JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2024

B.Tech-III Semester (ECE)

COURSE CODE (CREDITS): 18B11EC313 (4) MAX. MARKS: 15

COURSE NAME: ELECTRONIC DEVICES AND CIRCUITS

COURSE INSTRUCTORS: Dr. Shruti Jain MAX. TIME: 1 Hour

Note: *(a)All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

Section A (Short Answers : 1 × 5 = 5 marks) [CO1]

1.

i. Total hole current is a sum of _____and_____current. Write formulas too.

ii. How Fermi level in a p-type semiconductor is a function of acceptor concentration.

iii. What is the significance of operating point and load line. How Sita can calculate for diode?

iv. What is the difference between different types of resistances of diode?

v. How Shyam can evaluate maximum zener current and minimum current limit resistance?

Section B (Long Answers : 2 × 5 = 10 marks) [CO1]

2. Chirag is working on the positive biased clipping circuit with 10V peak to peak input sinusoidal waveform as input with 1 V biasing. What is the expected output?
3. "Zener diode as a Voltage Regulator". Justify this statement.
4. Determine the donor concentration in an *n*-type germanium semiconductor having a conductivity of 2.016 $(\text{ohm m})^{-1}$, if the mobility of electrons in germanium is about 0.23 m^2/ V-s. Also, determine the minority carrier density. Assume $n_i = 2.5 \times 10^{19}/m^3$.

5. The reverse saturation current of a silicon PN junction diode is 10μA at the temperature 300K. Determine the forward bias voltage to be applied across the PN junction to obtain a current of about 100mA.
6. Complete the table below :

	Half wave rectifier	**Centre tapped Full wave rectifier**	**Full wave bridge rectifier**
Number of diodes	01		
Peak inverse voltage		$2\,V_m$	
Average DC output voltage	V_m/π		
RMS output voltage	$V_m/2$		

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