Roll. No:

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 - AUGUST 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.   Kirchhoff's voltage law is concerned with…..... (CO1)   1

            (a) IR drop

            (b) Battery emfs

            (c) Both (a)and (b)

            (d) None of these

1.b.   Which of the following theorems is applicable for both linear and nonlinear circuits? (CO2)   1

            (a) Superposition

            (b) Thevenin's

            (c) Norton's

            (d) None of these

1.c.   For getting maximum efficiency from a distributed system the power factor should be.............. (CO3)   1

            (a) 1

            (b) 0.707

            (c) 0.62

(d) 0.82

1.d.   Which of the following is not a method of earthing(CO4)   1

(a) Plate Earthing

(b) Pipe Earthing

(c) Earthing through Air Medium

(d) Rod Earthing

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 source transformation with suitable example.(CO1)   2

2.b.   State and explain the Superposition theorem. (CO2)   2

2.c.   Define Band-Width and Quality Factor of series R-L-C circuit. (CO3)   2

2.d.   What are the features of good conductor in electrical circuit? (C04)   2

2.e.   What is damping torque in measuring system? (CO5)   2

SECTION B   15
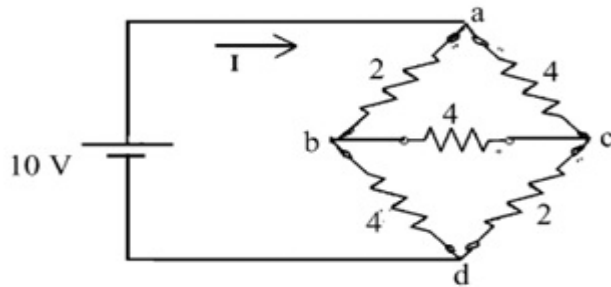
3. Answer any three of the following:-

3.a.   Explain KVL and hence find the current in 3 ohm resistance in the given circuit using Mesh   5
         Analysis. (CO1)
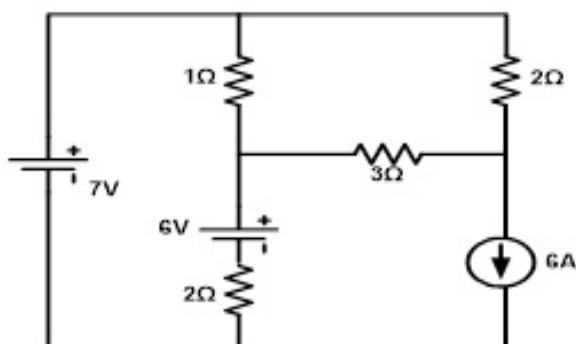
3.b.   Using star-delta transformation, find the current in the branch b-c of the circuit. Consider all   5
   the values of resistances are in ohms. (CO2)

3.c.   Two impedances given by $Z1 = 5 + j10$ Ω and $Z2 = 10 - j15$ Ω , are connected in parallel. If 5 the total current supplied is 20 A, then find (i) current taken by each branch, (ii) power factor. (CO3)

3.d.   The efficiency of a 400 KVA transformer is 98.77% at full load 0.8 p.f & 99.13% at half 5 load, unity p.f. Find iron & cu loss at both full & half load.(C04)

3.e.   What are safety devices in electrical engineering? Explain SFU,MCB,MCCB and ELCB in 5 details with neat labelled diagram . (CO5)
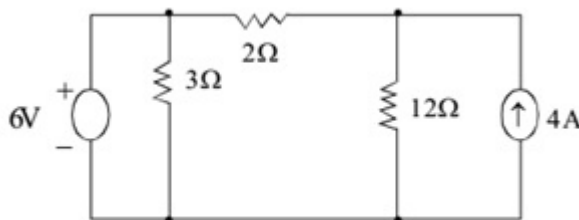
<div align="center">SECTION C   20</div>

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

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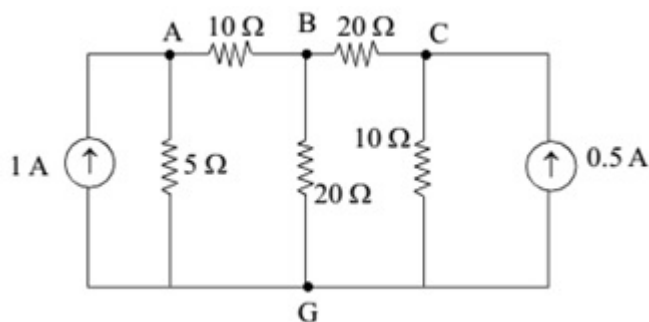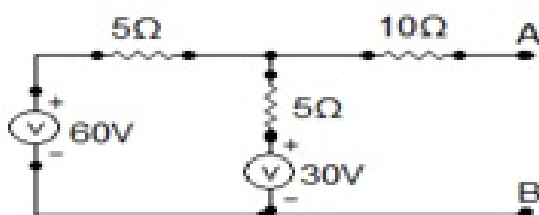

4-b.   Find the current in 12 Ω resistance using mesh analysis. (CO1)   4

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

5-a.   State and prove maximum power transfer theorem. (CO2)   4

5-b.   Find the Thevenin's equivalent circuit of the given network. (CO2)   4

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

6-a.   In parallel Resonant circuit (tank circuit) if R=50 ohm, L=0.1H and c=140 F, Calculate   4
         (a)Quality Factor (b) Impedance at resonance (c)Band width   (CO3)

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

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

7   Discuss the need of earthing in detail. (C04)   4

7   Explain MCB and MCCB in detail. (C04)   4

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

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

8-b.   Explain different types of sensors. Explain each one giving suitable examples . (CO5)   4