DEHRADUN INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRICAL ENGINEERING

Assignment:-1

EA1210-Introduction to EE & ECE-Unit 1: DC N/W Theorems

Note: - All resistances are in ohm (Ω)

Q1. Using Node Analysis, determine current in each branch of the network in fig 1. Also find total power loss in the network..

(Ans: - 0.6 A, 0.3 A, 0.4 A, 0.2 A, 0.6 A, 15 Watts)

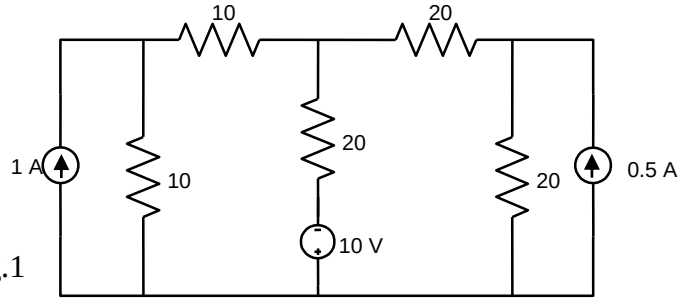

Fig.1

Q2. A Wheatstone bridge ABCD has the following details: AB= 10 Ω BC = 30 Ω CD = 15 Ω & DA = 20 Ω. A battery of e.m.f. 2 V and negligible internal resistance is connected between A & C with A positive. A galvanometer of 40 ohm resistance is connected between B & D. Determine the magnitude and direction of current in the galvanometer using Thevenin's theorem.
(Ans: - R_{Th} = 16.07 Ω , V_{Th} = 0.642 V, 11.5 mA from B to D)

Q3. Find the current in 10 Ω resistor using (Fig. 2)
(i) Superposition Theorem
(ii)Thevenin's Theorem
(ii) Norton's Theorem
(Ans: - R_{Th} = 5.35 Ω, V_{Th} = 7 V, 0.46A)

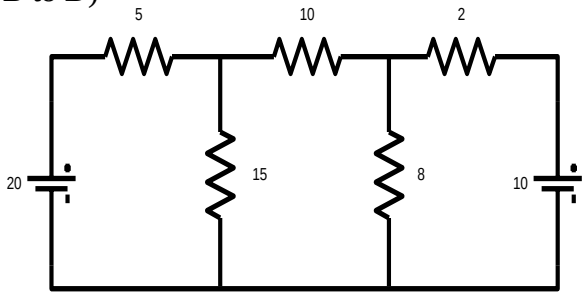

Fig. 2

Q4. Find the current in 3 Ω resistor using (Fig. 3)
(i) Superposition Theorem
(ii) Thevenin's Theorem
(iii)Norton's Theorem
(Ans: - 1 A)

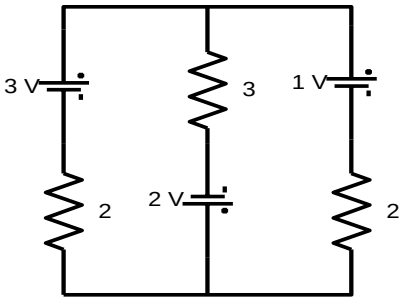

Fig. 3

Q5. Obtain the essential condition for maximum power transfer to the load R_L , and hence determine the maximum power transferred. (Fig.4)
(Ans: - R_{Th} = R_L = 4.3 Ω,V_{Th}=10.71 V, P_{max}= 26.68 W)

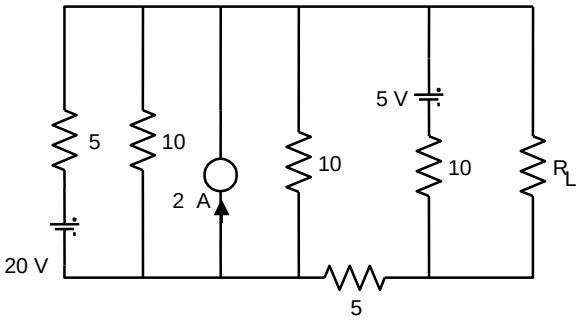

Fig. 4

Assignment:-1

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Note: - All resistances are in ohm (Ω)

Q6. Find the current in 2 Ω connected between A & B resistor using (Fig. 5)

