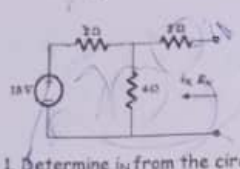
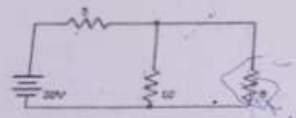
2019/2020 HARMATTAN SEMESTER EXAMINATIONS
GET 201: APPLIED ELECTRICITY I UNITS: 3

Use the figure below to answer questions 1 & 2.



1. Determine i_N from the circuit.
   a. 1.5 A
   ~~b. 3 A~~
   c. 6 A
   d. 10 A
2. Find R_N (in ohm).
   a. 10/3
   b. 4/3
   c. 10
   d. 4
3. From the circuit shown below, find the Norton's equivalent circuit (i.e. the current passing through the short-circuited terminals).

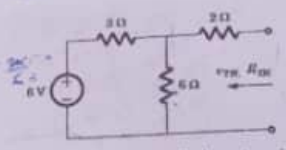


   a. 1
   b. 2
   ~~c. 3~~
   d. 4

4. Norton's theorem provides that: *Any Linear Electric Network or complex circuit with Current and Voltage sources can be replaced by an equivalent circuit containing of a single independent* _____ *and a* _____ R_N.
   a. Current source/Parallel Resistance
   b. Voltage source/Parallel Resistance
   c. Current source/Series Resistance
   d. Voltage source/Series Resistance

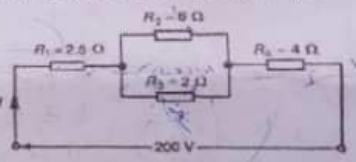
5. The main difference between Thevenin's theorem and Norton's theorem is that Thevenin's theorem provides an equivalent voltage source and an equivalent series resistance, while Norton's theorem provides an equivalent Current source and an equivalent parallel resistance.
   ~~a. True~~
   b. False
   c. Not exactly
   d. None of the mentioned

Use the figure below to answer questions 6 & 7.



6. Find the V_{TH} of the circuit.
   a. 1 V
   b. 2 V
   c. 3 V
   d. 4 V
7. Determine the R_{TH} (in ohm).
   a. 2
   b. 3
   c. 4
   d. 5

Use the series-parallel resistor arrangement shown in the circuit below to answer questions 8 to 10.



8. Find the current flowing through Resistor, R_3.
   a. 18.75A
   b. 4.5A
   c. 7.5A
   d. 2.75A

9. Find the potential difference across resistor, R_1.
   a. 60.5V
   b. 62.5V
   c. 45.2V
   d. 67.5V

10. Find the potential difference across resistor, R_4.
    a. 106V
    b. 26V
    c. 100V
    d. 60V

Apply Kirchhoff's law to the figure below to answer questions 11 & 12.

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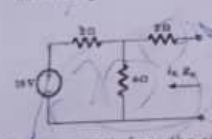

1. Determine i_N from the circuit.
   a. 1.5 A b. 3 A c. 6 A d. 10 A
2. Find R_N (in ohm).
   a. 10/3 b. 4/3 c. 10 d. 4

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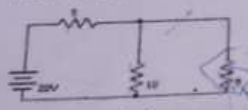

a. 1 b. 2 c. 3 d. 4

4. Norton's theorem provides that: *Any Linear Electric Network or complex circuit with Current and Voltage sources can be replaced by an equivalent circuit containing of a single independent* _____ *and a* _____ R_N.
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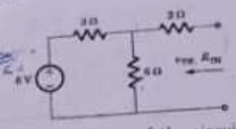
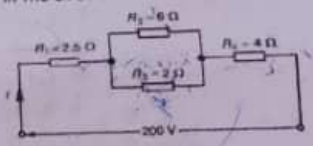


6. Find the V_{TH} of the circuit.
   a. 1 V b. 2 V c. 3 V d. 4 V
7. Determine the R_{TH} (in ohm).
   a. 2 b. 3 c. 4 d. 5

Use the series-parallel resistor arrangement shown in the circuit below to answer questions 8 to 10.



