Printed Page:- 05 **Subject Code:- ACSBS0102**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: I - CARRY OVER THEORY EXAMINATION - AUGUST 2023

Subject: Principles of Electrical Engineering

Time: 2 Hours **Max. Marks: 50**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **15**

1. Attempt all parts:-

1-a. In Superposition theorem, while considering a source, all other voltage sources are? (CO2) 1

(a) Open circuited

(b) Short circuited

(c) Change its position

(d) Removed from the circuit

1-b. In a series L-C circuit at the resonant frequency the (CO3) 1

(a) Current is maximum

(b) Current is minimum

(c) Impedance is maximum

(d) Voltage across C is minimum

1-c. If a sinusoidal wave has frequency of 50 Hz with 30 A r.m.s. current which of the following equation represents this wave? (CO3) 1

(a) 42.42 sin 314 t

(b) 60 sin 25 t

(c) 30 sin 50 t

(d) 84.84 sin 25 t

1-d. The total capacitance of capacitors connected in parallel is given by _____(CO4) 1

(a) product of the individual capacitors in parallel

(b) sum of all the individual capacitors in parallel

(c) sum of their reciprocals

(d) product of their reciprocals

1-e. A _____ is thermally sensitive resistor that exhibits a large change in resistance.(CO5) 1

(a) Thermistor

(b) Resistance Thermometer

(c) Thermocouple

(d) Semiconductor based sensor

2. Attempt all parts:-

2.a. Explain Kirchhoff's first law obeys law of conversation of charge. (CO1) 2

2.b. Find the equivalent star of the delta connection having 10, 5 and 15 ohm resistances.(CO2) 2

2.c. If v = 200 sin (377t – 30) V and i = 8 sin (377t – 30) A. What will be power factor? (CO3) 2

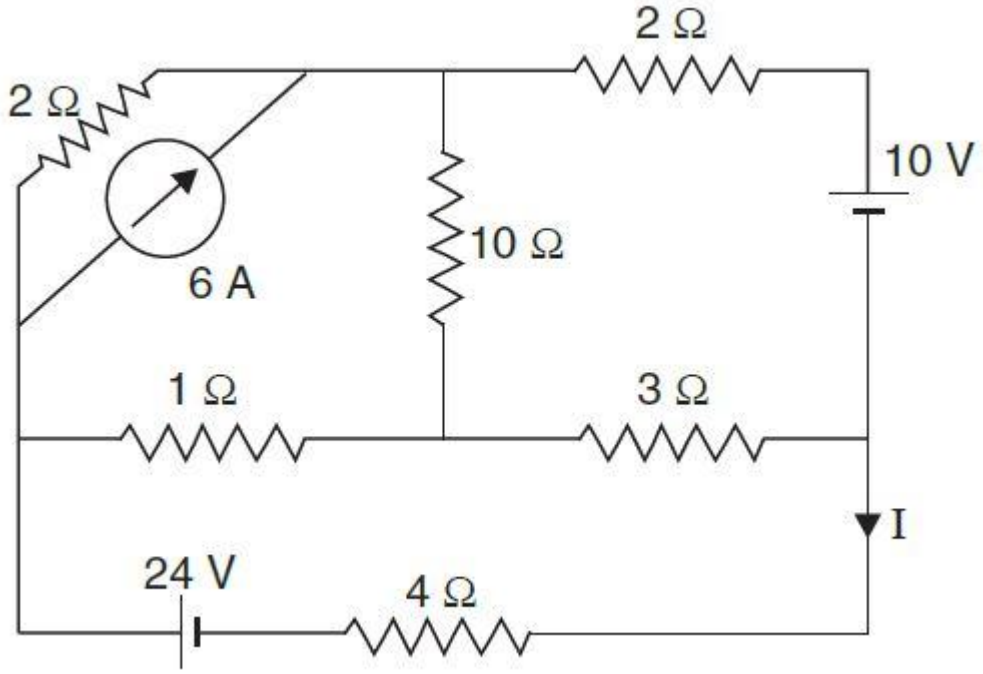
2.d. Why is the lamination insulated from each other in a transformer?(CO4) 2

