Printed Page:- Subject Code:- ACSBS0102

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute)

Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow)

B.Tech.

SEM: I - CARRY OVER THEORY EXAMINATION - SEPTEMBER 2022

Subject: Principles of Electrical Engineering

Time: 03:00 Hours Max. Marks: 50

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 marks each.
3. Section B - Question No-3 is based on external choice carrying 5 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 4 marks each.
5. 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. An active element in a circuit is…. (CO1) 1

(a) Current source

(b) Resistance

(c) Inductance

(d) Capacitance

1.b. The superposition theorem is applicable to…....(CO2) 1

(a) voltage only

(b) current only

(c) Both current and voltage

(d) Current, voltage and power

1.c. An RLC series circuit has Q = 100 and ωo = 20 rad/sec. The bandwidth is.....(CO3) 1

(a) 0.2 rad/sec

(b) 2 rad/sec

(c) 20 rad/sec

(d) 200 rad/sec

1.d. A fuse has.....(CO4) 1

(a) High Resistivity and Low Melting Point

(b) Low Resistivity and High Melting Point

(c) High Resistivity and High Melting Point

(d) Low Resistivity and Low Melting Point

1.e. Which one is not essential torque in an indicating instrument? (CO5) 1

(a) Deflecting torque

(b) Controlling torque

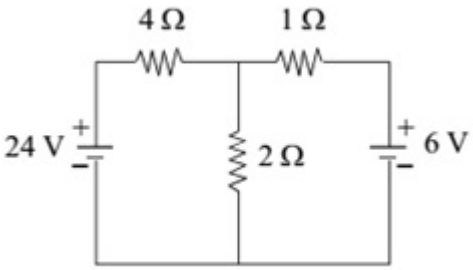
(c) Damping torque

(d) Electrostatic torque

2. Attempt all parts:-

2.a. Define the term loop and mesh.(CO1) 2

2.b. Find current in 2 Ω. (CO2) 2



2.c. What is form factor and peak factor? (CO3) 2

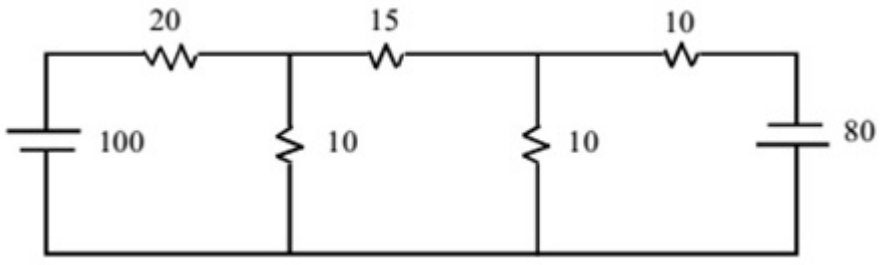
2.d. What is Ampere's Law, Explain? (CO4) 2

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

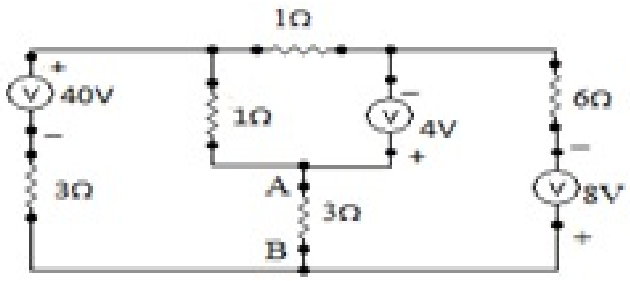
SECTION B 15

3. Answer any three of the following:-

3.a. Explain kirchoff's voltage law and hence find the current in various branches of circuit using mesh analysis. (CO1) 5



3.b. Replace the given network by its Thevenin's equivalent circuit across AB. (CO2) 5



3.c. Define RMS and AVERAGE value of an alternating supply. Also derive the expressions of RMS and AVERAGE value for sinusoidal AC supply voltage. What is form factor and peak factor? (CO3) 5

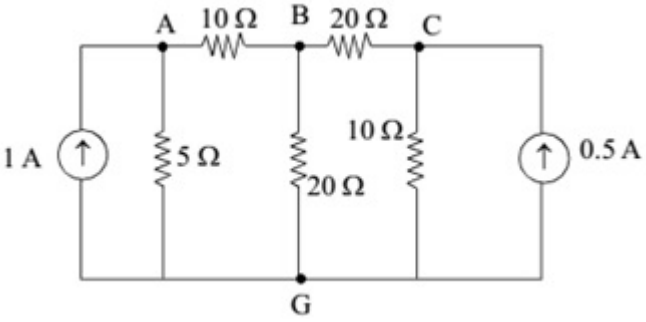
3.d. An 2000/400 V, 10kVA, Single Phase transformer has primary resistance and reactance 5.5 Ω and 12 Ω respectively. The secondary resistance and reactance are 0.2 Ω and 0.45 Ω respectively. Calculate(i) Primary winding resistance and reactance referred to secondary side.(ii) Equivalent resistance and reactance referred to secondary.(CO4) 5

3.e. Explain construction and working of PMMC type instruments mentioning its advantage and disadvantage. (CO5) 5

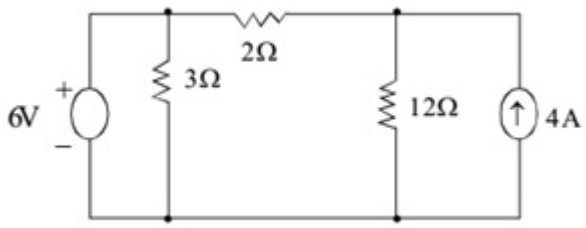
SECTION C 20

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

4-a. Find the current in 5 Ω using mesh analysis. (CO1) 4



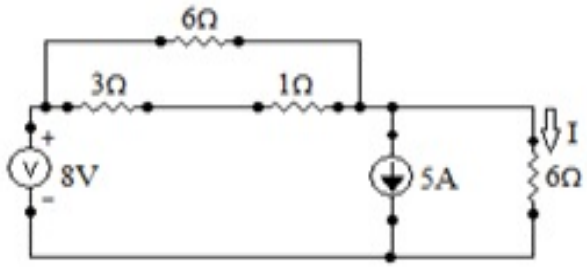
4-b. Find the current in all branches using nodal analysis. (CO1) 4



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

5-a. State and prove maximum power transfer theorem. also determine the efficiency at the maximum power transfer condition (CO2) 4

5-b. In the given network find the current I, by using superposition theorem. (CO2) 4



6. Answer any one of the following:-

6-a. A coil of resistance 8 Ω and inductance 0.12 H is connected in series with a loss free capacitor of 140 μF capacitance. The circuit is then connected across 230 V, 50 Hz AC supply. Determine Impedance, Power factor and Current of entire circuit (CO3) 4

6-b. Derive the relationship between phase current and line current in 3- ϕ star connection. (CO3) 4

7. Answer any one of the following:-

7-a. Explain the working of battery. How Battery Back up helps in household and industrial applications.(C04) 4

7-b. What are the needs of safety devices in industry. Explain MCB and MCCB in detail.(C04) 4

8. Answer any one of the following:-

8-a. Explain B-H curve for magnetic materials. (CO5) 4

8-b. What do you mean by sensors. Explain the working principle of thermocouple. (CO5) 4