Electrical Circuits &Machines

UNIT I: Basic circuit Analysis and Simplification Techniques MCQ'S

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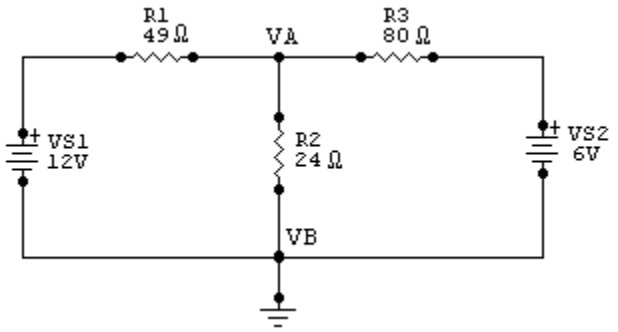
1. Find the node voltage V_A.



A 6 V

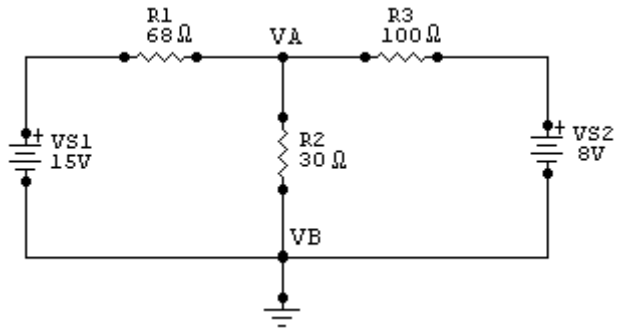
B. 12 V

C. 4.25 V

D. 3 V

Ans: C

2. What is the current through R_2?



A. 3.19 A

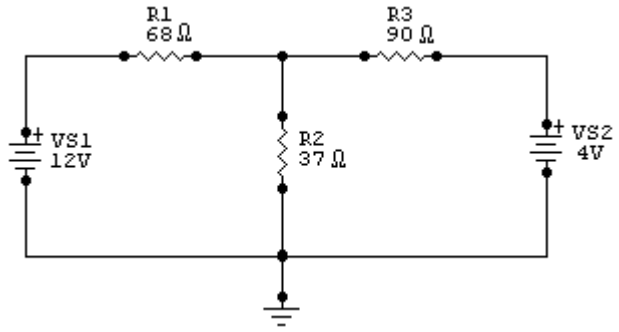
B. 319 mA

C. 1.73 A

D. 173 mA

Ans: D

3. Find branch current IR_2.



A. 5.4 mA

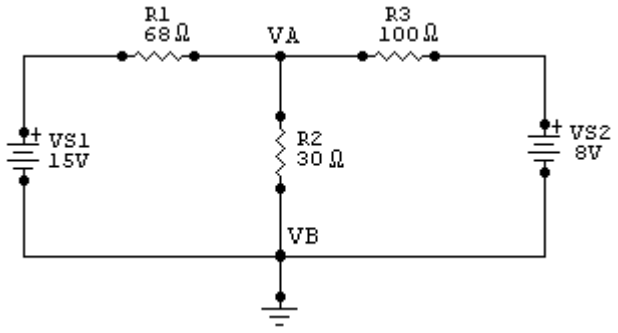
B. –5.4 mA

C. 130.4 mA

D. 119.6 mA

Ans: C

4. Find the node voltage V_A.



A. 518 mV

B. 5.18 V

C. 9.56 V

D. 956 mV

Ans: B

5. Find I_2.

$4I_1 + 4I_2 = 2$
$6I_1 + 7I_2 = 4$

A. 1 A

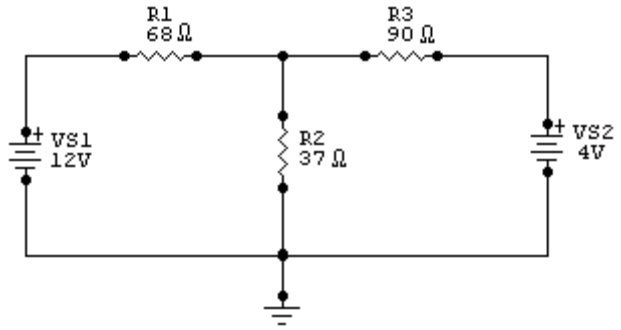
B. –1 A

C. 100 mA

D. –100 mA

Ans: A

6. What is the voltage drop across R_1?



A. 850 mV

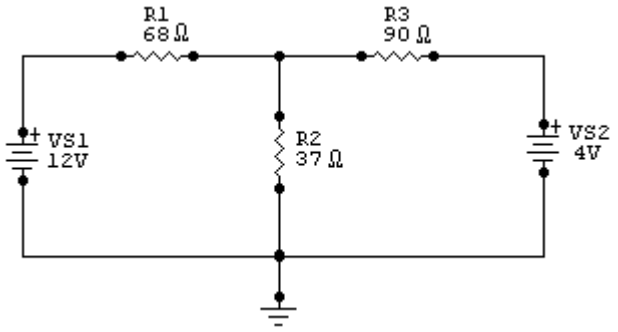
B. 8.5 V

C. 9.18 V

D. 918 mV

Ans: B

7. What is the voltage drop across R_2?



A. 3.5 V

B. 4.18 V

C. 1.5 V

D. 145 mV

Ans: B

8. In assigning the direction of branch currents,

A. the directions are critical

B. the directions are not critical

C. they must point into a node

D. they must point out of a node

Ans: B

9. Referring to Problem 10, find branch current IR_3.

A. 5.4 mA

B. –5.4 mA

C. 67.8 mA

D. –67.8 mA

Ans: B

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10. Find I_1.

$4I_1 + 4I_2 = 2$
$6I_1 + 7I_2 = 4$

A. 0.5 A

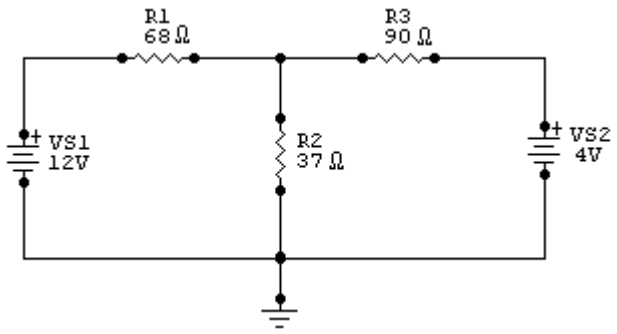
B. 50 mA

C. –0.5 A

D. –50 mA

Ans: C

11. Using the mesh current method, find the branch current, IR_1, in the above figure.



A. 125 mA

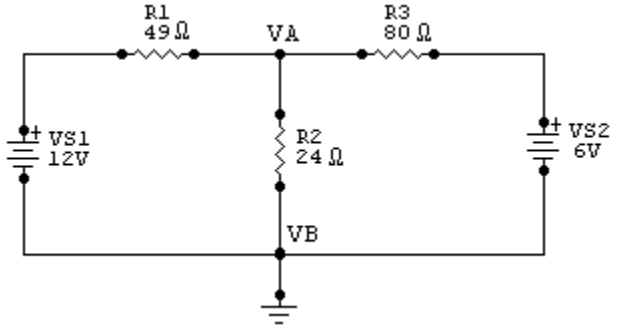
B. 12.5 mA

C. 12.5 A

D. 135 mA

Ans: A

12. What is the current through R_2?



A. 177 mA

B. 250 mA

C. 500 mA

D. 125 mA

Ans: A

13. The first row of a certain determinant has the numbers 3 and 5. The second row has the numbers 7 and 2. The value of this determinant is

A. 31 B. –31

C. 39 D. –29

Ans: D

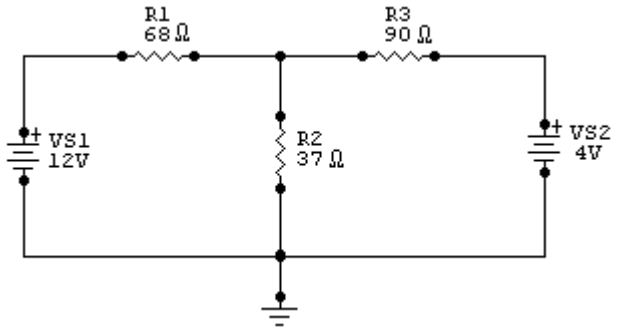
14. The first row of a certain determinant has the numbers 10 and 6. The second row has the numbers 3 and 5. The value of this determinant is

