C. U. SHAH UNIVERSITY Winter Examination-2021

Subject Name : Nano-Science and Thin Film Physics

Subject Code : 5SC03NST1		Branch: M.Sc. (Physics)		
Semester: 3	Date: 16/12/2021	Time: 02:30 To 05:30	Marks: 70	

Instructions:

Q-1

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

SECTION – I Attempt the Following questions

(07)

	a.	What are Quantum dots?	01	
	b. List one of the drawback of STM technique			
c. Define the term Quantum Confinement				
	d.	Why thickness measurement an important parameter for Thin films?	01	
	e.	Which mode in AFM is suitable for Biological samples studies?	01	
	f.	Define the term coalescence	01	
	g.	List some properties of Evanescent waves.	01	
Q-2		Attempt all questions	(14)	
	a.	Explain in detail how TEM works in characterizing Nanoparticles.	07	
	b.	Discuss the any two methods used for CNT synthesis	07	
		OR		
Q-2		Attempt all questions	(14)	
	a.	Write a note on Raman Spectroscopy	08	
	b.	List the various steps involved in Thin film growth process	06	
Q-3		Attempt all questions	(14)	
	a.	Describe how is SNOM method is helpful in surface studies?	07	
	b.	Discuss methods to synthesize Metal Nanoparticles	07	
		OR		
Q-3		Attempt all questions		
	a.	Explain the importance of AFM and its applications in Nanoresearch.	08	
	b.	With suitable figures, discuss Island, Layer and Mixed type thin film growth processes.	06	



		SECTION – II	
Q-4		Attempt the Following questions	(07)
	a.	Name any four Physical processes for the thin film deposition.	01
	b.	Write the formula to find the mean free path of a gas molecule.	01
	c.	Write full form of OMVPE.	01
	d.	Define Knudsen cell.	01
	e.	What do you mean by epitaxy and give two its types.	01
	f.	RHEED stands for?	01
	g.	Give full name of NEMS and MEMS	01
Q-5		Attempt all questions	(14)
	a	Write a note on Vacuum Thermal Evaporation technique.	06
	b	Explain XRD with necessary diagram and details.	08
		OR	
Q-5		Attempt all questions	
	a	Explain in detail MBE with necessary diagram.	07
	b	Write a note on SEM.	07
Q-6		Attempt all questions	(14)
-	a	Write a note on LPE and briefly discuss its types with necessary	10
		diagram.	
	b	Define Vacuum and give its four ranges.	04
		OR	
Q-6		Attempt all Questions	
	a	Write a note on Magnetron sputtering with necessary diagram.	06
	b	Explain in detail XPS with necessary diagram.	08