



Reg. No. : .....

Name : .....

**Fourth Semester M.Sc. Degree Examination, July 2018**  
**Branch : Chemistry**  
**CH/CL/CA 241 : CHEMISTRY OF ADVANCED MATERIALS**  
**(2016 Admission)**

Time : 3 Hours

Max. Marks : 75

SECTION – A

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

1. a) Describe about different stabilisation methods adopted in colloidal synthesis.  
b) Explain the vapour deposition method for the synthesis of nanomaterial.  
c) Explain the synthesis of metal nanoparticle with an example.
2. a) Explain the working principle of photocatalysis.  
b) Describe about electron source used in scanning electron microscopy.  
c) How particle size is determined by X-ray diffraction analysis ?
3. a) How X-ray diffraction data can be used to estimate the sizes of polymer crystallites ? Explain.  
b) Define the term number average molecular weight.  
c) Explain the term tacticity.
4. a) Explain negative and positive photoresists in lithography with examples.  
b) Write an example for polymer reagent used in organic synthesis.  
c) Discuss the term heterochain polymer.
5. a) What are piezoelectric materials ? Explain with an example.  
b) Explain the polymorphism in polycaprolactone.  
c) What is meant by pseudoelasticity ?

(2×10=20 Marks)



## SECTION – B

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

6. a) Describe the theory of Surface Plasmon Resonance and its applications.  
b) Explain about the electronic property of 0D, 1D, 2D and 3D materials.
7. a) Describe about application of IR spectroscopy in nanomaterial analysis.  
b) Explain the principle and applications of Atomic Force Microscopy (AFM).
8. a) Unlike free radical polymerization, both cationic and anionic polymerizations show a marked dependence on the type of solvent used. Discuss the causes and nature of these effects.  
b) Explain the kinetics and mechanism of free radical polymerisation.
9. a) Discuss the structure and working principle of lithium polymer batteries.  
b) Explain the structure and applications of liquid crystal polymers.
10. a) Discuss the chemistry behind the photochromism in spiropyrans.  
b) Write short note on synthesis and application of ferrofluid. **(5×5=25 Marks)**

## SECTION – C

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

11. Explain application and role of metal nanoparticles in catalysis with examples.
  12. Describe about synthesis, properties and applications of  $C_{60}$ .
  13. Elaborate different methods to determine the molecular weight of a polymer.
  14. Explain the synthesis and applications of following conducting polymers
    - a) poly acetylenes
    - b) poly anilines and
    - c) polythiophenes.
  15. Describe with proper examples :
    - a) Shape memory polymers
    - b) pH sensitive polymers.
    - c) Temperature responsive polymers. **(10×3=30 Marks)**
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