

*Network Theory Questions and Answers –
Basic Network Concepts*

1. Energy per unit charge is _____

- a) Power
- b) Voltage
- c) Current
- d) Capacitance

Answer: b

2.

2. A conductor is said to have resistance of one ohm if a potential difference of one volt across its terminals causes a current of X ampere to flow through it. What will be the value of X?

- a) 4
- b) 2
- c) 3
- d) 1

Answer: d

3. Resistance depends on the temperature of the conductor.

- a) True
- b) False

Answer: a

4. A 25Ω resistor has a voltage of $150 \sin 377 t$. Find the corresponding power.

- a) $900 \sin^2 337 t$
- b) $90 \sin^2 337 t$
- c) $900 \sin^2 377 t$
- d) $9 \sin^2 337 t$

Answer: c

5. Unit of inductance is _____

- a) Weber
- b) Henry
- c) Farad
- d) Tesla

Answer: b

6. Inductance of an conductor is inversely proportional to its _____

- a) Number of turns
- b) Area of cross section
- c) Absolute permeability
- d) Length

Answer: d

7. Energy stored in an conductor is _____

- a) LI
- b) LI²
- c) LI/2
- d) LI²/2

Answer: d

8. An conductor of 3mH has a current $i = 5(1 - e^{-5000t})$. Find the corresponding maximum energy stored.

- a) 37.5 mJ
- b) 375 J
- c) 37.5 kJ
- d) 3.75 mJ

Answer: a

9. The capacitance of a capacitor does not depend on the absolute permittivity of the medium between the plates.

- a) True
- b) False

Answer: b

10. Which of the following is not the energy stored in a capacitor?

- a) CV²
- b) QV
- c) Q²/C
- d) QC

Answer: d

11. A voltage is defined by $v(t) = \begin{cases} 0 & t < 0 \\ 2t & 0 < t < 2 \\ 4e^{-(t-2)} & t > 2 \end{cases}$ and is applied to the 10 μ F capacitor. Which of the following is incorrect?

- a) $i = 0$ for $t < 0$
- b) $i = 20\mu A$ for $0 < t < 2s$
- c) $i = 40e^{t-2}\mu A$ for $t > 2s$
- d) $i = -40e^{t-2}\mu A$ for $t > 2s$

Answer: c

Network Theory Questions and Answers – Circuit Elements and Kirchhoff's Laws

1. Potential difference in electrical terminology is known as?

- a) Voltage
- b) Current
- c) Resistance

d) Conductance

Answer: a

2. The circuit in which current has a complete path to flow is called _____ circuit.

a) short

b) open

c) closed

d) open loop

Answer: c

3. If the voltage-current characteristics is a straight line through the origin, then the element is said to be?

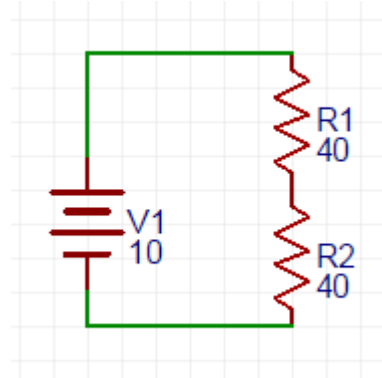
a) Linear element

b) Non-linear element

c) Unilateral element

d) Bilateral element

4. The voltage across R1 resistor in the circuit shown below is?



a) 10

b) 5

c) 2.5

d) 1.25

[View Answer](#)

Answer: b

Explanation: According to voltage divider rule, 10v is divide equally across resistors R1 and R2. So the voltage across R1 will be 5v.

5. The energy stored in the conductor is?

a) $Li^2/4$

b) $Li^2/2$

c) Li^2

d) $Li^2/8$

Answer: b

How many types of dependent or controlled sources are there?

a) 1

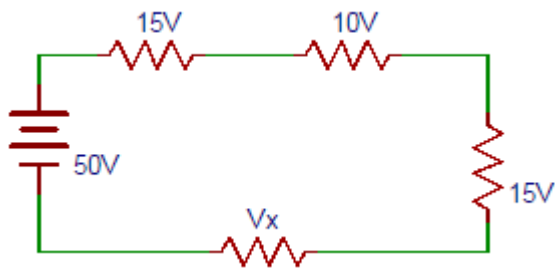
b) 2

c) 3

d) 4

Answer: d

7. Find the voltage V_x in the given circuit.



- a) 10
- b) 20
- c) 30
- d) 40

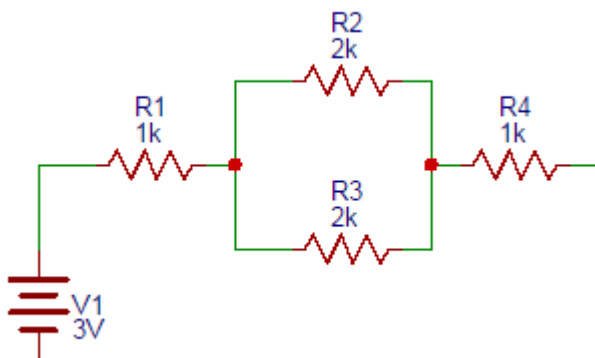
Answer: a

8. If the resistances 1Ω , 2Ω , 3Ω , 4Ω are parallel, then the equivalent resistance is?

- a) 0.46Ω
- b) 0.48Ω
- c) 0.5Ω
- d) 0.52Ω

Answer: b

9. Find total current(mA) in the circuit.



- a) 1
- b) 2
- c) 3
- d) 4

Answer: a

10. If the resistances 3Ω , 5Ω , 7Ω , 9Ω are in series, then their equivalent resistance(Ω) is?

- a) 9
- b) 20
- c) 24
- d) 32

Answer: c

Network Theory Questions and Answers – Voltage and Current Sources

1. Pick the incorrect statement among the following.

- a) conductor is a passive element

- b) Current source is an active element
- c) Resistor is a passive element
- d) Voltage source is a passive element

Answer: b

2. For a voltage source to be neglected, the terminals across the source should be

- _____
- a) replaced by conductor
 - b) short circuited
 - c) replaced by some resistance
 - d) open circuited

Answer: b

3. Voltage source and terminal voltage can be related as _____

- a) terminal voltage is higher than the source emf
- b) terminal voltage is equal to the source emf
- c) terminal voltage is always lower than source emf
- d) terminal voltage cannot exceed source emf

Answer: c

4. In case of ideal current sources, they have _____

- a) zero internal resistance
- b) low value of voltage
- c) large value of current
- d) infinite internal resistance

