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BTECH
(SEM III) THEORY EXAMINATION 2023-24
ELECTRONIC DEVICES

TIME: 3HRS

M.MARKS: 70

Note: Attempt all Sections. If require any missing data, then choose suitably.

SECTION A

1. Attempt all questions in brief.

| Q no. | Question | Marks |
|-------|--|-------|
| a. | Discuss thermal Equilibrium Condition. | 2 |
| b. | Illustrate the energy band diagram for PN junction in reverse mode. | 2 |
| c. | A transistor has an α of 0.98. Determine the value of β . | 2 |
| d. | Illustrate Electroluminescence. | 2 |
| e. | State the de Broglie principle of duality. | 2 |
| f. | Write properties of MOS capacitor. | 2 |
| g. | Differentiate between drift and diffusion current. | 2 |

SECTION B

2. Attempt any three of the following:

| | | |
|----|--|---|
| a. | Explain photoelectric effect. justify how this effect verifies the particle nature of light. | 7 |
| b. | Illustrate Intrinsic and Extrinsic Semiconductor in detail. | 7 |
| c. | Explain the small signal model of PN-Junction Diode | 7 |
| d. | Describe stability factor and explain how it affect the transistor biasing. | 7 |
| e. | Explain the C-V Characteristic of MOS Transistor. | 7 |

SECTION C

3. Attempt any one part of the following:

| | | |
|----|--|---|
| a. | Discuss Application of Schrödinger wave equation for infinite Potential well and discuss the effect of various in relation to the energy of the particle. | 7 |
| b. | Illustrate the concept of allowed and forbidden energy bands in a single crystal both qualitatively and more rigorously from the results of using the Kronig–Penney model. | 7 |

4. Attempt any one part of the following:

| | | |
|----|--|---|
| a. | Define the term Doping. Explain the effect of Impurity on energy band gap Diagram in detail. | 7 |
| b. | Using the concept of drift and diffusion of carriers, derive the continuity equation. | 7 |

5. Attempt any one part of the following:

| | | |
|----|--|---|
| a. | Describe the importance of Einstein relation and prove the relation. | 7 |
| b. | Derive the relation of voltage and current for PN junction diode. | 7 |

6. Attempt any one part of the following:

| | | |
|----|--|---|
| a. | Explain Ebers-Moll model for PNP transistor. | 7 |
| b. | Name the different biasing schemes used transistor biasing. Explain voltage divider biasing in detail. | 7 |

7. Attempt any one part of the following:

| | | |
|----|---|---|
| a. | Explain various biasing schemes for JFET. | 7 |
| b. | Explain Enhancement P channel MOSFET in detail. Draw and elaborate the drain Characteristic | 7 |