GUJARAT TECHNOLOGICAL UNIVERSITY
BE –SEMESTER 1&2(NEW SYLLABUS)EXAMINATION- WINTER 2018

Subject Code: 3110018   **Date: 04-01-2019**
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.**

Q.1	**(a)**	Give assumptions of classical free electron theory.	**03**
	(b)	Explain mechanism of superconductivity.	**04**
	(c)	What is photovoltaic effect. Explain construction and working of solar cell.	**07**
Q.2	**(a)**	Give difference between N type and P type semiconductors.	**03**
	(b)	Derive an expression for joint density of states.	**04**
	(c)	Explain Kronig Penney model in detail.	**07**
		OR	
	(c)	Explain properties of superconductors.	**07**
Q.3	**(a)**	What are hot probe method.	**03**
	(b)	Explain fermi levels.	**04**
	(c)	Explain classification of materials as conductors, insulators and semiconductors.	**07**
		OR	
Q.3	**(a)**	Give difference between intrinsic and extrinsic semiconductors.	**03**
	(b)	Explain drift and diffusion current.	**04**
	(c)	Explain direct and indirect band gap with E-k diagrams.	**07**
Q.4	**(a)**	Define superconductivity and critical temperature.	**03**
	(b)	Discuss fermi golden rule.	**04**
	(c)	Explain diffusion mechanism in detail.	**07**
		OR	
Q.4	**(a)**	Define radiative and non-radiative transitions.	**03**
	(b)	Explain emission and absorption.	**04**
	(c)	Explain experimental procedure for DLTS.	**07**
Q.5	**(a)**	The critical temperature of Nb is 9.15 K. At zero kelvin, the critical field is 0.196 T. Calculate the critical field at 6 K.	**03**
	(b)	Explain Drude model.	**04**
	(c)	Why two probe method for resistivity measurement failed and hence explain four probe method.	**07**
		OR	
Q.5	**(a)**	Give success and drawback of classical free electron theory.	**03**
	(b)	Derive expression of electron concentration in conduction band.	**04**
	(c)	Discuss UV – VIS method for band gap measurement of semiconductors.	**07**

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