

(Common for Analytical, Organic & Inorganic)

MASTER OF SCIENCE (CHEMISTRY) (CBCS - 2018 COURSE)

M.Sc. (Chemistry) Sem-I : WINTER :- 2021

SUBJECT: INORGANIC CHEMISTRY - I

Day : Friday
Date 4/2/2022

W-20140-2021

Time : 02:00 PM-05:00 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 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) Write the Schrodinger's equation and explain the significance of all the terms in it.
- b) Summarize VSEPR rules and explain in brief the applications of these rules to study the molecular structures.
- c) What is quantum number? Write different quantum numbers. Explain any two quantum numbers with suitable examples.
- d) Explain Pauli's exclusion principle. Discuss it with suitable examples.
- e) Define Born Haber cycle. Write its different applications with suitable examples.

Q.2 a) Answer **ANY TWO** of the following: (10)

- i) What is hybridization? Write different types of hybridizations. Explain SP^3 hybridization with suitable example.
 - ii) Define lattice energy. Explain Born-Landé's method to calculate the lattice energy of an ionic crystal.
 - iii) Write a note on - 'Assumptions of Valence Bond Theory'.
- b) Solve **ANY ONE** of the following: (05)
- i) Calculate the wavelength of a body weighing 500 gm moving with a velocity of 1.0 km per second.
 - ii) Write the electronic configuration of Mg atom (At. No. 12) and assign the quantum numbers for its valence electrons.

P.T.O.

SECTION – II

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

- a) What are 'defects' in solids? Explain Frenkel defect with suitable examples.
- b) Write a comparison between organic and inorganic polymers.
- c) Discuss the hybridization and geometry of following Interhalogen compounds.
i) ClF_3 ii) IF_7 .
- d) What are n-type and p-type semiconductors? Explain with suitable example.
- e) Write notes on i) Ionic solids ii) Covalent solids.

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

- a) Define 'Nonstoichiometric defects'. Explain 'metal excess' type of defects with suitable examples.
- b) Discuss the bonding in XeF_2 and XeF_4 molecules on the basis of valence bond theory.
- c) What are phosphonitrilic compounds? Explain their structures.
- d) Explain different applications of halogens.
- e) Write a note on 'Schottky Defects' in solids.

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