Vidyavardhini's College of Engineering and Technology, Vasai (West)

First Year Engineering

Academic Year: 2024-2025

Problem Set 6: Nanotechnology

Subject: BSC2023/EP **Date: 17/03/2025**
Max Marks: 10 **Submission Deadline: 04-04-2025**

CO6: To give exposure to the upcoming field of nanotechnology in the field of measurements.

Q. No.	Questions	Marks	CO	CL
1	Explain the significance of the surface-to-volume ratio in nanomaterials. How does this property influence their mechanical, optical, and electrical behavior? Provide relevant examples.	**2**	**6**	**2**
2	Compare and contrast Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Atomic Force Microscopy (AFM) in terms of working principles, resolution, and applications in nanotechnology.	**3**	**6**	**3**
3	Discuss the role of nanotechnology in environmental applications, focusing on gas sensing and water purification. Explain the working principles of gas-sensing capacitors and nanomaterials used for toxic gas detection.	**3**	**6**	**2**
4	What is lithography in nanotechnology? Describe different lithographic techniques used in nanofabrication and their applications.	**2**	**6**	**2**

NB: There's plenty of room at the bottom; every atom is a world! – R. P. Feynman
In his 1959 lecture, Feynman envisioned a future where we could manipulate matter at the atomic level, creating machines and devices at the nanoscale.