2.e. Mention the factors on which earthing depend. (CO5) 2

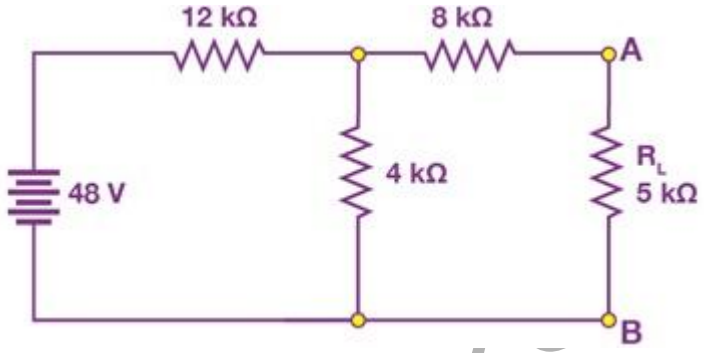
SECTION B **15**

3. Answer any <u>three</u> of the following:-

3-a. By using mesh analysis determine the current in the 4 Ω resistance of the circuit shown in Fig. (CO1) 5



3-b. Find thevenin voltage, thevenin resistance and the load current flowing through load resistor in the circuit below using Thevenin's Theorem.(CO2) 5



3.c. A coil of resistance 8 and inductance 150 mH, is connected in series with a 100 μ F capacitor, across a 240 V, 50 Hz a.c. supply. Calculate (a) the circuit current, (b) the circuit phase angle, (c) the voltage across the coil, (d) the voltage across the capacitor, and (e) the power dissipated in the circuit. (CO3) 5

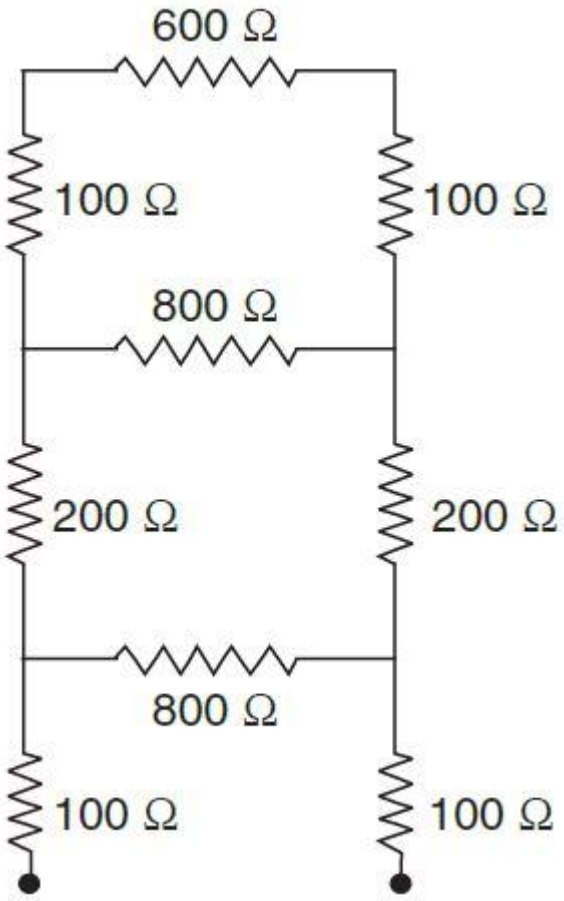
3.d. The no-load ratio required in a single-phase 50 Hz transformer is 6600/600 V. If the maximum value of flux in the core is to be about 0.08 Wb, find the number of turns in each winding (CO4) 5

3.e. Discuss the different thermocouple laws for the measurement of temperature? (CO5) 5

