

**11201****B. Sc. (Pass Course) 1st Sem.****(Regular/Re-Appear/Imp) Exams., 2022****CHEMISTRY****INORGANIC CHEMISTRY**

Paper Code : CH-101

**Time : 3 Hours****Max. Marks : 30**

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after examination.

**Note :** Attempt Five questions in all. Question No. 1 is compulsory. All question carry equal marks.

1. (a) Write the electronic configuration of Cr (Atomic number = 24). 1
- (b) Define Frenkel defect. 1
- (c) What is the value of bond order in He<sub>2</sub> molecule. 1

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- (d) Define Polarizability. 1
  - (e) Which has higher ionization energy, Oxygen or Nitrogen? 1
  - (f) What is the hybridization and shape of ClO<sub>4</sub><sup>-</sup> ion? 1
2. (a) Which set of quantum numbers are possible? 3
    - (i)  $n = 4, l = 4, m = -2$
    - (ii)  $n = 3, l = 0, m = -1$
    - (iii)  $n = 5, l = 1, m = 0$
    - (iv)  $n = 5, l = 3, m = -1$
  - (b) Draw the radial probability distribution graph for : 3
    - (i) 3s
    - (ii) 3p
    - (iii) 3d
3. (a) An electron can not exist in the nucleus. Explain on the basis of Heisenberg uncertainty principle. 3
  - (b) Derive de-Broglie equation. What is the significance of de-Broglie equation? 3

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4. (a) Using Slater's rule, calculate the effective nuclear charge experienced by 3s electrons in Aluminium. 3
- (b) Explain the following : 3
- (i) Explain Pauli's Exclusion principle.
- (ii) Explain Hund's Rule.
- (a) Explain the following : 3
- (i) Why the electron affinity values of 18<sup>th</sup> group elements are Zero?
- (ii) Which has lowest 2<sup>nd</sup> ionization energy and why out of Na and Mg?
- (b) Define electronegativity. What are the factors affecting it along the period and group? <https://www.iguonline.com> 3
6. (a) Explain the shape of Sulphate ion on the basis of hybridization. 3
- (b) Describe the shape of SF<sub>4</sub> molecule by using VSEPR theory. 3

7. (a) What is bond order? Draw the MO diagram of NO molecule and predict its bond order. 3
- (b) Explain Valence bond theory and write its limitations. 3
8. (a) Describe the structure of NaCl. 3
- (b) Discuss Born-Haber cycle for the calculation of lattice energy of a solid. 3
9. (a) Explain Fajan's rule with example. 3
- (b) Explain the ionic structure, co-ordination number of CaF<sub>2</sub>. 3

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