Printed Page:- 05 **Subject Code**:- AMIEC0101

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech (Integrated)

SEM:I 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.*

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

(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

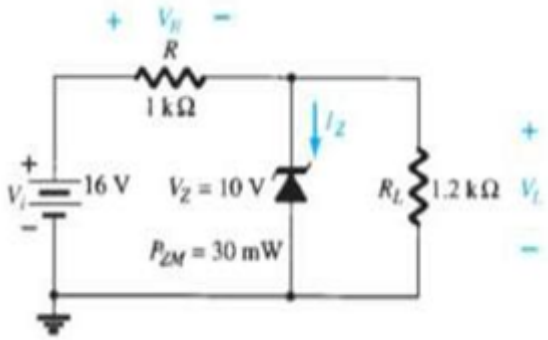
3-d. Derive the relationship between phase and line voltage in 3- ϕ star connection system.(CO2) 6

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)

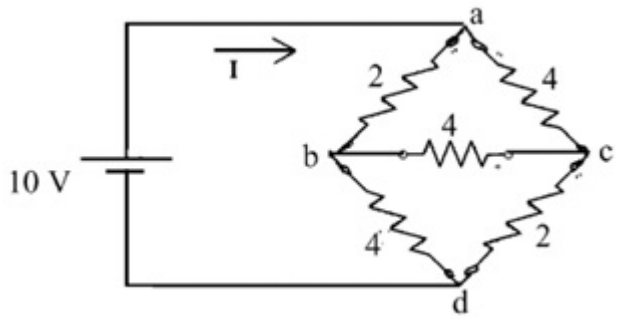


3.g. Analyze the differential amplifier with suitable circuit in two modes of operation. (CO5) 6

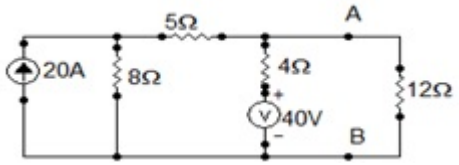
SECTION C **50**

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

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