MCH-016

ASSIGNMENT BOOKLET

M.Sc. in Chemistry Programme
(MSCCHEM)

INORGANIC CHEMISTRY 2

Valid from 1st January, 2025 to 31st December, 2025

It is Compulsory to submit the Assignment before filling in the Term-End Examination Form.

School of Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
(2025)

Dear Student,

Please read the Section on assignments in the Programme Guide for M.Sc. in 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:** ……..……...

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

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) Solve Part (A) and Part (B) of this assignment, and **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 answer sheets.

7) This assignment is **valid from 1st Januaryy, 2024 to 31st December, 2025**. If you have failed in this assignment or fail to submit it by December, 2025, then you need to get the assignment valid from 1st January 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 this assignment.

We wish you good luck.

Tutor Marked Assignment

MCH-016: INORGANIC CHEMISTRY 2

Course Code: MCH-016
Assignment Code: MCH-011/TMA/2025
Maximum Marks: 100

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

1.	a)	Give the classification of substitution mechanisms for octahedral complexes.	(5)
	b)	Explain the mechanism of substitution reactions in trigonal bipyramidal complexes.	(5)
2.	a)	With a suitable example suggest the order of the reactions of base-catalyzed hydrolyses and predict the mechanism that is followed in them.	(5)
	b)	Explain with suitable figures the Bailar twist mechanism followed in intramolecular racemization reactions.	(5)
3.	a)	Explain the dissociation mechanism and stereochemical changes for *trans* - $[M(LL)_2BX]$ with the help of suitable diagrams.	(5)
	b)	Give suitable examples for *trans*-effect in octahedral complexes where CO and substituted phosphines are used as ligands.	(5)
4.	a)	With the help of suitable diagrams explain the rearrangement of the *cis* Λ enantiomer by the bond rupture mechanism involving a trigonal bipyramidal intermediate.	(5)
	b)	What are the salient features of an outer-sphere electron transfer mechanism?	(5)
5.	a)	Give the elementary steps and rate expression for the inner sphere mechanism which involves formation of a precursor complex.	(5)
	b)	What are the ways by which the outer sphere electron transfer reaction is utilized to synthesize coordination compounds?	(5)
6.	a)	What is there in the 5^{th} position of deoxyhemoglobin? Explain with a suitable diagram. Give the relevant equations for the equilibrium constant regarding the oxygen binding by myoglobin.	(5)
	b)	With suitable figures explain the arrangement of the subunits of the apoferretin shell.	(5)
7.	a)	What is cytochrome c Oxidase? Also explain the role of cytochrome P450 in drug metabolism.	(5)
	b)	Write a short note on rubredoxins.	(5)
8.	a)	With suitable figures give the differences in the chemical structures of chlorophyll a and chlorophyll b,	(5)
	b)	Explain “in vivo” and “in vitro” nitrogen fixation.	(5)
9.	a)	With suitable diagrams explain which is the active Zn^{2+} site of carboxypeptidase A.	(5)
	b)	Explain the transformation of xanthine to uric acid by xanthine oxidase	(5)

10.	a)	What is the role of metal ion in protein-RNA interaction?	(5)
	b)	Give a brief account on the toxic effects of metals.	(5)