BCHCT-137

ASSIGNMENT BOOKLET

Bachelor's Degree Programme
(BSCG)

COORDINATION CHEMISTRY, STATES OF MATTER & CHEMICAL KINETICS

Valid from 1st January, 2021 to 31st December, 2021

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(2021)

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: ……

……

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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 January, 2021 to 31st December, 2021**. If you have failed in this assignment or fail to submit it by December, 2021, then you need to get the assignment for the year 2022, 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/2021
Maximum Marks: 100

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

PART A: COORDINATION CHEMISTRY

1. a) Find the electronic configuration of Mo. (2)

   b) For transition elements, why does the ionization enthalpy tend to increase along the series only slightly as compared to the main group elements? (3)

2. What do you mean by electrode potential and how the trends of the electrode potentials vary across the first series of the transition metals ? (5)

3. Explain why $NiSO_4$ is green while $ZnSO_4$ is white. (5)

4. Gd^{3+} has seven unpaired electrons, find its spin only magnetic moment. (5)

5. What is the reason of the lanthanoid contraction. (5)

6. Explain with a suitable example the kappa convention for naming coordination compounds. (5)

7. Explain linkage isomerism with suitable example. (5)

8. Predict the geometry of the $[CoCl_4]^2$ complex showing their hybridized orbitals. (5)

9. Calculate the CFSE of an octahedral complex with four electrons in the *d* orbitals for both weak field and strong field. (5)

10. Give the possible electronic configurations for d^5 system in tetrahedral crystal field. (5)

PART B: STATES OF MATTER & CHEMICAL KINETICS

11. State the assumptions of kinetic theory of gases and derive the following expression for the pressure of a gas. (5)

$$p = \frac{mN\bar{u}^2}{3V}$$

12. Write the equation of the corresponding states and explain the meaning of the terms involved in it. (5)

13. What is the principle of liquefaction of gases? Describe any one method used for the liquefaction of gases. (5)

14. What is meant by rate of a reaction? List and explain different types of rates used in chemical kinetics. (5)

15. List and explain different factors affecting rate of a chemical reaction. (5)

16. For the reaction, $Cl_2(g)+2NO(g) \longrightarrow 2NOCl(g)$, the initial concentrations, $[Cl_2]_0$ and $[NO]_0$ are given below along the corresponding with initial rates. (5)

$[Cl_2]_0$/M	$[NO]_0$/M	Initial rate/Ms^{-1}
0.10	0.10	3.0×10^{-3}
0.20	0.10	6.0×10^{-3}
0.20	0.20	2.4×10^{-2}

Determine (i) the order of the reaction with respect to NO and Cl_2; (ii) the rate law; and (iii) the rate constant.

17. Explain the terms lattice and basis used in crystal system. (5)

18. Describe body-centred cubic crystals with a suitable diagram. (5)

19. Give the classification of stoichiometric defects in solids. (5)

20. For a liquid what is, meant by its coefficient of viscosity? (5)