



BBA-003-0496001

Seat No. _____

**B. Sc. / M. Sc. (Applied Physics) (Sem. VI)
(CBCS) Examination**

July - 2021

**Elements of Nanoscience & Nanotechnology :
Paper - XXI
(New Course)**

Faculty Code : 003

Subject Code : 0496001

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Attempt any five questions.
(2) Numbers in the right margin indicate marks.

- 1** Write answer of short questions (Two marks each) **14**
- (1) List various applications of Nanotechnology.
 - (2) What are core shell nanostructures? Give suitable examples.
 - (3) Define the terms Nanoscience, Nanomaterial and Nanotechnology.
 - (4) Write full forms of CVD, PVD, MBE, PES & XPS.
 - (5) What are Carbon Fullerenes?
 - (6) Write down the principle of XRD.
 - (7) Draw a well-labelled diagram of AFM.
- 2** Write answer of short questions (Two marks each) **14**
- (1) Write full form of ALD, XPS, PLD, PES, XRD & FT-IR.
 - (2) What are properties of CNTs ?
 - (3) Describe in brief synthesis and properties of carbon nano tube (CNTs).
 - (4) What are Stokes' and Anti Stoke's lines in Raman spectrum?
 - (5) Classify nanomaterials using suitable diagrams.
 - (6) Draw a well-labelled diagram of SOL GEL Synthesis method.
 - (7) Write in brief: Laser Ablation for Nanomaterial Thin film growth.

- 3 Write the detailed answers of following questions 14
 (1) What is meant by homogeneous nucleation? Describe in detail.
 (2) Write the principle and working of (SEM).
- 4 Write the detailed answers of following questions 14
 (1) Differentiate between top down and bottom up processes of nanomaterial synthesis.
 (2) Explain various Nanomaterials based on their classification.
- 5 Write the detailed answers of following questions 14
 (1) Describe various steps involved in the SOL GEL synthesis of nanoparticles.
 (2) Describe the XRD technique used for structural characterization of nanomaterial.
- 6 Write the detailed answers of following questions 14
 (1) Explain the use of Raman Spectroscopy in the nanomaterial characterization.
 (2) Write a note on X-ray photoelectron Spectroscopy.
- 7 Write the detailed answers of following questions 14
 (1) Describe the synthesis of nanomaterial using PVD method.
 (2) Explain the use of Photoluminescence spectroscopy in nanomaterial characterization.
- 8 Write the detailed answers of following questions 14
 (1) Discuss the applications of nanotechnology in Modern electronics and computer technology.
 (2) What is meant by Nanophononics? Give suitable examples of nanomaterials used in Nanophononics.
- 9 Write the detailed answers of following questions 14
 (1) Explain in detail applications of Nanomaterial in agriculture and energy harvesting.
 (2) Write a note on Past, Present and Future of Nanotechnology.
- 10 Write the detailed answers of following questions 14
 (1) Write a note on Emergence of Nanoscience and Nanotechnology.
 (2) Differentiate between Class I and Class II Organic-inorganic hybrid nanostructures.