

Exam. Code : 103201

Subject Code : 1296

B.A./B.Sc. 1<sup>st</sup> Semester

CHEMISTRY

(Inorganic Chemistry—I)

Time Allowed—Three Hours] [Maximum Marks—35

PART—A

**Note** :— All questions are compulsory. Each question carries 1 mark.

1. Give electronic configuration of iron(III) ions.
2. Name and draw various orbitals possible for  $n = 3$  and  $l = 1$ .
3. Calculate effective nuclear charge for one of the outer electrons (2p) of oxygen atoms.
4. Define isoelectronic ions. Give one example.
5.  $\text{BeF}_2$  molecule is linear while  $\text{SF}_2$  is angular though both are triatomic. Why ?
6. Calculate the percentage ionic character in HCl molecule. Electronegativities of H and Cl are 2.1 and 3.0 respectively.
7. Melting point of NaCl is higher than that of  $\text{AlCl}_3$ . Why ?
8. Give the coordination numbers of  $\text{Ca}^{2+}$  and  $\text{F}^-$  ions in calcium fluoride structure.

**PART—B**

**Note :—** Attempt any **TWO** questions from each section.  
Each question carries **4.5** marks.

**SECTION—I**

9. Calculate the kinetic energy of moving electron which has a wavelength of 4.5 pm.  
[Given : Mass of electron =  $9.1 \times 10^{-31}$  kg;  
 $h = 6.63 \times 10^{-34}$  kg m<sup>2</sup> s<sup>-1</sup>]
10. Write Schrodinger wave equation for hydrogen atom. What are the various parameters used in the equation? Also discuss the significance of  $\psi$  and  $\psi^2$ .
11. What is ionization energy? Discuss various factors which affect ionization energy and give its variation in a period and in a group in periodic table.

**SECTION—II**

12. What do you understand by hybridization? Discuss the shapes of PF<sub>5</sub>, XeF<sub>4</sub> and IF<sub>7</sub> on the basis of hybridization.
13. Draw energy level diagram of CN molecule. Calculate its bond order.
14. What are electron deficient molecules? Explain them with suitable examples.

**SECTION—III**

15. Explain how Born-Haber cycle is used to calculate the lattice energy of NaCl.
16. Discuss Fajan's rules.
17. Write short notes on :—  
(i) Frenkel defects  
(ii) Schottky defects  
(iii) van der Waals forces.