Answer: d

5. In a network consisting of linear resistors and ideal voltage source, if the value of resistors are doubled, then voltage across each resistor _____

- a) increases four times
- b) remains unchanged
- c) doubled
- d) halved

Answer: b

6. A practical current source can also be represented as _____

- a) a resistance in parallel with an ideal voltage source
- b) a resistance in parallel with an ideal current source
- c) a resistance in series with an ideal current source
- d) none of the mentioned

Answer: b

7. A practical voltage source can also be represented as _____

- a) a resistance in series with an ideal current source
- b) a resistance in series with an ideal voltage source
- c) a resistance in parallel with an ideal voltage source
- d) none of the mentioned

Answer: b

8. Constant voltage source is _____

- a) active and bilateral
- b) passive and bilateral
- c) active and unilateral

d) passive and unilateral

Answer: c

9. Which of the following is true about an ideal voltage source?

a) zero resistance

b) small emf

c) large emf

d) infinite resistance

Answer: a

A dependent source _____

a) may be a current source or a voltage source

b) is always a voltage source

c) is always a current source

d) none of the mentioned

Answer: a

11. With some initial charge at $t = 0^+$, a capacitor will act as _____

a) open circuit

b) short circuit

c) a current source

d) a voltage source

Answer: d

12. If a current source is to be neglected, the terminals across the source are _____

a) replaced by a source resistance

b) open circuited

c) replaced by a capacitor

d) short circuited

Answer: b

13. A constant current source supplies a electric current of 200 mA to a load of 2k Ω .

When the load changed to 100 Ω , the load current will be _____

a) 9mA

b) 4A

c) 700mA

d) 12A

Answer: b

14. A voltage source having an open circuit voltage of 200 V and internal resistance of 50 Ω is equivalent to a current source of _____

a) 4A with 50 Ω in parallel

b) 4A with 50 Ω in series

c) 0.5A with 50 Ω in parallel

d) none of the mentioned

Answer: a

15. A voltage source of 300 V has internal resistance of 4 Ω and supplies a load having the same resistance. The power absorbed by the load is?

a) 1150 W

b) 1250 W

c) 5625 W

d) 5000 W

Answer: c

Kirchhoff's Voltage Law

1. Kirchhoff's voltage law is based on principle of conservation of _____

- a) energy
- b) momentum
- c) mass
- d) charge

Answer: a

2. In a circuit with more number of loops, which law can be best suited for the analysis?

- a) KCL
- b) Ohm's law
- c) KVL
- d) None of the mentioned

Answer: c

3. Mathematically, Kirchhoff's Voltage law can be _____

- a) $\sum_{k=0}^n (V) = 0$
- b) $V^2 \sum_{k=0}^n (V) = 0$
- c) $V \sum_{k=0}^n (V) = 0$
- d) None of the mentioned

Answer: a

Mesh Analysis

Mesh analysis is applicable for non planar networks also.

- a) true
- b) false

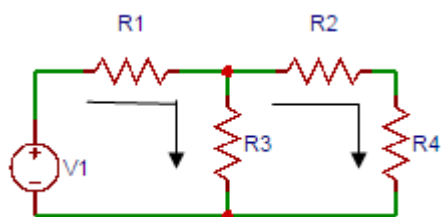
Answer: b

2. A mesh is a loop which contains _____ number of loops within it.

- a) 1
- b) 2
- c) 3
- d) no loop

Answer: d

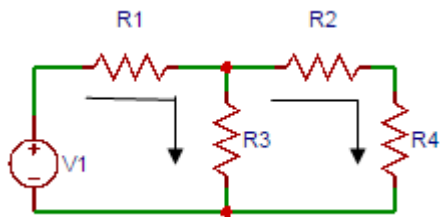
3. Consider the circuit shown below. The number mesh equations that can be formed are?



- a) 1
- b) 2
- c) 3

d) 4

4. In the figure shown below, the current through loop 1 be I_1 and through the loop 2 be I_2 , then the current flowing through the resistor R_2 will be?



a) I_1

b) I_2

c) $I_1 - I_2$

d) $I_1 + I_2$

Answer: c

5. If there are 5 branches and 4 nodes in graph, then the number of mesh equations that can be formed are?

a) 2

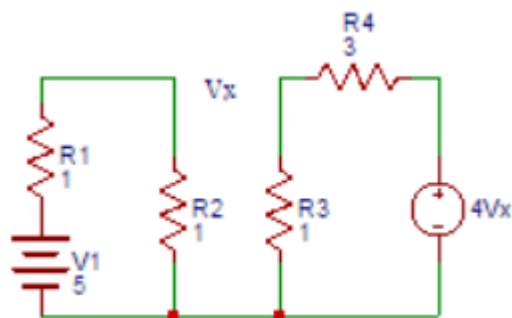
b) 4

c) 6

d) 8

Answer: a

6. Consider the circuit shown in the figure. Find voltage V_x .



a) 1

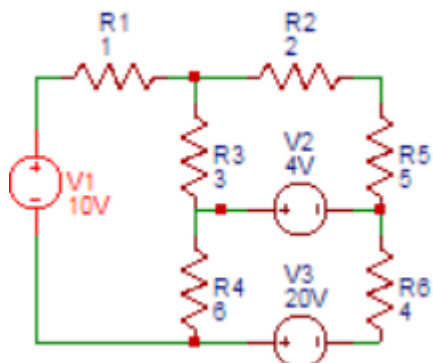
b) 1.25

c) 1.5

d) 1.75

Answer: b

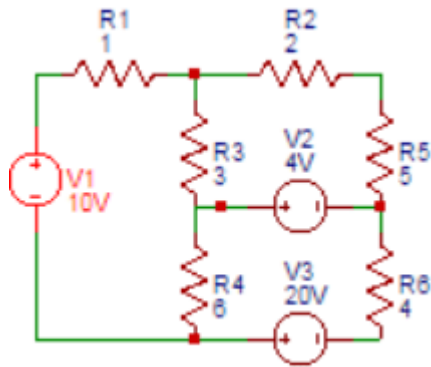
7. Consider the circuit shown below. Find the current I_1 (A).



- a) 3.32
- b) 3.78
- c) 5.33
- d) 6.38

Answer: b

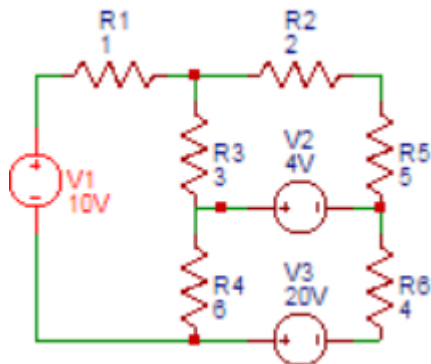
8. Consider the following figure. Find the current I_2 (A).



