

M. SC. (Analytical Chemistry) / M. SC. (Organic Chemistry) / M. SC.  
(Inorganic Chemistry) Sem-I (Choice Based Credit & Grade System) :  
WINTER - 2018

SUBJECT : INORGANIC CHEMISTRY – I

Day : Thursday  
Date : 11/10/2018

Time : 03.00 PM TO 06.00 PM  
Max. Marks : 60

W-2018-0981

**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) Explain SP hybridization in detail with suitable example.
- b) Write the expression for a particle revolving in three dimensional box. Write the significance of each term present in the expression.
- c) Define 'Heigenberg's Uncertainty Principle'. Discuss it in detail.
- d) Describe Principal Quantum Number and Azimuthal Quantum Number with suitable example.
- e) What is Born-Haber cycle? Illustrate it for NaF crystal.

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

- a) Write the assumption of VB Theory.
- b) Explain in brief the theory of VSEPR.
- c) Write a note on – 'Aufbau's Principle'.

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

- a) Write the quantum numbers of the valency electrons in the atom Ni ( $z = 28$ ).
- b) Calculate the wavelength of an electron when its kinetic energy is  $3.80 \times 10^{-11}$  ergs; its mass is  $9.1 \times 10^{-28}$  gm.  
[Given : Plank's constant  $h = 6.62 \times 10^{-27}$  ergs. Sec]

**SECTION – II**

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

- a) What are Stoichiometric Defects? Describe Schottky defects with suitable examples.
- b) Explain electrical conductivity in monovalent, divalent and trivalent metals using  $N(E) / E$  curves.
- c) What are interhalogen compounds? Give their composition. How are they prepared?
- d) Write a comparison between Organic and Inorganic Polymers.
- e) Write a note on 'Applications of noble gases'.

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

- a) Define semiconductor. Silicon doped with Arsenic shows n-type of semi-conductivity. Explain.
- b) What are pseudohalogens? Compare the properties of pseudohalogens and halogens.
- c) Explain 'Metal excess' type of defects in solids.
- d) Describe 'PON Polymers' with suitable example.
- e) What are Clathrate compounds? Explain the Clathrate compounds of Noble gases.

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