Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2173905 Date:28/01/2021

Subject Name:Electrical and Optical properties of Nanomaterials

Time:10:30 AM TO 12:30 PM Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define: Band diagram in the vicinity of nanomaterial.	**03**
	(b)	Explain Direct and Indirect band gap in the vicinity of E-K diagram.	**04**
	(c)	Write down various applications associated with optical thin films.	**07**
Q.2	**(a)**	What do mean by Plasmonic Nanomaterial?	**03**
	(b)	Differentiate: Polar and Non-polar molecular.	**04**
	(c)	Explain response of a pure resistor to an applied AC signal.	**07**
Q.3	**(a)**	What do you mean by Polarization in Dielectric Material?	**03**
	(b)	Write short not on Electrical-Transport Properties in 2D electron gas (2DEG) nanostructure.	**04**
	(c)	Write a shot note on ac and dc conduction mechanism in ZnO nanorods and nanotubes.	**07**
Q.4	**(a)**	Define : Quantum Dots.	**03**
	(b)	Differentiate: Rayleigh scattering, Compton scattering and Photoelectric effect.	**04**
	(c)	Explain : how to change photo response of Photo catalytic nanomaterial from UV light to visible light.	**07**
Q.5	**(a)**	Define: Photonic Crystals and its colour emission	**03**
	(b)	Write a short note on Surface Plasmon Resonance.	**04**
	(c)	Write a shot note on Grain boundary and its types and shows its impact on different microstructures.	**07**
Q.6	**(a)**	Define : oxidation and reduction.	**03**
	(b)	Explain: Importance of Microstructure.	**04**
	(c)	Write a short note on : Photo catalytic effect.	**07**
Q.7	**(a)**	Define: Free radicals.	**03**
	(b)	Explain: particle Size effect on optical properties of nanostructured materials.	**04**
	(c)	Write a short note on operating and affecting Parameters of Photo catalysis.	**07**
Q.8	**(a)**	Define: Homogeneous Photo catalysis.	**03**
	(b)	Explain : Metallic nanoparticles and its optical properties.	**04**
	(c)	Write a short note on photo catalytic activity of TiO2.	**07**

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