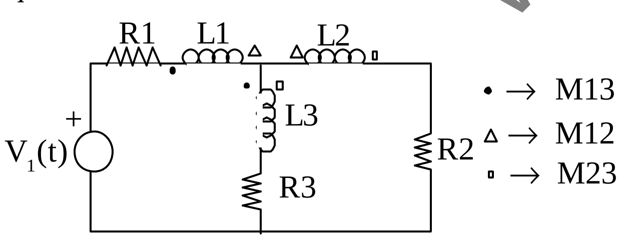

Fig. 2(b)

3. (a) Find the voltage V, which makes the current in 10 Ω resistance is zero using nodal analysis. 6

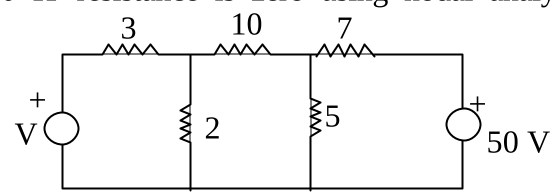

Fig. 3(a)

(b) Write the matrix form of the nodal equation for the Network shown. 7

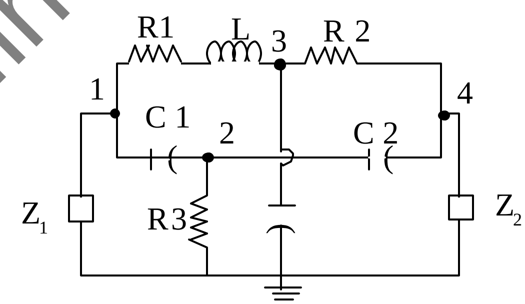

Fig. 3(b)

OR

4. (a) Define Dual Network. Draw the dual of the following Network. Write the condition satisfied by Dual Network. 6

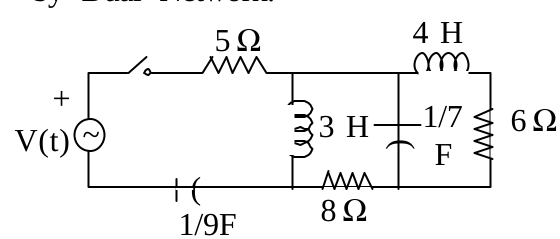

Fig. 4(a)

(b) Using nodal analysis for the 'Fig. 4(b)', find the power factor of source V_A and V_B. 7

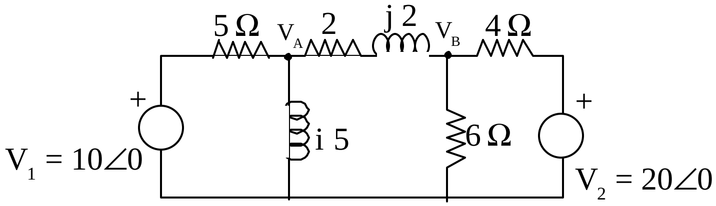

Fig. 4(b)

5. (a) In the Network of Fig 5(a) shown below; determine V_b by principle of Superposition. 7

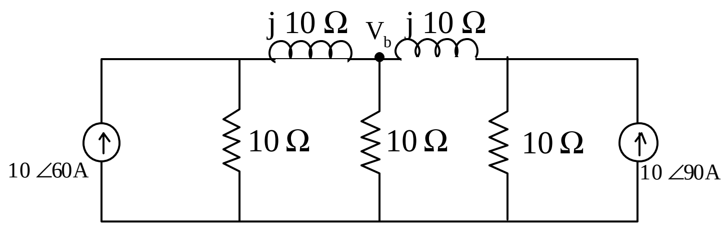

Fig. 5(a)

(b) Find out the current flowing through branch AB of Network shown in Fig. 5(b) by applying Norton's theorem and hence find Thevenin's equivalent network. 7

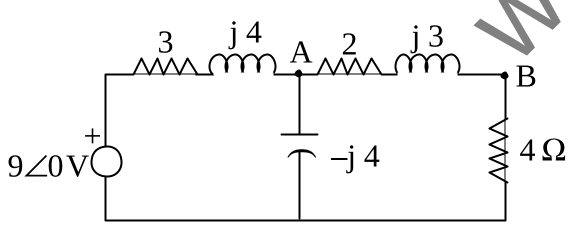

Fig. 5(b)