A. 18 B. 50

C. 32 D. –32

Ans: C

15. What is the voltage drop across R_3?



A. 112 mV

B. 11.25 V

C. 486 mV

D. 4.86 V

Ans: C

16. The expansion method for evaluating determinants is

A. better than any other method

B. good for only one determinant

C. more flexible than the cofactor method

D. good for second- and third-order determinants

Ans: D

17. The branch current method uses

A. Kirchhoff's voltage and current laws

B. Thevenin's theorem and Ohm's law

C. Kirchhoff's current law and Ohm's law

D. the superposition theorem and Thevenin's theorem

Ans: A

18. Generally, the mesh current method results in fewer equations than the node voltage method.

A. True B. False

Ans: B

19. Third-order determinants are evaluated by the expansion method or by the cofactor method.

A. True B. False

Ans: A

20. Second-order determinants are evaluated by subtracting the signed cross-products.

A. True B. False

Ans: B

21. The mesh method can be applied to circuits with any number of loops.

A. True B. False

Ans: A

22. The node voltage method is based on Kirchhoff's voltage law.

A. True B. False

Ans: B

23. A loop current is an actual current in a branch.

A. True B. False

Ans: B

24. The mesh current method is based on Kirchhoff's current law.

A. True B. False

Ans: B

25. The branch current method is based on Kirchhoff's voltage law and Kirchhoff's current law.

A. True B. False

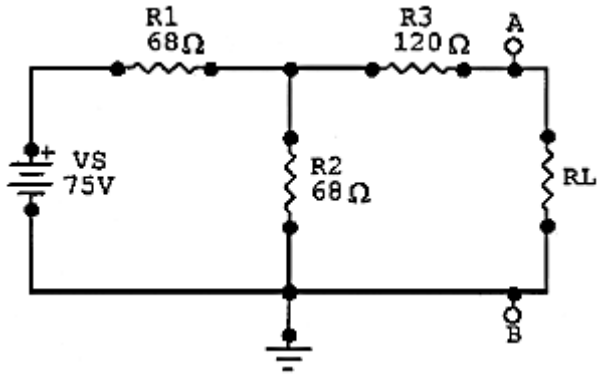
Ans: A

26. When assigning branch currents, you need not be concerned with the direction you choose.

A. True B. False

Ans: A

27. Find R_N for the circuit given.



A. 34 Ω

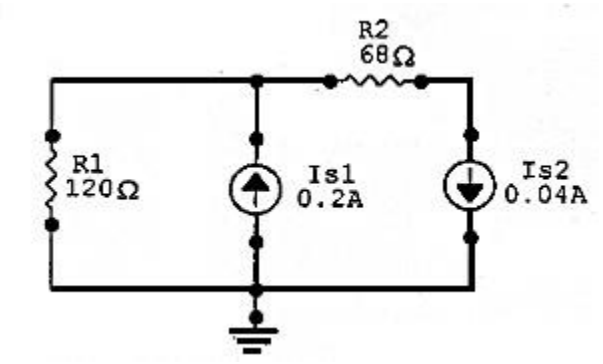
B. 68 Ω

C. 120 Ω

D. 154 Ω

Ans: D

28. Referring to circuit given, if R_1 is changed to a 68 Ω resistor, what will be the current through it?



A. 0.16 A

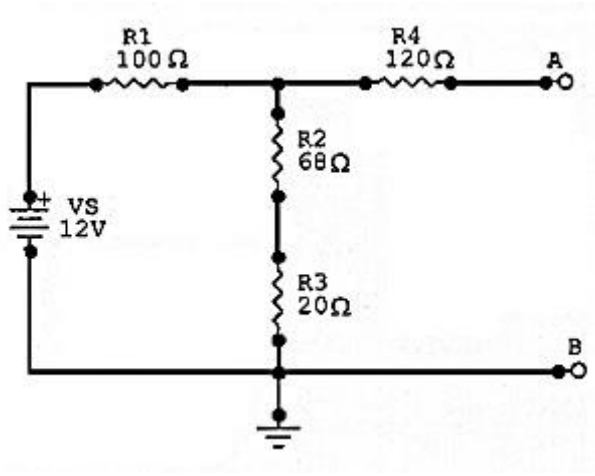
B. 0.24 A

C. 0.2 A

D. 0.04 A

Ans: A

29. Find the Thevenin equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given.



A. 562 mV, 167 Ω

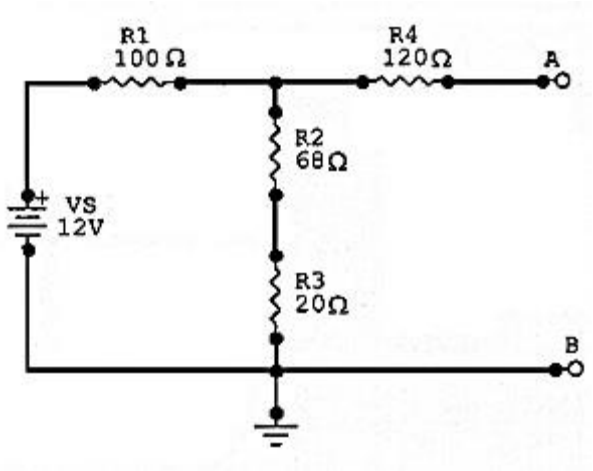
B. 5.62 V, 167 Ω

C. 5.62 V, 188 Ω

D. 562 mV, 188 Ω

Ans: B

30. Referring to the given circuit, determine V_{TH} and R_{TH} if a 68 Ω resistor is connected in parallel across R_2 and R_3.



A. 3.3 V, 148 Ω

B. 330 mV, 148 Ω

C. 3.3 V, 68 Ω

D. 330 mV, 68 Ω

Ans: A

31. A 12 mA current source has an internal resistance, R_S, of 1.2 k Ω. The equivalent voltage source is

A. 144 V

B. 14.4 V

C. 7.2 V

D. 72 mV

Ans: B

32. An 18 V source has an internal resistance of 70 Ω. If a load resistance of 33 Ω is connected to the voltage source, the load power, P_L, is

A. 0 W

B. 1 W

C. 175 mW

D. 18 mW

Ans: B

33. A certain voltage source has the values $V_S = 30$ V and $R_S = 6$ Ω. The values for an equivalent current source are

A. 5 A, 6 Ω

B. 30 A, 6 Ω

C. 5 A, 30 Ω

D. 30 A, 5 Ω

Ans: A

34. A 120 Ω load is connected across an ideal voltage source with $V_S = 12$ V. The voltage across the load

A. is 0 V

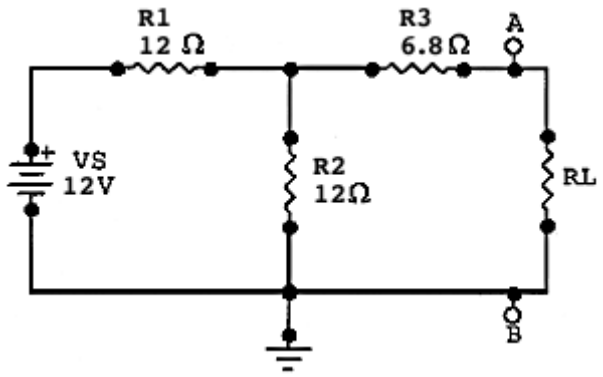
B. is 12 V

C. is 120 V

D. cannot be determined

Ans: B

35. Find the Norton circuit, that is, I_{IN} and R_N, for the circuit given below.



A. 478 mA, 12.8 Ω

B. 750 mA, 12.8 Ω

C. 478 mA, 6.8 Ω

D. 750 mA, 6.8 Ω

Ans: A

36. A 120 Ω load is connected across a voltage source with V_S = 12 V and R_S = 8 Ω. The voltage across the load is

A. 11.25 V

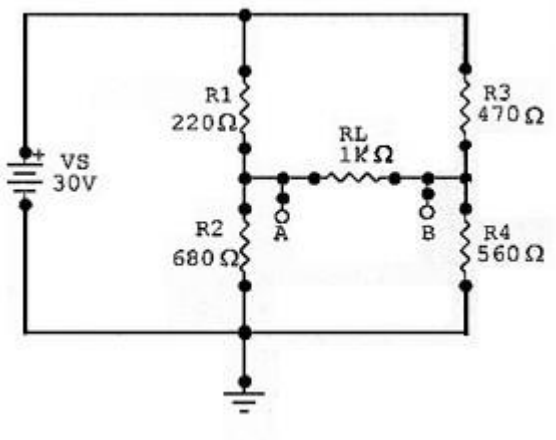
B. 0 V

C. 12 V

D. 1.13 V

Ans: A

37. What is the Thevenin equivalent (V_{TH} and R_{TH}) for the circuit given?



A. 6.4 V, 422 Ω

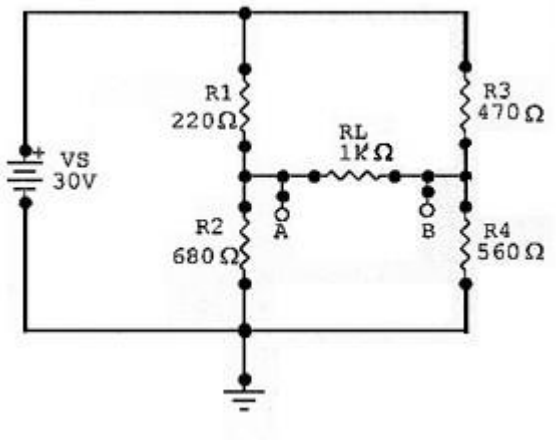
B. 6.4 V, 560 Ω

C. 6.4 V, 680 Ω

D. 30 V, 422 Ω

Ans: A

38. Referring to the given circuit, the voltage and current for the load resistor, R_L, is



A. 450 mV, 4.5 mA

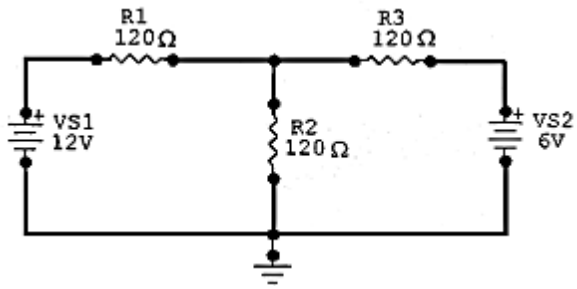
B. 4.50 V, 45 mA

C. 4.50 V, 4.5 mA

D. 450 mV, 45 mA

Ans: C

39. Find the current in R_2 of the given circuit, using the superposition theorem.



A. 16.7 mA

B. 33.3 mA

C. 50 mA

D. 16.6 mA

Ans: C

40. A 470 Ω R_L is connected across a voltage source, V_S, of 120 V. The source's internal resistance, R_S, is 12 Ω. What is the output voltage across the load?

A. 120 V

B. 0 V

C. 117 V

D. 12 V

Ans: C

41. A 2 Ω R_L is connected across a voltage source, V_S, of 110 V. The source's internal resistance is 24 Ω. What is the output voltage across the load?

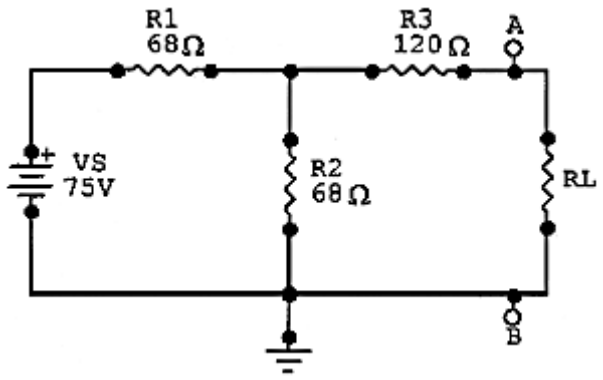
A. 8.5 V

B. 85 V

C. 0 V

D. 110 V Ans:A

42. Determine I_N for the circuit consisting of V_S, R_1, R_2, and R_3 shown in the given circuit.



A. 676 mA

B. 245 mA

C. 431 mA

D. 75 mA

Ans: B

43. A 120 V voltage source has a source resistance, R_S, of 60 Ω. The equivalent current source is

A. 2 A

B. 4 A

C. 200 mA

D. 400 mA

Ans: A

44. A 12 V source has an internal resistance of 90 Ω. If a load resistance of 20 Ω is connected to the voltage source, the load power, P_L, is

A. 2.38 mW

B. 2.38 W

C. 238 mW

D. 23.8 W

Ans: C

45. In a two-source circuit, one source acting alone produces 12 mA through a given branch. The other source acting alone produces 10 mA in the opposite direction through the same branch. The actual current through the branch is