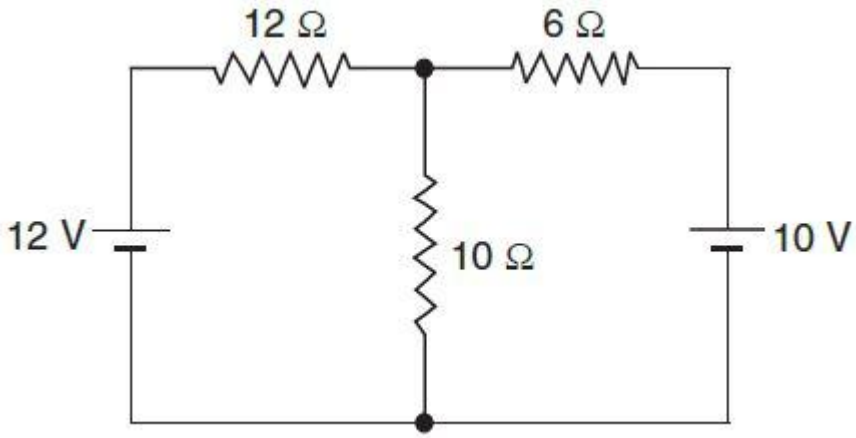
SECTION C **20**

4. Answer any <u>one</u> of the following:-

4-a. What is the equivalent resistance of the network shown in Fig.(CO1) 4

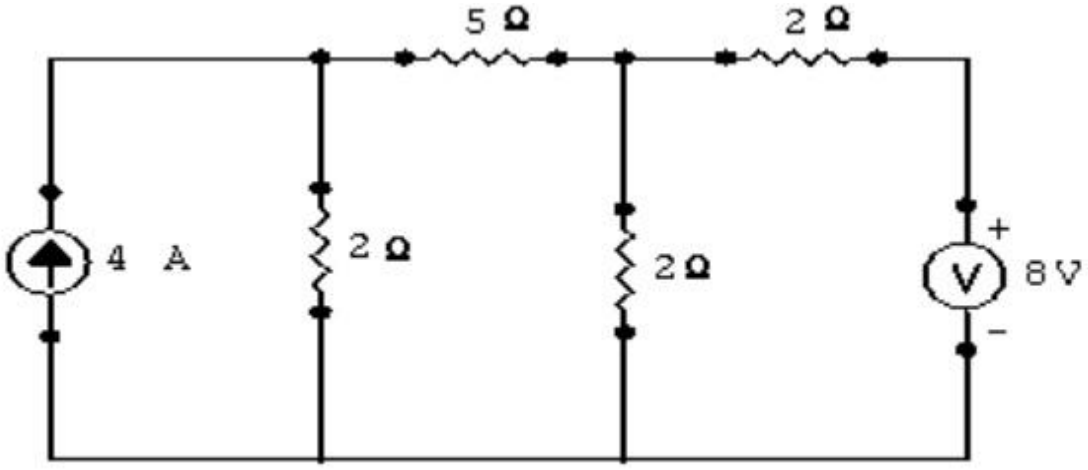


4-b. In the circuit of Fig. , find the current through each resistor using nodal analysis.(CO1) 4



5. Answer any <u>one</u> of the following:-

5-a. In the given circuit calculate current across 5Ω resistance by using superposition theorem. (CO2) 4



5-b. Derive the expression for Star to Delta transformation. (CO2) 4

6. Answer any <u>one</u> of the following:-

6-a. A non- inductive resistance of 10 Ω is connected in series with an inductive coil across 200V, 50Hz ac supply, the current drawn by the series combination is 10A. The resistance of the coil is 2Ω. Determine (i) inductance of coil. (ii) Power factor. (iii) Voltage across the coil. (CO3) 4

6-b. If the bandwidth of a resonant circuit is 10 kHz and lower half power frequency is 120 kHz. Find upper half power frequency and quality factor of resonant circuit. (CO3) 4

7. Answer any <u>one</u> of the following:-

7-a. Draw the equivalent circuit of transformer. (CO4) 4

7-b. What are the various types of losses in transformer ? Discuss the suitable methods to reduce them. (CO4) 4

8. Answer any <u>one</u> of the following:-

8-a. Discuss the type of material used in earth electrode. (CO5) 4

8-b. Draw and explain B-H curve for a magnetic material. (CO5) 4