8. Find the current flowing through Resistor, R_3.
   a. 18.75A b. 4.5A c. 7.5A d. 2.75A

9. Find the potential difference across resistor, R_1.
   a. 60.5V b. 62.5V c. 45.2V d. 67.5V

10. Find the potential difference across resistor, R_4.
    a. 106V b. 26V c. 100V d. 60V

Apply Kirchhoff's law to the figure below to answer questions 11 & 12.

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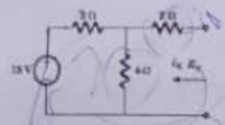
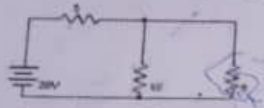


1. Determine i_N from the circuit. a. 1.5 A b. 3 A c. 6 A d. 10 A
2. Find R_N (in ohm). a. 10/3 b. 4/3 c. 10 d. 4
3. From the circuit shown below, find the Norton's equivalent circuit (i.e. the current passing through the short-circuited terminals).



a. 1 b. 2 c. 3 d. 4

4. Norton's theorem provides that: *Any Linear Electric Network or complex circuit with Current and Voltage sources can be replaced by an equivalent circuit containing of a single independent* _____ *and a* _____ R_N.
a. Current source/Parallel Resistance b. Voltage source/Parallel Resistance c. Current source/Series Resistance d. Voltage source/Series Resistance

5. The main difference between Thevenin's theorem and Norton's theorem is that Thevenin's theorem provides an equivalent voltage source and an equivalent series resistance, while Norton's theorem provides an equivalent Current source and an equivalent parallel resistance.
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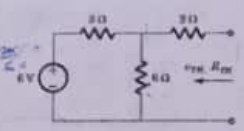
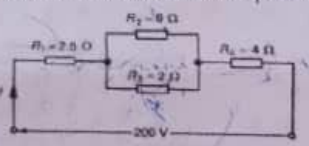


6. Find the V_{TH} of the circuit. a. 1 V b. 2 V c. 3 V d. 4 V
7. Determine the R_{TH} (in ohm). a. 2 b. 3 c. 4 d. 5

Use the series-parallel resistor arrangement shown in the circuit below to answer questions 8 to 10.



8. Find the current flowing through Resistor, R_3
a. 18.75A b. 4.5A c. 7.5A d. 2.75A
9. Find the potential difference across resistor, R_L
a. 60.5V b. 62.5V c. 45.2V d. 67.5V
10. Find the potential difference across resistor, R_4 a. 106V b. 26V c. 100V d. 60V

Apply Kirchhoff's law to the figure below to answer questions 11 & 12.

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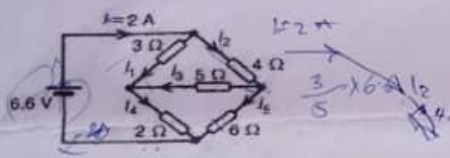
11. Find I_3 a. 20A b. 160A c. 120A d. 90A

12. Find I_4 a. 24A b. 70A c. 150A d. 100A

Apply KCL and KVL to the following circuit to solve the questions 13 & 14.



13. Find the current, I_2 through the 4Ω resistor.
a. 0.405A b. 0.74A c. 2.55A d. 1.25A

14. Find the voltage across the 6Ω resistor.
a. 3.54 V b. 2.52 V c. 4.62 V d. 2.96 V

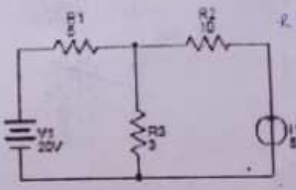
15. The Kirchhoff's current law represents a mathematical statement of fact that
a. voltage cannot accumulate at node b. charge cannot accumulate at node c. charge at the node is infinite d. none of the mentioned