A. 22 mA

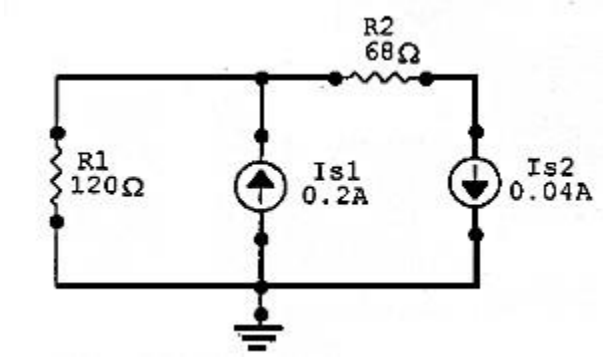
B. 12 mA

C. 10 mA

D. 2 mA

Ans: D

46. Find the current through R_1 in the given circuit.



A. 0.16 A

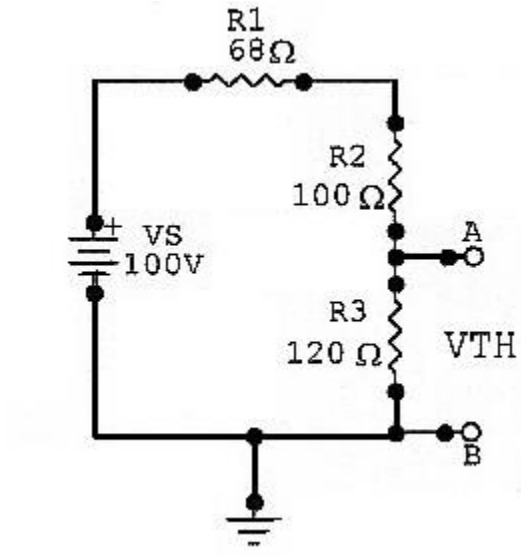
B. 0.24 A

C. 0.2 A

D. 0.04 A

Ans: A

47. Find the Thevenin equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given below.



A. 4.16 V, 120 Ω

B. 41.6 V, 120 Ω

C. 4.16 V, 70 Ω

D. 41.67 V, 70 Ω

Ans: D

48. A certain current source has the values $I_S = 4$ μA and $R_S = 1.2$ M Ω. The values for an equivalent voltage source are

A. 4.8 μV, 1.2 M Ω

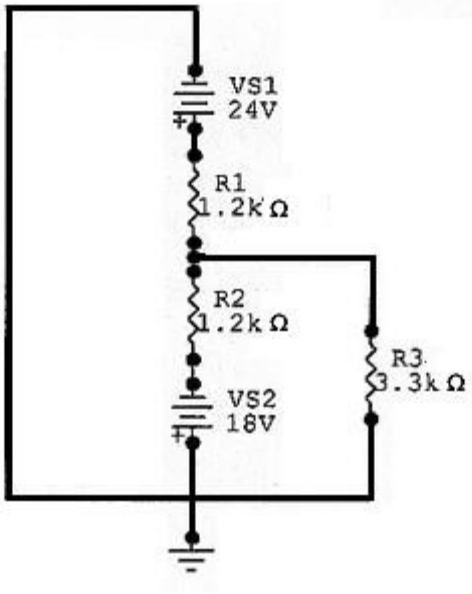
B. 1 V, 1.2 M Ω

C. 4.8 V, 4.8 M Ω

D. 4.8 V, 1.2 M Ω

Ans: D

49. Find the total current through R_3 in the given circuit.



A. 7.3 mA

B. 5.5 mA

C. 12.8 mA

D. 1.8 mA

Ans: D

50. A 680 Ω load resistor, R_L, is connected across a constant current source of 1.2 A. The internal source resistance, R_S, is 12 k Ω. The load current, R_L, is

A. 0 A

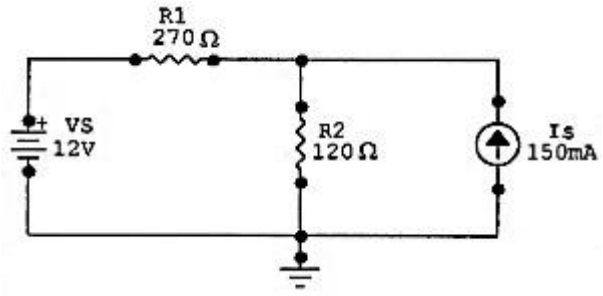
B. 1.2 A

C. 114 mA

D. 1.14 A

Ans: D

51. Find the current through R_2 of the given circuit.



A. 30.7 mA

B. 104 mA

C. 74 mA

D. 134 mA

Ans: D

52. Some circuits require more than one voltage or current source.

A. True B. False

Ans: A

53. An ideal voltage source has zero internal resistance.

A. True B. False

Ans: A

54. A practical current source has a finite internal resistance.

A. True B. False

Ans: A

55. Norton's equivalent current (I_N) is an open-circuit current between two points in a circuit.

A. True B. False

Ans: B

56. A practical voltage source has a nonzero internal resistance.

A. True B. False

Ans: A

57. You cannot convert a voltage source to an equivalent current source, or vice versa.

A. True B. False

Ans: B

58. An ideal current source has zero internal resistance.

A. True B. False

Ans: B

59. The Thevenin equivalent voltage (V_{TH}) is the short-circuit voltage between two terminals in a circuit.

A. True B. False

Ans: B

60. Transistors act basically as voltage sources.

A. True B. False

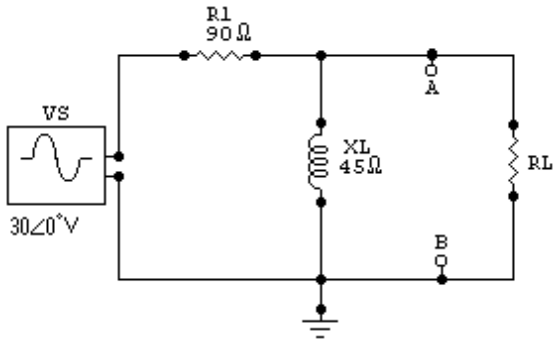
Ans: B

61. Conversions between delta-type and wye-type circuit arrangements are useful in certain specialized applications.

A. True B. False

Ans: A

1. Determine V_{TH} when R_1 is 180 Ω and X_L is 90 Ω.



A. $135\angle 63.4°$ V

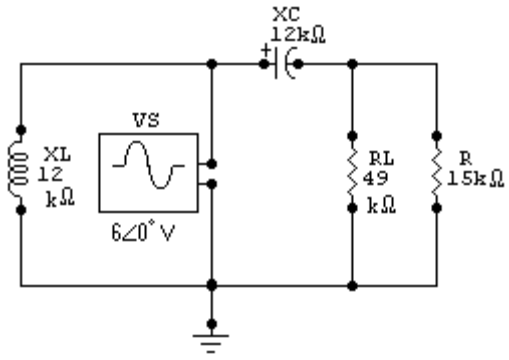
B. $13.5\angle 63.4°$ V

C. $12.2\angle 0°$ V

D. $122\angle 0°$ V

Ans: B

62. For the given circuit, find V_{TH} for the circuit external to R_L.



A. $4.69\angle 51.3°$ V

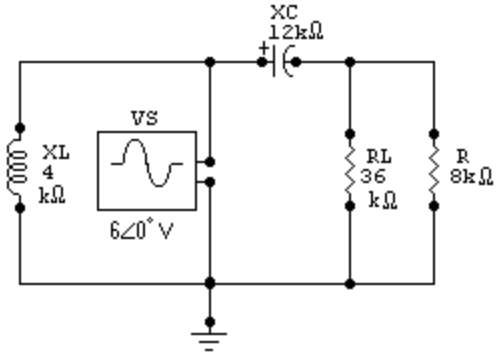
B. $4.69\angle 38.7°$ V

C. $469\angle 38.7°$ mV

D. $6\angle 0°$ V

Ans: B

63. Referring to the given circuit, find Z_{TH} if R is 15 k Ω and R_L is 38 k Ω.



A. $89.82 \angle -51.3°\ \text{k}\Omega$

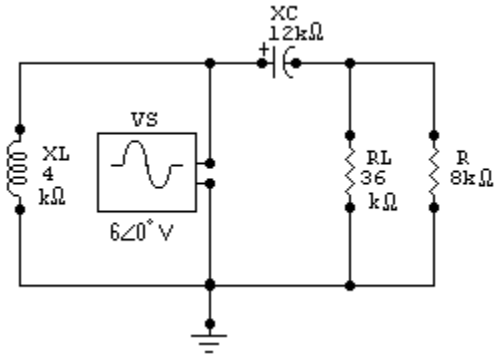
B. $19.2 \angle -38.3°\ \text{k}\Omega$

C. $9.38 \angle -51.3°\ \text{k}\Omega$

D. $180 \angle -38.3°\ \text{k}\Omega$

Ans: C

64. For the circuit shown, determine Z_{TH} for the portion of the circuit external to R_L.



A. $66.7 \angle -33.7°\ \text{k}\Omega$

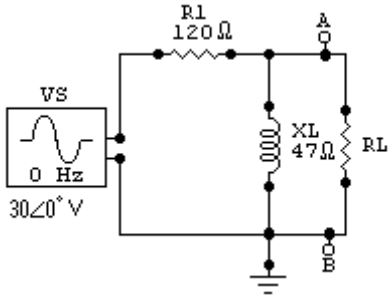
B. $6.67 \angle -333.7°\ \text{k}\Omega$

C. $14.4 \angle -56.3°$ k Ω

D. $1.44 \angle -33.7°$ k Ω

Ans: B

65. Referring to the given circuit, what is Z_{TH} if R_1 is changed to 220 Ω?



A. $225 \angle 12.1°$ Ω

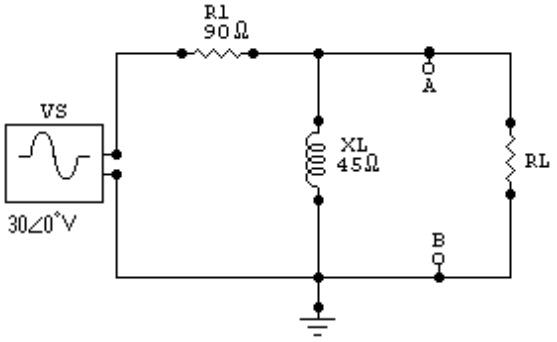
B. $225 \angle 77.9°$ Ω

C. $46 \angle 77.9°$ Ω

D. $46 \angle 12.1°$ Ω

Ans: C

66. Determine V_{TH} for the circuit external to R_L in the given figure.



A. $135\angle 63.4°$ V

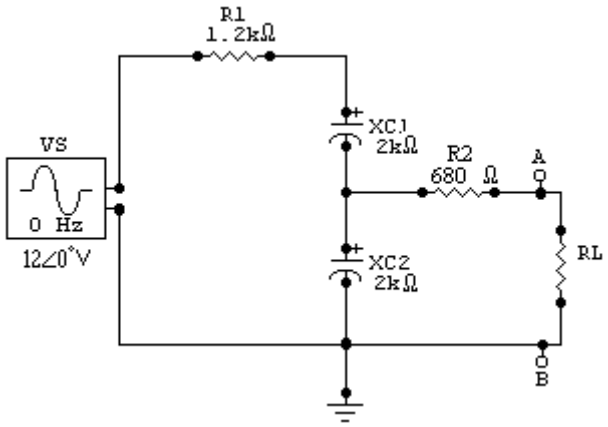
B. $13.5\angle 63.4°$ V

C. $13.5\angle 0°$ V

D. $135\angle 0°$ V

Ans: B

67. Referring to the given figure, determine Z_{TH} as seen by R_L if R_1 is changed to 3.3 k Ω.



A. $1488\angle -70.7°$ Ω

B. $3859\angle -31.2°$ Ω

C. $5180\angle -50.5°$ Ω

D. $1828\angle -50.2°$ Ω

Ans: D

68. The two basic components of a Thevenin equivalent ac circuit are

A. the equivalent voltage source and the equivalent series impedance

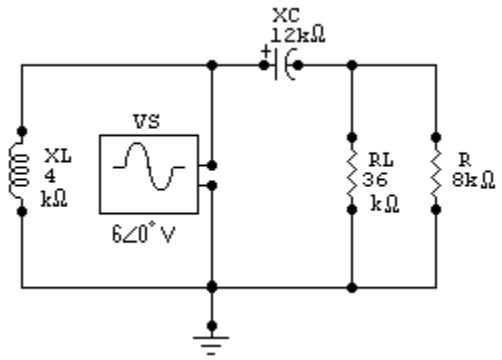
B. the equivalent voltage source and the equivalent series resistance

