ECE 102

B.Tech. I[st] SEMESTER EXAMINATION, 2024-25

B. TECH.

Basic Electrical Engineering

(CSE, ME)

(CBCS Mode)

AFFIX PRESCRIBED RUBBER STAMP

Date (तिथि) : _____

Paper ID
(To be filled in the OMR Sheet)

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अनुक्रमांक (अंकों में) :
Roll No. (In Figures) : 2 5 1 4 7 5 0 0 1 0 4 7

अनुक्रमांक (शब्दों में) : _____

Roll No. (In Words) : _____

Time : 1:30 Hrs.
समय : 1:30 घण्टे

Max. Marks : 75
अधिकतम अंक : 75

नोट : पुस्तिका में 50 प्रश्न दिये गये हैं, सभी प्रश्न करने होंगे। प्रत्येक प्रश्न 1.5 अंक का होगा।

Important Instructions :

1. The candidate will write his/her Roll Number only at the places provided for, i.e. on the cover page and on the OMR answer sheet at the end and nowhere else.
2. Immediately on receipt of the question booklet, the candidate should check up the booklet and ensure that it contains all the pages and that no question is missing. If the candidate finds any discrepancy in the question booklet, he/she should report the invigilator within 10 minutes of the issue of this booklet and a fresh question booklet without any discrepancy be obtained.

महत्वपूर्ण निर्देश :

1. अभ्यर्थी अपने अनुक्रमांक केवल उन्हीं स्थानों पर लिखेंगे जो इसके लिए दिये गये हैं, अर्थात् प्रश्न पुस्तिका के मुख्य पृष्ठ तथा साथ दिये गये ओ०एम०आर० उत्तर पत्र पर, तथा अन्यत्र कहीं नहीं लिखेंगे।
2. प्रश्न पुस्तिका मिलते ही अभ्यर्थी को जाँच करके सुनिश्चित कर लेना चाहिए कि इस पुस्तिका में पूरे पृष्ठ हैं और कोई प्रश्न छूटा तो नहीं है। यदि कोई विसंगति है तो प्रश्न पुस्तिका मिलने के 10 मिनट के भीतर ही कक्ष परिप्रेक्षक को सूचित करना चाहिए और बिना त्रुटि की दूसरी प्रश्न पुस्तिका प्राप्त कर लेना चाहिए।

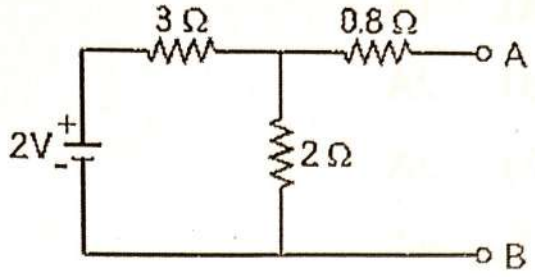
1. The Norton equivalent between A and B for the circuit is -

(A) 2 A and 2.5 Ω

(B) 0.5 A and 1 Ω

(C) 1A and 2 Ω

(D) 0.4 A and 2 Ω



2. An ideal voltage source should have -

(A) Large emf

(B) Small emf

(C) Zero resistance

(D) None of these

3. A Practical current source is represented by -

(A) A resistance in series with an ideal current source

(B) A resistance in parallel with an ideal current source

(C) A resistance in parallel with an ideal voltage source

(D) None of the above

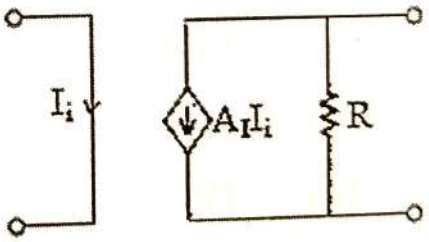
4. The circuit shown in the figure represents a –

(A) Voltage controlled voltage source

(B) Voltage controlled current source

(C) Current controlled voltage source

(D) Current controlled current source



5. For determining the polarity of the voltage drop across a resistor, it is necessary to know the -

(A) Value of resistor

(B) Value of current

(C) Direction of current flowing through the resistor

(D) Value of emf in the circuit

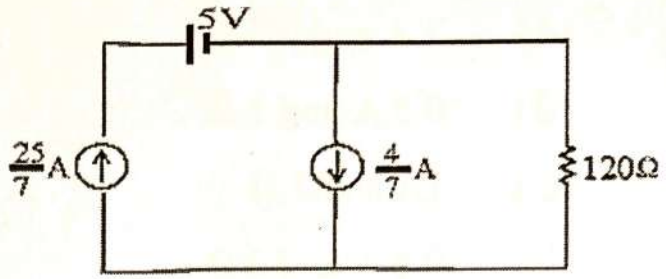
6. The current through 120 Ω resistor in the circuit shown in figure is –

(A) 1A

(B) 2A

(C) 3A

(D) 4A



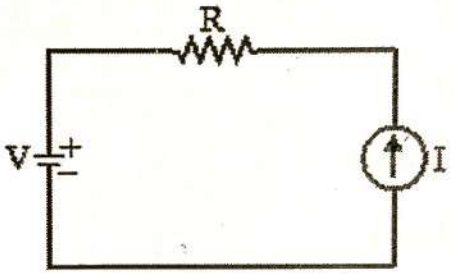
7. For the network shown in figure, what is the voltage across the current source I ?

