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

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: I - THEORY EXAMINATION (2022 - 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   Which unit is used to describe electric potential difference? (CO1)   1

         (a) Volts

         (b) Ampere

         (c) Joule

         (d) Coulomb

1.b   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.c   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.d   What happens to the capacitance when a dielectric material is inserted between the plates of a parallel plate capacitor? (CO4)   1

(a) Capacitance decreases

(b) Capacitance remains same

(c) Capacitance increases

(d) Depends upon the material of the dielectric

1.e   Thermocouple generate output voltage according to _____(CO5)   1

(a) Circuit parameters

(b) Humidity

(c) Temperature
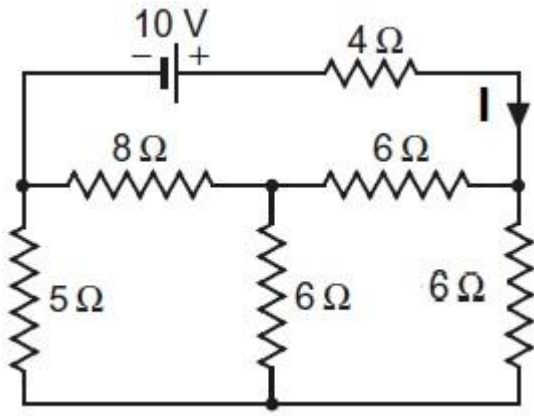
(d) Voltage

2. Attempt all parts:-

2.a   Two resistor of 4Ω and 6Ω are connected in parallel. If the total current is 30 A. find the curent through each resistor. (CO1)   2

2.b   Give two applications of the maximum power transfer theorem. (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   What are the two components of no load current in a transformer?(CO4)   2

2.e   What is earthing and its necessities in practical life . (CO5)   2

<center>**SECTION B**   **15**</center>

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

3.a   Three resistors are connected in series across a 12V battery. The first resistance has a value of 2Ω, second has a voltage drop of 4V and third has a power dissipation of 12W. Calculate the value of the circuit current. (CO1)   5

3.b   Find current I in the network shown in Figure using star–delta transformation. (CO2)   5

3.c   A current of 5A flows through a non-inductive resistance in series with a chok   5
      coil when supplied at 250 V, 50 Hz. If the voltage across the resistance is 125 V
      and across the coil is 200 V, calculate : (i) Impedance, reactance and resistance
      of the coil, (ii) The power absorbed by the coil, (iii) The total power supplied to
      the circuit. (CO3)

3.d   Derive the emf equation of a single phase transformer also explain its working   5
      principle. (CO4)

3.e   Explain the working principle of J type and K type thermocouple? Why reference   5
      junction compensation is important? (CO5)

