Roll No. _____

310707/310807

B. Tech. III - Sem. (Main) Exam., February - 2021
Electronics & Communication Engineering
3EC4-07 Electronics Devices
Common for EC/EIC

310707/310807

Time: 3 Hours   **Maximum Marks: 160**

Instructions to Candidates:

Part – A: *Short answer questions (up to 25 words) 10 × 3 marks = 30 marks. All ten questions are compulsory.*

Part – B: *Analytical/Problem Solving questions (up to 100 words) 5 × 10 marks = 50 marks. Candidates have to answer five questions out of seven.*

Part – C: *Descriptive/Analytical/Problem Solving questions 4 × 20 marks = 80 marks. Candidates have to answer four questions out of five.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. NIL_____   2. NIL_____

PART - A

Q.1 Describe the energy band theory of a crystal. What is meant by the term forbidden energy gap? [3]

Q.2 What is meant by injected hole (or electron) density? [3]

Q.3 What do you understand by diffusion and diffusion current? [3]

Q.4 Briefly define the donor and accepting impurities for semiconductors. [3]

Q.5 Explain the Zener diode and Schottky diode. [3]

Q.6 Write down the characteristics of Poisson and Continuity equation for P – N junction. [3]

Q.7 Explain the term bipolar as used in bipolar transistor. [3]

Q.8 What is meant by the term collector reverse saturation current I_{co}? [3]

Q.9 Briefly define the Ion implantation process of IC's fabrication. [3]

Q.10 What do you mean by Chemical Vapour Deposition (CVD) in IC's fabrication. [3]

PART – B

Q.1 Define a graded semiconductor. Explain, why an electric field gets created in a graded semiconductor. [10]

Q.2 Derive the expression for continuity equation. [10]

Q.3 What is fermi level? Explain the fermi level in intrinsic and extrinsic semi-conductors. https://www.btubikaner.com [10]

Q.4 Explain the V-I characteristics of P-N Junction diode. [10]

Q.5 Write short note on –

   (a) Photo diode [5]

   (b) Twin-tub CMOS process [5]

Q.6 Describe the small signal models of MOS transistor. [10]

Q.7 Give explanation about –

   (a) Solar Cell [5]

   (b) Sputtering Process [5]

PART – C

Q.1 What do you understand by the classification of semiconductors? Discuss some important electronic properties of Gallium Arsenide. [20]

Q.2 Write the detailed explanation of energy bands in intrinsic and extrinsic silicon. Briefly define the sheet resistance. [20]

Q.3 Describe the various biasing and their characteristics of P-N junction. [20]

Q.4 Describe the construction feature and I-V characteristics of BJT. [20]

Q.5 Describe the etching in IC fabrication process. [20]