- a) 1.5
- b) 2.6
- c) 3.6
- d) 4.6

Answer: a

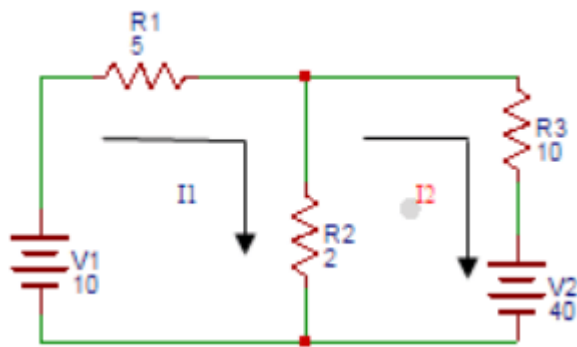
9. Consider the following figure. Find the current I_3 (A).



- a) 4.34
- b) 3.86
- c) 5.45
- d) 5.72

Answer: b

10. Find current through R2 resistor.



- a) 3
 - b) 3.25
 - c) 3.5
 - d) 3.75
- Answer: d

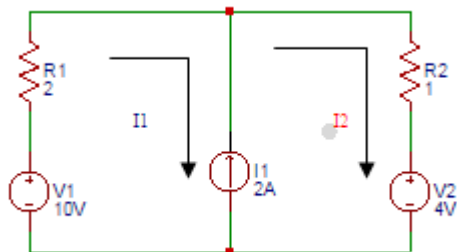
Network Theory Questions and Answers – Supermesh Analysis

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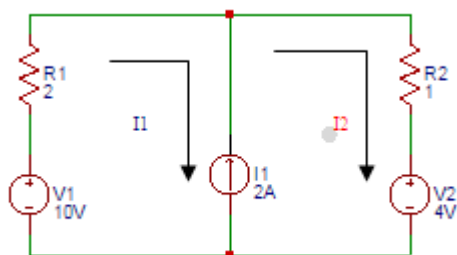
“Supermesh Analysis”.

1. Consider the circuit shown below. Find the current I1 (A).



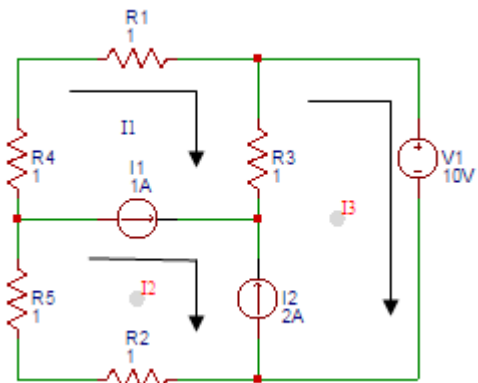
- a) 1
 - b) 1.33
 - c) 1.66
 - d) 2
- Answer: b

2. Consider the circuit shown below. Find the current I2 (A).



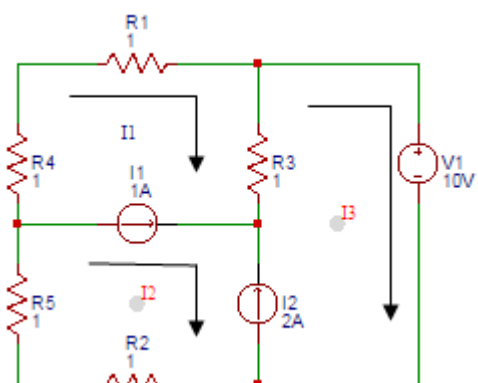
- a) 1.33
 - b) 2.33
 - c) 3.33
 - d) 4.33
- Answer: c

3. Consider the circuit shown below. Find the current I_1 (A).



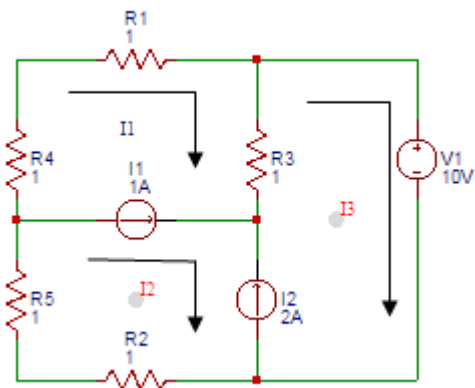
- a) -1
 - b) -2
 - c) -3
 - d) -4
- Answer: c

Consider the circuit shown below. Find the current I_1 (A).



- a) -1
 - b) -2
 - c) -3
 - d) -4
- Answer: c

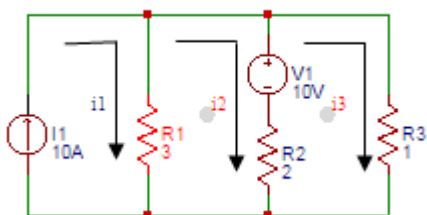
5. Find the power (W) supplied by the voltage source in the following figure.



- a) 0
- b) 1
- c) 2
- d) 3

Answer: a

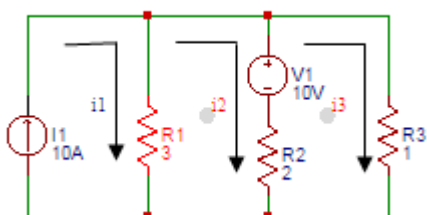
6. Find the current i_1 in the circuit shown below.



- a) 8
- b) 9
- c) 10
- d) 11

Answer: c

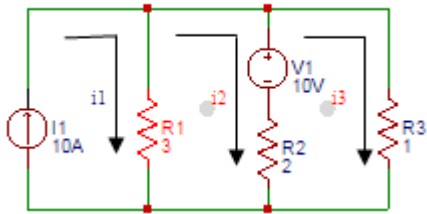
7. Find the current i_2 in the circuit shown below.



- a) 6.27
- b) 7.27
- c) 8.27
- d) 9.27

Answer: b

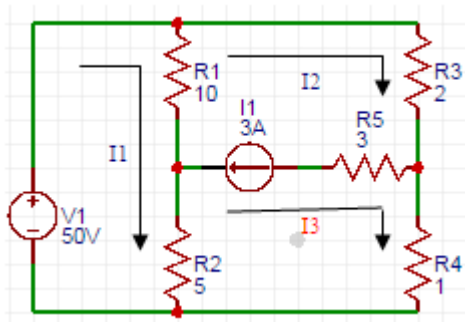
8. Find the current i_3 in the circuit shown below.



