

Answer all the Questions

1. Find the power dissipated in the 1Ω resistor in the circuit shown in Fig. 1. (Hint: Δ to Y conversion) [3]

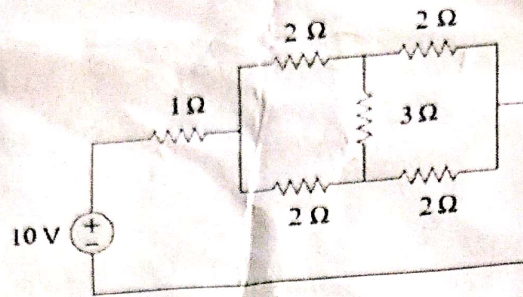


Fig. 1

2. Find the equivalent resistance R_{ab} in the circuit shown in Fig. 2 using the star-delta conversion. [3]

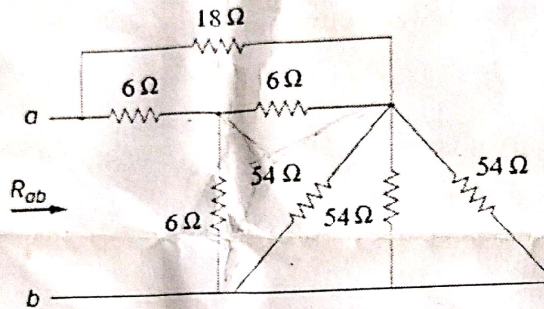


Fig. 2

3. Using the superposition theorem, find the current I in the circuit shown in Fig. 3. [2]

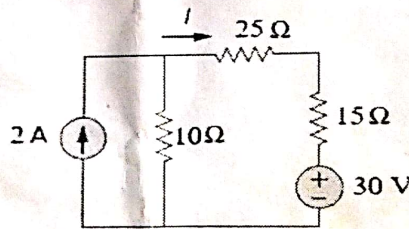


Fig. 3

4. Using nodal analysis, find the current i and the voltage v_x in the circuit shown in Fig. 4. [3]

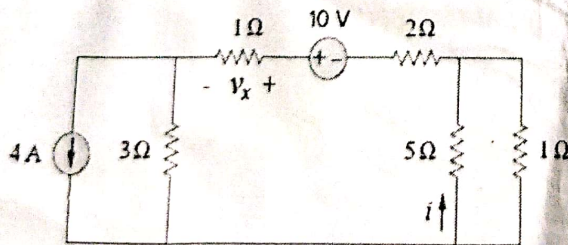


Fig. 4

5. Calculate the mesh currents I_1 and I_2 in the circuit shown in Fig. 5. [2]

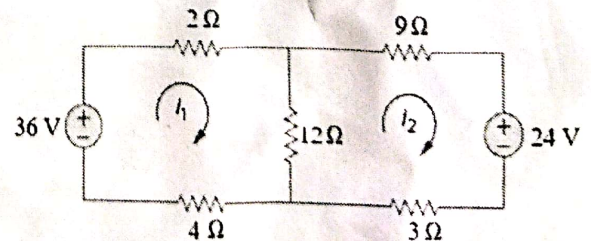


Fig. 5

6. Find the Thevenin equivalent circuits when looking into the circuit between (i) a and b, (ii) b and c in Fig. 6. [4]

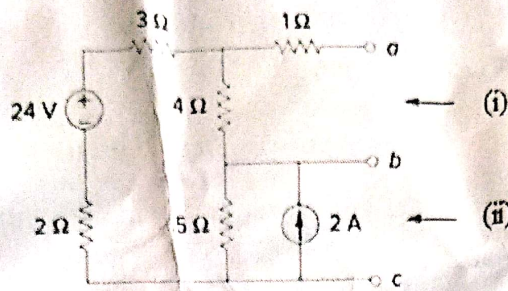


Fig. 6

7. Find the Norton equivalent circuit at terminals a and b of the circuit shown in Fig. 7. [4]

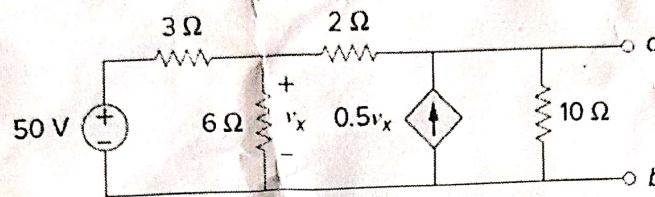


Fig. 7

8. Using Millman's theorem, find the current through and voltage across R_L in Fig. 8. [3]

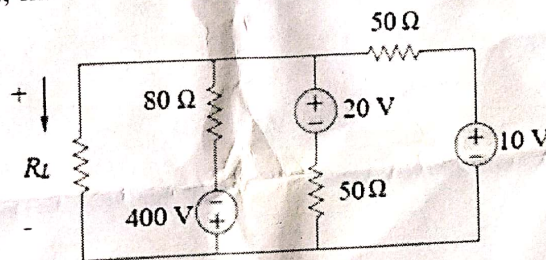


Fig. 8

9. Find the current I in the circuit shown in Fig. 9a, and repeat for the circuit shown in Fig. 9b. Is the reciprocity theorem satisfied? [4]

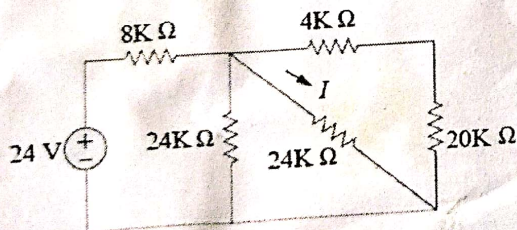


Fig. 9a

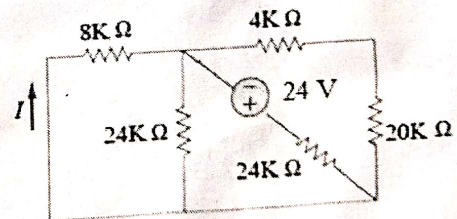


Fig. 9b

10. Find the value of R_L such that the maximum power is delivered to R_L in Fig. 10. [2]

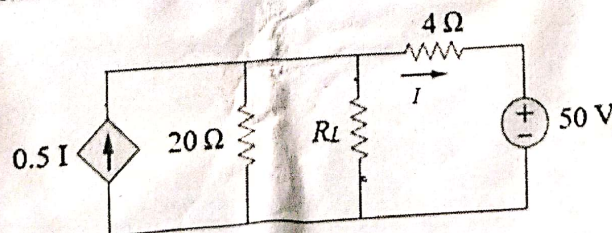


Fig. 10