

Enrollment No: _____

Exam Seat No: _____

C. U. SHAH UNIVERSITY

Winter Examination - 2022

Subject Name : Nano-Science and Thin Film Physics

Subject Code : 5SC03NST1

Branch: M.Sc. (Physics)

Semester: 3

Date: 24/11/2022

Time: 11:00 To 02:00

Marks: 70

Instructions:

- (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.
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SECTION – I

Q-1 Attempt the Following questions (07)

- a. Define Quantum dots. **01**
- b. What do you mean by nanoclusters? **01**
- c. List out any two methods for the synthesis of CNTs. **01**
- d. What is nanocrystalline material? **01**
- e. Name the modes in AFM ? **01**
- f. Where a Raman spectroscopy is used? **01**
- g. Define Evanescent waves. **01**

Q-2 Write a note on CNTs, discuss its properties and explain any two synthesis methods for CNTs in detail. (14)

OR

Q-2 Attempt all questions (14)

- a. Explain the photoluminescence in detail with necessary diagram. **08**
- b. Write a note on metallic nanoparticles. **06**

Q-3 Attempt all questions (14)

- a. Explain in detail TEM with necessary diagram. **07**
- b. Write a note on Raman Spectroscopy. **07**

OR

Q-3 Attempt all questions (08)

- a. Write a note on AFM and discuss its various modes with diagrams. **08**
- b. Explain oxide nanomaterials in detail. **06**



SECTION – II

- Q-4 Attempt the Following questions (07)**
- a. Name the modes of thin film growth. **01**
 - b. What is nanolithography? **01**
 - c. What is DPN? **01**
 - d. What do you mean by LCVD? **01**
 - e. Define epitaxy. **01**
 - f. Vacuum condition for MBE is _____ torr **01**
 - g. Name the types of sputtering processes. **01**
- Q-5 Attempt all questions (14)**
- a Write a note on modes of thin film growth with necessary diagram. **07**
 - b Explain in detail the crystal film thickness monitors with necessary diagram. **07**
- OR**
- Q-5 Attempt all questions**
- a Write note on MBE with necessary diagram. **07**
 - b Explain in detail the DC magnetron sputtering with necessary diagram. **07**
- Q-6 Attempt all questions (14)**
- a Write a note on LPE and discuss its types with necessary diagram. **08**
 - b Write a note on E- beam deposition technique with diagram. **06**
- OR**
- Q-6 Attempt all Questions**
- a Write a note on SIMS with necessary diagram and discuss strengths, limitations and applications. **08**
 - b Explain in detail AES with necessary diagram. **06**