- a) 8.18
- b) 9.18
- c) 10.18
- d) 8.8

Answer: a

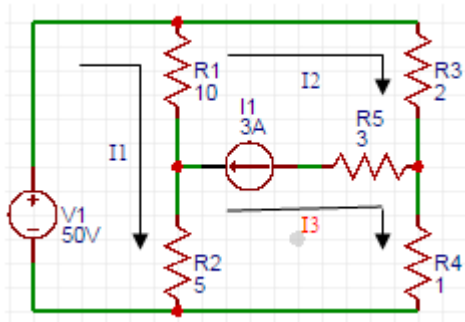
9. Find the current I_1 in the circuit shown below.



- a) 8
- b) -8
- c) 9
- d) -9

Answer: b

10. Find the current I_2 in the circuit shown below.



- a) 5.3
- b) -5.3
- c) 7.3
- d) -7.3

Answer: d

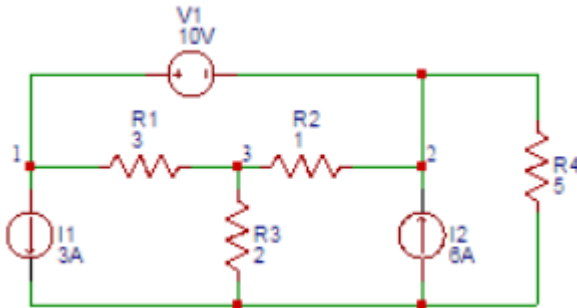
Supernode Analysis

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This set of Network Theory Multiple Choice Questions & Answers (MCQs) focuses on “Supernode Analysis”.

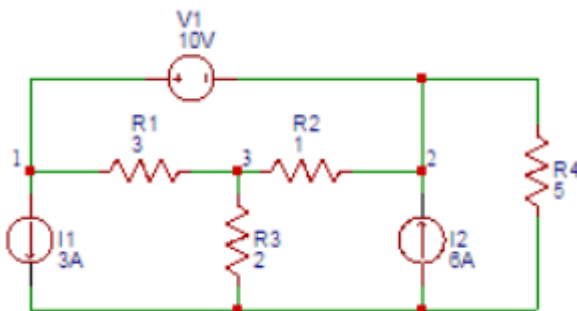
1. Consider the figure shown below. Find the voltage (V) at node 1.



- a) 13
- b) 14
- c) 15
- d) 16

Answer: b

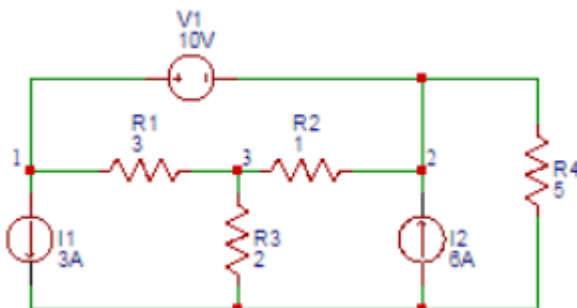
2. Consider the figure shown below. Find the voltage (V) at node 2.



- a) 3
- b) 4
- c) 5
- d) 6

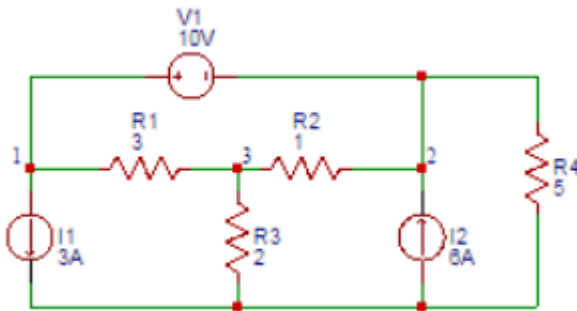
Answer: b

3. Consider the figure shown below. Find the voltage (V) at node 3.



- a) 4.5
- b) 5.5
- c) 6.5
- d) 7.5

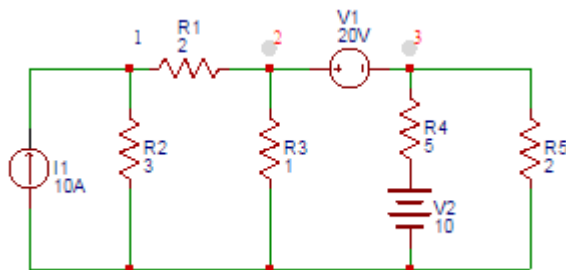
Answer: a4. Consider the figure shown below. Find the power (W) delivered by the source 6A.



- a) 20.3
- b) 21.3
- c) 22.3
- d) 24.3

Answer: c

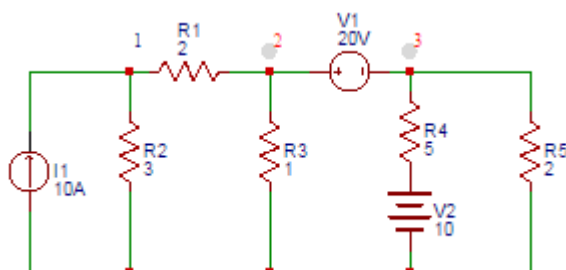
5. Find the voltage (V) at node 1 in the circuit shown below.



- a) 18
- b) 19
- c) 20
- d) 21

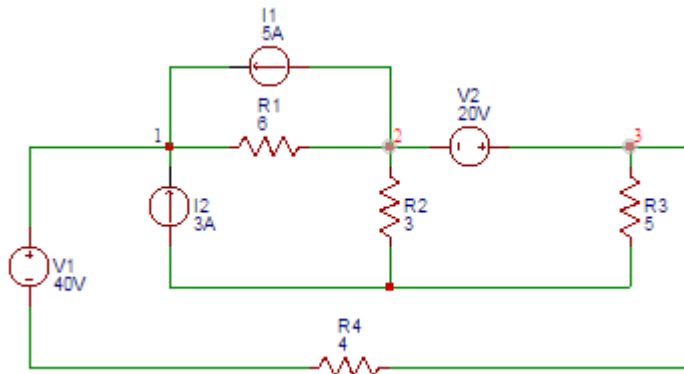
Answer: b

6. Consider the figure shown below. Find the voltage (V) at node 2.



- a) 11.5
- b) 12
- c) 12.5
- d) 13

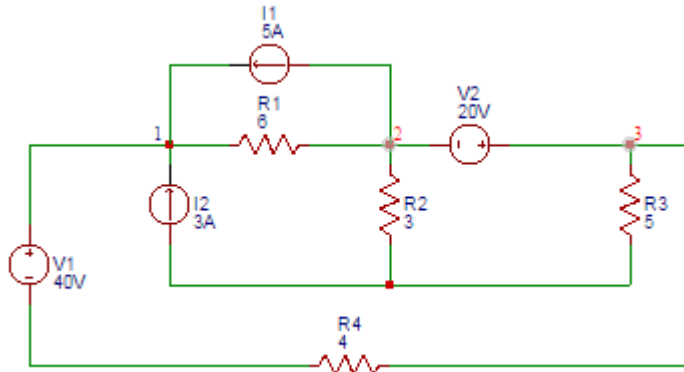
7. Find the voltage (V) at node 3 in the figure shown below.



