Department of ECE, Bennett University

CSET102L: Introduction to Electrical and Electronics Engineering

Tutorial Sheet-4

Topics Covered: Source Transformation/Source conversion

1. For the circuit shown in Fig. 1, by converting the current source into voltage source, find the current through 91 Ω resistor.

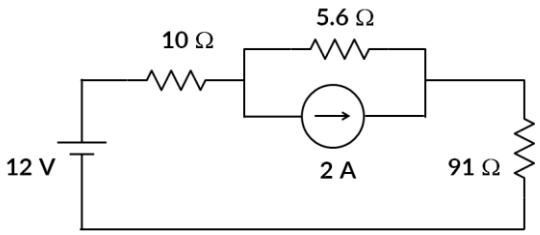

Fig. 1

2. For the network shown in fig. 2, by replacing all the current sources with a single current source, find the source voltage V_s.

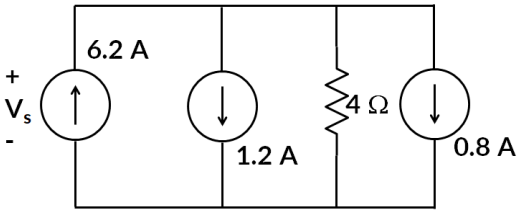

Fig. 2

3. For the network shown in fig. 3, find the voltage V_s and current through 4 Ω resistor.

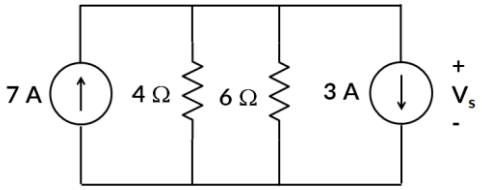

Fig. 3

4. For the circuit shown in fig. 4, determine the current through 12 Ω resistor by changing the voltage sources into current sources.

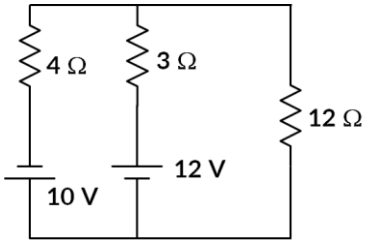

Fig. 4

5. In the circuit shown in fig. 5, find the voltage V_{ab} and current through 6 Ω resistance.

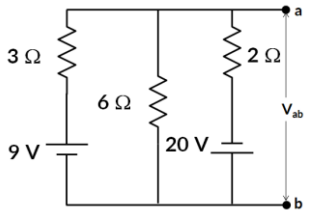

Fig. 5

6. For the circuit shown in fig. 6, find the voltage V_s and current through 12 V source.

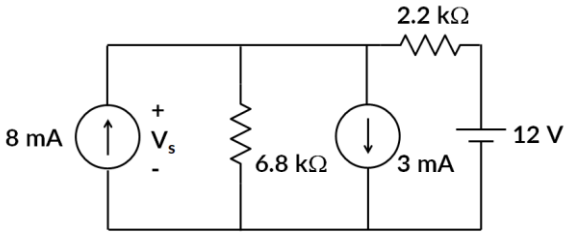

Fig. 6

Topics Covered: Superposition Theorem (Principle of Superposition)

7. Using superposition theorem, find the current flowing through 12 Ω resistance in fig. 7.

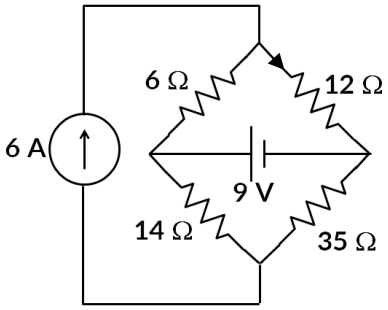

Fig. 7

8. Using superposition principle (superposition theorem), in the circuit shown in fig. 8, find the current flowing through 2 Ω resistance.

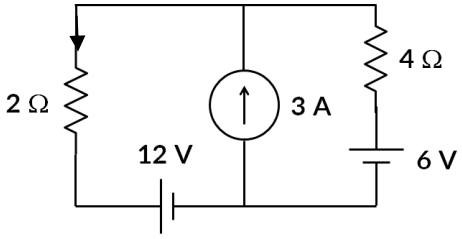

Fig. 8

9. Using superposition theorem, for the circuit shown in fig. 9, determine the voltage across the 4.7 Ω resistor and power delivered to the resistor. Find the power delivered to 4.7 Ω

resistor solely by voltage source and solely by current source. What are your observations and reasons for discrepancies if any.

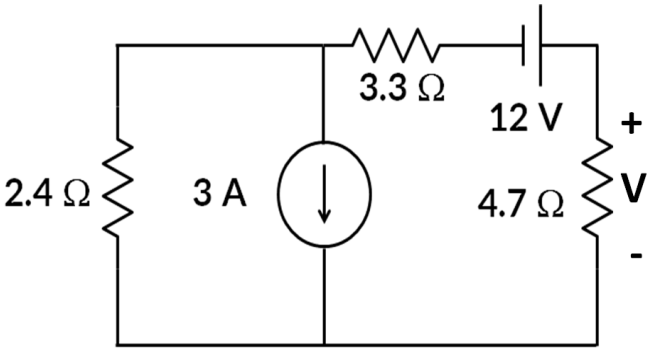

Fig. 9

10. Using superposition theorem, find the current through 56 Ω resistor for the circuit in fig. 10.

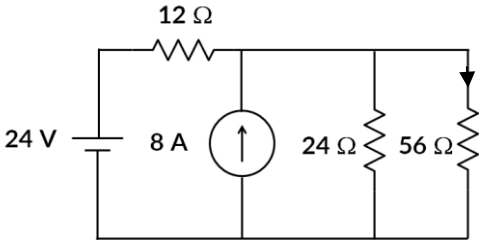

Fig. 10

11. Using superposition theorem, for the 24 V source shown in fig. 11, find the current through and power consumed or delivered by the 24 V source.

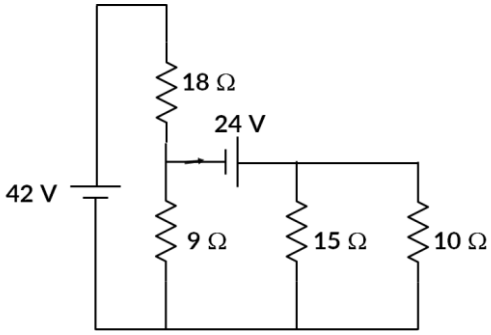

Fig. 11

Answers:

Source Transformation/ Source Conversion

1) 218 mA
2) 16.8 V
3) 9.6 V, 2.4 A
4) 0.19 A
5) -7 V, -1.17 A
6) 17.35 V, 2.43 A

Superposition Theorem

7) I(6 mA) = 2 A, I(9 V) = 0.5 A, I = 2.5 mA
8) I(12 V) = -2 A, I(6 V) = 1 A, I(3 A) = 2 A, I = 1A
9) V(3 A) = -3.25 V, P(3 A)= 2.24 W; V (12 V) = 5.53 V, P(12 V) = 6.51 W, P = 1.106 W (P≠P1+P2 Reason?)
10) I(24 V) = 0.25 A, I(8 A) = 1 A, I = 1.25 A
11) I(42 V) = 1.17 A, I(24 V) = 2 A, I = 3.17 A, P = 76.08 W