C. the equivalent voltage source and the equivalent parallel impedance

D. the equivalent voltage source and the equivalent parallel resistance

Ans: A

69. Referring to the given circuit, find Z_{TH} if V_S is 18 $\angle 0°$ V.



A. 9.82 $\angle$–51.3° k Ω

B. 9.38 $\angle$–51.3° k Ω

C. 180 $\angle$–38.3° k Ω

D. 19.2 $\angle$–38.3° k Ω

Ans: B

70. In applying the superposition theorem,

A. the sources are considered one at a time with all others replaced by their internal impedance

B. all sources are considered independently

C. all sources are considered simultaneously

Ans: A

71. If two currents are in the same direction at any instant of time in a given branch of a circuit, the net current at that instant

A. is zero

B. is the sum of the two currents

C. is the difference between the two currents

D. cannot be determined

Ans: B

72. The Thevenin equivalent voltage is

A. equal to the source voltage

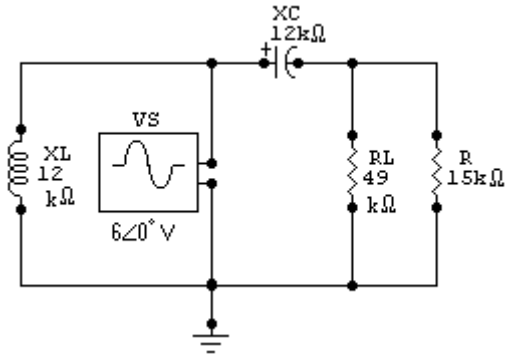
B. the same as the load voltage

C. the open circuit voltage

D. none of the above

Ans: C

73. Referring to the given circuit, *L*



A. must be in parallel with R_L

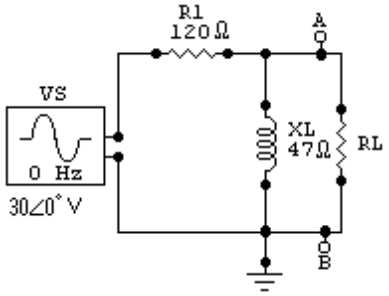
B. must be placed in parallel with V_S

C. must have a reactance equal to X_C

D. has no effect on the result

Ans: D

74. Referring to the given circuit, find Z_{TH} for the part of the circuit that is external to R_L.



A. $129\angle 21.4°\ \Omega$

B. $43.7\angle 68.6°\ \Omega$

C. $43.7\angle 21.4°\ \Omega$

D. $12.9\angle 68.6°\ \Omega$

Ans: B

75. In order to get maximum power transfer from a capacitive source, the load must

A. have a capacitive reactance equal to circuit resistance

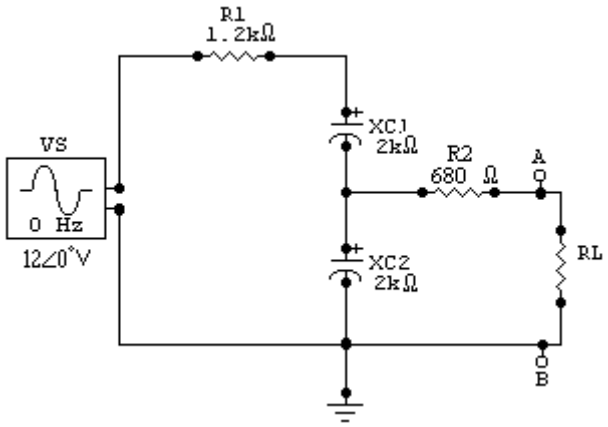
B. have an impedance that is the complex conjugate of the source impedance

C. be as capacitive as it is inductive

D. none of the above

Ans: B

76. Referring to the given circuit, determine Z_{TH} as seen by R_L.



A. $1444\angle -48.5°\ \Omega$

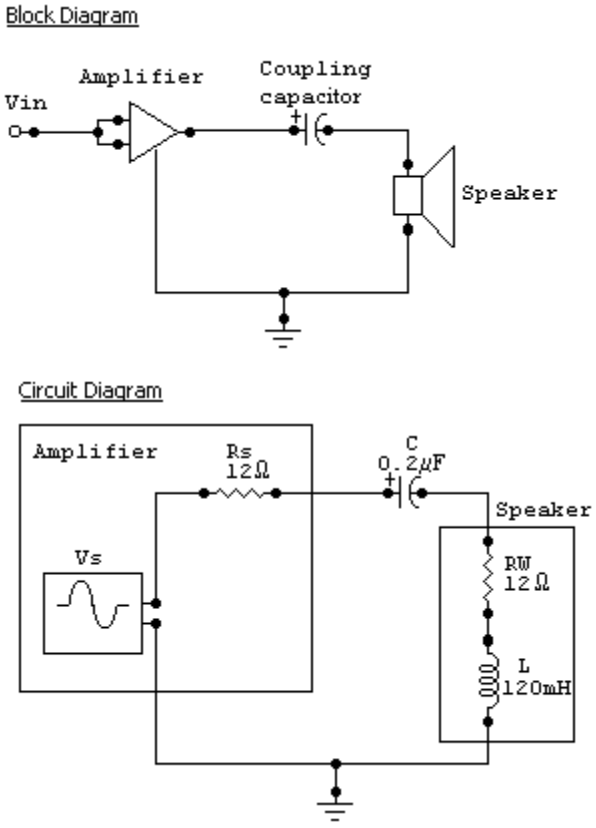
B. $4176 \angle -73.3° \ \Omega$

C. $956 \angle -48.5° \ \Omega$

D. $1444 \angle -73.3° \ \Omega$

Ans: A

77. Referring to the given circuit, how much power, in watts, is delivered to the speaker at the determined frequency if $V_S = 4.5\ V_{RMS}$?



A. 226 mW

B. 2.26 mW

C. 4.24 mW

D. 424 mW

Ans: D

78. The Norton equivalent current is

A. the current through the load

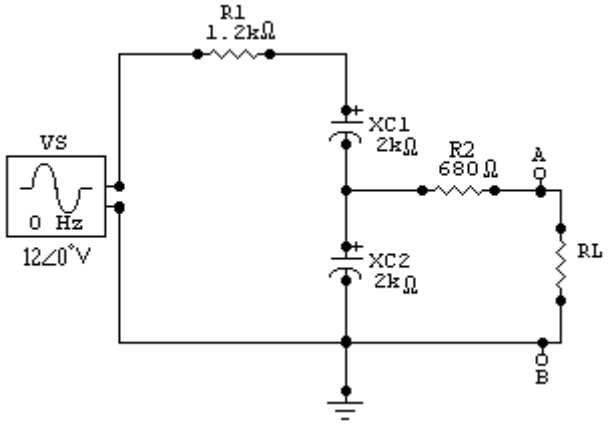
B. the open-current from the source

C. the short circuit current

D. none of the above

Ans: C

79. Determine V_{TH} if R_1 is changed to 3.3 k Ω.



A. 0.574 ∠16.7° V

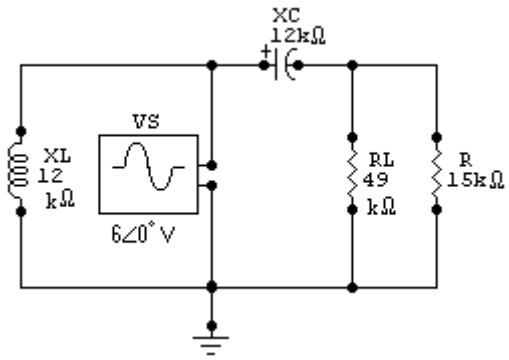
B. $4.63 \angle 16.7° \text{ V}$

C. $4.63 \angle 39.5° \text{ V}$

D. $0.463 \angle 39.5° \text{ V}$

Ans: C

80. Referring to the given circuit, what is V_{TH} if $V_S = 12 \angle 0° \text{ V}$?



A. $4.69 \angle 38.7° \text{ V}$

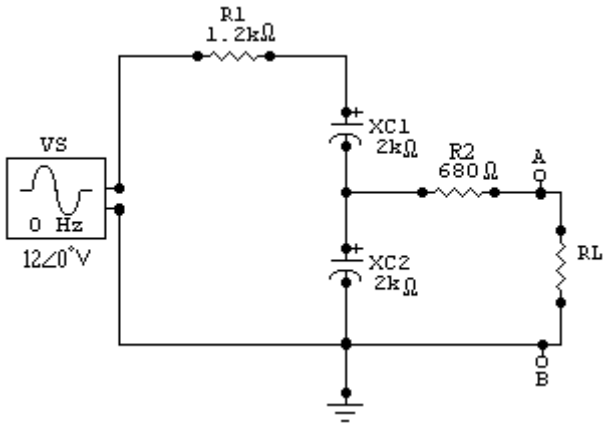
B. $9.38 \angle 38.7° \text{ V}$

C. $12 \angle 0° \text{ V}$

D. $6 \angle 0° \text{ V}$

Ans: B

81. For the circuit given, determine the Thevenin voltage as seen by R_L.



A. $0.574 \angle 16.7° \text{ V}$

B. $5.74 \angle 16.7° \text{ V}$

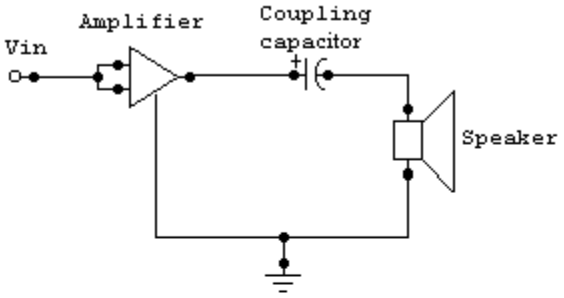
C. $0.574 \angle -16.7° \text{ V}$

D. $5.74 \angle -16.7° \text{ V}$

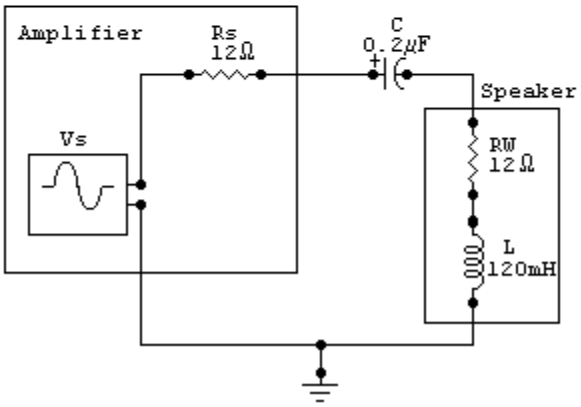
Ans: D

82. Determine the frequency at which the maximum power is transferred from the amplifier to the speaker in the given figure.

