Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

Year and Program: 2020-21 PG	**School of Science**	**Department: Physics**
Course Code: PHS 621 R1	**Course Title: Nanoscience I**	**Semester : III**
Day : Wedneday **Date : 16.12.2020**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Instructions: 1) All Questions are compulsory.
2) Use of non-programmable calculator is allowed.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (Any Two)**–			
a)	How much is the nanometer? Write history for the evolution of nanoscience and nanotechnology.	8	L2	CO1
b)	i) Explain surface chemistry of nanomaterials.	4	L3	CO1
	ii) Explain basic science behind nanotechnology.	4		
c)	How nucleation rate influences the crystal size? Explain top down and bottom approach to synthesize the nano-particles.	8	L3	CO2
Q.2	**Answer the following (Any two)** –			
a)	Elaborate quantum transport in nanostructures? Explain quantum confinement along one dimension, two dimension, three dimensional materials. Write about confined states in quantum wells, quantum wires and quantum dots.	8	L2	CO2
b)	Elaborate Drude's model of thermal conductivity.	8	L4	CO3
c)	i) What is thermionic emission?	4	L4	CO3
	ii) How conduction take place in insulators?	4		
Q.3	**Answer the following (Any two)** –			
a)	Why being allotropes of carbon, diamond and graphite are different from each other? Explain structure and types of CNT.	9	L3	CO4
b)	i) How CNT and graphene are used as nanomaterials?	5	L2	CO4
	ii) Write general applications of other nanomaterials.	4		
c)	Explain how surface to volume ratio of nanoparticles help in improving the properties of nanoparticles. Take help of proper example.	9	L3	CO1

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