K22P 3270

Reg. No. : .....

Name : .....

IV Semester M.Sc. Degree (CBSS – Reg./Supple./Imp.) Examination, April 2022
(2018 Admission Onwards)
CHEMISTRY
CHE 4E.05 : Nanomaterial Chemistry

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or **one** sentence. **Each** question carries **one** mark.

1. What is meant by surface-to-volume ratio ?
2. What are direct and indirect semiconductors ?
3. Give any two stabilization mechanisms.
4. Who coined the term Nanotechnology ?
5. What is the significance of Lycurgus Cup ?
6. Suggest a technique for analyzing surface roughness.
7. What is fluorescence ?
8. What are Bucky balls ? **(8×1=8)**

SECTION – B

Answer **any eight** questions. **Each** question carries **two** marks.

9. What are superconducting nanoparticles ?
10. What is quantum confinement ?
11. Distinguish between amorphous and crystalline materials.

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12. What is bottom-up approach ? Give examples.
13. Write a short note on surfactants.
14. Write note on dry etching technique.
15. What is meant by contact angle ?
16. What is the principle of ellipsometry ?
17. Explain the principle of UV-Visible absorption spectroscopy.
18. Give the electronic structure of carbon nanotubes.
19. Distinguish 0D and 1D photonic bandgap materials.
20. What are nanosensors ? **(8×2=16)**

SECTION – C

Answer **any four** questions. **Each** question carries **three** marks.

21. Explain the different types of nanomaterials with examples.
22. Briefly explain the FIB lithographic technique.
23. Differentiate between directed and layer-by-layer assembly process.
24. Discuss the principle and application of NMR.
25. Explain the working principle of confocal microscopy.
26. Explain the principle of photocatalysis. **(4×3=12)**

SECTION – D

Essay type questions. Answer **any four** questions. **Each** question carries **six** marks.

27. A) Discuss the enhanced properties of nanomaterials compared to bulk materials.

OR

B) Explain the application of nanomaterials in the field of healthcare and environment.

28. A) Give details of the soft lithographic technique.

OR

B) Explain the different top-down techniques for the preparation of nanomaterials.

29. A) Discuss the principle and working of SEM with a neat diagram.

OR

B) Discuss the principle, working and application of XRD. Also explain the determination of particle size from XRD pattern.

30. A) Discuss the application of nanotechnology in energy conversion and storage.

OR

B) Discuss the application of nanomaterials in LED and LCD. **(4×6=24)**