(i) **Printed Pages : 4** **Roll No. .....**

(ii) **Questions : 9**

Sub. Code : 0048

Exam. Code: 0001

B.A./B.Sc. (General) 1st Semester

1124

CHEMISTRY

(Same for B.Sc. Microbial and Food Tech.)

Paper-I: Inorganic Chemistry-A

Time Allowed : Three Hours] **[Maximum Marks : 45**

Note :- (i) Attempt **five** questions in all, selecting **one** question from each Unit.

(ii) Unit-V is compulsory.

UNIT-I

I. (a) Write Schrodinger Wave Equation in terms of spherical polar co-ordinates. How spherical polar co-ordinates are related to Cartesian co-ordinates ? 3

(b) What do you mean by Radial Probability Distribution ? Draw RPDC for (i) n = 3, l = 0 (ii) n = 3, l = 1. 3

(c) (i) How many Nodal Planes are Present in $3d_{x^2-y^2}$ and $3p_2$ orbital ? 1

(ii) Is set of quantum numbers possible or not ? n = 4, l = 3, m = -3, s = 0 . 1

(iii) Why s-orbital is spherically symmetrical ? 1

II.(a) How many orientations are possible for p and f-orbitals ? 2

(b) Explain Radial Wave functions and Angular Wave function . 3

(c) Write Schrodinger Wave Equation in terms of Cartesian co-ordinates . 1

(d) Write the name of element and its electronic configuration having atomic number 29. 1

(e) Write relations of *d-Broglie equation* and *Heisenberg Uncertainity Principle* . 2

UNIT-II

III. (a) What is Effective nuclear charge ? Calculate effective nuclear charge of an electron present in 3p orbital chlorine atom . 3

(b) Why electron affinity of 18^{th} group elements are zero ? 2

(c) Which have smaller EA and why—F or Cl ? 2

(d) Out of which compound, C has maximum electronegativity and why – CH_4 , C_2H_4 and C_2H_2 ? 2

IV. (a) Which has smaller size and why – O^- or O^{-2}? 2

(b) Why successive electron affinities have negative values ? 2

(c) How many total blocks are there in Periodic Table ? Write their general electronic configuration. 3

(d) Calculate electronegativity of Fluorine. Given bond energies as E_{H-H} = 104.2 KCal/mole; E_{F-F} = 36.6 K Cal/mole; E_{H-F} = 136.6 KCal/mole and electronegativity of H = 2.1 . 2

UNIT-III

V. (a) Complete the reactions :

(i) $Xe(g) + PtF_6(g) \rightarrow ?$

(ii) $XeF_6 + 3H_20(excess) \rightarrow ?$

(iii) $XeF_4 + BF_4 \rightarrow ?$ 3

(b) Discuss bonding and shape of XeF_6 molecule . 3

(c) Why do Helium and Neon not form Clatharates ? 2

(d) XeO_3 acts as oxidising or reducing agent ? 1

VI.(a) Why lithium forms normal oxide, sodium forms peroxide and potassium forms superoxide, when burnt in air ? 3

(b) Why alkali metals dissolved in ammonia (l) to give blue coloured solution, the resulting solution is oxidising or reducing in nature ? 3

(c) Describe the difference in structure of BeH_2 and CaH_2 . 3

UNIT-IV

VII. (a) Discuss Linear Combination of atomic orbital (LCAO) . 3

(b) Calculate percentage of Ionic character of C-Cl bond in CCl_4 ,if electronegativityof carbon and Chlorine are 3.5 and 3.0 respectively . 3

(c) Discuss bonding and structure of ICl_2^- on basis of VSEPR theory . 3

VIII.(a) The dlpole moment of HX molecule is 1.92 D and bond distance is 1.20 A°. Calculate percentage ionic character. 3

(b) Draw molecular orbital diagram of CN molecule . 3

(c) Discuss bonding and geometry of SF_4 molecule . 3

UNIT-V

IX. (a) Can uncertainity principle be applied on stationary electron ?

(b) What are Eigen Values ?

(c) Arrange in order of increasing size : Na^{+}, Li^{+}, Ba^{2+}, B^{3+} .

(d) How many elements are present in 3^{rd} period ?

(e) Can you dissolve Sodium Hydride in water ?

(f) Which out of two $Mg(OH)_2$ or $Ca(OH)_2$ is stronger base ?

(g) How many Lone pairs of $\bar{e}$ and Bond pairs of electrons are in ClF_3 ?

(h) What type of Molecular orbital is formed by combination of $2p_x$ and $2p_x$ atomic orbitals .

(i) Although CCl_4 has polar bonds but its dipole moments is zero, why ? 9x1=9