- a) 18
- b) 20
- c) 22
- d) 24

Answer: a

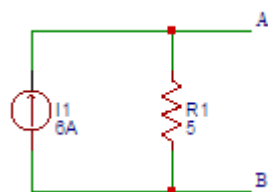
8. Find the power absorbed by 5Ω resistor in the following figure.



- a) 60
- b) 65.5
- c) 70.6
- d) 75

Answer: b

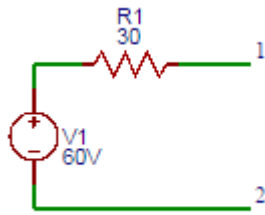
9. Find the value of the voltage (V) in the equivalent voltage source of the current source shown below.



- a) 20
- b) 25
- c) 30
- d) 35

Answer: c

10. Find the value of the current (A) in the equivalent current source of the voltage source shown below.



- a) 1
- b) 2
- c) 3
- d) 4

Answer: b

Maximum Power Transfer Theorem

The maximum power is delivered from a source to its load when the load resistance is _____ the source resistance.

- a) greater than
- b) less than
- c) equal to
- d) less than or equal to

Answer: c

2. If source impedance is complex, then maximum power transfer occurs when the load impedance is _____ the source impedance.

- a) equal to
- b) negative of
- c) complex conjugate of
- d) negative of complex conjugate of

Answer: c

3. If the source impedance is complex, then the condition for maximum power transfer is?

- a) $Z_L = Z_S$
- b) $Z_L = Z_S^*$
- c) $Z_L = -Z_S$
- d) $Z_L = -Z_S^*$

Answer: b4. If $Z_L = Z_S^*$, then?

- a) $R_L = 1$
- b) $R_L = 0$
- c) $R_L = -R_S$
- d) $R_L = R_S$

Answer: d

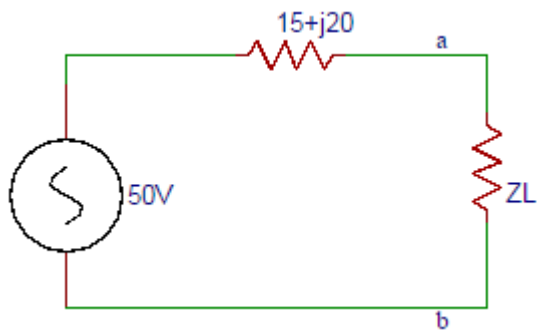
5. For $Z_L = Z_S^*$, the relation between X_L and X_S is?

- a) $X_L = X_S$
- b) $X_L = 0$
- c) $X_L = 1$
- d) $X_L = -X_S$

Answer: d

6. In the circuit shown below, find the value of load impedance for which source

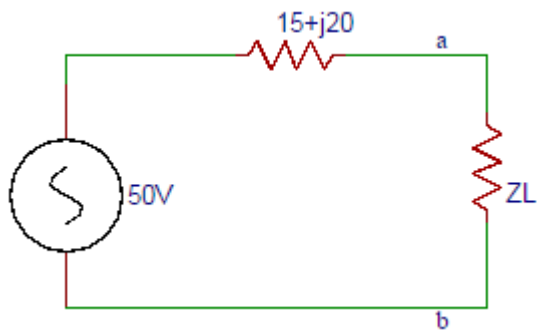
delivers maximum power.



- a) $15-j20$
- b) $15+j20$
- c) $20-j15$
- d) $20+j15$

Answer: a

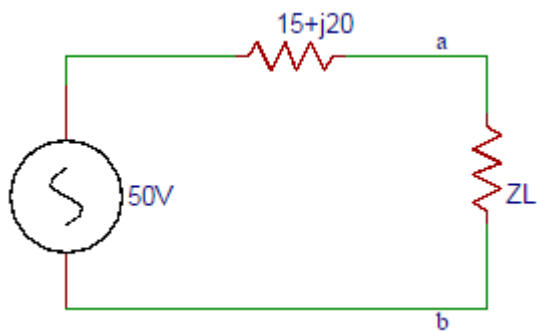
What is the load current in the following circuit?



- a) $1.66\angle 90^\circ$
- b) $1.66\angle 0^\circ$
- c) $2.66\angle 0^\circ$
- d) $2.66\angle 90^\circ$

Answer: b

7. 8. The maximum power delivered by the source in the below circuit shown?

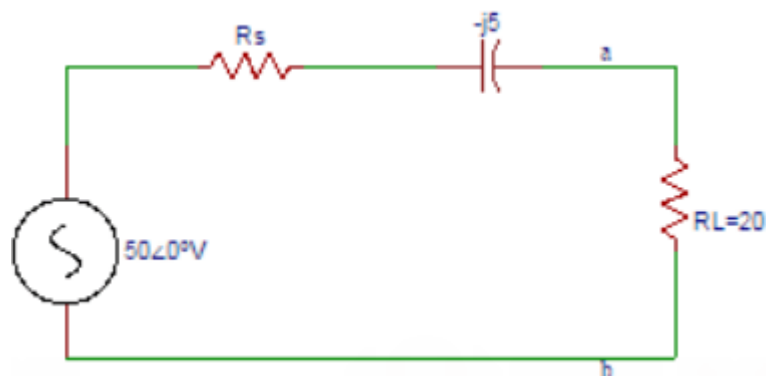


- a) 39.33
- b) 40.33
- c) 41.33
- d) 42.33

Answer: c

9. For the circuit shown, the resistance R is variable from 2Ω to 50Ω . What value of

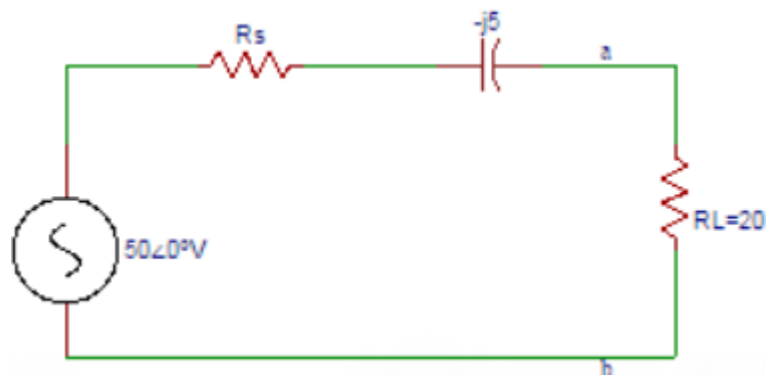
RS results in maximum power transfer across terminals 'ab'.



