

BCHCT-137

ASSIGNMENT BOOKLET

**Bachelor's Degree Programme
(BSCG)**

**COORDINATION CHEMISTRY, STATES OF MATTER &
CHEMICAL KINETICS**

Valid from 1st January, 2022 to 31st December, 2022



**School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(2022)**

Dear Student,

Please read the section on assignments in the Programme Guide for B. Sc. 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 it consists of two parts, Part A and B. It covers all blocks of the course. The total marks of all the parts are 100, of which 35% 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:

ROLL NO.:

NAME:

ADDRESS:

.....

.....

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 January, 2022 to 31st December, 2022.** If you have failed in this assignment or fail to submit it by December, 2022, then you need to get the assignment for the year 2023, 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.

ASSIGNMENT

COORDINATION CHEMISTRY, STATES OF MATTER & CHEMICAL KINETICS

Course Code: BCHCT-137
Assignment Code: BCHCT-137/TMA/2022
Maximum Marks: 100

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

PART A: COORDINATION CHEMISTRY

1	What is the general electronic configuration of elements of the second transition series? Which <i>d</i> -orbitals are filled up here?	(5)
2	Give two examples of alloys alongwith their compositions and uses.	(5)
3	Give the general pattern of the paramagnetic moments of lanthanoid ions with the help of a graph.	(5)
4	What are ambidentate ligands?	(5)
5	Give the rules of IUPAC nomenclature for naming complexes (give any five points).	(5)
6	Explain ligand isomerism with suitable example.	(5)
7	Explain the structure of $[\text{CoF}_6]^{3-}$ with the help of valence bond theory.	(5)
8	Predict the geometry of the $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ complex showing their hybridized orbitals.	(5)
9	Diagrammatically explain the crystal field splitting in octahedral complexes.	(5)
10	Give the pattern crystal field splitting energies for d^0 to d^{10} high spin ions.	(5)
PART B: STATES OF MATTER & CHEMICAL KINETICS		
11	Calculate the i) average speed ii) root mean square speed and iii) most probable speed of oxygen molecules at 515 K. (Given $M_m(\text{O}_2) = 0.016 \text{ kg mol}^{-1}$)	(5)
12	a) State the Dalton's law of partial pressure and give its significance. b) Define critical constants and give their expressions in terms of van der Waals constants.	(2) (3)
13	Explain the pressure and volume correction terms to the ideal gas equation, and deduce van der Waals equation.	(5)
14	a) Differentiate between the average and instantaneous rates of a reaction. b) How is order of reaction determined by half-life method? Explain with the help of an example.	(2) (3)
15	The decomposition of hydrogen iodide on gold was studied at 323 K with an initial concentration of HI to be 0.500 M. The reaction followed zero order kinetics with a rate constant of be $1.20 \times 10^{-4} \text{ M s}^{-1}$. Calculate the i) half-life of the reaction and ii) the time required for the concentration of HI to reduce to 0.10 M.	(5)
16	The decomposition of acetaldehyde in gas-phase was studied at 791 K, using the initial concentrations of $7.77 \times 10^{-3} \text{ M}$ and $3.64 \times 10^{-3} \text{ M}$. The half-life periods were determined to be 295 s and 515 s respectively. Determine the order of the reaction.	(5)
17	Explain hydrogen bonding with suitable examples.	(5)
18	Explain the seven primitive unit cells in crystals.	(5)
19	What are Bravais lattices? Give the diagrams of any one type.	(5)
20	Explain the packing efficiency.	(5)