Block Diagram



Circuit Diagram



A. 1,027 Hz

B. 10,270 Hz

C. 6,330 Hz

D. 63,330 Hz

Ans: A

83. Norton's theorem gives

A. an equivalent current source in parallel with an equivalent impedance

B. an equivalent current source in series with an equivalent impedance

C. an equivalent voltage source in parallel with an equivalent impedance

D. an equivalent voltage source in series with an equivalent impedance

Ans: A

1. One circuit is equivalent to another, in the context of Thevenin's theorem, when the circuits produce the same voltage.

A. True B. False

Ans: B

84. Norton's theorem provides a method for the reduction of any ac circuit to an equivalent form consisting of an equivalent voltage source in series with an equivalent impedance.

A. True B. False

Ans: B

85. A Thevenin ac equivalent circuit always consists of an equivalent ac voltage source and an equivalent capacitance.

A. True B. False

Ans: B

86. The superposition theorem is useful for circuit analysis only in ac circuits.

A. True B. False

Ans: B

87. An equivalent circuit is one that produces the same voltage and current to a given load as the original circuit that it replaces.

A. True B. False

Ans: A

88. In an ac circuit, power to the load peaks at the frequency at which the load impedance is the complex conjugate of the output impedance.

A. True B. False

Ans: A

89. In order to get maximum power transfer from a capacitive source, the load must have an impedance that is the complex conjugate of the source impedance.

A. True B. False

Ans: A

90. Thevenin's theorem provides a method for the reduction of any ac circuit to an equivalent form consisting of an equivalent current source in parallel with an equivalent impedance.

A. True B. False

Ans: B

91. The superposition theorem is useful for the analysis of single-source circuits.

A. True B. False

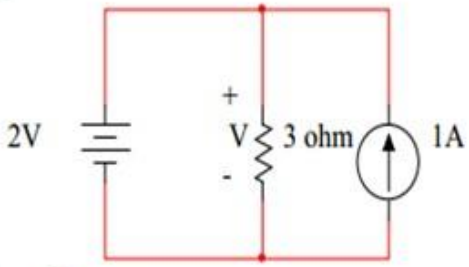
Ans: B

92. Like Thevenin's theorem, Norton's theorem provides a method of reducing a more complex circuit to a simpler, more manageable form for analysis.

A. True B. False

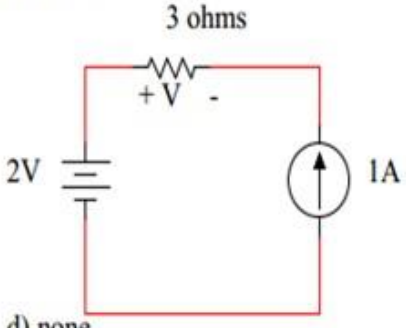
Ans: A

93. Find V in the circuit shown?



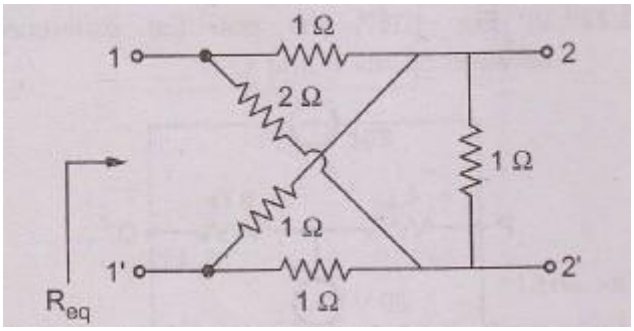
a) 2V b) 3V c) 1V d) none Ans: (a)

94. Find V in the circuit shown?



a) – 3 b) +3 c) 2V d) none Ans: (a)

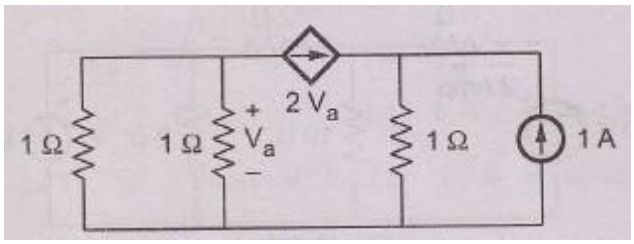
96. For the lattice type attenuator shown in the given Fig. The impedance across terminal 1 - l' is



a) 1Ω
b) 13/11
c) 11/13
d) 2Ω

Ans:b

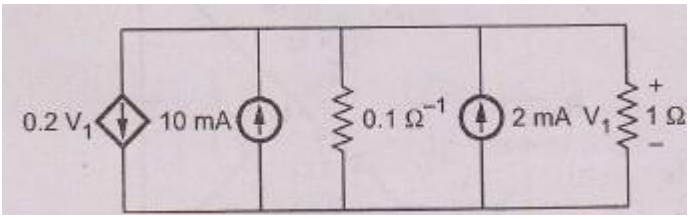
97. In the circuit shown, the power delivered by the dependent source is



a)0W
b)1W
c)2W
d)4W

Ans: a

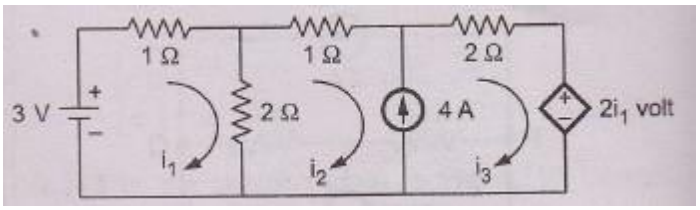
98. The value of VI in the circuit shown in Fig. below is



a)5mW
b)9.23mW
c)5mW
d)1.07mW

Ans: b

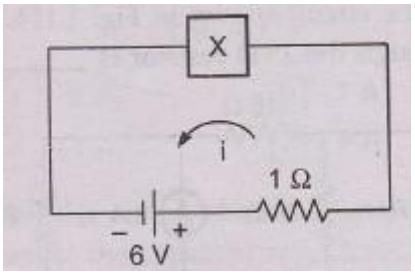
99. In the network shown in Fig. The value of current il will be



a)1/15A
b)-1/15A
c)-2A
d)1A

Ans: b

100. The value of X =……. for i= 1A



a)4Ω

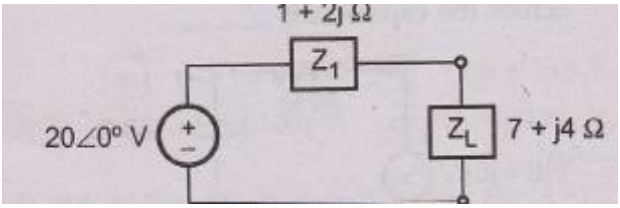
b)5 Ω

c)6 Ω

d)1Ω

Ans :d

101. The reactive power consumed by the load ZL is



a)10 VAR

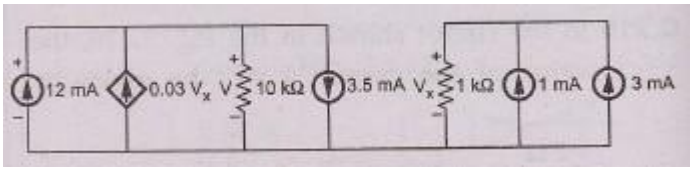
b)16 VAR

c)25 VAR

d)32 VAR

Ans: d

102. The voltage V in the circuit of below Fig. is



a)1475.12 V

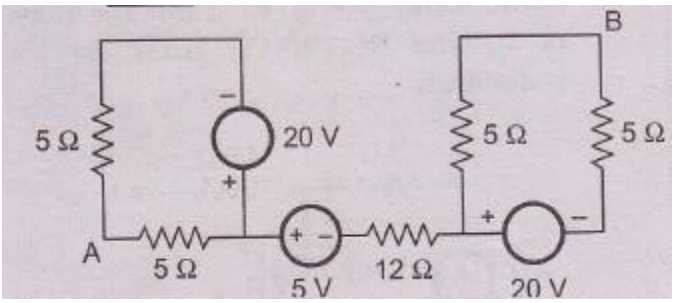
b)-475.12V

c)520.85V

d)1285 V

Ans: d

103. The voltage between points A and B is



a)50 V

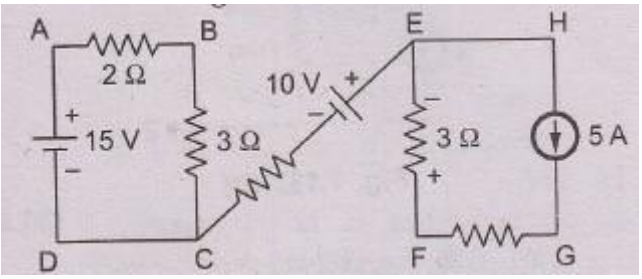
b)-5 V

c)5 V

d)25 V

Ans: c

104. A network is shown in Fig.The voltage across AF will be



a)-15 V

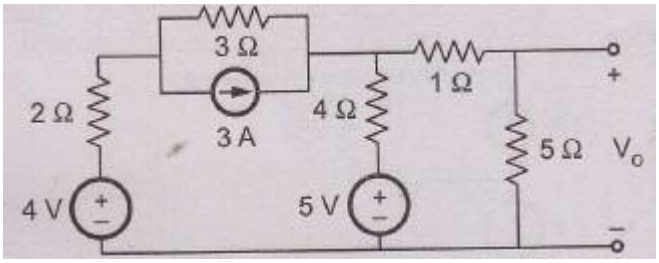
b) 5 V

c)-10 V

d)15 V

Ans: c

105. The value of V0 in the network of below fig is



a)5.21 V

b) 6.21 V

c) 7.21 V

d)10.21 V

Ans: a

106. An ideal voltage source and an ideal current source are connected in parallel. The circuit has

a) a Nortan's equivalent but not Thevenin's equivalent

b) a Thevenin's equivalent but not Nortan's equivalent

c) both Nortan's equivalent and Thevenin's equivalent

d) niether Nortan's equivalent nor Thevenin's equivalent

Ans: b

107. Superposition theorem is not applicable for
a) voltage calculations
b) bilateral calculations
c) power calculations
d)passive elements

