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Reg. No. : .....

Name : .....

Fourth Semester M.Sc. Degree Examination, June 2025

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** from each questions a, b or c. Each question carries **2** marks.

1. (a) Explain sonochemical method.
   (b) What is surface plasmon resonance?
   (c) Explain the structure of Fullerenes with an example.

2. (a) Differentiate between TEM and HR-TEM.
   (b) Explain the principle behind XRF.
   (c) Define Photoluminescence.

3. (a) What is meant by tacticity of polymers?
   (b) What is free radical polymerisation, explain with example.
   (c) Discuss light scattering method for determination polymer molecular weight.

4. (a) What are liquid crystalline polymers, give examples?
   (b) Explain the advantage of polymer based LED material.
   (c) What are the polymers used in optical lithography?

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5. (a) Explain piezo electricity with examples.
   (b) What are spiropyrans and their applications?
   (c) What are shape memory polymers?

(10 × 2 = 20 Marks)

SECTION – B

Answer either (a) or (b) of each questions. Each question carries **5** marks.

6. (a) Comment on graphene and its various applications.
   (b) Describe the Sol-Gel method for the preparation of nanoparticles

7. (a) Explain the principle behind XRD and its application.
   (b) Describe Raman spectroscopy towards nano material characterisation.

8. (a) Describe cationic and anionic polymerisation.
   (b) Explain application of DSC.

9. (a) Describe synthesis and application of polyaniline.
   (b) Comment on the use of polymers used in drug delivery processes

10. (a) What are photochromic compounds, explain their applications?
    (b) What are self-healing polymers

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions, each carry **10** marks.

11. Elaborate on various methods for the synthesis of nano particles and its applications.

12. Explain various methods of polymerisation taking suitable example

13. Describe on

    (a) Quinones

    (b) Thermochromic

    (c) Magnetocaloric

    (d) Spiropyrans materials

14. Illustrate AFM and STM techniques for characterisation of nano materials.

15. Describe on various types of carbon nano tube, its properties and applications

(3 × 10 = 30 Marks)
