Reg. No. | | | | | | | | | |

ICS 504

III Semester M.Sc. Degree Examination, April/May 2022
INDUSTRIAL CHEMISTRY
Polymers and Soft Materials

Time : 3 Hours

Max. Marks : 70

Instructions : *1) Answer **any five** questions from Part – **A** and **any five** questions from Part – **B**.*
*2) Figures to the **right** indicate marks.*

PART – A

Answer **any five** questions. **(5x2=10)**

1. a) What are thermoplastics ? Give one example and its application.

   b) Define polydispersity. What is its significance ?

   c) State the principle of reverse osmosis.

   d) Give an example and an application of a biodegradable polymer.

   e) Mention any two applications of liquid crystals.

   f) State the parameters that are used to describe the liquid crystals.

   g) Explain the principle of MOCVD technique of thin film preparation.

   h) Give any two properties and applications of thin films.

PART – B

Answer **any five full** questions. **(5x12=60)**

2. a) Discuss in detail the different ways of classifying polymers.

   b) Define and explain the terms number average, weight average and viscosity average molecular weight of polymers. **(6+6)**

P.T.O.

3. a) What are elastomeric materials ? Describe in detail the structural features which impart elastic nature to these materials.
   b) Explain the importance of additives in improving polymer properties.
   c) Write a note on dry melt spinning. **(6+3+3)**

4. a) Discuss the application of polymers in
      i) Nano filtration
      ii) Electrodialysis.
   b) Explain the medical application of polymers in targeted drug delivery systems. **(6+6)**

5. a) Describe the preparation and uses of polymer blend and composites.
   b) What are nano composites ? Explain any one synthetic route of nano composites.
   c) Write a note on application of polymers in food industry. **(6+3+3)**

6. a) Explain nematic, smectic and cholesteric phases of liquid crystals.
   b) Discuss in detail the optical properties of liquid crystals. **(6+6)**

7. a) Write a note on :
      i) Lyotropic liquid crystals.
      ii) LED materials.
   b) What are NLO materials ? What are the essential conditions for an organic molecule to exhibit NLO properties ?
   c) Explain briefly the theoretical treatment of liquid crystals. **(6+3+3)**

8. a) What are Langmuir-Blodgett films ? Explain the principle and procedure for their preparations. Mention the applications of these films.
   b) Explain :
      i) sol-gel method of preparation of thin films.
      ii) Photolithography. **(6+6)**

9. a) What are fullerenes ? How are they prepared ? Explain the superconductivity of doped fullerenes.
   b) Write a note on :
      i) Organic superconductors
      ii) Magnetism in organic materials. **(6+6)**