

Reg. No. :

Name :

Fourth Semester M.Sc. Degree Examination, September 2019

Chemistry

CH/CL/CA 241 – CHEMISTRY OF ADVANCED MATERIALS

(2016 Admission onwards)

Time : 3 Hours

Max. Marks : 75

PART – A

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

1. (a) What is meant by quantum dots?
(b) How does size change affect the optical properties of nano particles?
(c) What is surface plasmon resonance?
2. (a) What is the principle of biosensing by nanoparticles?
(b) What is photocatalysis?
(c) What is the basic principle of transmission electron microscopy?
3. (a) Define glass transition temperature.
(b) What are chain transfer agents?
(c) What is living polymerization? How does it occurs?

P.T.O.



4. (a) Give any two examples of polymeric reagents.
(b) What are photorefractive polymers?
(c) Explain the properties of polyacetylenes.
5. (a) What is a ferrofluid?
(b) What are electrochromic materials?
(c) What are shape memory polymers?

(10 × 2 = 20 Marks)

PART – B

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

6. (a) Discuss in detail Sol-gel and sonochemical methods for preparing nanoparticles.
(b) Explain in detail with examples the nano materials of different sizes and shapes.
7. (a) Discuss the basic principle and applications of atomic force microscopy in analysis of nanomaterials.
(b) Explain briefly the functionalisation and reactivity of carbon nanotubes.
8. (a) Compare and Explain the steps involved in cationic and anionic polymerization reactions.
(b) Discuss the DSC method for determination of glass transition temperature.
9. (a) Explain the synthesis of poly anilines and poly pyrroles.
(b) Write notes on liquid crystalline polymers.



10. (a) Write a note on the chemistry behind the photochromism in quinones and azobenzenes.

(b) Discuss in detail the polymorphism in polycaprolactone.

(5 × 5 = 25 Marks)

PART – C

Answer **any three** questions and each question carries **10** marks.

11. Compare the quantum confinement and resulting structures like quantum dots and quantum wells and their physical significance.

12. Discuss the applications of UV-Visible and IR spectroscopy in the analysis of nanomaterials.

13. Explain the determination of molecular weights by gel permeation chromatography and light scattering methods.

14. Discuss and compare (a) bulk (b) solution (c) melt (d) melt polymerisation technique. (4 × 2½ = 10 Marks)

15. Write notes on the following.

(a) Temperature responsive polymers.

(b) pH sensitive polymers.

(c) Self-healing polymers.

(d) Dielectric elastomers.

(4 × 2½ = 10 Marks)

