

# C.U. SHAH UNIVERSITY

## Summer Examination-2019

**Subject Name: Nano-Science and Thin Film Physics**

**Subject Code: 5SC03NST1**

**Branch: M.Sc. (Physics)**

**Semester: 3**

**Date: 18/03/2019**

**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. Give two applications of SNOM
- b. How does Contact mode in AFM operation work?
- c. Define evanescent waves and give some of its properties
- d. Which has better resolution: Electron beam Lithography or X-ray Lithography?
- e. How Size Effect affects the properties of Nanoparticles?
- f. Define Contrast in Microscopic Techniques.
- g. Name the different quantum structures

**Q-2 Attempt all questions (14)**

- a. Discuss two methods to synthesize CNTs **07**
- b. Discuss the principle and working of TEM **07**

**OR**

**Q-2 Attempt all questions (14)**

- a. Explain the working of STM in detail. **07**
- b. Explain how is SNOM method is useful in surface studies? **07**

**Q-3 Attempt all questions (14)**

- a. Explain how AFM method is useful in surface studies? **07**
- b. Explain Raman Spectroscopy as a thin film characterization technique. **07**

**OR**

**Q-3 a. Enumerate on Lithography techniques. 06**

- b. Explain the different stages governing the growth of thin films 08**