16. While considering a source in Superposition theorem, all other current sources are?

a. short circuited b. changed c. open circuited d. removed from the circuit

17. In the circuit shown below, find the current through 3Ω resistor using Superposition theorem.

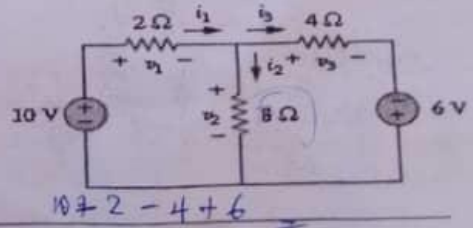
a. 4 b. 5 c. 6 d. 7



18. The superposition theorem states that "the *voltage across an element in a* _____ *circuit is the algebraic sum of the voltages across that element due to each independent source acting* _____".

a. linear/together b. linear/alone c. nonlinear/alone d. nonlinear/together

Use the figure below to answer questions 19 & 20.



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GET 201: APPLIED ELECTRICITY I UNITS: 3

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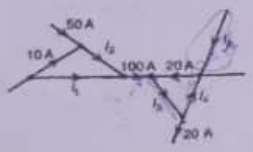
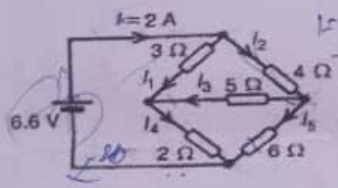


Apply KCL and KVL to the following circuit to solve the questions 13 & 14.



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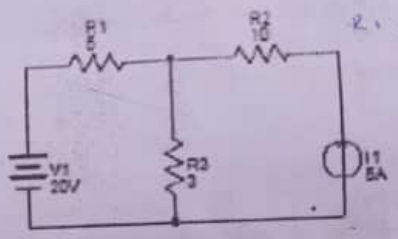

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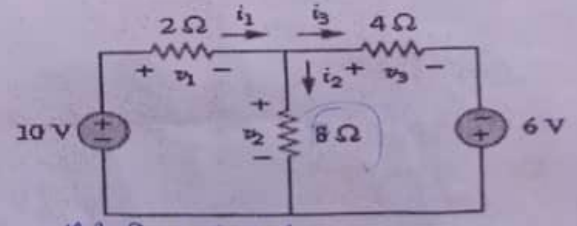

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19. Determine the voltage drop across the resistor 8Ω using Superposition's Theorem.
a. 6V b. 8V c. 4V d. 10V

20. Determine the current across the resistor 8Ω using Superposition's Theorem.
a. 3 A b. 1.5 A c. 2.5 A d. 0.5 A

21. A magnetic pole face has a rectangular section having dimensions 200 mm by 100 mm. If the total flux immerging from the pole is 150μWb, calculate the flux density.
a. 0.0075T b. 0.016T c. 0.5T d. 0.0006T

Use the following information to answer questions 22 & 23.

The magnetic flux density (D) between two plates separated by mica of relative permittivity (ε_r) of 5 is 2μC/m². Given permittivity of free space (ε_0) = 8.85×10^{-12} F/m:

22. Find permittivity of plates (ε).
a. 4.425×10^{-11} F/m b. 3.5×10^{-12} F/m c. 8.45×10^{-11} F/m d. 0.00036F/m

23. Voltage gradient (E) between the plates.
a. 60.5KV/m b. 62.5KV/m c. 45.2KV/m d. 67.5KV/m

24. Lines of magnetic flux are _____ lines for determining distribution and _____ of magnetic field.
a. physical/transmission imaginary/density b. c. physical/transmission d. imaginary/density

25. The ratio of the electric flux density in a vacuum to the electric field strength in electrostatics is termed as the
a. permittivity of free space b. relative permittivity c. relative permeability d. permeability of free space

26. Given constant $K = 9 \times 10^9$ and distance between two equal point charges to be 16mm. What is the force between the two charges if q = 1.6μC?
a. 160 N b. 175 N c. 100 N d. 90 N

27. There is an attractive force between two charged objects
a. When charges are of like polarity b. When charges are of the same values c. When charges are of different polarity d. When charges are of different values

Use the information in the plot below to answer questions 28 to 30.