(A) V-RI

(B) V+RI

(C) Zero

(D) RI - V



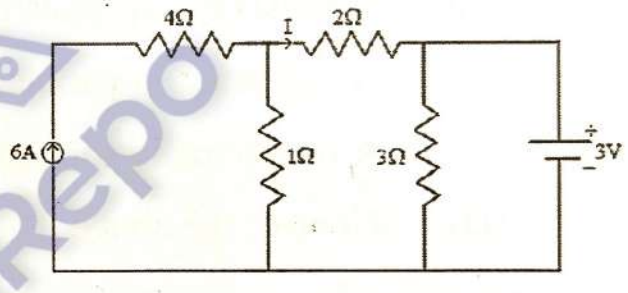
8. For the circuit shown in the figure, I is –

(A) 0A

(B) 1A

(C) 2A

(D) 3A



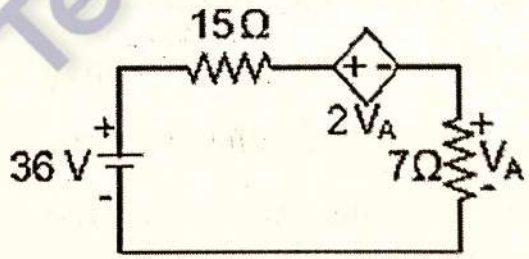
9. The power dissipated in the controlled source of the network shown below is –

(A) 36W

(B) 15W

(C) 7W

(D) 14W



10. Which of the following is not bilateral element ?

(A) Constant current source

(B) Resistor

(C) Inductor

(D) Capacitor

11. The elements which are not capable of delivering energy by its own are known as -

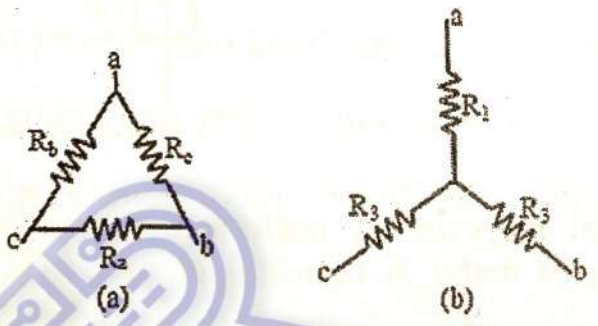
(A) Unilateral elements

(B) Non linear elements

(C) Passive elements

(D) Active elements

12. In given figure R_a, R_b, R_c are 20Ω 10Ω and 10Ω respectively. The resistance R_1, R_2 and R_3 in ohms of an equivalent star connection are –



(A) 2.5, 5, 5

(B) 5, 2.5, 5

(C) 5, 5, 2.5

(D) 2.5, 5, 2.5

13. Super position theorem is applicable for -

(A) Linear circuits only

(B) Non-linear circuits only

(C) Linear and non-linear circuits only

(D) None of these

14. In a linear circuit, the super position principle can be applied to calculate the -

(A) Voltage and power

(B) Voltage and current

(C) Current and power

(D) Voltage, current and power

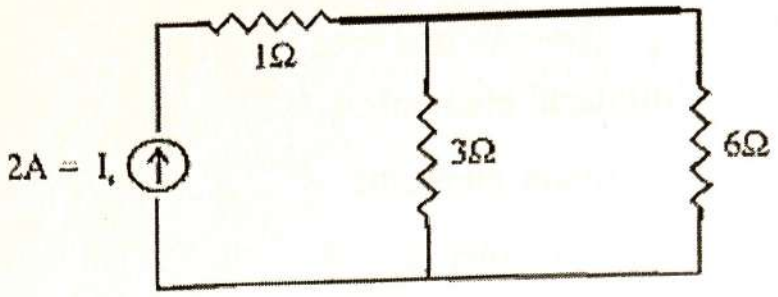
15. In the given circuit, what is the voltage across the current source I_s ?

