

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.

B.Sc.Physics - END SEMESTER EXAMINATIONS - APRIL 2025
SEMESTER - V

20UPHCT5010 - Fundamental of Nanoscience and Nanotechnology

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

Section B

Answer any **SIX** questions ($6 \times 5 = 30$ Marks)

1. What are 1D, 2D, and 3D nano structures? Give one example of each.
2. Explain how secondary electrons are used in a Scanning Electron Microscope (SEM).
3. Narrate the role of nanotechnology in optoelectronics devices of displays and energy applications.
4. Give a brief account on nano toxicology and its significance.
5. Explain how ball milling can be used to produce nano materials.
6. Compare and contrast a Transmission Electron Microscope (TEM) and a light microscope.
7. Describe anyone application of graphene-based nanosensors.
8. Analyse how do nanomaterials improve the performance of electronic devices?

Section C

Answer any **THREE** questions ($3 \times 10 = 30$ Marks)

9. Explain the concept of quantum confinement and its effect on the band structure and density of states in nanoscale materials. How does this affect their electronic and optical properties?
10. Discuss the properties and applications of various carbon-based nano materials, including CNTs, C60, and graphene.
11. Describe the principles of X-ray diffraction (XRD) and explain how it is used to determine the crystal structure of materials.
12. Discuss the molecular electronics and its potential impact on the future of nano electronics.
13. Summarize how nanotechnology is used in the detection and treatment of cancer and explain its advantages over traditional methods.
