

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-I & II(NEW) EXAMINATION – SUMMER 2023

Subject Code:3110018

Date:01-08-2023

Subject Name:Physics

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define: Recombination and carrier generation	03
	(b) Differentiate: Spontaneous and Stimulated emission.	04
	(c) Explain Energy Band Diagrams in solids with the necessary diagram.	07
Q.2	(a) State assumption of classical free electron gas theory.	03
	(b) Differentiate: Direct and Indirect bandgap in semiconductors	04
	(c) Explain: Working of the p-n junction diode and state its applications.	07
OR		
	(c) Write a short note on DOS (Density of State)	07
Q.3	(a) State: Fermi function	03
	(b) Differentiate: Intrinsic and Extrinsic Semiconductor.	04
	(c) Explain the working of solar cells with the necessary diagram.	07
OR		
Q.3	(a) Define: Ohmic junction	03
	(b) Explain: Exciton	04
	(c) Write a brief note on Kronig-Penney Model.	07
Q.4	(a) Define: Superconductivity and Transition temperature T_c	03
	(b) Write down applications associated with SQUID.	04
	(c) Explain the Meissner effect and prove that superconductors are perfect diamagnetic.	07
OR		
Q.4	(a) Define: Absorption of Light	03
	(b) Explain: Hot Point probe measurements.	04
	(c) Write a brief note on the density of electrons in the conduction band.	07
Q.5	(a) What do you mean by drift and diffusion current?	03
	(b) Differentiate: Type I and Type II superconductors.	04
	(c) Explain: Four Point Probe technique (for Bulk sample)	07

OR

- Q.5** (a) State: Formula for Fermi's Golden Rules. **03**
(b) Calculate the critical current which can flow through a long thin **04**
superconducting wire of diameter 10^{-3} m. Given $H_c=7.9 \times 10^3$ amp/m
(c) Write a brief note on Visible Spectroscopy and state its applications. **07**

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