28. Identify the plot in the diagram
a. I/V plot of Ohms Law b. Hysteresis loop of magnetic circuit c. I/V plot of PN Junction Diode d. I_E/V_{EB} plot of a transistor

29. At what value of Magnetic field strength H on the plot does flux density (B) reach saturation point?

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MATRICULATION NUMBER----------

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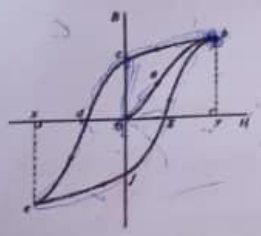
a. Oy b. Og c. Of d. Od

30. At what value of H do we have remnant flux density?

a. 0 b. Oc c. Of d. Og



31. Determine the current if a 20 coulomb charge passes a point in 0.25 seconds.

a. 60 A b. 80 A c. 100 A d. 5 A

32. A mass of 5000g is accelerated at $2ms^{-2}$ by a force. Determine the force needed.

a. 10 N b. 10,000N c. 2.5 N d. 2,500 N

33. If a 5V e.m.f. source supplies a current of 3A for 10 minutes. Calculate the energy provided in this time.

a. 150 KJ b. 18 KJ c. 90 KJ d. 9, KJ

34. An electric heater consumes 1.8MJ when connected to a 200V supply for 30 minutes. Find the power rating of the heater.

a. 1.5 KW b. 1.0 KW c. 15KW d. 10 KW

35. An electric heater consumes 3.6 MJ when connected to a 250 V supply for 40 minutes. Find the current taken from the supply.

a. 4 A b. 5 A c. 6 A d. 10 A

36. The current flowing in the branches of a d.c. circuit may be determined using _____

a. Kirchhoff's laws b. Lenz's law c. Faraday's laws d. Fleming's law

37. The Thevenin voltage is the _____

a. Open circuit voltage b. Short circuit voltage c. Both open circuit and short circuit voltage d. Neither open circuit nor short circuit voltage

38. Thevenin's resistance is found by _____

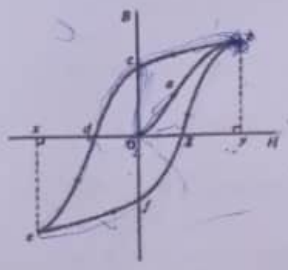
a. Shorting all voltage sources b. Opening all current sources c. Shorting all voltage sources and opening all current sources d. Opening all voltage sources and shorting all current sources

Consider the circuit shown below for question 39 & 40.

39. Find the equivalent Thevenin's voltage between nodes A and B.

a. Oy b. Og c. Of d. Od

30. At what value of H do we have remnant flux density?
a. 0 b. Oc c. Of d. Og



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a. 10 N b. 10,000N c. 2.5 N d. 2,500 N

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34. An electric heater consumes 1.8MJ when connected to a 200V supply for 30 minutes. Find the power rating of the heater.
a. 1.5 KW b. 1.0 KW c. 15KW d. 10 KW

35. An electric heater consumes 3.6 MJ when connected to a 250 V supply for 40 minutes. Find the current taken from the supply.
a. 4 A b. 5 A c. 6 A d. 10 A

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37. The Thevenin voltage is the _____.
a. Open circuit voltage b. Short circuit voltage c. Both open circuit and short circuit voltage d. Neither open circuit nor short circuit voltage

38. Thevenin's resistance is found by _____
a. Shorting all voltage sources b. Opening all current sources c. Shorting all voltage sources and opening all current sources d. Opening all voltage sources and shorting all current sources

Consider the circuit shown below for question 39 & 40.

