Printed Page:- 03 **Subject Code:- BCSBS0202**

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: Principles of Electronics

Time: 2 Hours **Max. Marks: 50**

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 **15**

1. Attempt all parts:-

1-a. Free electrons exist in..... (CO1) 1

(a) Valance band

(b) Coduction band

(c) Free band

(d) Second band

1-b. Zener diode is invariably used with.....(CO2) 1

(a) Forward biased

(b) Reverse biased

(c) Equilibrium

(d) Schottky barrier

1-c. What is the left hand section of a junction transistor in CB called? (CO3) 1

(a) Base

(b) Collector

(c) Emitter

(d) Depletion region

1-d. What is the main advantage of FET which makes it more useful in industrial applications? (CO4) 1

(a) Voltage controlled operation

(b) Less cost

(c) Small size

(d) Semiconductor device

1-e. In which configuration is an op-amp typically used for voltage amplification? (CO5) 1

(a) Inverting amplifier

(b) Non-inverting amplifier

(c) Voltage folllower

(d) both (a) and (b)

2. Attempt all parts:-

2.a. What are donor and acceptor impurities? (CO1) 2

2.b. Compare pn junction and zener diode.(CO2) 2

2.c. Define NPN and PNP transistor with their symbols. (CO3) 2

2.d. How FET worked as VVR? (CO4) 2

2.e. Define CMRR and Slew Rate in reference to op-amp. (CO5) 2

SECTION B **15**

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

3-a. Discuss the current flow mechanism in a p-n junction under no bias.(CO1) 5

3-b. Draw neat and clean diagram of transition capacitance and explain with their CV characteristics. (CO2) 5

3.c. Draw circuit diagrams of different configurations of BJT and define their current amplification factors. (CO3) 5

3.d. Sketch the VI characteristics of JFET. Define pinch off voltage and mark it on the characteristics. Explain its importance.(CO4) 5

3.e. Draw and explain integral circuit using an op-amp. Derive its output expression. (CO5) 5

SECTION C **20**

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

4-a. What do you understand by energy bands in semiconductors? (CO1) 4

4-b.	Explain the following terms: (a) Potential Barrier (b) Knee Voltage (c) Forward biased (d) Reverse biased. (CO1)	4

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

5-a.	Give the comparison of Half wave rectifier and full wave rectifier. (CO2)	4
5-b.	Discuss avalanche breakdown mechanism in p-n junction diode. (CO2)	4

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

6-a.	Explain the mechanism and principal of operation of BJT in brief. Also prove that $I_E = I_B + I_C$. (CO3)	4
6-b.	Define and explain the reverse leakage current of CB configuration. (CO3)	4

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

7-a.	Define transconductance (g_m). Determine the transconductance (g_m) of JFET if there is a change in I_D of 0.6A with respect to change in V_{GS} of 0.2V.(CO4)	4
7-b.	What is Full-Subtractor? Explain with the help of truth table and logic circuit diagram.(CO4)	4

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

8-a.	Define differential gain, common mode gain for differential amplifier and calculate the output voltage. (CO5)	4
8-b.	In a feedback circuit, the input resistor R_1 = 15KΩ, and feedback resistor R_f = 90KΩ. Calculate the output voltage for 1V input for both inverting and non-inverting configurations. (CO5)	4