



K24P 0269

Reg. No. : .....

Name : .....

**IV Semester M.Sc. Degree (CBSS – Reg./Supple. – (One Time Mercy Chance)/Imp.) Examination, April 2024  
(2014 Admission Onwards)**

**CHEMISTRY**

**CHE4C.12 : Inter Disciplinary Topics and Instrumentation Techniques**

Time : 3 Hours

Max. Marks : 60

**SECTION – A**

Answer **all** questions in **one** word or **one** sentence. **Each** question carries **1** mark.

1. How many ESR lines are expected for benzene anion radical ?
2. Distinguish between inter and intra-molecular hydrogen bonding.
3. What are ionic liquids ?
4. How the amount of scattering from the same particle will change with respect to the wavelength of light ?
5. What is the basic force behind  $\pi$ - $\pi$  interaction ?
6. What are green solvents ?
7. Why electron microscopy is an important characterisation technique for nanomaterials ?
8. Explain the term 'quantum confinement'.

**SECTION – B**

Answer **any eight** questions. **Each** question carries **2** marks.

9. How do you distinguish J and H aggregates ?
10. What do you understand about host-guest chemistry ? Explain with an example.
11. What are the environmental effects of green reactions ?

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12. How reaction time is important in green chemistry ?
13. How do you calculate the atom efficiency of a chemical reaction ?
14. How tetrabutylammonium chloride act as a phase-transfer catalyst ?
15. Explain the importance of nanoCAD.
16. What are smart materials ? Explain.
17. What are the applications of nanomaterials in optics ?
18. What is Mössbauer effect in chemistry ?
19. Explain the term 'hyper fine splitting' in ESR spectroscopy.
20. Explain any two applications of nephelometry.

**SECTION – C**

Answer **any four** questions. **Each** question carries **3** marks.

21. What are the advantages of microwave assisted organic synthesis ?
22. Explain how  $\pi$ - $\pi$  stacking and cation- $\pi$  interactions help the formation of supramolecular assemblies.
23. Write a short note on the relevance of green chemistry.
24. Explain the working principle of supramolecular (i) electronic devices and (ii) switching devices.
25. Explain the principles of thermometric titration.
26. How UV -Vis spectroscopy can be used to characterize nanomaterials ? Explain with an example.
27. Explain the nucleation and growth processes during the synthesis of nanoparticles.
28. What is a thermochemical analyser ? Explain its working.



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**SECTION – D**

Answer **four** questions. **Each** question carries **6** marks.

29. Explain the principles of ESR spectroscopy. Explain the ESR spectroscopy of inorganic radicals.

OR

Explain the following terms (i) Chemical isomer shift (ii) Doppler effect and (iii) Quadrupole effect in Mössbauer spectroscopy.

30. Explain the applications of nanomaterials in (i) Electronics (ii) Biomedical and (iii) Telecommunication.

OR

Explain the following methods used for the preparation of nanomaterials (i) Lithography (ii) Self-assembly (iii) Polymerization.

31. Explain the role of green chemistry in (i) Sustainability of environment (ii) Energy management and (iii) Solvent selection.

OR

Explain the green synthesis of (i) Cannizzaro reaction (ii) Aldol condensation and (iii) Grignard reaction.

32. How supramolecules are used for the molecular recognition ? Explain with examples.

OR

Explain any three common experimental techniques used in supramolecular chemistry.