MCH-021

ASSIGNMENTBOOKLET

M.Sc. in Chemistry Programme
(MSCCHEM)

CHEMISTRY OF POLYMERS AND MATERIALS

(Valid from January, 2025 to December, 2025)

It is compulsory to submit the assignment before filling in the examination form.

School of Sciences
Indira Gandhi National Open University
Maidan Garhi, NewDelhi – 110068
(2025)

Dear Learner,

Please read the Section on assignments in the Programme Guide for M.Sc. in Chemistry/M.Sc.in Analytical Chemistry that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, which would consist of one tutor-marked assignment for this course. The assignment is in this booklet, and covers all the four blocks of the course. The total marks of all the parts are 100, of which 40% are needed to pass it.

Instructions for Formatting Your Assignments

Before attempting the assignment, please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLMENT NO.: ……...

NAME **:**……

ADDRESS **:**……...

……

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COURSE CODE **:**…….

COURSE TITLE **:**……..

ASSIGNMENT NO. : ……...

STUDY CENTRE : ……..… **DATE:……...**

(NAME AND CODE)

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

2) Use only foolscap size paper (but not of very thin variety) for writing your answers.
3) Leave about 4cm margin on the left, top and bottom of your assignment response sheet.
4) Your answers should be precise.
5) Submit the complete assignment answer sheets within the due date.
6) The assignment answer sheets are to be submitted to your Study centre within the due date. Answer sheets received after the due date shall not be accepted.

   We strongly suggest that you retain a copy of your solved assignment.
7) This assignment is valid from **1st January, 2025 to 31st December, 2025**. If you have failed in this assignment or fail to submit it by **31st December, 2025**, then you need to get the assignment for the year **2026**, and submit it as per the instructions given in the Programme Guide.
8) **You cannot fill the examination form for this course until you have submitted the assignment.**

Wishing you good luck

Tutor Marked Assignment
Chemistry of Polymers and Materials

Course Code: MCH-021
Assignment Code: MCH-021/TMA/2025
Maximum Marks: 100

Note: Attempt all the questions. The marks for each question are indicated against it.

1. (a) What are pendant groups? Give one example. (2)

   (b) Illustrate different arrangements of polymers according to their tacticity. (3)

2. (a) Give one example each for an addition and a condensation polymer. (2)

   (b) Which type of initiators can be used to initiate anionic polymersation? Give any two examples. (3)

3. In the kinetics of uncatalysed step growth polymerisation, arrive at the following expression: (5)

$$2kt\left[\mathrm{A}_o\right]^2 + 1 = \frac{1}{(1-p)^2}$$

4. Discuss the free electron molecular orbital model of conduction in conducting polymers. (5)

5. (a) What features are required in a conducting polymer? (3)

   (b) Name any two polycarboxylic acids which can behave as pH-responsive polymers. (2)

6. Discuss how pH-sensitive smart polymers can be used in glucose sensors. (5)

7. Discuss the mechanism of biological degradation of polymers by microorganisms. (5)

8. (a) Give the products formed by aerobic and anaerobic biodegradation of biodegradable polymers. (2)

   (b) Name four types of hydrogels based on four their composition. (2)

   (c) What is artificial kidney? (1)

9. For cross linking by free radical polymerisation in hydrogels, name any two initiators, a cross linking agent and any two monomers. (5)

10. (a) List any four characteristics of artificial blood. (4)

    (b) What is PBT? Give its use. (1)

11. What are liquid crystals? Give the structural requirements of liquid crystals. (5)

12. (i) Draw comparative arrangement of molecules in solids, liquids and liquid crystals. (3)

    (ii) What is hydrophobic-lipophilic balance? Briefly explain. (2)

13.	What are main chain liquid crystal polymers? Explain with the help of suitable examples.	(5)
14.	(i) Give the applications of LCPs in electronics. (ii) What are micelles? Briefly explain using a diagram.	(2+3)
15.	What is CMC? List the factors affecting it.	(5)
16.	Give the important applications of glass. What are the various oxides which plays an important role in firing of traditional ceramics?	(5)
17.	Give the classification of composites. Explain any one of the physical methods of preparation of nanomaterials.	(3+2)
18.	Explain the magnetic properties of nanomaterials.	(5)
19.	Explain briefly the common methods for thin film deposition.	(5)
20.	What is the difference between Langmuir-Schaefer (LS) and Langmuir-Blodgett (LB) films?	(5)