Ans: c

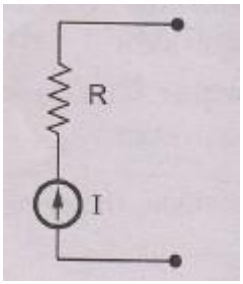
108. An independent voltage source in series with an impedance Zs = Rl + jXl delivers a maximum average power to a load impedance ZL When
a) ZL = Rl +jXl
b) ZL = Rl
c) ZL = jXl
d) ZL = Rl - jXl

Ans: d

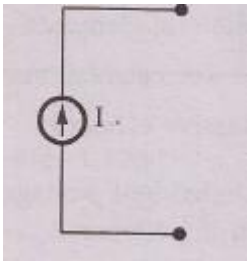
109. A certain network consists of a large number of ideal linear resistances,each of which is designated as R and two constant ideal sources.The power consumed by R is PI when only the first source is active ,and P_2 when only the second source is active. If both sources are active simultaneously,then the power consumed by R is
a)(P1±P2)^2
b) (P1)^1/2 ± (P2)^1/2
c) [(P1)^1/2 ± (P2)^1/2]^2
d) (P1 ± P2)^1/2
Ans : c

110. A simple equivalent circuit of 2 terminal network shown in the Fig. will be

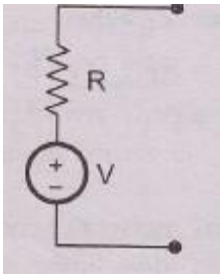
a)



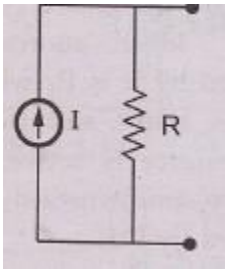
b)



c)

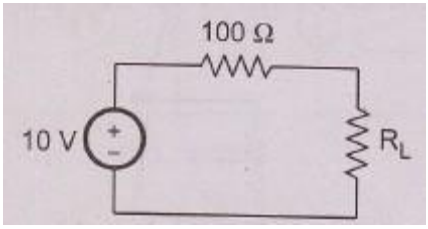


d)



Ans :b

111. The maximum power that can be transferred to the load resistor RL from the voltage source in the Fig. is



a)0.75 W

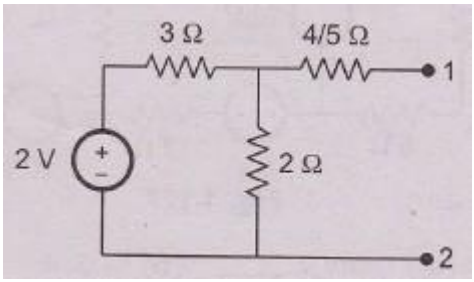
b)10 W

c)0.25 W

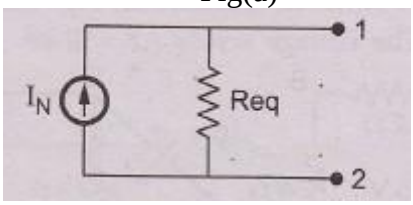
d)0.5 W

Ans. C

112. The Norton's equivalent of the circuit shown in Fig. (a) is drawn in the circuit shown in Fig. (b). The value of IN and Req in Fig. (b) are respectively



Fig(a)

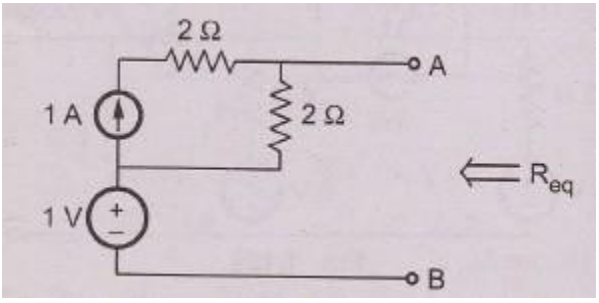


Fig(b)

a) 0.25 and 2Ω
b) 0.4 and 1Ω
c) 0.8 and 2.4Ω
d) 0.4 and 2Ω

Ans: d

113. The Thevenin's equivalent resistance Req for the given network is



a) 1Ω
b) 2Ω
c) 0Ω
d) ∞

Ans: b

114. Consider the circuit A and B. For what values respectively of I and R, the circuit A is equivalent to circuit B ?

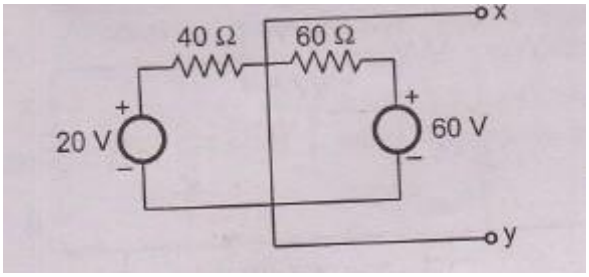


Fig.(a)

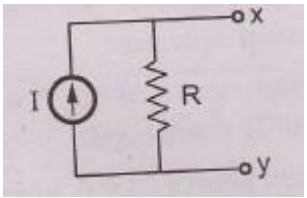


Fig.(b)

a) 2A,24Ω
b) 1.5A,24Ω
c) 1A,50Ω
d) 1.5A,40 Ω

Ans: b

115. A circuit (a) and its equivalent (b) are shown. What are the values of V_{TH} and Z?

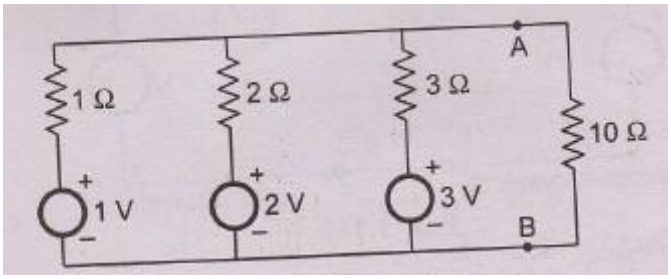


Fig.(a)

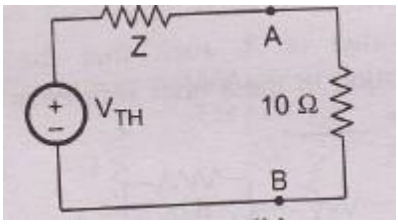
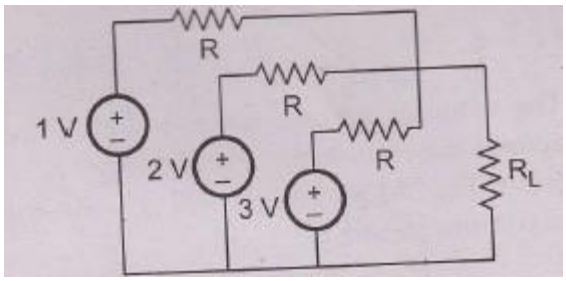


Fig.(b)

a) 6V,6Ω
b) 6V,0.5454Ω
c) 1.8V,1.8Ω
d) 1.6364V,0.5454 Ω

Ans: d

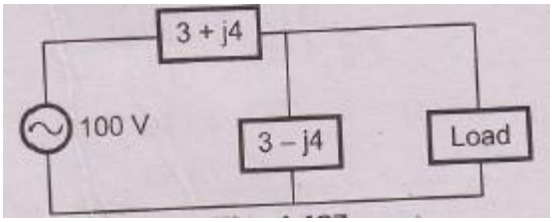
116. For the circuit, the value of R such that the maximum power delivered to the load is 3 mW will be?



a) 0.5kΩ
b) 1kΩ
c) 4kΩ
d) 2kΩ

Ans: b

117. In the given circuit, for maximum power transfer to the load, the load should be



a)pure resistive

b)pure inductive

c)pure capacitive

d)complex

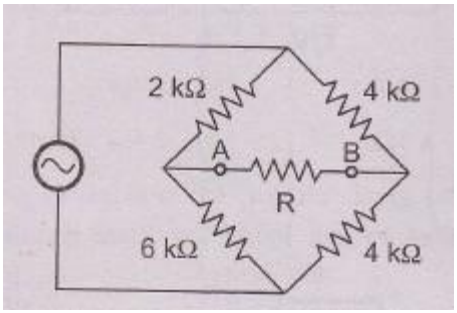
Ans: a

118. A source of angular frequency 1 rad/ sec has a source impedance consisting of 1 Q resistance in series with 1 iH inductance. The load that will obtain the maximum power transfer is

a) 1 Ω resistance
b) 1 Ω resistance in parallel with 1 F capacitor
c) 1 Ω resistance in series with 1 F capacitor
d) 1 Ω resistance in parallel with 1 H inductor

Ans: c

119. The value of the resistance, R, connected across the terminals, A and B. (refer Fig.) which will absorb the maximum power is

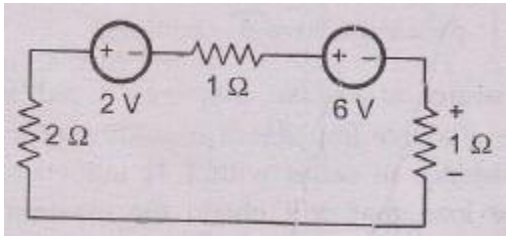


.

a) 3.5kΩ
b) 4.5kΩ
c) 8kΩ
d) 9.5kΩ

Ans: b

120. If the voltage of each source is doubled which of the following statement is true ?



a) Current flowing in the network is doubled.

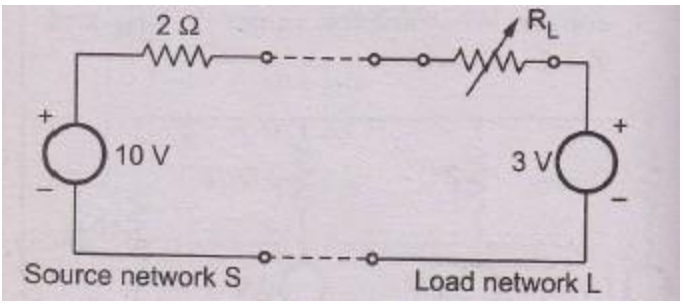
b) Power absorbed by each resistor is doubled.

c) Power delivered by each resistor is doubled.

d)Voltage across each resistor remain costant.

