

Enrollment No:- \_\_\_\_\_

Exam Seat No:- \_\_\_\_\_

# C.U.SHAH UNIVERSITY

Summer-2015

Subject Code: 5SC04PCE1 Subject Name: Physics and Chemistry of Nanomaterials

Course Name: M.Sc. (Physics)

Date: 19/5/2015

Semester: IV

Marks: 70

Time: 10:30 TO 01:30

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**Instructions:**

- 1) Attempt all Questions in same answer book/Supplementary.
- 2) Use of Programmable calculator & any other electronic instrument prohibited.
- 3) Instructions written on main answer book are strictly to be obeyed.
- 4) Draw neat diagrams & figures (if necessary) at right places.
- 5) Assume suitable & perfect data if needed.

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**SECTION-I**

- Q-1 a) Define: Nanoscience. (01)  
b) Define: Nanotechnology. (01)  
c) What are quantum dots? (01)  
d) What are Carbon Nanotubes? (01)  
e) What is the meaning of Bucky balls? (01)  
f) Define: Nanoparticles. (01)  
g) What is full form of SAMs? (01)

- Q-2 a) Tabulate nanostructures according to dimensions and electron confinement. (07)  
b) Describe in detail: Spray Pyrolysis and Aerosol synthesis. (07)

**OR**

- Q-2 a) Describe in brief: Homogenous and Heterogeneous nucleation. (07)  
b) Explain Template based growth in thin films. (07)

**OR**

- Q-3 a) Explain TOP-BOTTOM approach for nanoparticle synthesis. (07)  
b) Write a short note on: SOL-GEL method. (07)

**OR**

- Q-3 a) Write a note on super lattices and self-assembled monolayers. (07)  
b) Explain in brief Core-shell nanostructures and their application in medical field. (07)

**SECTION-II**

- Q-4 a) Define: Electron tunneling process. (01)  
b) Define: Nucleation. (01)  
c) Why do electron microscopes give high resolution images? (01)  
d) Name three types of Thin Film Growth. (01)

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19-5

- e) Give full form of SAXS. (01)
- f) Write different types of magnetism occurring in materials. (01)
- g) What are piezoelectric materials? (01)
- Q-5 a) Explain Thermal and e-beam Evaporation. (07)
- b) Describe process of thin film growth (07)
- OR**
- Q-5 a) Write a note on: SEM. (07)
- b) Explain how do electrical, optical & mechanical properties of a material change as we approach nanometer range. (07)
- Q-6 a) Explain in detail: Nanotribology. (07)
- b) Explain in detail: Nanosensors. (07)
- OR**
- Q-6 a) Write notes on Molecular electronics and MEMs. (07)
- b) Write notes on Application of nanotechnology in the field of medicines. (07)

