Printed Page:- 04 Subject Code:- AEC0201

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - THEORY EXAMINATION (2023 - 2024)

Subject: Basic Electrical and Electronics Engineering

Time: 3 Hours Max. Marks: 100

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 20

1. Attempt all parts:-

1-a. Which basic law should be followed to analyse the circuit? (CO1) 1

(a) Newton's law

(b) Amperes law

(c) Faraday's law

(d) Kirchoff's law

1-b. Which law is applied to the supernode? (CO1) 1

(a) Faraday's Law

(b) Kirchhoff's voltage law

(c) Kirchhoff's current law

(d) Option b and c

1-c. Form factor for a sine wave is(CO2) 1

(a) 1.414

(b) 0.707

(c) 1.11

(d) 1.637

1-d. In an A.C. circuit power is dissipated in(CO2) 1

(a) Resistance only

(b) Inductance only

(c) Capacitance only

(d) None of above

1-e. The emf induced in a coil is …….the rate of change in flux linkages (CO3) 1

(a) directly proportional to
(b) inversely proportional to
(c) independent of
(d) none of above

1-f. Transformer ratings are given in _____(CO3) 1

(a) kW
(b) kVA
(c) kVAR
(d) HP

1-g. In a half wave rectifier, the sine wave input is 200sin300t. The average value of output voltage is?(CO4) 1

(a) 63.694V
(b) 67.453V
(c) 57.876V
(d) 76.987V

1-h. PIV for full wave rectifier (Center-tap), if E is peak voltage……..(CO4) 1

(a) E
(b) 1.5E
(c) 0.636E
(d) 2E

1-i. CMRR value indicates the capability to reject …… (CO5) 1

(a) Power supply variation
(b) Difference of signal
(c) Common mode signal
(d) None of these

1-j. What is IoT? (CO5) 1

(a) Network of physical objects embedded with sensors
(b) network of virtual objects
(c) network of objects in the ring structure
(d) network of sensors

2. Attempt all parts:-

2.a. Define Active & Passive elements. (CO1) 2

2.b. Define the term resonance, quality factor and band width (CO2) 2

2.c. On what theory the principal of operation of a transformer is based ?(CO3) 2

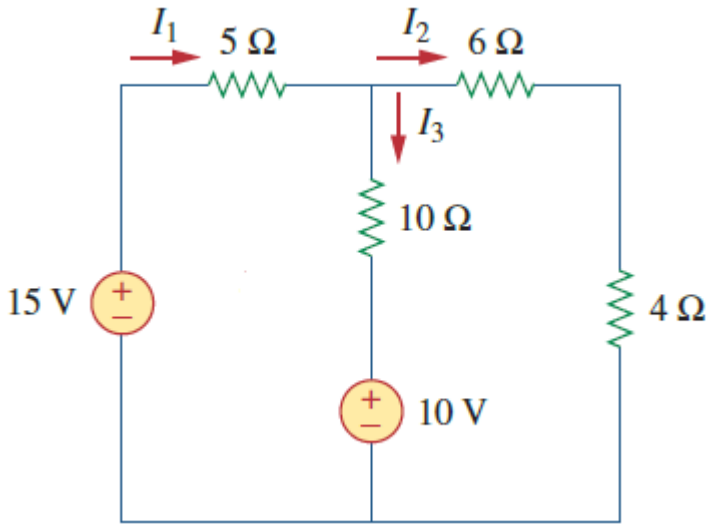
2.d. Explain the Intrinsic and Extrinsic semiconductors.(CO4) 2

2.e. Define the slew rate of Op-Amp. (CO5) 2

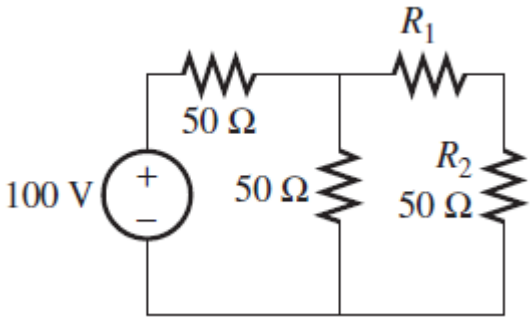
SECTION-B 30

3. Answer any five of the following:-

3-a. For the given circuit , find the branch currents I1, I2 and I3 using mesh analysis. (CO1) 6



3-b. Find the resistance R1 in Figure ,to transfer maximum power to R2 . (CO1) 6



3-c. The instantaneous values of two alternating voltages are represented as V1 = 60 sin ωt and V2 = 40 sin (ωt – π/3). Derive the expression of voltage as sum and difference of voltages. (CO2) 6

3-d. Find the relationships between line current and phase current in a delta connected system. (CO2) 6

3.e. Explain why the hysteresis loss and eddy current loss occur in a transformer. Explain how thee losses can be reduced in a transformer.(CO3) 6

3.f. Draw the circuit diagram of Full Wave Rectifier (Centre tapped) and explain its operation with output waveforms.(CO4) 6

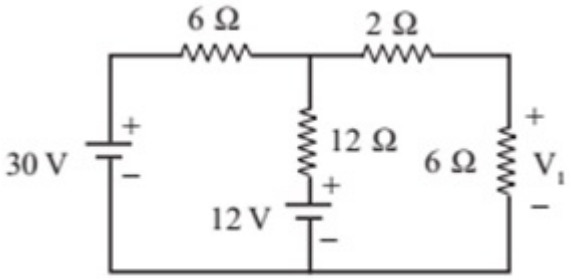
3.g. Explain what are differential gain and common-mode gain of a differential amplifier? (CO5) 6

SECTION-C 50

4. Answer any one of the following:-

4-a. Derive the expression for Delta to Star transformation. (CO1) 10

4-b. Find the voltage V1 across 6 ohm resistance using mesh analysis method. (CO1) 10



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

5-a.	A coil connected to 100 V DC supply draws 10A current from supply. The same coil when connected to 100 V, 50 Hz AC supply draws 5A current. Calculate the parameters of coil and power factor of circuit. (CO2)	10
5-b.	An R-C circuit consisting of a 4.7 μF capacitor in series with a 200 resistor, is connected to a 250 V, 50 Hz supply. Determine, (a) the current, (b) the power factor, and (c) the values for true, apparent and reactive powers. (CO2)	10

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

6-a.	Derive the emf equation of a single phase transformer also explain its principle and working. (CO3)	10
6-b.	A single phase transformer working at unity power factor has efficiency of 90% at both half load and full load of 500kW. Determine its efficiency at 75% of full load.(CO3)	10

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

7-a.	Draw and explain the characteristics of a PN junction diode and also write diode current equation. (CO4)	10
7-b.	Explain the Light Emitting Diodes (LED) with neat diagram. Write its Advantages and Disadvantages and its application in Brief. (CO4)	10

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

8-a.	Discuss the Op-Amp Application as integrator and differentiator. (CO5)	10
8-b.	What do you mean by sensors? How they differ from transduces? What are the different types of sensors? (CO5)	10