Ans: a

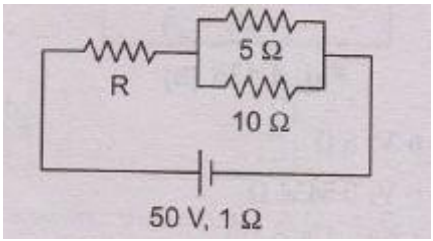
121. The source network S is connected to the load network L as shown by dashed lines. The power transferred from S to L would be maximum when RL is



a) 0Ω
b) 0.6Ω
c) 0.8Ω
d) 2 Ω

Ans: d

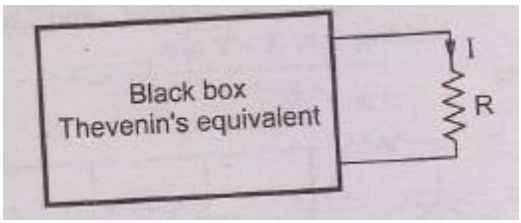
122. The value of R, such that the power dissipation in the 5 ohm resistor is 100 W will be



a) 2.12Ω
b) 3.12Ω
c) 4.12Ω
d) none of this

Ans: b

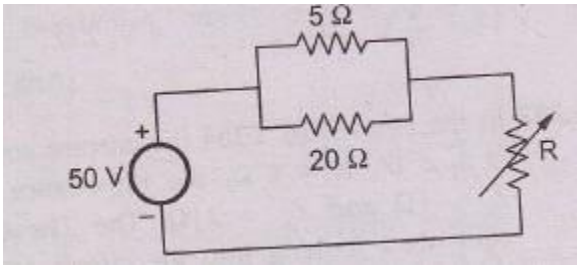
123. The black box shown in the Fig. contains linear resistor and independent sources. For R = 0Ω and 2Ω, the values of currents are 3 A and 1.5 A respectively. The value of I when R = 1Ω will be



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

Ans: b

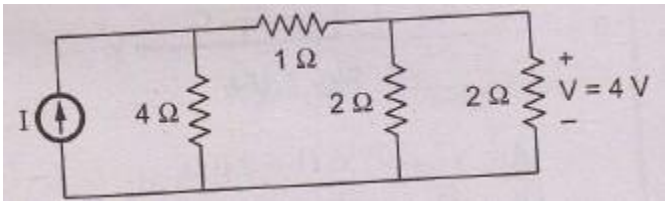
124. Power in 5Ω is 20 W. The resistance R will be



a) 5Ω
b) 25Ω
c) 16Ω
d) 4 Ω

Ans: c

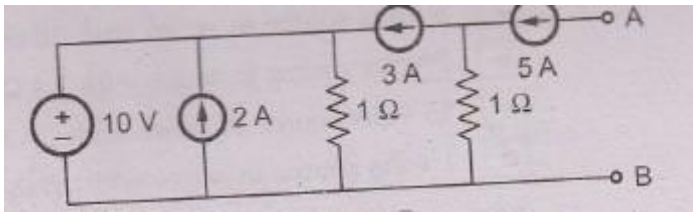
125. The current I flowing in the circuit shown in below Fig. is



a) 3A
b) 6A
c) 0A
d) -3A

Ans: b

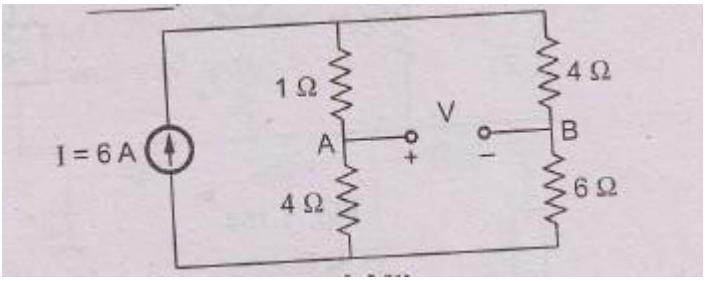
126. In the circuit shown, the Thevenin's equivalent across A-B is



a) 2V,1Ω
b) 5V,1Ω
c) 2V,0.5Ω
d) not possible

Ans: d

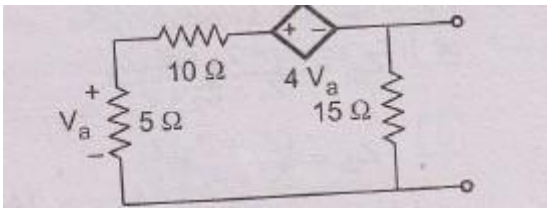
127. The Thevenin's equivalent across AB has VAB and Req given respectively by



a) -16V,10/3Ω
b) -12V,10Ω
c) 11V,16/6Ω
d) 4V,10/3 Ω

Ans: d

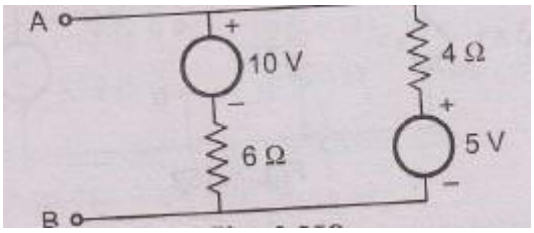
128. The Thevenin's equivalent resistance of the circuit is



a) 15Ω
b) 7.5Ω
c) -7.5Ω
d) 8.4 Ω

Ans: c

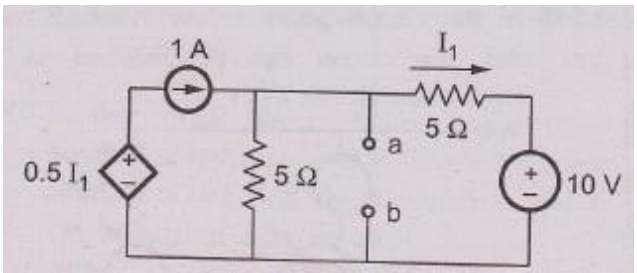
129. In the circuit given below, viewed form AB, the circuit can be reduced to an equivalent circuit as



a)5V source in series with 10Ω
b)7V source in series with 2.4Ω
c)15V source in series with 2.4Ω
d)1V source in series with 10Ω

Ans: b

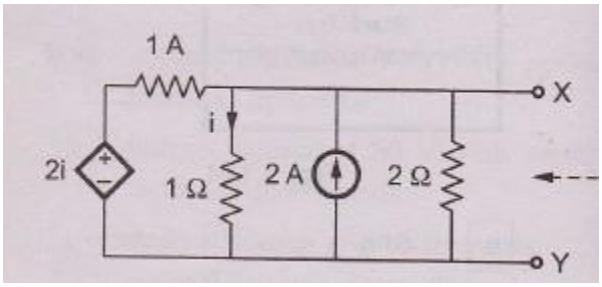
130. For the circuit shown in Fig. Thevenin's voltage and Thevenin's equivalent resistance at terminals (a - b) is



a) 2V,2Ω
b) 7.5V,2.5Ω
c) 4V,0.2Ω
d) 3V,2.5Ω

Ans: b

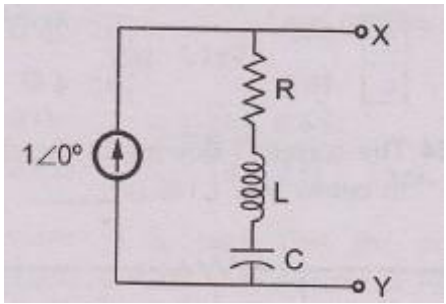
131. For the circuit shown in the Fig. the Thevenin's voltage and resistance looking into X – Yare



a) 4/3V,2Ω
b) 4V,2/3Ω
c) 4/3V,2/3Ω
d) 4V,2Ω

Ans: d

132. In the below Fig.Ihe current source is 1 *L* 0°, R = 1Ω, the impedance are Zc = - j Ω and ZL = 2 j Ω. The Thevenin equivalent looking into the circuit across X-Y is



a	$\sqrt{2} \angle 0°$ V, (1 + 2 j) Ω
b	$\sqrt{2} \angle 45°$ V, (1 – 2 j) Ω
c	$2 \angle 45°$ V, (1 + j) Ω
d	$\sqrt{2} \angle 45°$ V, (1 + j) Ω

Ans: d

133. For ideal voltage source, internal resistance is ……ohm.

a) infinite
b) zero
c) constant
d) none of these

Ans: b

134. For ideal current source, internal is ……ohm

a) infinite
b) zero
c) constant
d) none of these

Ans: a

135. Validity of Ohm's law requires that the

a) voltage should remain constant

b) current should remain constant

c) resistance must remain constant

d) power must remain constant

Ans: c

136. For application of Ohm's law,….. of circuit must remain constant

a) voltage

b) current

c)resistance

d)inductance

Ans:c

138. The Ohm's law cannot be applied to

a) resistace

b) inductance

c) capacitance

d) diode

Ans: d

139. In series circuit ……. Remains same

a)current

b)voltage

c)resistance

d)none of these

Ans:a

140. In seris circuit the equivalent resistance is …… of all individual resistances

a)smallest

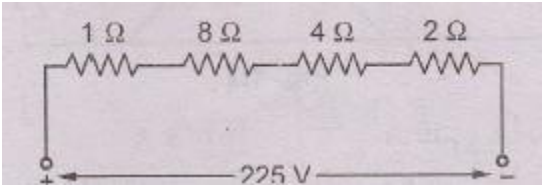
b)same as

c)largest

d)none of these

Ans.c

141. The voltage drop across 8Ω resistor is



a) 0V

b)80V

c)220V

d)120V

Ans: d

142. The voltage across the short circuit is

a)infinite

b)one

c)zero

d)none of these

Ans: c

143. The load increases means load resistance

a)increases

b)decreases

c)remain constant

d)none of these

Ans: b

144. In parallel circuit … remains same

a)current

b)voltage

c)resistnce

d)none of these

Ans: b

145. In a parallel circuit,the equivalent resistance is …..of all the individual resistances

a)smallest

b)same as

c)largest

d)none of these

Ans. a

146. If 20 resistances, each of 1 Ωare connected in parallel then the equivalent resistance is

a) 0.01Ω

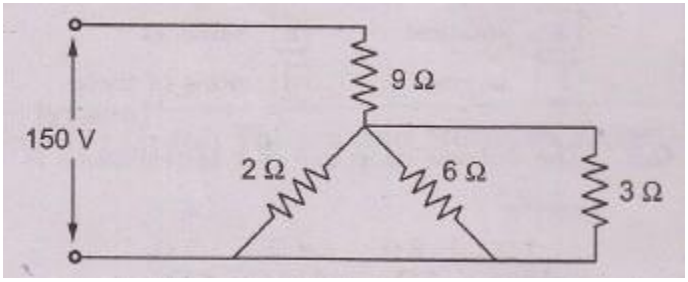
b)0.05Ω

c)20Ω

d)0.02Ω

Ans:b

147. The total current drawn by the circuit shown from the supply is



a) 10A
b) 5A
c) 1A
d) 15A

Ans: d

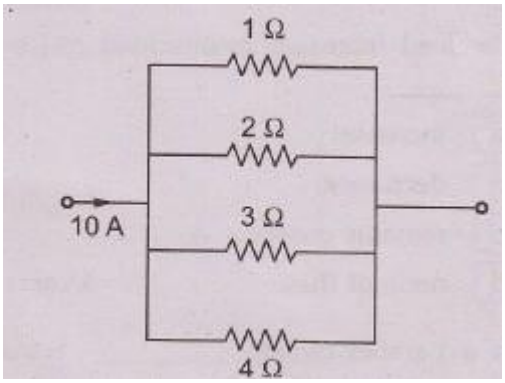
148. If the 3 Q resistance is removed from the circuit shown in the Fig. The current drawn by the circuit is

a) 14.285A
b) 9.185A
c) 2A
d) 1.185A

Ans: a

149. The voltage across the parallel circuit shown in the fig is

–



a)1.8V
b)4.8V
c)8.4V
d)2.8V

Ans:b

150. The algebraic sum of all the currents at a junction point is always zero is the statement of …… law
a) KVL
b)Lenz's
c)Faraday's
d)KCL

