

Exam. Code : 103201
Subject Code : 1254

B.A./B.Sc. 1st Semester

CHEMISTRY (Inorganic Chemistry-I)

Time Allowed—3 Hours]

[Maximum Marks—35

Note :— Attempt any five questions, selecting at least one question from each section. The fifth question may be attempted from any section. Each question carries 7 marks.

SECTION-A

1. (a) What is $(n+l)$ rule ? Give two examples to explain $(n+l)$ rule. 3
- (b) Write a brief note on Pauli Exclusion Principle. 2
- (c) Draw radial probability distribution curves for :
 - (i) $n = 3, l = 0$
 - (ii) $n = 4, l = 3$ 2
2. (a) Write Schrodinger wave equation for hydrogen atom. What are the various parameters used in the equation ? Also discuss the significance of ψ and ψ^2 . 5
- (b) Cu ($Z = 29$) has two oxidation states, Cu^+ and Cu^{2+} , which is more stable and why ? 2

SECTION-B

3. (a) What is effective nuclear charge ? Calculate effective nuclear charge for one of the outer electrons (2p) of oxygen atom. 3
- (b) Give reasons :
- (i) Ionic radius of K^+ is smaller than that of Cl^- .
 - (ii) Electron affinity of N is almost zero while that of F is very high. 4
4. (a) Arrange the hydrogen halides in decreasing order of their ionic character : HBr, HCl, HI, HF.
Also give suitable explanation in support of your answer. 3
- (b) What is electron affinity ? Give its variation in a period and in a group of the periodic table. Also discuss various factors which affect electron affinity. 4

SECTION-C

5. (a) Discuss the shapes of PF_5 , on the basis of hybridization. 3
- (b) Give reasons for the following :
- (i) NO^+ has shorter bond length than NO , even though latter has extra electron.
 - (ii) Both CH_4 and H_2O have tetrahedral geometry but their bond angles are different. 4

6. (a) H_2O is liquid while H_2S is a gas. Why ? 1
(b) Using VSEPR theory, describe the shapes of following :
(i) NH_3 (ii) SF_6 (iii) IF_3 6

SECTION-D

7. (a) Out of LiCl and KCl , which compound is more covalent, according to Fajan's rule ? 2
(b) What is Born-Haber cycle ? How is it used to calculate the lattice energy of NaCl ? 5
8. (a) What are non-stoichiometric compounds ? Discuss various types of defects in non-stoichiometric compounds. 4
(b) Briefly discuss various types of Van der Waals forces. 3