- a) 1
- b) 2
- c) 3
- d) 4

Answer: b

10. Find the maximum power delivered by the source in the following circuit.



- a) 96.6
- b) 97.6
- c) 98.6
- d) 99.6

Answer: c

Reciprocity Theorem

In Reciprocity Theorem, which of the following ratios is considered?

- a) Voltage to current
- b) Current to current
- c) Voltage to voltage
- d) No ratio is considered

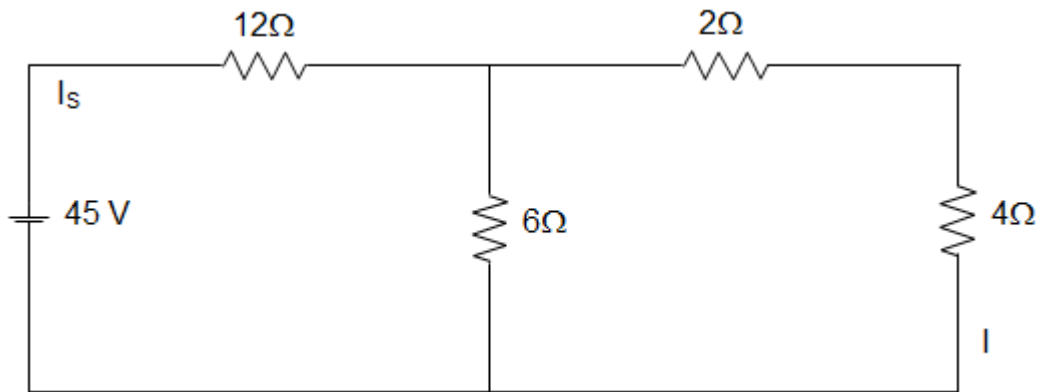
Answer: a

2. The Reciprocity Theorem is valid for _____

- a) Non-Linear Time Invariant circuits
- b) Linear Time Invariant circuits
- c) Non-Linear Time Variant circuits
- d) Linear Time Variant circuits

Answer: b

3. In the circuit given below, the current in the 4-ohm resistor is _____



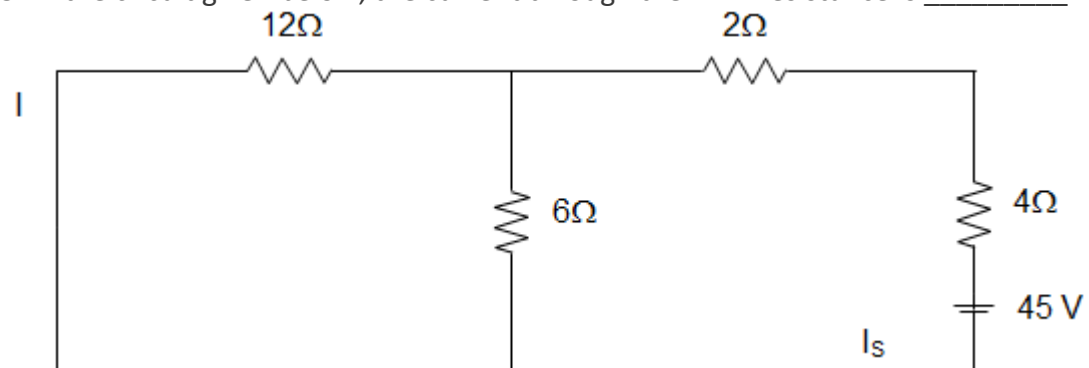
- a) 3.5 A
- b) 2.5 A
- c) 1.5 A
- d) 0.5 A

Answer: c4. The Reciprocity Theorem is applicable for _____

- a) Single-source networks
- b) Multi-source networks
- c) Both Single and Multi-source networks
- d) Neither Single nor Multi-source networks

Answer: a

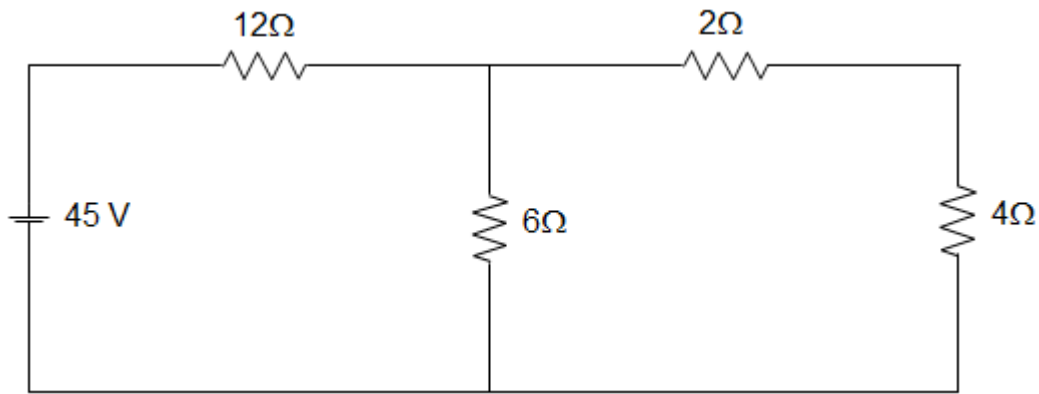
5. In the circuit given below, the current through the 12 Ω resistance is _____



- a) 1.5 A
- b) 2.5 A
- c) 3.5 A
- d) 4.5 A

Answer: a

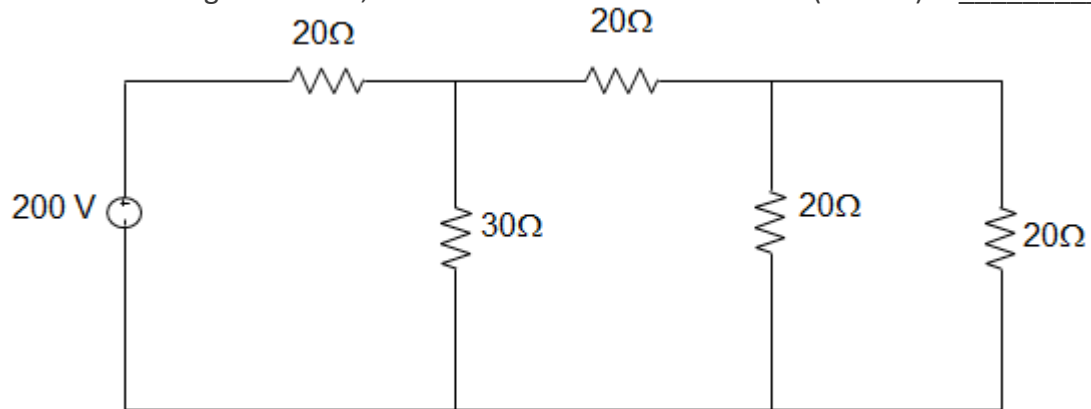
6. A circuit is given in the figure below. We can infer that _____



