

ASSIGNMENT BOOKLET**Inorganic Chemistry****Bachelor's Degree Programme (B.Sc.)****INORGANIC CHEMISTRY****(Valid from 1st January, 2013 to 31st December, 2013)****Insert box here****Please Note**

- You can take electives (56 to 64 credits) from a minimum of TWO and a maximum of FOUR science disciplines, viz. Physics, Chemistry, Life Sciences and Mathematics.
- You can opt for elective courses worth a MINIMUM OF 8 CREDITS and a MAXIMUM OF 48 CREDITS from any of these four disciplines.
- At least 25% of the total credits that you register for in the elective courses from Life Sciences, Chemistry and Physics disciplines must be from the laboratory courses. For example, if you opt for a total of 64 credits of electives in these 3 disciplines, at least 16 credits should be from lab courses.
- You cannot appear in the Term-End Examination of any course without registering for the course. Otherwise, your result will not be declared and the onus will be on you.



**School of Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
2013**

Dear Student,

We hope, you are familiar with the system of evaluation to be followed for the Bachelor's Degree Programme. At this stage you may probably like to re-read the section on assignments in the Programme Guide that we sent you after your enrolment. A weightage of 30 percent, as you are aware, has been earmarked for continuous evaluation, which would consist of one tutor-marked assignment. The assignment is based on Blocks 1, 2, 3 and 4.

Instructions for Formatting Your Assignments

Before attempting the assignments, 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:.....

.....

.....

COURSE CODE :

COURSE TITLE :

ASSIGNMENT NO.:

STUDY CENTRE :
(NAME AND CODE)

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 While writing answers, clearly indicate the Question No. and part of the question being solved.
- 6 Please note that:
 - i) The Assignment is valid from 1st January, 2013 to 31st December, 2013.
 - ii) The response to this assignment is to be submitted to the Study Centre Coordinator within 12 weeks of the receipt of this booklet in order to get the feedback and comments on the evaluated assignment.
 - iii) In any case, you have to submit the assignment response before appearing in the term end examination.
- 7 **We strongly suggest that you should retain a copy of your assignment responses.**

Wishing you all good luck.

Tutor Marked Assignment
Inorganic Chemistry
An Elective Course in Chemistry

Course Code: CHE-02
Assignment Code: CHE-02/TMA/2013
Maximum Marks: 100

- Note:** *
- * This assignment is based on all the four Blocks of the entire course.
 - * All questions are compulsory. Marks for the questions are shown against them within brackets.
 - * Please answer in your **own words**; do not copy from the course material.
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- Q.1 a) Explain why all the periods of the periodic table did not comprise the same number of elements. (5)
- b) Explain the difference between electron affinity and electronegativity. Discuss the variation in electron affinity down the groups in the periodic table. (5)
- Q.2 a) What are hydrides? How are they classified? Give their important uses. (5)
- b) Discuss the variation in thermal stability of salts of alkali metals. (5)
- Q.3 a) Explain the solubility behaviour of alkaline earth metal salts in water. (5)
- b) Why is electrolysis of purified alumina in fused cryolite done for extraction of aluminium? (5)
- Q.4 a) What is the reason for the banana shape of the 3-centre-2-electron bonds between the bridging H atom and the B atoms in diborane ? (3)
- b) How is BF_3 best prepared in the laboratory ? (3)
- c) What is the difference in structure between grey tin (α tin) and white tin (β tin) ? Also show how the two forms are interconverted? (2+2=4)
- Q.5 a) The carbon monoxide molecule is expected to show a large dipole moment but actually it shows a small dipole moment of 0.112D. Explain with the help of its valence bond structure? (5)
- b) Which compound of nitrogen is used as a rocket fuel and what is the chemical property of it which is utilized for this purpose? (1+2=3)
- c) Which compound of nitrogen is isoelectronic with carbon dioxide ? Explain with the help of the Lewis structures whether they will also have similar dipole moments. (2)
- Q.6 a) Give one reaction each indicating the use of sulphuric acid as
- i) an acid
 - ii) a sulphonating agent
 - iii) an oxidizing agent
 - iv) a dehydrating agent (4)
- b) Explain the role of hypo in photography and quantitative analysis. (3)
- c) Arrange the hydrides of Group 16 elements in the decreasing order of their reducing power and give reasons for your answer. (3)

- Q.7 a) How will you account for the fact that fluorine, which has a higher electronegativity and a lower electron affinity than those of chlorine, is a stronger oxidizing agent than chlorine? (3)
- b) How did Bartlett interpret the reactions between Xe and PtF_6 ? (3)
- c) What do you understand by three centre four electron bond? How does this idea help in explaining the structure of XeF_2 ? (4)
- Q.8 a) Explain the hybridization and bond angle in OF_2 and give a reason for why it is different in Cl_2O ? (5)
- b) What is exchange energy? Explain why does Cr have $[\text{Ar}] 3d^5 4s^1$ configuration. (5)
- Q.9 a) What are lanthanide elements? Why is the separation of lanthanide elements difficult? List the methods of separation of lanthanide elements. (5)
- b) List the weaknesses of the Valence Bond theory of coordination compounds. (5)
- Q.10 a) The Complex ion $[\text{NiCl}_4]^{2-}$ contains two unpaired electrons. Propose the structure of this ion on the basis of Crystal Field theory. (5)
- b) List the criteria of selection of a good reducing agent for extraction of metals. (3)
- c) What kind of metals cannot be obtained by reduction of their oxides with carbon? (2)