

C. U. SHAH UNIVERSITY

Summer Examination-2022

Subject Name : Nano-Science and Thin Film Physics

Subject Code : 5SC03NST1

Branch: M.Sc. (Physics)

Semester: 3

Date: 26/04/2022

Time: 02:30 To 05:30

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. What are Quantum dots? 01
 - b. Write full form of STM. 01
 - c. What do you mean by Quantum Confinement? 01
 - d. Why thickness measurement an important parameter for Thin films? 01
 - e. List out the modes in AFM. 01
 - f. What is meant by targeted drug delivery? 01
 - g. How surface area changes as we decrease the size of particle? 01
- Q-2** (14)
- Discuss the methods used for CNT synthesis and explain with necessary diagram.
- 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** (14)
- Explain in detail AFM with necessary diagram and discuss its modes of operations with advantages and disadvantages.
- OR**
- Q-3** Attempt all questions
- a. Write a note on Raman Spectroscopy. 08
 - b. Discuss methods to synthesize Metal Nanoparticles. 06



SECTION – II

- Q-4** **Attempt the Following questions** **(07)**
- a.** Define Vacuum. **01**
 - b.** Give the full form of CVD. **01**
 - c.** Write the ranges of (1) Rough Vacuum (2) High Vacuum. **01**
 - d.** State full form of PECVD. **01**
 - e.** What do you mean by LEED? **01**
 - f.** What is LPE? **01**
 - g.** Write full form of VPE. **01**

- Q-5** **Attempt all questions** **(14)**
- a** Write a note on Vacuum Thermal Evaporation technique with necessary diagram. **07**
 - b** Write a note on the Electron beam Evaporation technique with necessary diagram. **07**

OR

- Q-5**
- Explain in detail XPS spectroscopy with necessary diagram and also give advantages and disadvantages.

- Q-6** **(14)**
- Write a note on sputtering and explain RF and DC sputtering with necessary diagrams.

OR

- Q-6** **Attempt all Questions**
- a** Write a note on SEM. **08**
 - b** Give a brief note on NEMS and MEMS. **06**

