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Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: II - THEORY EXAMINATION (2021 - 2022)

Subject: Principles of Electronics

Time: 3 Hours Max. Marks: 50

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 mark each.
3. Section B - Question No-3 is based on external choice carrying 5 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 4 marks each.
5. 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 gap is much more in silicon than in germanium because (CO1) 1

(a) It has less number of electrons

(b) It has high atomic mass number

(c) Its valence electrons are more tightly bound to their parent nuclii

(d) Its crystal has much stronger bonds called ionic bonds

1-b. If the positive terminal of the battery is connected to the anode of the diode, then it is known as... (CO2) 1

(a) Forward biasing

(b) Reverse Biasing

(c) Equilibrium Condition

(d) None of these

1-c. In an NPN transistor symbol, the arrow is pointed outward from_____(CO3) 1

(a) the collector

(b) the base

(c) depends on the configuration

(d) the emitter

1-d. What is the value of drain current in JFET when V_{gs}=pinch off voltage? (CO4) 1

(a) 0A

(b) 1A

(c) 2A

(d) Cannot be determined

1-e. An oscillator produces……. oscillations (CO5) 1

(a) Damped

(b) Undamped

(c) Modulated

(d) None of the above

2. Attempt all parts:-

2.a. Define the term mobility with reference to semiconductor materials. (CO1) 2

2.b. Define PIV for HWR and FWR. (CO2) 2

2.c. Why CE configuration is most preferred configuration?(CO3) 2

2.d. Define logic gates. Give the symbol representation of all gates. (CO4) 2

2.e. Define slew rate. (CO5) 2

SECTION B 15

3. Answer any three of the following:-

3-a. With neat and clean energy band diagram classify conductors , semiconductors and Insulators. (CO1) 5

3-b. What are the effect of temperature on the V-I characteristics of diode? Draw and explain the observations of V-I characteristics of Si for 4 different temperatures. (CO2) 5

3.c. Draw and explain the input and output characteristics of common emitter (CE) configuration using NPN bipolar junction transistor. Also indicate all the the region of operations. (CO3) 5

3.d. What is counter? Explain the working of synchronous counter with neat and clean circuit diagram. (CO4) 5

3.e. Draw the differentiator circuit and derive the expression for the output voltage. Also draw the input and output voltage waveforms. (CO5) 5

SECTION C 20

4. Answer any one of the following:-

4-a.	Explain the formation of Depletion layer. (CO1)	4
4-b.	Explain Energy band theory of Solids and draw energy band diagram showing how energy band separated in solids. (CO1)	4

5. Answer any one of the following:-

5-a.	Define diffusion current and Drift current in a semiconductor in details. Also write current equations.(CO2)	4
5-b.	For the same order of doping, why does n-type semiconductor exhibit larger conductivity than p-type semiconductor? Also explain why Si is most widely used semiconductor? (CO2)	4

6. Answer any one of the following:-

6-a.	Draw and explain the input and output characteristics of common base configuration. (CO3)	4
6-b.	Explain the factors affecting the stability of Q point.(CO3)	4

7. Answer any one of the following:-

7-a.	Explain the Working and Characteristics of Enhancement Type N-MOSFET (CO4)	4
7-b.	What is demultiplexer? What are the applications of demultiplexer (DMUX)? (CO4)	4

8. Answer any one of the following:-

8-a.	What are advantages of negative feedback? Explain the different types of feedback topologies. (CO5)	4
8-b.	Define ideal op-amp and write its ideal and practical characteristics. (CO5)	4