

**Subject- Physical Chemistry (Paper -1)**

- Q.1) Explain Maxwell –Boltzmann distribution of molecular velocities. Write its equation and explain the meaning of terms used in this equation.
- Q.2) Write notes on following .
- A) Schottky defect    B) Frankel defect
- Q.3) Explain the Arrhenius equation .write method of determination of activation energy.
- Q.4) Define radioactivity. What is natural and artificial radioactivity.
- Q.5) Write a method for the preparation of colloidal solution.

**Subject-Inorganic Chemistry (Paper -2)**

- Q.1) Explain Schrodinger wave equation.
- Q.2) What is known as hybridization? Explain sp, sp<sup>2</sup> and sp<sup>3</sup> hybridization giving examples.
- Q.3) Draw Born-Haber cycle and give the equation to relate the energies involved in the cycle.
- Q.4) Write diagonal relationship between lithium and magnesium.
- Q.5) Describe the hydride of boron. Give the structure of diborane.

**Subject- Organic Chemistry (Paper -3)**

- Q.1) Discuss the types of organic reactions explain with suitable examples
- Q.2) Explain the free radical mechanism of halogenations of alkane.
- Q.3) Describe the methods of [preparations, properties and structure of allene.
- Q.4) Explain SN<sub>1</sub> and SN<sub>2</sub> mechanism with example of alkyl halides.
- Q.5) Discuss the conformation of n-butane.

**Subject- Physical Chemistry (Paper -1)**

- Q.1) What is carnot cycle ? explain its different steps.
- Q.2) Apply phase rule to water system .
- Q.3) Write the postulates of debye- hukel theory .
- Q.4) Describe a galvanic cell with example.
- Q.5) Explain the terms physical absorption and chemisorptions with examples.

**Subject- Inorganic Chemistry (Paper -2)**

- Q.1) Complex formation is a characteristic property of d-block elements. Explain with examples.
- Q.2) Describe the following properties of 5d transitions series elements.
- a) Magnetic Properties                      b) Oxidation state
- Q.3) What do you mean by isomerism? Explain the isomerism found in complex compounds.
- Q.4) What is lanthanide contraction? What is the effect on the properties of lanthanides?
- Q.5) Write an essay on acid – bases concept.

**Subject- Organic Chemistry (Paper -3)**

- Q.1) Woodward-Fieser rules for determining  $\lambda_{max}$  of  $\alpha$ - $\beta$  unsaturated carbonyl compound
- Q.2) What are alcohols? How are they classified give method of preparation of monohydric alcohols.
- Q.3) Write notes or reaction mechanism on the following.
- A) Knoevenagel reaction    B) Aldol condensation    C) Benzoin condensation

Q.4) Describe the preparation ,properties and uses of tartaric acid.

Q.5) Give an account of preparation, properties and uses of nitroalkanes.

**Prof.Brijmohan Mishra Institute of Medical & Technical sciences ,Burhanpur**

**Class- B.sc 3 year**

**Subject- Physical Chemistry (Paper -1)**

Q.1) Explain Hamiltonian operator.

Q.2)What is rigid rotator ? Derive an expression for the energy levels of a diatomic molecule.

Q.3) Give the qualitative description of  $\sigma$  , $\pi$  and n molecular orbitals , their energy levels and the respective transition.

Q.4) Describe how you will verify stark- Einstein law.

Q.5) Explain Mosotti – clausius equations .

**Subject- Inorganic Chemistry (Paper -2)**

Q.1) Describe pearson theory of soft and hard acid bases and discuss its applications.

Q.2) Describe the d-orbital splitting in octahedral complexes.

Q.3) What do you mean by L-S coupling ? Explain the term symbols obtained by L-S coupling with one example.

Q.4) What are selection rules? Explain selection rules for d-dtransition.

Q.5) What is nitrogen fixation? Explain.

**Subject- Organic Chemistry (Paper-3)**

Q.1) What is spectroscopy? What information can be obtained from UV, IR and NMR spectroscopy?

Q.2) Write synthetic applications of Grignard reagent and organolithium compound .

Q.3) What are carbohydrates? Write the mechanism of osazone formation.

Q.4) What are nucleic acid ? Describe double helix structure of DNA.

Q.5) Give a detailed account of the classification of dyes.