Printed Page:- 05 **Subject Code**:- **AEC0201**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B. Tech

SEM:II CARRY OVER THEORY EXAMINATION - AUGUST 2023

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.*

2022-23 Jan_Jun

SECTION A **20**

1. Attempt all parts:-

1-a. A 12 mA current source has an internal resistance, R_S, of 1.2 kΩ The equivalent voltage source is..... (CO1) 1

(a) 144 V

(b) 14.4 V

(c) 7.2 V

(d) 72 mV

1-b. The terminals across the source are ..... if a current source is to be neglected. (CO1) 1

(a) Open-circuited

(b) Short-circuited

(c) Replaced by a capacitor

(d) Replaced by a source resistance

1-c. A sinusoidal voltage has peak to peak value of 100 V. The rms value is (CO2) 1

(a) 50

(b) 70.7

(c) 35.35

(d) 141.41

1-d. In an ac circuit, the maximum and minimum values of power factor can be (CO2) 1

(a) 2 and 0

(b) 1 and zero

(c) 0 and -1

(d) 1 and -1

1-e. A fuse has _____. (CO3) 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-f. An inverter converts _____. (CO3) 1

(a) AC to DC

(b) DC to AC

(c) DC to AC and vice-versa

(d) AC to AC (with changed frequency)

1-g. If the voltage of the potential barrier is V_O. A voltage V is applied to the input, at what moment will the barrier disappear? (CO4) 1

(a) $V< V_O$

(b) $V= V_O$

(c) $V> V_O$

(d) V<< V0

1-h. The clipper circuit are used for.....(CO4) 1

(a) Rectification

(b) Removal of a part from the applied waveform

(c) Shifting of DC level

(d) None of these

1-i. Thermocouple generate output voltage according to ..... (CO5) 1

(a) Circuit Parameters

(b) Humidity

2022-23 Jan_Jun

(c) Temperature

(d) Voltage

1-j. 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

2. Attempt all parts:-

2.a. State the Superposition theorem. (CO1) 2

2.b. If the bandwidth of a resonant circuit is 10 KHz and lower half frequency is 120 KHz, Find the upper half frequency and Quality Factor..(CO2) 2

2.c. Discuss the different types of losses in Transformer. (CO3) 2

2.d. What is reverse saturation current? (CO4) 2

2.e. Write down the Ideal characteristics of op-amp (CO5) 2

SECTION B **30**

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

3-a. State and prove maximum power transfer theorem. (CO1) 6

3-b. Derive the expression for Delta to Star transformation.(CO1) 6

3-c. Derive RMS and Average values of half and full wave rectifier output waveform. (CO2) 6

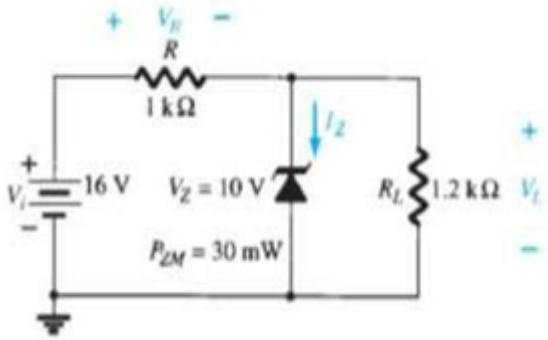
3-d. Derive the relationship between phase and line voltage in 3- ϕ star connection system.(CO2) 6

3.e. Derive the condition for maximum efficiency in the transformer. (CO3) 6

3.f. 6

1. For the Zenar Diode network, Determine V_L, V_R, I_Z and P_Z.
2. Repeat part 1 with R_L=3 kΩ

(Refer Figure Below) (CO4)



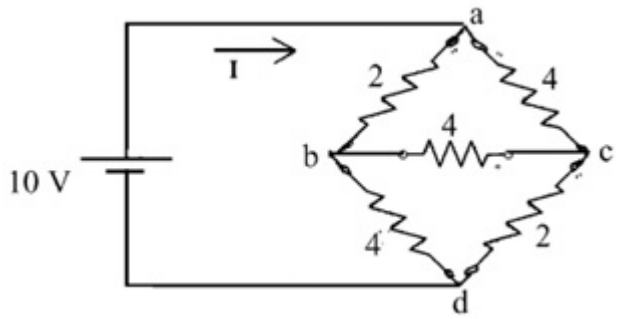
2022-23 Jan_Jun

3.g. Analyze the differential amplifier with suitable circuit in two modes of operation. (CO5) 6

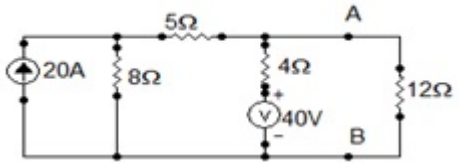
SECTION C **50**

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

4-a. Using star-delta transformation, find the current in the branch b-c of the circuit. Consider all the values of resistances are in ohms. (CO1) 10



4-b. Determine the Norton's equivalent circuit across A-B and determine current flowing through 12Ω Resister for the network shown below. (CO1) 10



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

5-a. The instantaneous values of two alternating voltages are represented as V_1 = 60 sin ωt and V_2 = 40 sin (ωt – π/3). Derive the expression of voltage as sum and difference of voltages.(CO2) 10

5-b. A balanced delta-connected load of (12+j9) ohm is connected to a 3- phase 400V supply, calculate line current, power factor and power drawn by it.(CO2) 10

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

6-a. Explain (i) SFU (ii)MCCB (iii) ELCB in detail. (CO3) 10

6-b. In a 25 kVA, 2000 V/200 V transformer the iron and copper losses are 350 W and 400W respectively. Calculate the efficiency of half load and 0.8 pf. lagging. Also determine the maximum efficiency and corresponding load KVA. (CO3) 10

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

7-a. Explain the Bridge rectifier with diagram and calculate Ripple Factor (derive) for various rectifiers. (CO4) 10

7-b. What is the working principle of Light Emitting Diode? Give its advantages and Disadvantages. (CO4) 10

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

8-a. For the inverting amplifier if the input voltages are 2V, 4V and 6V and 10

2022-23 Jan_Jun

corresponding resistances are 2K, 4K and 6K respectively and feed back resistor is 3K. Calculate the output voltage. (CO5)

8-b. Explain the working of DMM with its block diagram. Also mention its advantages and disadvantages. (CO5) 10

2022-23 Jan_Jun