(A) 0V

(B) 2V

(C) 3V

(D) 6V



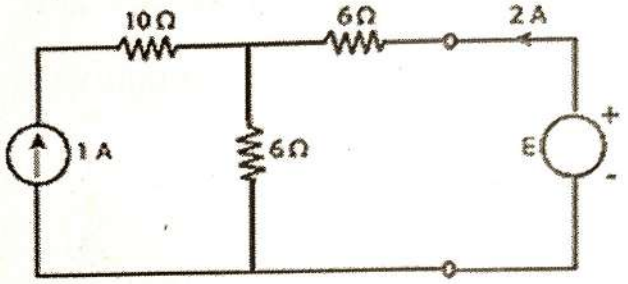
16. In the figure, the value of source voltage is –

(A) 12V

(B) 24V

(C) 30V

(D) 44V



17. In the nodal analysis, the preferred reference node is a node that is connected to -

1 Ground

2 Many parts of the network

3 The highest voltage source

Which of the following is/are correct.

(A) 1 Only

(B) 2 Only

(C) 3 Only

(D) 1 and 2 Only

18. While thevenizing a circuit between two terminals, V_{Th} is equal to -

(A) Short-circuits terminal voltage

(B) Open- circuit terminal voltage

(C) Net voltage available in the circuit

(D) Emf of the battery nearest to the terminals.

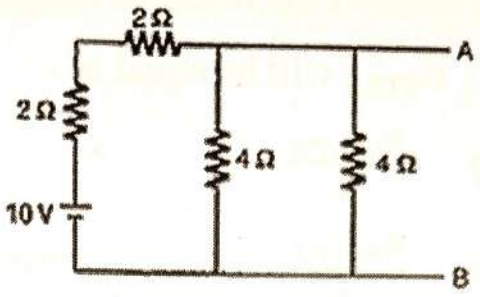
19. The output resistance of the circuit at port AB is –

(A) 1 Ω

(B) 1.2 Ω

(C) 1.33 Ω

(D) 1.5 Ω



20. In a network containing active components output voltage -

(A) Will always be greater than input voltage

(B) Will always be equal to the input voltage

(C) Can be less than or greater than input voltage

(D) Will be less than, equal to or greater than input voltage

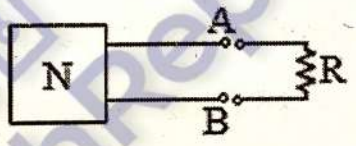
21. Norton equivalent to the network N to the left of AB is current source $I_N = 4A$ from B to A, $R_N = 2\Omega$. The current through R when it is connected across AB = 2A. What is the value of resistance R ?

(A) 1 Ω

(B) 2 Ω

(C) 3 Ω

(D) 4 Ω



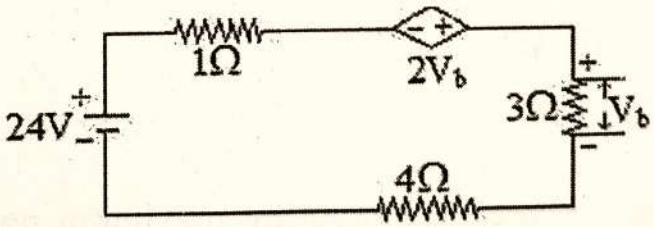
22. The current in the given circuit with a dependent voltage source is –

(A) 10A

(B) 12A

(C) 14A

(D) 16A



23. Which relay is used to detect and protect internal faults of a transformer ?

(A) Buchholz relay

(B) Directional relay

(C) Thermal relay

(D) Distance relay

24. If the three resistors in a delta network are all equal in values i.e., R_{DELTA} then the value of the resultant resistors in each branch of the equivalent star network i.e. , R_{STAR} will be equal to -

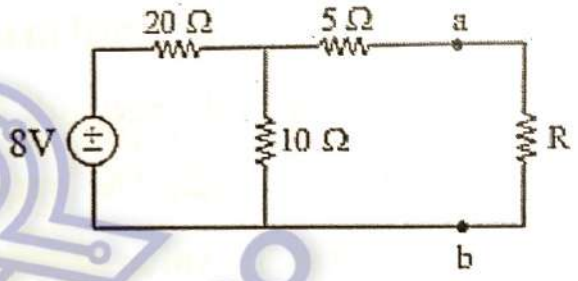
(A) $\frac{R_{DELTA}}{3}$

(B) $\frac{R_{DELTA}}{2}$

(C) $2\ R_{DELTA}$

(D) $3\ R_{DELTA}$

25. What is the value of resistance R which will allow maximum power dissipation in the circuit ?



(A) 11. 66 Ω

(B) 10.33Ω

(C) 8.33 Ω

(D) 7.66 Ω

26. A load is connected to an active network at the terminals to which the load is connected, $R_{th} = 10\ \Omega$ and $V_{th} = 60V$. The maximum power supplied to the load is -