Ans: d

151. Kirchhoff s current law states that
(a) net current flow at the junction is positive
(b) Algebric sum of the currents meeting at the junction is zero
(c) no curreht can leave the junction without some current entering it.
(d) total sum of currents meeting at the junction is zero

Ans: b

152. According to Kirchhoff's voltage law, the algebraic sum of all IR drops and e.m.fs. in any closed loop of a network is always
(a) negative
(b) positive
(c) determined by battery e.m.fs.
(d) zero

Ans: d

153. Kirchhoffs current law is applicable to only
(a) junction in a network
(b) closed loops in a network
(c) electric circuits
(d) electronic circuits

Ans: a

154. Kirchhoff's voltage law is related to
(a) junction currents
(b) battery e.m.fs.
(c) IR drops
(d) both (b) and (c)
(e) none of the above

Ans: d

155. Superposition theorem can be applied only to circuits having
(a) resistive elements
(b) passive elements
(c) non-linear elements
(d) linear bilateral elements
Ans: d

156. The concept on which Superposition theorem is based is
(a) reciprocity
(b) duality
(c) non-linearity
(d) linearity
Ans: d

157. Thevenin resistance Rth is found
(a) by removing voltage sources along with their internal resistances
(6) by short-circuiting the given two terminals
(c) between any two 'open' terminals
(d) between same open terminals as for Etk
Ans: d

158. An ideal voltage source should have
(a) large value of e.m.f.
(b) small value of e.m.f.
(c) zero source resistance
(d) infinite source resistance
Ans: c

159. For a voltage source
(a) terminal voltage is always lower than source e.m.f.
(b) terminal voltage cannot be higher than source e.m.f.
(c) the source e.m.f. and terminal voltage are equal
Ans: b

160. To determine the polarity of the voltage drop across a resistor, it is necessary to know
(a) value of current through the resistor
(b) direction of current through the resistor
(c) value of resistor
(d) e.m.fs. in the circuit
Ans: b

161. "Maximum power output is obtained from a network when the load resistance is equal to the output resistance of the network as seen from the terminals of the load". The above statement is associated with
(a) Millman's theorem
(b) Thevenin's theorem
(c) Superposition theorem
(d) Maximum power transfer theorem
Ans: d

162. "Any number of current sources in parallel may be replaced by a single current source whose current is the algebraic sum of individual source currents and source resistance is the parallel combination of individual
source resistances".
The above statement is associated with
(a) Thevenin's theorem
(b) Millman's theorem
(c) Maximum power transfer theorem
(d) None of the above
Ans: b

163. "In any linear bilateral network, if a source of e.m.f. E in any branch produces a current I in any other
branch, then same e.m.f. acting in the second branch would produce the same current / in the first branch".
The above statement is associated with
(a) compensation theorem
(b) superposition theorem
(c) reciprocity theorem
(d) none of the above
Ans: c

164. Which of the following is non-linear circuit parameter ?
(a) Inductance

(b) Condenser
(c) Wire wound resistor
(d) Transistor
Ans: a

165. A capacitor is generally a
(a) bilateral and active component
(b) active, passive, linear and nonlinear component
(c) linear and bilateral component
(d) non-linear and active component
Ans: c

166. "In any network containing more than one sources of e.m.f. the current in any branch is the algebraic sum of a number of individual fictitious currents (the number being equal to the number of sources of e.m.f.), each of which is due to separate action of each source of e.m.f., taken in order, when the remaining sources of e.m.f. are
replaced by conductors, the resistances of which are equal to the internal resistances of the respective sources".
The above statement is associated with
(a) Thevenin's theorem
(b) Norton's theorem
(c) Superposition theorem
(d) None of the above
Ans: c

167. Kirchhoff s law is applicable to
(a) passive networks only
(b) a.c. circuits only
(c) d.c. circuits only
(d) both a.c. as well d.c. circuits
Ans: d

168. Kirchhoff s law is not applicable to circuits with
(a) lumped parameters
(b) passive elements
(c) distributed parameters
(d) non-linear resistances
Ans: c

169. Kirchhoff s voltage law applies to circuits with
(a) nonlinear elements only
(b) linear elements only
(c) linear, non-linear, active and passive elements
(d) linear, non-linear, active, passive, time varying as wells as time-in-variant elements
Ans: d

170. The resistance LM will be
(a) 6.66 Q
(b) 12 Q
(c) 18Q
(d) 20Q
Ans: a

171. For high efficiency of transfer of power, internal resistance of the source should be
(a) equal to the load resistance
(b) less than the load resistance
(c) more than the load resistance
(d) none of the above
Ans: b

172. Efficiency of power transfer when maximum transfer of power c xurs is
(a) 100%
(b) 80%
(c) 75%
(d) 50%
Ans: d

173. If resistance across LM in Fig. 2.30 is 15 ohms, the value of R is
(a) 10 Q
(6) 20 Q
(c) 30 Q
(d) 40 Q
Ans: c

174. For maximum transfer of power, inter¬nal resistance of the source should be
(a) equal to load resistance
(b) less than the load resistance
(c) greater than the load resistance
(d) none of the above
Ans: a

175. If the energy is supplied from a source, whose resistance is 1 ohm, to a load of 100 ohms the source will be
(a) a voltage source
(b) a current source
(c) both of above
(d) none of the above
Ans: a

176. The circuit whose properties are same in either direction is known as
(a) unilateral circuit
(b) bilateral circuit

(c) irreversible circuit
(d) reversible circuit
Ans: b

177. In a series parallel circuit, any two resistances in the same current path must be in
(a) series with each other
(b) parallel with each other
(c) series with the voltage source.'
(d) parallel with the voltage source
Ans: a

178. The circuit has resistors, capacitors and semi-conductor diodes. The circuit will be known as
(a) non-linear circuit
(b) linear circuit
(c) bilateral circuit
(d) none of the above
Ans: a

179. A non-linear network does not satisfy
(a) superposition condition
(b) homogeneity condition
(c) both homogeneity as well as superposition condition
(d) homogeneity, superposition and associative condition
Ans: c

180. An ideal voltage source has
(a) zero internal resistance
(b) open circuit voltage equal to the voltage on full load
(c) terminal voltage in proportion to current
(d) terminal voltage in proportion to load
Ans: a

181. A network which contains one or more than one source of e.m.f. is known as
(a) linear network
(b) non-linear network
(c) passive network
(d) active network
Ans: c

182. The superposition theorem is applicable to
(a) linear, non-linear and time variant responses
(b) linear and non-linear resistors only
(c) linear responses only
(d) none of the above
Ans: c

183. Which of the following is not a nonlinear element ?
(a) Gas diode
(b) Heater coil
(c) Tunnel diode
(d) Electric arc
Ans:

184. Application of Norton's theorem to a circuit yields
(a) equivalent current source and impedance in series
(6) equivalent current source and impedance in parallel
(c) equivalent impedance
(d) equivalent current source
Ans: a

185. Millman's theorem yields
(a) equivalent resistance
(6) equivalent impedance
(c) equivalent voltage source
(d) equivalent voltage or current source
Ans: d

186. The superposition theorem is applicable to
(a) voltage only
(b) current "only
(c) both current and voltage
(d) current voltage and power
Ans: d

187. Between the branch voltages of a loop the Kirchhoff s voltage law imposes
(a) non-linear constraints
(b) linear constraints
(c) no constraints
(d) none of the above
Ans: b

188. A passive network is one which contains
(a) only variable resistances
(b) only some sources of e.m.f. in it
(c) only two sources of e.m.f. in it
(d) no source of e.m.f. in it
Ans: d

189. A terminal where three on more branches meet is known as
(a) node
(b) terminus

(c) combination
(d) anode
Ans: a

190. Which of the following is the passive element?
(a) Capacitance
(b) Ideal current source
(c) Ideal voltage source
(d) All of the above
Ans: a

191. Which of the following is a bilateral element?
(a) Constant current source
(b) Constant voltage source
(c) Capacitance
(d) None of the above
Ans: c

192. A closed path made by several branches of the network is known as
(a) branch
(b) loop
(c) circuit
(d) junction
Ans: b

193. A linear resistor having $0 < R < °o$ is a
(a) current controlled resistor
(6) voltage controlled resistor
(c) both current controlled and voltage controlled resistor
(d) none of the above
Ans: c

194. A star circuit has element of resistance R/2. The equivalent delta elements will be
(a) R/6
(b) fi?
(c) 2R
(d) 4R
Ans: b

195. A delta circuit has each element of value R/2. The equivalent elements of star circuit with be
(a) RIG
(b) R/3
(c) 2R
(d) 3R
Ans: a

196. In Thevenin's theorem, to find Z
(a) all independent current sources are short circuited and independent voltage sources are open circuited
(b) all independent voltage sources are open circuited and all independent current sources are short circuited
(c) all independent voltage and current sources are short circuited
(d) all independent voltage sources are short circuited and all independent current sources are open circuited
Ans: d

197. While calculating Rth in Thevenin's theorem and Norton equivalent
(a) all independent sources are made dead
(b) only current sources are made dead
(c) only voltage sources are made dead
(d) all voltage and current sources are made dead
Ans: a

198. The number of independent equations to solve a network is equal to
(a) the number of chords
(b) the number of branches
(c) sum of the number of branches and chords
(d) sum of number of branches, chords and nodes
Ans: a

199. The superposition theorem requires as many circuits to be solved as there are
(a) sources, nodes and meshes
(b) sources and nodes
(c) sources
(d) nodes
Ans: c

200. Choose the incorrect statement.
(a) A branch formed by the parallel connection of any resistor R and open circuit has the characteristic of an open circuit.
(b) A branch formed by the parallel connection of any resistor R and a short circuit has the characteristic of a short circuit.
(c) A branch formed by the series connection of any resistor R and an open circuit has the characteristic of an open circuit.
(d) A branch formed by the series connection of any resistor R and a short circuit has the characteristic of resistor R.
Ans: a