Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2143902 **Date:15/05/2019**

Subject Name: Physics of Nanomaterials

Time:02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	What is Lattice and Lattice point?	**03**
	(b)	Explain Direct and Indirect Band Gap in Semiconductor.	**04**
	(c)	Write a short note on Energy Band Gap in Solids.	**07**
Q.2	**(a)**	Define Chiral Vector in Carbon Nanotube.	**03**
	(b)	Explain types of CNTs.	**04**
	(c)	Write a short note on Carbon Nanotubes.	**07**
		OR	
	(c)	Describe Unit Cell, Chiral Angle, Chiral Vector of CNTs.	**07**
Q.3	**(a)**	What is Type I Hetero Structure?	**03**
	(b)	What is Type II Hetero Structure?	**04**
	(c)	Describe Classification of Quantum Confined System.	**07**
		OR	
Q.3	**(a)**	Define Reciprocal Vectors.	**03**
	(b)	Explain Reciprocal Lattice.	**04**
	(c)	Describe Brillouin Zone.	**07**
Q.4	**(a)**	What is Spherical Cluster Approximation?	**03**
	(b)	Describe Interior and Exterior Surface Area.	**04**
	(c)	Explain Surface to Volume Ratio with Diagram.	**07**
		OR	
Q.4	**(a)**	Define Quantum Confinement Effect.	**03**
	(b)	Explain 2D, 3D Nanomaterials with Examples.	**04**
	(c)	Write a note on applications of Carbon Nanotubes.	**07**
Q.5	**(a)**	What is Reciprocal space?	**03**
	(b)	Explain Photonic Crystal.	**04**
	(c)	Write a note on Hetero Structures.	**07**
		OR	
Q.5	**(a)**	What is Quantum well, Quantum wire, Quantum dot?	**03**
	(b)	Describe type of Excitons and Binding Energy.	**04**
	(c)	Write short note on Excitons.	**07**

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