

**M. SC. (CHEMISTRY) (MSCCHEM)**

**Term-End Examination**

**December, 2025**

**MCH-021 : CHEMISTRY OF POLYMERS AND  
MATERIALS**

*Time : 2 Hours*

*Maximum Marks : 50*

---

**Note :** Attempt any *five* questions. All questions carry equal marks.

---

---

1. (a) (i) How can you classify polymers according to their structure ? Illustrate their different types. 3
- (ii) Write the expressions for the number average and weight average molar masses. 2
- (b) Illustrate the steps involved in cationic polymerisation, giving a suitable example. 5

2. (a) (i) What are conducting polymers ?  
Give their *two* examples. 2
- (ii) Why is doping important ? Briefly  
explain *two* types of doping. 3
- (b) (i) Name any *four* physical stimuli  
which can affect the response of  
stimuli responsive polymers. 2
- (ii) Explain how pH sensitive smart  
polymers can be used in the  
delivery of therapeutic agents. 3
3. (a) What are biodegradable materials ?  
Why should their use be encouraged ? 5
- (b) Briefly explain physical hydrogels and  
chemical hydrogels along with their  
suitable applications. 5
4. (a) (i) List any *four* important properties  
of materials suitable for making  
contact lens. 2

- (ii) What are the *two* types of contact lenses ? Give the materials from which they are made up of. 3
- (b) What are shape memory polymers ? Name their *four* types. 5
5. (a) Briefly explain the characteristics of liquid crystals. 5
- (b) What are side chain liquid crystals ? Give the structures of *two* types of side chain liquid crystal polymers. Briefly explain *two* methods of their preparation. 5
6. (a) (i) What are surfactants ? Give their characteristic amphiphilic nature. 2
- (ii) What are non-ionic surfactants ? Give their *two* examples with their structures. 3

- (b) Briefly discuss about glass transition temperature giving a suitable diagram. What is its significance in glass processing ? 5
7. (a) What are nanomaterials and why are they important ? 5
- (b) What are the common methods for thin film deposition ? 5

x x x x x