

No. of Printed Pages : 5

**MCH-021**

**MASTER OF SCIENCE**

**(CHEMISTRY)**

**(MSCCHEM)**

**Term-End Examination**

**June, 2026**

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

*Time : 2 Hours*

*Maximum Marks : 50*

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**Note :** (i) *Attempt any **five** questions.*

(ii) *All questions carry equal marks.*

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1. (a) (i) What is a Copolymer ? Give *one* example. Illustrate different types of copolymers. 4

- (ii) Write Mark-Houwink equation. 1
- (b) Write the steps involved in the radical polymerization of ethane. 5
2. (a) Discuss the salient features of band theory used for explaining the mechanism of conduction in conducting polymers. 5
- (b) (i) Give *two* examples each for natural and synthetic pH responsive polymers. 2
- (ii) Draw the shapes/structures of various types of pH responsive polymers classified according to their structure. 3

3. (a) Explain the need of polymer degradation. Name any *four* factors which cause polymer degradation. 5
- (b) (i) Give any *two* advantages of using natural polymers as hydrogels. 2
- (ii) Name any *two* natural and any *two* synthetic polymers which can be used for hydrogel formation. 3
4. (a) (i) For which purpose, the acrylates and silicon polymers are used in dental polymers ? 2
- (ii) Name any *two* substances suitable for preparing membranes used for dialysis. 3
- (b) (i) List the steps involved in the one-way shape memory cycle. 3
- (ii) Which type of stimuli can be used for causing shape memory effect ? 2

5. (a) (i) What are different classes of liquid crystals ? Briefly explain. 3
- (ii) Draw the shapes of calamitic and discotic liquid crystals. Also give one example of each of them. 2
- (b) Name various types of textures observed in liquid crystals. 5
6. (a) What are anionic surfactants ? Which anionic groups could be present in their chain ? Give any *two* examples of anionic surfactants along with their structures. 5
- (b) Discuss about the importance of glass formers in manufacturing glass. What are their various types ? Give examples of any *two* types of each of the glass formers. 5

7. (a) Give a brief account of the applications of nanomaterials in medicine. 5
- (b) Give the details of MOCVD technique to produce thin films. Is it a physical method or a chemical method ? 5

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