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 Tc	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

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 Hc=7.9 $X10^3$ amp/m

(c) Write a brief note on Visible Spectroscopy and state its applications. **07**

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