2024

M.Sc.

Fourth Semester

DISCIPLINE SPECIFIC ELECTIVE – 03

CHEMISTRY

Course Code: MCHD 4.11(A)

(Applied Inorganic Chemistry)

Total Mark: 70 *Pass Mark: 28*

Time: 3 hours

Answer five *questions, taking* one *from each unit.*

UNIT–I

1. (a) Briefly discuss the mechanical properties of inorganic polymers citing the curves for typical polymeric materials. 4
   (b) Explain the characterization of inorganic polymers with respect to other structural features. 4
   (c) Write short notes on the following: 3×2=6
      (i) Inorganic condensation polymers
      (ii) Weight-average molecular weight

2. (a) Differentiate between organic and inorganic polymers. 4
   (b) Explain the characterization of inorganic polymers with respect to spectroscopy. 4
   (c) Write short notes on the following: 3×2=6
      (i) Number-average molecular weight
      (ii) Inorganic addition polymers

UNIT–II

3. (a) Draw the structure of star, cyclolinear, cyclomatrix and comb polyphosphazenes. 1½×4=6
   (b) What is ring-opening polymerization? Explain the mechanism of it. 1+3=4
   (c) What are the experimental observations in ROP? 4

4. (a) Discuss three preparations of single substituted polyphosphazenes. 2×3=6
   (b) Explain the mechanism of condensation polymerization. 5
   (c) Discuss two surface reactions of polyphosphazenes. 3

UNIT–III

5. (a) Write short notes on nanomaterials and nanotechnology. 3
   (b) Discuss the synthesis of Pd nanoparticles by dendrimer attached method. 5
   (c) What is lithography? Write notes on either maskless or directed self-assembly lithography. 1+5=6

6. (a) Discuss the applications of nanoparticles in the next generation computer chips. 3
   (b) Explain the synthesis of silver nanoparticles by photochemical method. 5
   (c) Discuss the chemical vapour deposition (CVD) for thin film growth. 6

UNIT–IV

7. (a) Give the difference between nuclear fission and nuclear fusion. 4
   (b) Explain the cause of radioactivity. 4
   (c) Write short notes on the following: 3×2=6
      (i) Transmutation of elements
      (ii) Isotope dilution technique

8. (a) Discuss the detection and measurement of radioactivity by G.M. counter method. 4
   (b) Give the application of radioisotopes as tracers in chemical analysis. 4
   (c) Write short notes on the following: 3×2=6
      (i) Radiometric titration
      (ii) Half-life period

UNIT–V

9. (a) What are phosphate fertilizers? How are they classified? 2+4=6

(b) Write short notes on the following: 3×2=6
   (i) Green manure
   (ii) Farmyard manure
(c) What is CAN? 2

10. (a) What are pesticides? Explain its ill effects. 1+3=4
(b) Explain soil acidity and alkalinity. 3+3=6
(c) Write a short note on soil minerals. 4