

6/10/2023

21BSC4C4CHL



B.Sc. IV Semester Degree Examination, September/October - 2023

CHEMISTRY - IV

DSC IV : Inorganic and Physical Chemistry-II

(NEP)

100620

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-Landé 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 Kohlrausch'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**



P.T.O.

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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