21BSC4C4CHL

B.Sc. IV Semester Degree Examination, September/October - 2023
CHEMISTRY - IV
DSC IV : Inorganic and Physical Chemistry-II
(NEP)

Time : 2 Hours   Maximum Marks : 60

Note : *Answer **all** questions.*

SECTION - A

1. Answer the following sub-questions. Each sub-question carries **one** mark. **10x1=10**

   (a) Write the Born-Lande equation and explain the terms.   **1**
   (b) What is Ionic Bond ?   **1**
   (c) What is meant by Hybridization ?   **1**
   (d) Define Resonance Energy.   **1**
   (e) Write any two rules for linear combination of atomic orbitals.   **1**
   (f) What is a Metallic Bond ?   **1**
   (g) What is Residual Entropy ?   **1**
   (h) State the third law of Thermodynamics.   **1**
   (i) Write BET equation.   **1**
   (j) State Kohlrauch's Law.   **1**

SECTION - B

Answer **any four** of the following questions. Each question carries **five** marks. **4x5=20**

2. Set up Born-Haber cycle for the formation of sodium chloride crystal and write the expression for the lattice energy. **5**

3. State and explain the Baffle rule with suitable example. **5**

4. Write the molecular orbital energy level diagram of oxygen molecule. Calculate its bond order and predict its magnetic nature. **5**

5. Derive an equilibrium for Langmuir adsorption isotherm. **5**

6. Derive an expression for the rate constant of a second order reaction where the initial concentration of both reactants are same. **5**

7. Define Enthalpy. Explain work done on isothermal and adiabatic expansion in ideal gas. **5**

SECTION - C

Answer **any three** of the following questions. Each question carries **ten** marks.

3x10=30

8. (a) What is radius ratio ? Calculate the limiting radius ratio of an ionic solid when co-ordination number is 6. **6**

(b) What are ionic compounds of the type Ax ? Explain with an example. **4**

9. (a) Explain Sp^3d hybridization by taking pcl_5 as an example. **6**

(b) Explain the structure of BF_3 and BF_4^- Ion according to VSEPR theory. **4**

10. (a) Derive Gibbs-Helmholtz equation with respect to volume, temperature and pressure. **6**

(b) Derive Michaelis-Menten equation for enzyme catalysis. **4**

11. (a) Discuss the 'Electron sea model' of metal. **6**

(b) Write a note on n-type semiconductors. **4**

12. (a) Explain the Debye-Huckel on sagar equation for the strong electrolyte. **6**

(b) How do you determine solubility product of sparingly soluble salts by conductance method ? **4**

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