

QP CODE: 26801753



Reg No :

Name :

INTEGRATED M.Sc. DEGREE EXAMINATION, APRIL 2026

Eight Semester

INTEGRATED M.Sc. BASIC SCIENCES-CHEMISTRY

ELECTIVE - ICH8ELB1 - NANOCHEMISTRY

2020 Admission Onwards

445C8E68

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. What does STM stands for? Describe the working principle of STM?
 2. In what ways does the surface area-to-volume ratio influence the reactivity of nanomaterials compared to bulk materials?
 3. State and explain Moor's law.
 4. List the types of core-shell systems commonly used in nanoshells.
 5. What are the common surface modification techniques for organic nanoparticles?
 6. How do percolation effects influence the electrical conductivity of nanocomposites?
 7. Define "Sensors"
 8. What are "Nanoparticle-biomaterial hybrid sensors"? How is it useful for sensing applications?
 9. Describe the challenges and limitations of using nanoporous polymers in large-scale water treatment facilities.
 10. How do nanomaterials contribute to the development of theranostic platforms in modern medicine?
- (8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Compare the physical and chemical properties of Nanowires and Nanofibers, Nanolayers.
12. Discuss the application of electrolytic methods in the preparation of nanomaterials.
13. Discuss the synthesis of nanomaterials based on atomic layer deposition technique?





14. Discuss the applications of nanopolymers in catalysis, highlighting how their unique properties make them suitable for specific catalytic processes.
15. Briefly describe the structure and significance of granular thin films in nanocomposite applications.
16. What are the advantages of using inorganic nanosensors in harsh environments?
17. What are the applications of Surface-Enhanced Raman Spectroscopy (SERS) technique?
18. How do nanomaterials contribute to the development of high-capacity energy storage devices, such as batteries and supercapacitors?

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Discuss the structural properties, synthesis methods and potential application of Fullerene.
20. Define and explain the applications of (a) Nano biology (b) Nano sensors (c) Nano medicine
21. How do the characteristics and applications of biosensors compare to those of traditional chemical sensors?
22. Evaluate the potential risks and benefits associated with the use of nanotechnology in environmental management. Discuss environmental, health, and safety considerations related to the application of nanomaterials in waste reduction, energy efficiency, and water treatment.

(2×5=10 weightage)