- a) The circuit follows Reciprocity Theorem
- b) The circuit follows Millman's Theorem
- c) The circuit follows Superposition Theorem
- d) The circuit follows Tellegen Theorem

Answer: a

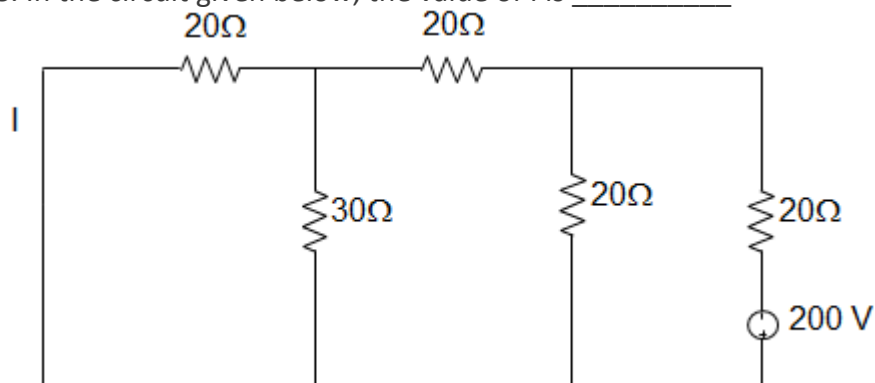
7. In the circuit given below, the current in the resistance 20 Ω (far end) is _____



- a) 8.43 A
- b) 5.67 A
- c) 1.43 A
- d) 2.47 A

Answer: c

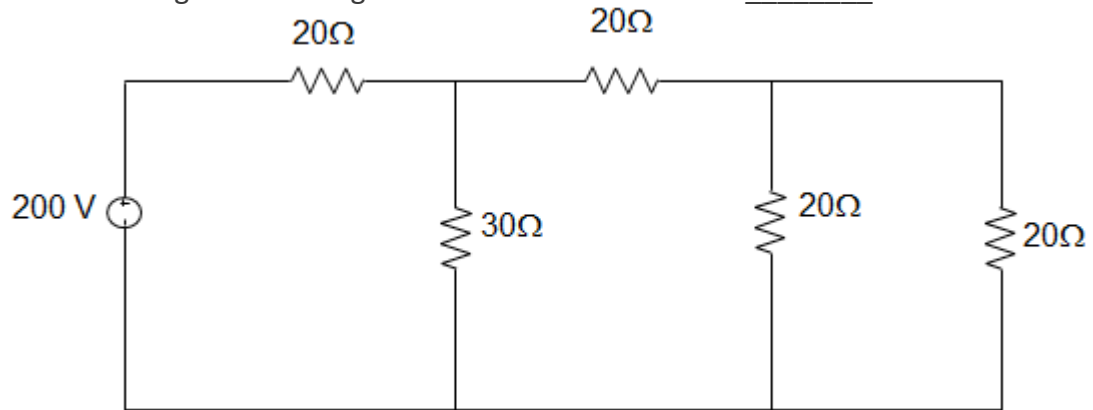
8. In the circuit given below, the value of I is _____



- a) 2.47 A
- b) 5.67 A
- c) 8.43 A
- d) 1.43 A

Answer: d

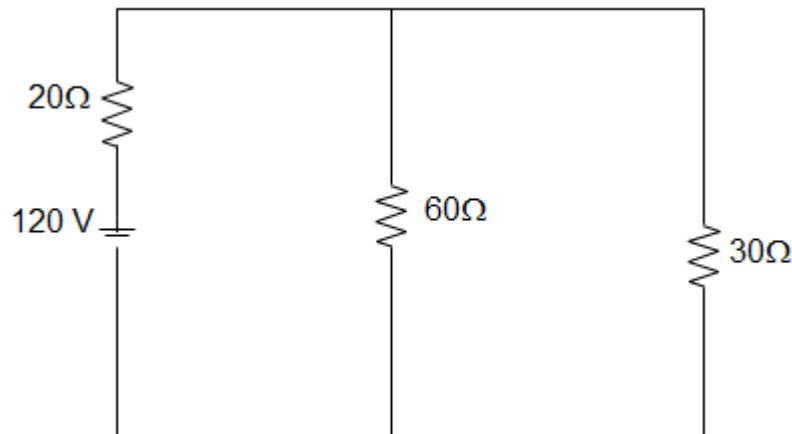
9. A circuit is given in the figure below. We can infer that _____



- a) The circuit follows Reciprocity Theorem
- b) The circuit follows Millman's Theorem
- c) The circuit follows Superposition Theorem
- d) The circuit follows Tellegen Theorem

Answer: a

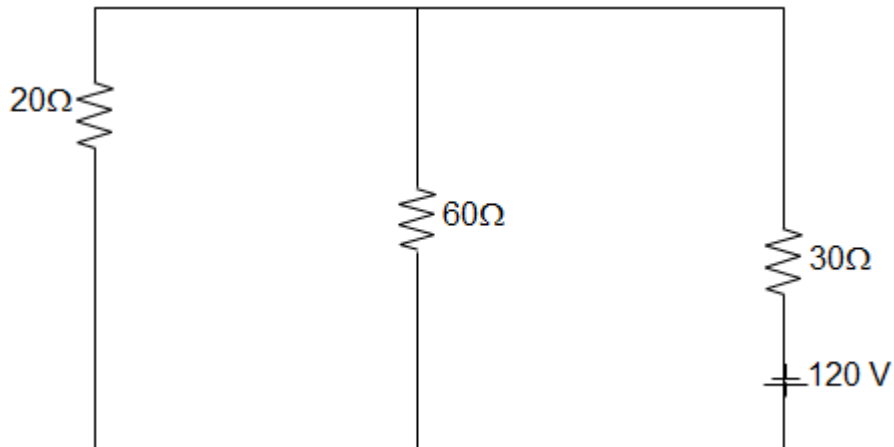
10. In the circuit given below, the current in the 30 Ω resistor is _____



