

MASTER OF SCIENCE (CHEMISTRY) (CBCS - 2018 COURSE)
M.Sc. (Chemistry) Sem-I :SUMMER- 2022
SUBJECT : INORGANIC CHEMISTRY - I

Day : Monday
Date : 4/7/2022

S-20140-2022

Time : 03:00 PM-06:00 PM
Max. Marks : 60

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 book.
- 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) Define hybridization. Write different types of hybridizations and explain any one of them with suitable example.
- b) Write the Schrödinger's equations. Explain the meaning of each term present in it.
- c) Define and explain in detail Aufbau's principle using a suitable example.
- d) Define quantum number. Write the importance of quantum numbers in atomic structure. Write the four quantum numbers and explain in brief any one of them.
- e) Define the following terms: (any **five**)
 - i) Lattice energy
 - ii) Heat of formation
 - iii) Crystal lattice
 - iv) Electron affinity
 - v) Exothermic reaction
 - vi) Heat of sublimation

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

- i) Write the VSEPR rules and write their importance in the study of molecular structure.
- ii) Write the assumptions of valence Bond Theory.
- iii) Explain the shapes of the following molecules.
 - a) NH_3
 - ii) H_2O
 - iii) PF_5

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

- i) Write the electronic configuration of Cl atom and write the quantum number of the valence electron in its last orbital.
- ii) Calculate the mass of a particle moving in wave-form having its wave-length (λ) $1.40 \times 10^{-16} \text{ cm}$ and its velocity $2.18 \times 10^8 \text{ cm/sec}$
(Give: plank's constant $h = 6.628 \times 10^{-34} \text{ Joules/sec}$)

P. T. O.

SECTION-II

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

- a) What are defects in Solids? Discuss Schottky defects with suitable examples.
- b) What are Interhalogen compounds? How are they prepared?
- c) Explain the bonding in following Xenon compounds:
i) XeF_2 ii) XeF_4
- d) Discuss PON Polymers with suitable examples.
- e) What do you mean by Extrinsic Semiconductivity? Why silicon doped with Arsenic exhibits n-type semiconductivity.

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

- a) Write a comparison between Amorphous solids and Crystalline solids.
- b) Describe different applications of Nobel gases.
- c) Explain electrical conductivity in monovalent and divalent metals using $N(E)$ curve.
- d) What are Silicones? Describe properties and uses of Silicones.
- e) Write a note on Ionic solids.

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