

# ASSIGNMENT BOOKLET

CHE-02

## Inorganic Chemistry

Bachelor's Degree Programme (B.Sc.)

### INORGANIC CHEMISTRY

(Valid from July 1, 2011 to March 31, 2012)

It is compulsory to submit the assignment before filling in the exam form

#### 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 and unless you have submitted the assignment of 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  
(For July, 2011 cycle)

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:

---

DATE: .....

ENROLMENT NO:.....

NAME:.....

ADDRESS:.....  
.....

COURSE CODE : .....

COURSE TITLE : .....

ASSIGNMENT NO.: .....

STUDY CENTRE : .....

(NAME AND CODE)

---

**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) Last date for submission of Assignment is March 31, 2012.
  - ii) The response to this assignment is to be submitted to the Study Centre Coordinator within eight 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

Course Code: CHE-02  
Assignment Code; CHE-02/TMA/2011-12  
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 within brackets on the right hand side.
  - \* Please answer in your **own words**; do not copy from the course material.
- 

- Q.1 a) Give the IUPAC nomenclature rules for naming new elements. Write the IUPAC name of element having  $Z=110$ . (3)
- b) What is the difference between ionization energy and electron affinity? Explain the variation in ionization energy and the electron affinity in the periodic table. (5)
- c) Explain the difference between covalent radius and ionic radius. (2)
- Q.2 a) What is the difference between intermolecular and intramolecular hydrogen bonding? Give one example of each. (4)
- b) What are the different isotopes of hydrogen? Give their characteristic properties. (3)
- c) Explain the anomalous behaviour of lithium. (3)
- Q.3 a) Explain the variation in thermal stability of carbonates of Group 1 elements. (3)
- b) Write short notes on "complexation behaviour" of alkaline earth metals. (3)
- c) Why are the borohydrides more stable than the boranes? (2)
- d) The extent of  $\pi$  bonding in boron halides decreases from  $\text{BF}_3$  to  $\text{BI}_3$ , explain. (2)
- Q.4 a) What are the components of storage batteries? (3)
- b) Explain the type of bonding which exists between N and Si in trisilylamine? (3)
- c) What are zeolites? (2)
- d) Give the order of the reactivity of the various allotropic forms of phosphorus towards other substances. (2)
- Q.5 a) Why is phosphine, unlike ammonia, much less soluble in water? (2)
- b) Which compound is known as laughing gas and how is it prepared and utilized by dentists? (3)
- c) Give reactions to show how nitrous acid can oxidise iodides to iodine. (2)
- d) What is superphosphate of lime and why is it named so? What is its use? (3)

- Q.6 a) Explain why?
- i) Oxygen normally exists as diatomic molecules whereas sulphur normally exists as  $S_8$  molecules. (2)
  - ii) Oxygen does not form a hexafluoride analogous to  $SF_6$ . (2)
  - iii) Why a number of oxides and fluorides are known for xenon but similar compounds are not formed by neon? (2)
- b) "Sulphuric acid is one of the most versatile reagents used in the laboratory". Justify this statement by giving reactions which illustrate its behaviour as,
- i) an acid
  - ii) a sulphonating agent
  - iii) an oxidising agent
  - iv) a dehydrating agent (4)
- Q.7 Explain the following.
- a) The bond dissociation energy of fluorine is low contrary to the general trend found in halogens. (2)
  - b) Iodine is a solid whereas chlorine is a gas. (2)
  - c) Fluorine is the strongest oxidizing agent despite the electron affinity of chlorine being the highest. (2)
  - d) Hydrofluoric acid is the weakest of all hydrohalic acids. (2)
  - e) Chloric acid,  $HOCIO_2$  is stronger than chlorous acid,  $HOCIO$ . (2)
- Q.8 a) "The Group 18 elements are rare and inert because of stable electronic configuration". Critically comment upon this statement. (5)
- b) What are transition and inner-transition elements? Why are they so called? Describe the general characteristics of transition elements. (5)
- Q.9 a) What is lanthanide contraction and what are its consequences? (2)
- b) Why is the separation of lanthanides so difficult? List the various methods of their separation and describe one method in brief. (4)
- c) Explain the limitations of application of Valence Bond Theory to complex formation. (4)
- Q.10 a) Explain the crystal field splitting of  $d$ -orbitals in an octahedral crystal field. What is crystal field stabilization energy? (5)
- b) Why is it necessary to purify the ores before extraction of metals from them? Describe briefly the extraction of titanium from its ores. (5)