

**M. SC. (Analytical Chemistry) / M. SC. (Organic Chemistry) / M. SC.
(Inorganic Chemistry) Sem-I (Choice Based Credit & Grade System) :
SUMMER - 2019**

SUBJECT : INORGANIC CHEMISTRY – I

Day : Wednesday

Date : 10/04/2019

S-2019-1170

Time : 03.00 PM TO 06.00 PM

Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Use of non-programmable **CALCULATOR** is allowed.
- 5) Answers to both the sections should be written in **SEPARATE** answer books.

SECTION – I

Q.1 Attempt **ANY THREE** of the following: [15]

- a) Write the Schrödinger wave equation and explain each term present in it.
- b) Define Hund's rule of maximum multiplicity. Explain it with suitable example.
- c) What is Born-Haber cycle? Explain it for sodium fluoride compound.
- d) Write the assumptions of VB Theory.
- e) Explain hybridization. Discuss sp^3 hybridization with suitable example.

Q.2 A) Attempt **ANY TWO** of the following: [10]

- a) Write VSEPR rules. What are lone pair and bond pair of electrons? How they affect the bond angles?
- b) Define Quantum Number. Write the quantum numbers and explain them in brief.
- c) Write a note on: "Born-Landé's equation".

B) Solve **ANY ONE** of the following: [05]

- a) Write the electronic configuration of Zn ($z = 30$) and give the four quantum numbers for the last electron in the valence orbital in this atom.
- b) Kinetic energy of an electron is 3.75×10^{-11} ergs. Calculate the wavelength associated with the electron.

[Given : i) Mass of electron $m = 9.1 \times 10^{-28}$ gm

ii) Plank's const, $h = 6.62 \times 10^{-27}$ ergs.sec]

SECTION – II

Q.3 Answer **ANY THREE** of the following: [15]

- a) What are Intrinsic semiconductors? Explain with suitable examples.
- b) What is Inorganic benzene? Explain structure and properties of Inorganic benzene.
- c) Describe 'Metal Deficient defects' with suitable examples.
- d) Define and explain polyhalides. Explain the structures of following polyhalides: i) I_3^- ii) ICl_4^- iii) IBr^-
- e) Define extrinsic semiconductivity. Silicon when doped with gallium shows p type of semiconductivity. Explain.

Q.4 Answer **ANY THREE** of the following: [15]

- a) Explain Frenkel Defects with suitable examples.
- b) What are Pseudohalogens? Compare the properties of Pseudohalogens and halogens.
- c) What are semiconductors? Explain applications of semiconductors in different fields.
- d) Discuss the structure and bonding in following Xenon compounds on the basis of VBT: i) XeF_2 ii) XeF_4 .
- e) Write notes on: i) Ionic solids ii) Covalent solids