M. SC. (Analytical Chemistry) / M. SC. (Organic Chemistry) / M. SC. (Inorganic Chemistry) Sem-I (CBCS – 2018 Course) : WINTER - 2018

SUBJECT: INORGANIC CHEMISTRY – I

Day: Thursday
Date: 11/10/2018

Time: 03.00 PM TO 06.00 PM
Max Marks. 60

W-2018-0978

N.B.

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

SECTION - I

Q.1 Answer any **THREE** of the following **(15)**

a) Derive an expression for a particle revolving in an one dimensional box.

b) What is principle quantum number and Azimuthal quantum number? Explain them in brief with suitable example.

c) Write the Born – Lande's equation used to calculate Lattice energy. Discuss in detail each term present in it.

d) Predict the shapes of the following molecules using hybridization.

i) CH_4 ii) PF_3 iii) SF_6

e) Write a brief note on "Concept of VSEPR theory".

Q.2 A) Answer any **TWO** of the following **(10)**

a) Define hybridization. Explain it in brief. Discus the SP^2 hybridization giving its suitable example.

b) Explain the Hund's rule of maximum multiplicity. Give suitable example.

c) Write a note on "Applications of Born – Haber cycle".

B) Solve any **ONE** of the following: **(05)**

a) Assign the four quantum numbers for the last electrons present in fluorine atom (Z=9)

b) Calculate the wave length of a metal ball of mass 90 gms moving with a velocity of 100 cm / Sec.

SECTION - II

Q.3 Answer any **THREE** of the following **(15)**

a) What are defects in solids? Explain Frenkel defect with suitable examples.

b) What are silicons? Describe properties and uses of silicons.

c) Write the members of halogen group. Why they are known as halogens? Explain anomalous behavior of Fluorine in the group.

d) Draw the structures of following compounds and explain geometry and bonding in the following compounds i) X_eOF_2 ii) X_eF_6

e) Compare the properties of Organic and Inorganic polymers.

P.T.O

Q.4 Answer any **THREE** of the following **(15)**

a) What do you mean by Extrinsic semiconductivity? Why silicon dopped with Arsenic exhibits n – type semi conductivity.

b) Explain band theory of metals with respect to Lithium metal.

c) What are interhalogen compounds? How are they prepared?

d) What are Nonstoichiometric defects? Explain any two types of nonstoichiometric defects.

e) Write a note on 'Ionic solids'

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