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(Pages : 2) **Y – 5261**

Reg. No. : .....

Name : .....

Fourth Semester M.Sc. Degree Examination, April 2026

Chemistry/Analytical Chemistry

CH 241/CL 241 : CHEMISTRY OF ADVANCED MATERIALS

(2020 Admission onwards)

Time : 3 Hours Max. Marks : 75

SECTION – A

Answer any **two** sub-questions among (a), (b) and (c) from each question. Each sub-question carries **2** marks.

1. (a) What are CNTs? Give its one method of synthesis.
   (b) What are nanocomposites? Mention its applications.
   (c) What is mean by surface plasmon resonance?
2. (a) What is EDAX? How is it useful for the characterization of nanomaterials?
   (b) What are the advantages of TEM over SEM?
   (c) What is the basic principle of DLS method of analysis of nanoparticles?
3. (a) What is glass transition temperature? Mention its significance.
   (b) Differentiate number average molecular weight and weight average molecular weight.
   (c) What do you mean by tacticity? Explain with an example.
4. (a) Which are the polymers used in optical lithography?
   (b) What are photo responsive polymers? Give one example.
   (c) What are the applications of polymer catalysts?
5. (a) How will you synthesis ferrofluids?
   (b) What are shape memory polymers? Give one example.
   (c) What are the important applications of magnetocaloric materials?

(10 × 2 = 20 Marks)

P.T.O.

SECTION – B

Answer **all** questions. Each question carries **5** marks.

6. What are the applications of nanomaterials in medicine?

OR

7. Discuss the classification of nanomaterials based on their confinement.

8. Explain the basic principle and working of SEM.

OR

9. Differentiate between AFM and STM.

10. Discuss the mechanism and kinetics of cationic polymerization.

OR

11. Write short note on DSC analysis of polymers.

12. What are liquid crystalline polymers? Discuss its types and applications.

OR

13. Explain the application of polymers in drug delivery.

14. Discuss the properties and applications of pH - sensitive polymers.

OR

15. What are halochromic and thermochromic materials? Explain their applications.

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions. Each question carries **10** marks.

16. Discuss any five methods of preparations of nanoparticles with examples.

17. Write an essay on various spectroscopic techniques used for the analysis of nanomaterials.

18. What do you understand by molecular weight distribution? Explain the viscosity method of determination of molecular weight of polymers.

19. What are conducting polymers? Discuss the synthesis and applications of PANI and polythiophines

20. Write short notes on the followings :
    (a) Self-healing polymers
    (b) Photochromism in spiropyrans
    (c) Dielectric elastomers **4 + 3 + 3**

(3 × 10 = 30 Marks)