39. Find the equivalent Thevenin's voltage between nodes A and B.

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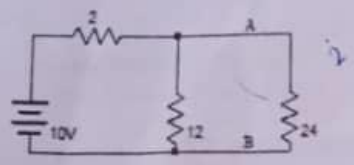


a. 8 V b. 8.6 Vc. 9 V d. 9.6 V

40. Find the Thevenin's resistance between terminals A and B.
a. 1 Ω b. 2 Ω c. 1.7 Ω d. 2.7 Ω

41. _____states that: "the direction of an induced e.m.f. is always such that it tends to set up a current opposing the motion or the change of flux responsible for inducing that e.m.f.".
a. Kirchhoff's laws b. Faraday's laws c. Fleming's law d. Lenz's law

42. The relative directions of a magnetic field, motion and an induced e.m.f. are given by the:
a. Fleming's left-hand rule b. Faraday's Law c. Fleming's right-hand rule d. Lenz's Law

43. When the magnetic flux linking a circuit is varied, an e.m.f. is induced in the circuit. This is known as _____?
a. Kirchhoff's laws b. Faraday's Law c. Fleming's law d. Lenz's Law

44. The direction of the force on a conductor in a magnetic field may be predetermined using _____. a. Fleming's left-hand rule b. Faraday's Law c. Fleming's right-hand rule d. Lenz's Law

45. Find the conductance of a conductor of resistance 100 mΩ.
a. 10 S b. 10 Ω c. 0.01 S d. 0.01 Ω

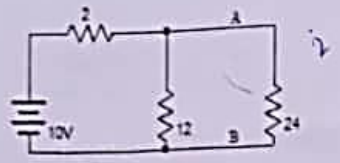
46. Determine the p.d. across a 4 μF capacitor when charged with 5 mC.
a. 12.5 V b. 1.25 kV c. 2.5 kV d. 12.25 kV

47. Find the charge on a 50 pF capacitor when the voltage applied to it is 2 kV.
a.12.5 μC b. 1.05 μC c. 10 μC d. 0.1 μC

48. State which of the following is false. The capacitance of a capacitor
a. is proportional to the cross-sectional area of the plates b. is proportional to the distance between the plates c. depends on the number of plates d. is proportional to the relative permittivity of the dielectric

49. The ratio of the capacitance of a capacitor having a given material as dielectric to the capacitance of that capacitor with vacuum (or air) dielectric is termed _____.
a. the permittivity of air b. the absolute permittivity of that material c. the permittivity of free space d. the relative permittivity of that material

50. The circuit which satisfies Reciprocity Theorem is called?
a. Short circuit b. Open circuit c. Linear circuit d. Non-linear circuit



a. 8 V b. 8.6 Vc. 9 V d. 9.6 V

40. Find the Thevenin's resistance between terminals A and B.
a. 1 Ω b. 2 Ω 1.7 Ω d. 2.7 Ω

41. _____states that: "the direction of an induced e.m.f. is always such that it tends to set up a current opposing the motion or the change of flux responsible for inducing that e.m.f.".
a. Kirchhoff's laws b. Faraday's laws c. Fleming's law d. Lenz's law

42. The relative directions of a magnetic field, motion and an induced e.m.f. are given by the:
a. Fleming's left-hand rule b. Faraday's Law c. Fleming's right-hand rule d. Lenz's Law

43. When the magnetic flux linking a circuit is varied, an e.m.f. is induced in the circuit. This is known as _____?
a. Kirchhoff's laws b. Faraday's Law c. Fleming's law d. Lenz's Law

44. The direction of the force on a conductor in a magnetic field may be predetermined using _____. a. Fleming's left-hand rule b. Faraday's Law c. Fleming's right-hand rule d. Lenz's Law

45. Find the conductance of a conductor of resistance 100 mΩ.
a. 10 S b. 10 Ω c. 0.01 S d. 0.01 Ω

46. Determine the p.d. across a 4 μF capacitor when charged with 5 mC.
a. 12.5 V 1.25 kV c. 2.5 kV d. 12.25 kV

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THE PENALTY FOR EXAMINATION MALPRACTICE IS DISMISSAL

MATRICULATION NUMBER----------