OR

6. (a) Find the current I and verify the reciprocity theorem for the Network shown in Fig. 6(a). 7

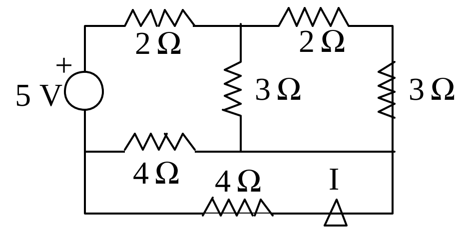

Fig. 6(a)

(b) For the Network shown in Fig. 6(b) the 5 Ω resistor is changed to 8 Ω. Determine the resulting change in current ΔI through (3+j4)Ω impedance branch using Compensation theorem. 7

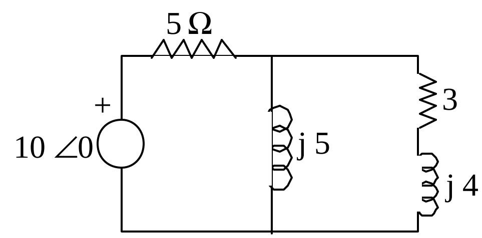

Fig. 6(b)

7. (a) In the Network of Fig. 7(a), the switch is opened at t = 0, find $i_2(t)$. 7

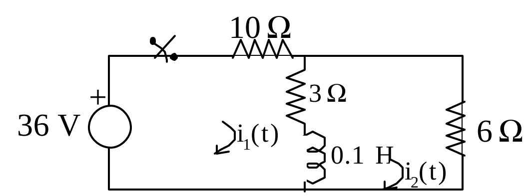

Fig. 7(a)

(b) Derive the expression for the impulse response of series RC Network using Laplace transform. 6

OR

8. (a) In the Network of Fig. 8(a) was initially in the steady state with the switch in the position a. At t = 0 the switch goes from a to b. find expression for voltage V(t) for t > 0. 7

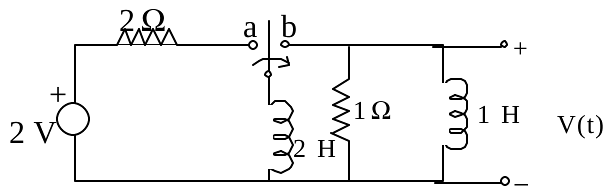

Fig. 8(a)

(b) Find the Laplace transform of the waveform shown in Fig 8(b). 6

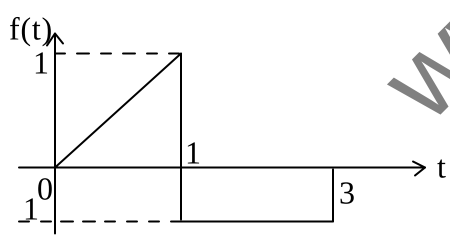

Fig. 8(b)

9. (a) Find the driving point admittance function of the Network shown. 4

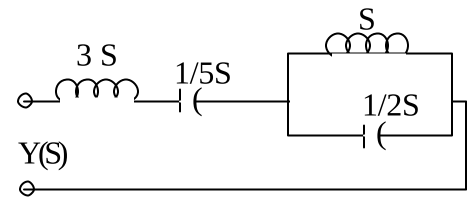

Fig. 9(a)

(b) Define the following terms :

(1) Driving point function

(2) Transfer function

(3) Current gain. 3

(c) The voltage V(s) of a Network is given by $V(s) = \frac{3s}{(s+2)(s^2+2s+2)}$. Plot its pole-zero diagram and hence obtain V(t) from pole-zero diagram. 6

OR

10. (a) Determine the voltage transfer function $\frac{V_2}{V_1}$ for the Network shown in Fig. 10(a). 6

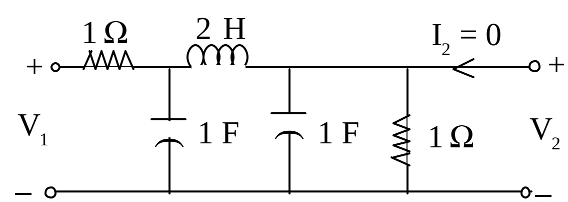

Fig. 10(a)