Printed Page:- 03 **Subject Code:- ACSBS0202**

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: 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. The energy level of electrons.....when they move away from the nucleus. (CO1) 1

(a) Increases

(b) Decreases

(c) remains constant

(d) Becomes zero

1-b. The arrowhead in the diode symbol points the direction.....(CO2) 1

(a) electron current

(b) conventional current

(c) reverse saturation current

(d) hole current

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 value of current when the gate to source voltage is equal to the pinch off voltage? (CO4) 1

(a) 1A

(b) 5A

(c) 100A

(d) 0

1-e. In order for an output to swing above and below a zero reference, the op-amp circuit requires.....(CO5) 1

(a) a resistive feedback network

(b) zero offset

(c) a wide bandwidth

(d) a negative and positive supply

2. Attempt all parts:-

2.a. How p-type semiconductors are formed? (CO1) 2

2.b. Explain transition capacitance with reference to p-n junction diode. (CO2) 2

2.c. Why transistor is called a bipolar device? (CO3) 2

2.d. What is the major difference between a bipolar and unipolar device? (CO4) 2

2.e. Draw the circuit diagram of basic integrator using an OPAMP. (CO5) 2

SECTION B **15**

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

3-a. Write short notes on Fermi Level . Draw Fermi level in case of N type and P type semiconductor. (CO1) 5

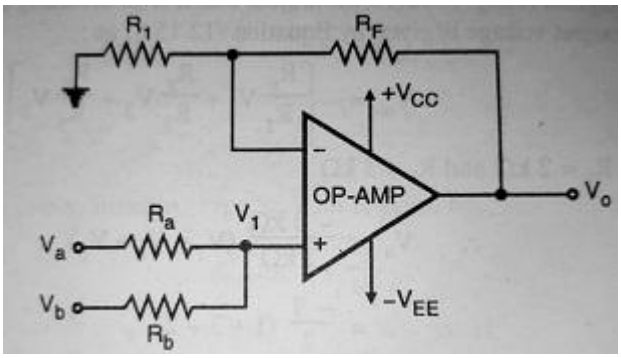
3-b. Explain ideal and practical diode models. Draw the characteristics of an ideal diode. How does it differ from practical diode characteristics? (CO2) 5

3.c. What do you understand by “Transistor biasing” ? Mention the important points to be considered for the selection of operating point. The emitter current of a transistor is 10mA. If α = 0.99 and I_{CBO} = 10μA . Calculate the value of I_C and I_B. (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. Derive the expression for output voltage of difference amplifier .If V_a = +2V and V_b = +4V , $R_a = R_b = R_1$ = 1kΩ and R_f = 3kΩ . Determine the voltage V_1 at 5

the non inverting terminal of OPAMP and the output voltage V_0. (CO5)



SECTION C **20**

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

4-a. With neat and clean energy band diagram classify conductors, semiconductors and Insulators. (CO1) 4

4-b. Differentiate between Intrinsic and Extrinsic semiconductor on the basis of carriers and conductivity. (CO1) 4

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

5-a. A Diode operating at 300 ^{0}K has V_F of 0.4V across it when the current through it is 10mA and 0.42V when the current is twice as large . What values of I_0 and η allow the diode to be modelled by the diode equation? (CO2) 4

5-b. Draw the circuit diagram of Bridge type full Wave Rectifier and explain its operation with output waveforms. (CO2) 4

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

6-a. Draw output characteristics of CB configuration and explain different regions. (CO3) 4

6-b. Explain the different stability factors for BJT amplifier. What are the factors affecting the stability of Q Point? (CO3) 4

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

7-a. What are the logic gates & types? Prove that the NAND and NOT gate are universal gates. (CO4) 4

7-b. What are the advantages of FET over BJT? How is an FET used as a voltage variable resistance? (CO4) 4

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

8-a. What is a feedback amplifier? Briefly explain different types of feedback amplifiers. (CO5) 4

8-b. Design a summing amplifier to add three input voltages. The output of this circuit must be equal to 2 times the negative sum of the inputs. (CO5) 4