(i) Superposition Theorem
(ii) Thevenin's Theorem
(iii) Norton's Theorem
(Ans: - 1.36 A)

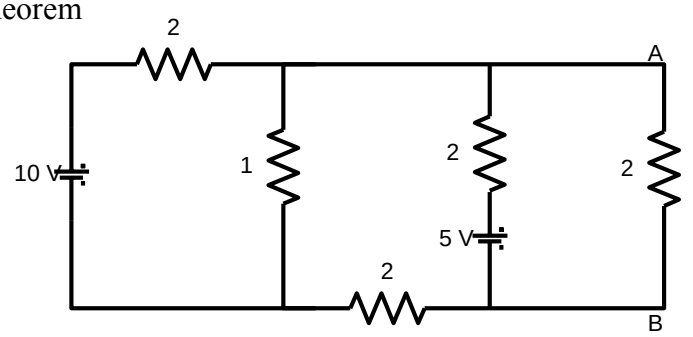

Fig. 5

Q7. At P-Q find (fig 6)

(i) Thevenin's Equivalent circuit
(ii) Norton's Equivalent circuit
(Ans: - R_{Th} = 7 Ω, V_{Th} = 72 V, 7 Ω, I_N = 10.29 A)

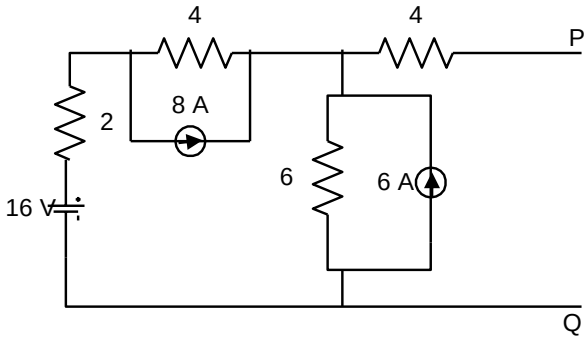

Fig. 6

Q8. At P-Q find (fig 7)

(i) Thevenin's Equivalent circuit
(ii) Norton's Equivalent circuit
(Ans: - R_{Th} = 8.33 Ω, V_{Th} = 10 V,
R_N = 8.33 Ω, I_N = 1.2 A)

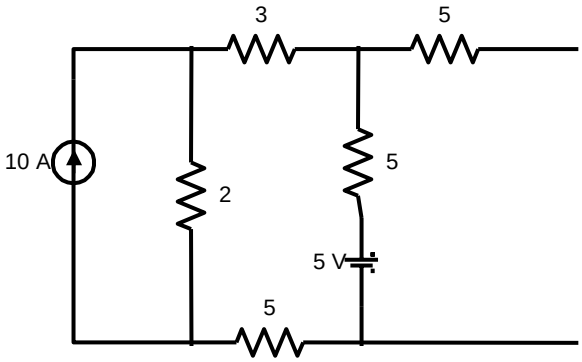

Fig. 7

Note: - All resistances are in ohm (Ω)

Q9. Find resistance between P-Q (fig 8) and A-B (fig 9)

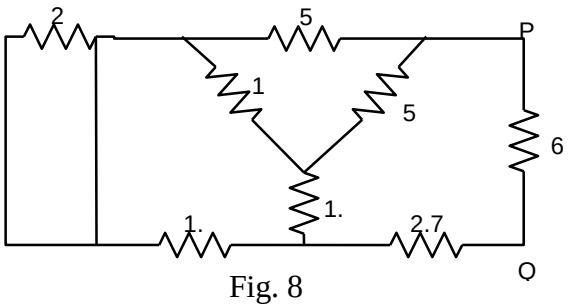

Fig. 8

(Ans: - 3 Ω)

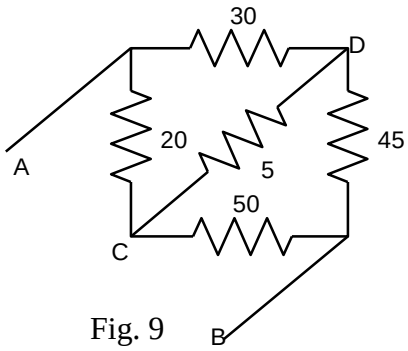

Fig. 9

(Ans: - 36 Ω)