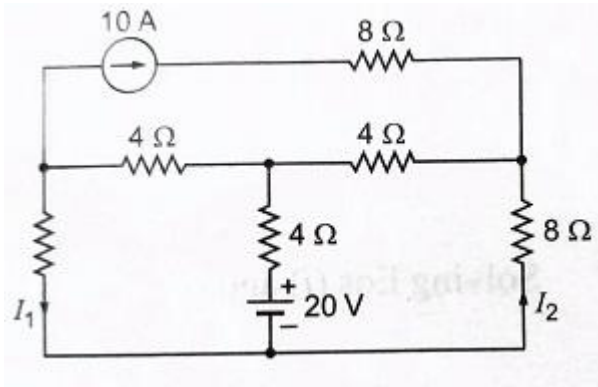**SECTION C**   **20**

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

4.a   Using Nodal method, find the current through resistor r2 . (CO1)   4
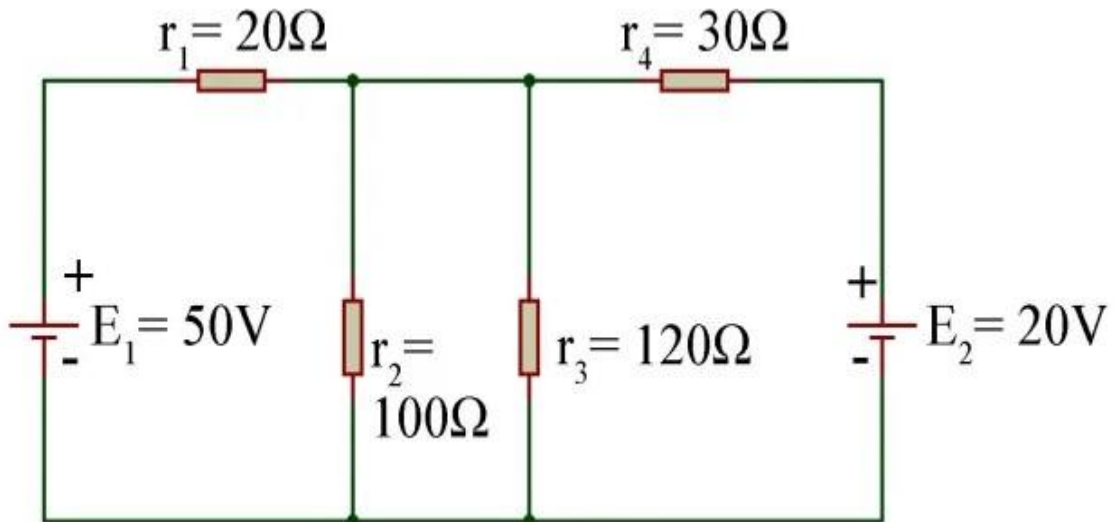
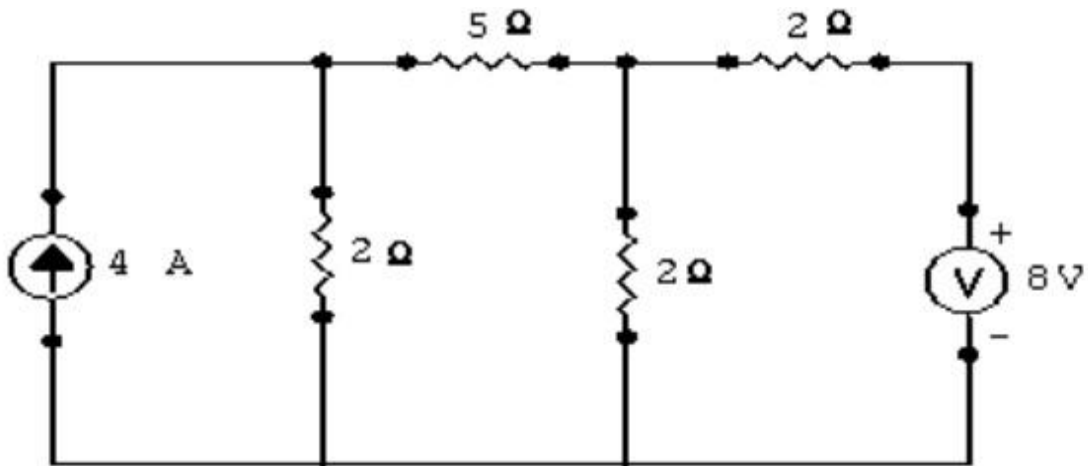**4.b**   Using mesh analysis , Calculate the currents I1 and I2 .(CO1)   4
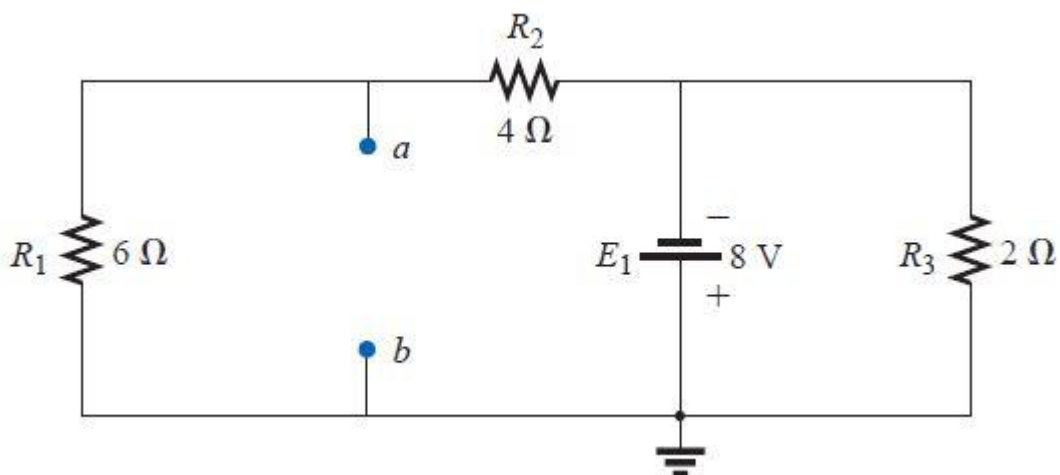

5. Answer any <u>one</u> of the following:-

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

5.b   Find the Thévenin equivalent circuit across terminals ab for the given network.   4
        (CO2)

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

6.a   Define RMS and AVERAGE value of an alternating supply. Also derive the   4
        expressions of RMS and AVERAGE value for sinusoidal AC supply voltage. What
        is form factor and peak factor? (CO3)

6.b	A three phase voltage source has a line voltage of 400 V and supplies star connected load having impedance (8+ j6) Ω per phase, calculate line current, power factor and total three phase power supplied to the load. (CO3)	4

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

7.a	Explain the principle of Electromechanical Energy Conversion and its applications. (CO4)	4
7.b	In a 25 kVA, 2000/200 V transformer, the constant and variable losses are 350 W and 400 W respectively. Calculate the efficiency on unity power factor at (i) Full load, and (ii) Half load. (CO4)	4

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

8.a	What is piezo electric effect? Give name of four piezo electric materials. (CO5)	4
8.b	Explain the working principle of battery. Also classify the types of batteries. (CO5)	4