

<b>310807</b>	Roll No.	Total No of Pages: <b>3</b>
	<b>310807</b> <b>B. Tech. III Sem. (Main) Exam., Dec. - 2019</b> <b>Common for ECE/EIC</b> <b>3EI4-07 Electronic Devices</b>	
<b>Time: 3 Hours</b>		<b>Maximum Marks: 160</b>

**Instructions to Candidates:**

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

**Part – B:** Analytical/Problem Solving questions  $5 \times 10$  marks = 50 marks. Candidates have to answer five questions out of seven.

**Part – C:** Descriptive/Analytical/Problem Solving questions  $4 \times 20$  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 Why is a semiconductor an insulator at ordinary temperature? [3]
- Q.2 Why is silicon preferred to germanium in the manufacture of semiconductor devices? [3]
- Q.3 Describe the electron distribution in a silicon atom. [3]
- Q.4 Why the doping materials are called impurities? [3]

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- Q.5 Briefly define the Ebers – Moll Model of Bipolar Junction Transistor [BJT]. [3]
- Q.6 Write down various applications of Photodiode. [3]
- Q.7 Define the leakage current for reverse V/I characteristic of P–N Junction. [3]
- Q.8 Write down the Poisson and continuity equation for P–N junction characteristics. [3]
- Q.9 Write any three advantages of Ion implantation process of ICs fabrication. [3]
- Q.10 Briefly define the Etching process of ICs fabrication. [3]

**PART – B**

- Q.1 Give the mechanism of hole current flow in a semiconductor. And, what do you understand by intrinsic and extrinsic semiconductors. [10]
- Q.2 Explain the E-k diagrams of semiconductors. [10]
- Q.3 Describe the basic fundamental construction features and working principle of Light Emitting Diode (LED). Also, write down various applications of LED. [10]
- Q.4 Write short – note on –
- (a) Zener diode and [5]
  - (b) Schottky diode [5]
- Q.5 Give the detailed explanation of following ICs fabrication process –
- (a) Oxidation [3]
  - (b) Diffusion [3]
  - (c) Photolithography [4]
- Q.6 Explain the generation and recombination process of carriers in semiconductors. [10]
- Q.7 Describe the small signal switching models of P–N Junction. Also, define the Avalanche breakdown phenomenon in P–N Junction. [10]

**PART - C**

- Q.1 What do you understand by a semi-conductor? Discuss some important properties of semi - conductors, which are the most commonly used semiconductors and why? Also, give the energy band description of semiconductors. [20]
- Q.2 Write the detailed explanation of diffusion current, drift current, mobility and resistivity as carrier transport in semiconductors. [20]
- Q.3 Describe the various biasing and their characteristics of P-N Junction. [20]
- Q.4 Describe the constructional features and I-V characteristics of MOSFET. [20]
- Q.5 Give the detailed description of constructional features and C-V characteristics of MOS capacitor. [20]

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