- a) 1 A
- b) 2 A
- c) 3 A
- d)

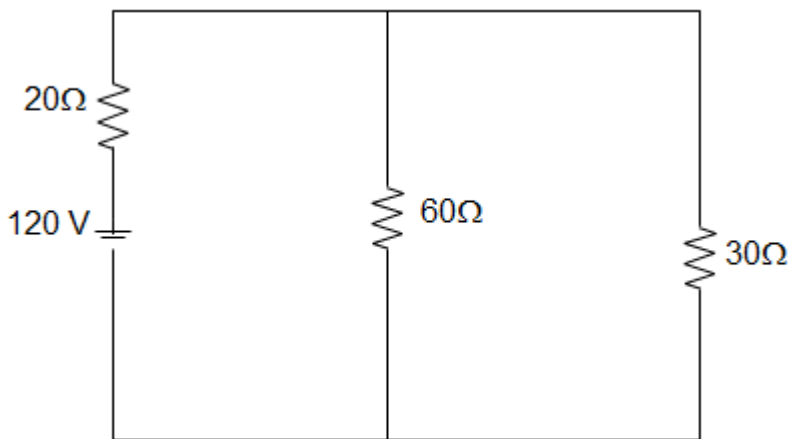
A4 A

11. In the circuit given below, the current in the 20 Ω resistor is _____



- a) 5 A
 - b) 1 A
 - c) 1.5 A
 - d) 2 A
- Answer: d

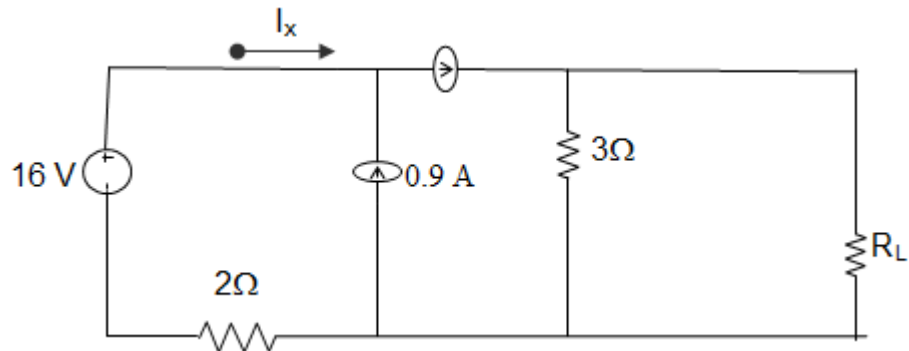
12. A circuit is given in the figure below. We can infer that _____



- a) The circuit follows Reciprocity Theorem
- b) The circuit follows Millman's Theorem
- c) The circuit follows Superposition Theorem
- d) The circuit follows Tellegen Theorem

Answer: a

13. In the circuit given below, the value of load R_L , for which maximum power is transferred through it is _____

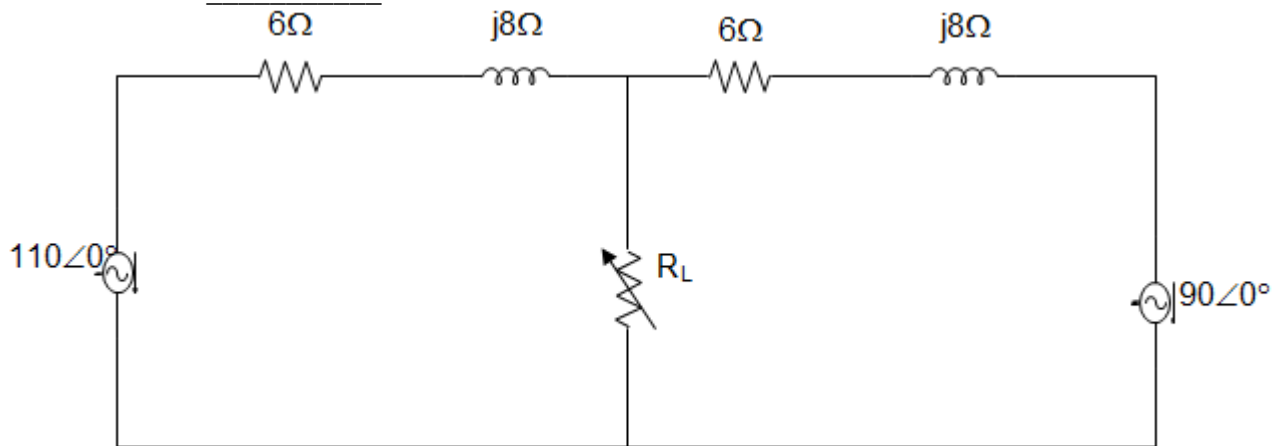


- a) 2 Ω

- b) $3\ \Omega$
- c) $1\ \Omega$
- d) $6\ \Omega$

Answer: b

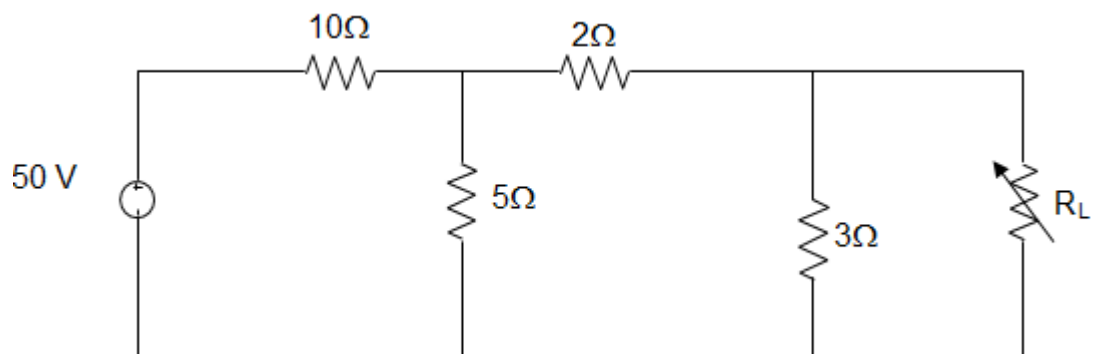
14. In the circuit given below, the maximum power absorbed by the load resistance R_L is _____



- a) 2200 W
- b) 1250 W
- c) 1000 W
- d) 621 W

Answer: d

15. In the circuit given below, the maximum power delivered to the load is _____



- a) 3 W
- b) 5.2 W
- c) 3.2 W
- d) 4.2 W

Answer: d

