

Department of ECE, Bennett University

EECE105L: Fundamentals of Electrical and Electronics Engineering

Tutorial Sheet-7

**Topics Covered:** Superposition Theorem (Principle of Superposition)

1. Using superposition theorem, find the current flowing through  $12\ \Omega$  resistance in fig. 1.

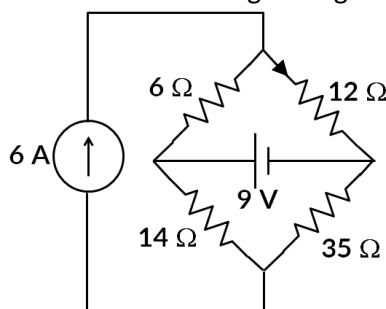


Fig. 1

2. Using superposition principle (superposition theorem), in the circuit shown in fig. 2, find the current flowing through  $2\ \Omega$  resistance.

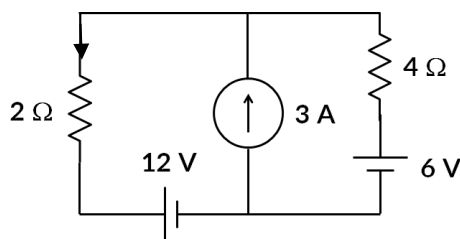


Fig. 2

3. Using superposition theorem, for the circuit shown in fig. 3, determine the voltage across the  $4.7\ \Omega$  resistor and power delivered to the resistor. Find the power delivered to  $4.7\ \Omega$  resistor solely by voltage source and solely by current source. What are your observations and reasons for discrepancies if any.

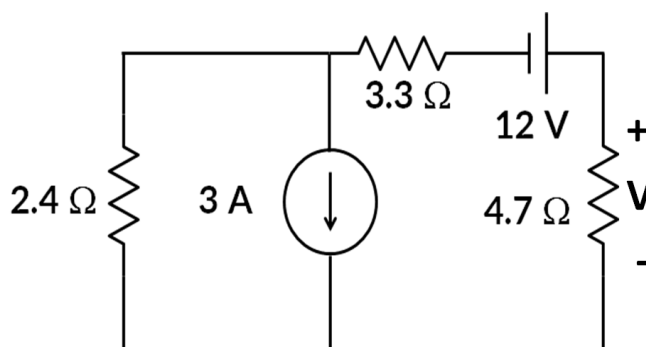


Fig. 3

4. Using superposition theorem, find the current through  $56\ \Omega$  resistor for the circuit in fig. 4.

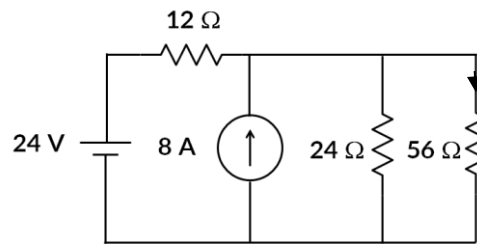


Fig. 4

5. Using superposition theorem, for the 24 V source shown in fig. 5, find the current through and power consumed or delivered by the 24 V source.

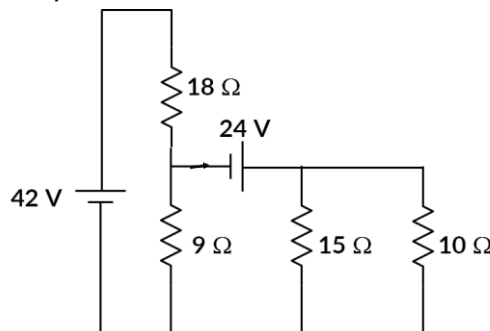


Fig. 5

----- END OF QUESTIONS -----

### Answers:

#### Superposition Theorem

- 1)  $I(6\ \text{mA}) = 2\ \text{A}$ ,  $I(9\ \text{V}) = 0.5\ \text{A}$ ,  $I = 2.5\ \text{mA}$
- 2)  $I(12\ \text{V}) = -2\ \text{A}$ ,  $I(6\ \text{V}) = 1\ \text{A}$ ,  $I(3\ \text{A}) = 2\ \text{A}$ ,  $I = 1\ \text{A}$
- 3)  $V(3\ \text{A}) = -3.25\ \text{V}$ ,  $P(3\ \text{A}) = 2.24\ \text{W}$ ;  $V(12\ \text{V}) = 5.53\ \text{V}$ ,  $P(12\ \text{V}) = 6.51\ \text{W}$ ,  $P = 1.106\ \text{W}$  ( $P \neq P_1 + P_2$  Reason?)
- 4)  $I(24\ \text{V}) = 0.25\ \text{A}$ ,  $I(8\ \text{A}) = 1\ \text{A}$ ,  $I = 1.25\ \text{A}$
- 5)  $I(42\ \text{V}) = 1.17\ \text{A}$ ,  $I(24\ \text{V}) = 2\ \text{A}$ ,  $I = 3.17\ \text{A}$ ,  $P = 76.08\ \text{W}$