



K26P 0734

Reg. No. :

Name :

IV Semester M.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supple./Imp.)

Examination, April 2026

(2023 Admission Onwards)

CHEMISTRY

MSCHE04E04 : Nanomaterial Chemistry

Time : 3 Hours

Max. Marks : 60

SECTION – A

Short answer questions. Answer **any five** questions and **each** carries **three** marks.

1. Briefly explain Feynman's vision and its significance in the development of nanoscience.
2. Distinguish between bulk materials and nanomaterials with respect to their physical properties.
3. State the basic principle of Physical Vapour Deposition (PVD).
4. What is meant by electrospinning ? Mention one advantage of this method.
5. State the principle of powder X-ray Diffraction (XRD) and mention its significance in nanomaterial characterization.
6. What is meant by hydrogen storage ? Mention any two nanomaterials used for hydrogen storage. (5×3=15)

SECTION – B

Paragraph questions. Answer **any three** questions and **each** carries **six** marks.

7. Describe surface plasmon resonance in metal nanoparticles.
8. Describe the Chemical Vapour Deposition (CVD) technique and its applications in nanomaterial synthesis.
9. Explain the principle of Scanning Electron Microscopy (SEM) and its use in the characterisation of nano particles.

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10. Discuss Dye-Sensitized Solar Cells (DSSC) and explain the role of nanomaterials in DSSC.
11. Discuss the role of nanomaterials in energy storage devices with emphasis on batteries and supercapacitors. (3×6=18)

SECTION – C

Essay type questions. Answer **any three** questions and **each** carries **nine** marks.

12. Explain nanoscale classification of materials based on its dimensionality and discuss its representative properties.
13. Compare different lithographic techniques used for nanoscale patterning.
14. Discuss the principle, instrumentation and applications of Transmission Electron Microscopy (TEM) in nanoscience.
15. Explain X-ray Photoelectron Spectroscopy (XPS) with emphasis on surface composition, oxidation states and chemical bonding.
16. Describe hydrogen production by water splitting using nanomaterials. (3×9=27)