(A) 360 W

(B) 90 W

(C) 60 W

(D) 10 W

27. When a source is delivering maximum power to a load, the efficiency of the circuit is always.

(A) 50%

(B) 75%

(C) 100%

(D) Depends on the circuit parameters

28. A current is said to be direct current when it's -

(A) Magnitude remains constant with time

(B) Magnitude changes with time

(C) Direction changes with time

(D) Magnitude and direction changes with time

29. The form factor of sinusoidal alternating current is -

(A) 1

(B) 0

(C) 1.11

(D) 1.15

30. Unit of inductive reactance is -

(A) Henry

(B) Milli henry

(C) Weber

(D) Ohm

31. The power factor of a practical inductor is -

(A) Unity

(B) Zero

(C) Lagging

(D) Leading

32. Unit of reactive power is -

(A) VA

(B) Watt

(C) VAR

(D) Ohm

33. The power factor of an ac circuit lies between

(A) 0 and 1

(B) -1 and 1

(C) 0 and-1

(D) None of these

34. A Voltage of 100 V is applied to an impedance of $Z = (3 + j4)\Omega$. What are the values of active power, reactive power and volt-amperes respectively ?

(A) 1200 W, 1200 VAR and 2000 VA

(B) 1200 W, 1600 VAR and 2200 VA

(C) 1200 W, 1600 VAR and 2000 VA

(D) 1600 W, 1200 VAR and 2200 VA

35. A parallel circuit is said to be in resonance when the admittance is purely.

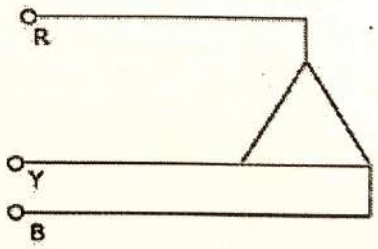
(A) Capacitive

(B) Inductive

(C) Susceptive

(D) Conductive

36. The phase sequence of the 3 - phase system shown in given figure is -



(A) RYB

(B) RBY

(C) BRY

(D) YBR

37. For a 3- phase load balanced condition, each phase has the same value of ____.

(A) impedance

(B) resistance

(C) power factor

(D) All of these

38. For delta - connected circuit the correct relationship is -

(A) $V_L = V_{ph}$

(B) $I_{ph} \times \sqrt{3} = I_L$

(C) $V_L = I_L \times \sqrt{3}$

(D) Both (A) and (B)

39. For a parallel RLC circuit, if $R = 40\Omega$, L= 2H and C= 0.5 F, the band width and quality factor are respectively.

(A) 20 rad/sec, 0.05

(B) 10 rad/sec, 20

(C) 20 rad/sec, 10

(D) 0.05 rad/sec, 20

40. If the total power consumed by three identical phase loads connected in delta and star configurations are W_1 and W_2 respectively. then W_1 is -

(A) $3\ W_2$

(B) $\frac{W_2}{3}$

(C) $\sqrt{3}\ W_2$

(D) $\frac{W_2}{\sqrt{3}}$

41. Moving -coil permanent magnet instruments can be used for the measurement of -

(A) AC and DC

(B) AC only

(C) DC only

(D) half-wave rectified DC

42. The different torques acting on a coil of a moving coil instrument are -

(A) Deflecting torque and control torque

(B) Deflecting torque and damping torque

(C) Control torque and damping torque

(D) Deflecting torque, control torque and damping torque

43. Consider the following types of damping -

1 Air-Friction damping

2 Fluid- Friction damping

3 Eddy- Current damping

PMMC type instruments use which of the above ?

(A) 1 Only

(B) 2 Only

(C) 3 Only

(D) 1, 2 and 3

44. The scale of an electro dynamometer usually reads the -

(A) average value of the ac

(B) mean value of the ac

(C) effective value of the ac

(D) squared value of the ac

45. The magnetic field required to reduce the residual magnetization to zero is called -

(A) retentivity

(B) Coercitivity

(C) hysteresis

(D) Saturation

46. Which of the following is not a part of dc machine ?

(A) Armature

(B) Commutator

(C) Field winding

(D) Damping winding

47. For a P- Pole machine, the relation between electrical and mechanical degree is -

(A) $\theta_{elec} = \frac{2}{P}\theta_{mech}$

(B) $\theta_{elec} = \frac{4}{P}\theta_{mech}$

(C) $\theta_{elec} = \theta_{mech}$

(D) $\theta_{elec} = \frac{P}{2}\theta_{mech}$

48. Transmission line connects -

(A) Generating station to a switching station/step down transformer station

(B) Step-down transformer station to service transformer banks

(C) Distribution transformer to consumer premises

(D) Service points to consumer premises

49. 66 KV is suitable for transmission of power over -

(A) 30 Km

(B) 60 Km

(C) 120 Km

(D) 200 Km

50. The primary function of fuse is to -

(A) Open the circuit

(B) Protect the appliance

(C) Protect the line

(D) Prevent excessive currents from flow through the circuit

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