

**2023**  
**M.Sc.**  
**Fourth Semester**  
DISCIPLINE SPECIFIC ELECTIVE – 03  
**CHEMISTRY**  
*Course Code: MCHD 4.11 (A)*  
(Applied Inorganic Chemistry)

*Total Mark: 70*  
*Time: 3 hours*

*Pass Mark: 28*

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

**UNIT-I**

1. (a) Explain in different mechanical properties with diagram of an efficient polymer. 6
- (b) What is the importance of molecular weights in an inorganic polymer? Explain the types of molecular weight. 2+2=4
- (c) Write short note on the following: 2×2=4
  - (i) Chain statistics
  - (ii) Crystallinity
  
2. (a) What are inorganic polymers? Write down the types of inorganic polymers with an example of each. 1+4=5
- (b) Discuss the molecular weight distribution in a polymer. 4
- (c) Write short notes on the following: 2½×2=5
  - (i) Structural features on inorganic polymers
  - (ii) Solubility consideration in inorganic polymers

**UNIT-II**

3. (a) What are small-molecule models? Give one preparation of it. 2+3=5
- (b) Discuss block copolymers taking three examples. 6
- (c) Write short note on hybrid systems through composition. 3
  
4. (a) How would you prepare cross-link inorganic rubber? Give the reaction involved. 4

- (b) What are organometallic polyphosphazenes? Give two examples. 2+2=4
- (c) Explain polyphosphazenes with metal-phosphorus bonds. Give one preparation of it. 4+2=6

### UNIT-III

5. (a) What is Moore's law? 1
- (b) Give a clear explanation about the synthesis of semiconductors, nanowires and nanorods, showing how redox reactions occur in MO's by electroplating method. 7
- (c) Discuss the applications of nanoparticles in advanced drug delivery. 6
6. (a) Discuss the emergence of nanotechnology. 4
- (b) Write short note on any one of the following: 5
- (i) Carbon fullerenes
- (ii) Carbon nanotubes
- (c) Discuss the synthesis of gold nanoparticles. 5

### UNIT-IV

7. (a) Discuss the group displacement law with an example. 4
- (b) Write short notes on the following: 3×2=6
- (i) Radiation sterilization
- (ii) Hot atom chemistry
- (c) Describe the principle of nuclear reactor. 4
8. (a) Define radioactivity. Write the difference between ordinary chemical reactions and nuclear reactions. 1+3=4
- (b) Write short notes on the following: 3×2=6
- (i) Radioimmunoassay
- (ii) Pharmaceutical importance of sterilization
- (c) What do you mean by nuclear binding energy? Calculate the B.E per nucleon of oxygen atom  ${}^8\text{O}^{16}$ , which has a mass of 15.994910 a.m.u. 1+3=4

## UNIT-V

9. (a) Explain the genetic classification of soil. 4  
(b) Write short notes on the following:  $2\frac{1}{2}\times 2=5$   
(i) Soil temperature  
(ii) Soil texture  
(c) What are stomach poisons? Discuss its effects.  $1+4=5$
10. (a) What are mixed fertilizers? 2  
(b) Write short notes on the following:  $2\frac{1}{2}\times 2=5$   
(i) Saw dust  
(ii) Soil pH  
(c) Mention some organophosphorus insecticides along with structures. 5  
(d) Define herbicides. Give one example. 2
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