

F.Sc PART II CLASS CHEMISTRY GUESS PAPER 2023.

ALL PUNJAB BOARD

LAHORE, RAWALPINDI, GUJRANWALA, SAHIWAL, MULTAN, FAISALABAD, SARGODHA
BAHAWALPUR, DERA GHAZI KHAN, AZAD KASHMIR

KNOWLEDGE BASED = 50% - UNDERSTANDING BASED = 35% - APPLICATION BASED = 15%

CHEMISTRY

CHAPTER NO. 1 PERIODIC CLASSIFICATION OF ELEMENTS.

SHORT QUESTIONS:

1. Discuss period 6th of periodic table.
2. In how many block, the periodic table is divided.
3. Why the Ionic radii of negative ion is largest than the size of their parent atom.
4. Why d and f-block elements are called transition.
5. Lanthanide contraction control the atomic sizes of elements of 6th and 7th period.
6. Why diamond is non-conductor and graphite is fairly a good conductor?
7. Define: i. Mendeleev Periodic Law ii. Modern Periodic Law
8. Why oxidation state vary in a period and main constant in a group.

LONG QUESTIONS:

1. Define Ionization Energy. How it varies within a group and across a period in the periodic table?
2. Define Electron affinity. How does it vary in group and periods generally in periodic table?
3. Justify the position of hydrogen with carbon family in the periodic table?
4. Write any two similarities and difference between hydrogen and halogens.
5. Define hydration energy. Explain its factors and trends in groups and period of the periodic table.

CHAPTER NO. 2 s - BLOCK ELEMENTS.

SHORT QUESTIONS:

1. Justify that BeO is amphoteric in nature
2. Why lime water turns milky with CO₂ but becomes clear with Excess CO₂?
3. Give advantages of Down's cell.
4. Mention two major problems that may arise in Nelson's cell.
5. How gypsum is converted into plaster of Paris?
6. How lime mortar is prepared?
7. How LiNO₃ and NaNO₂ differ on application of heat? Write corresponding chemical equations also.
8. Why alkali and alkaline earth metals are among the reactive elements of the periodic table?
9. Why calcium is essential for the normal development of plants?

LONG QUESTIONS:

1. Discuss peculiar behavior of Li?
2. Describe the process for the preparation of sodium metal on industrial scale by Down's cell? What are advantages of the process?
3. Describe commercial preparation of sodium hydroxide by diaphragm cell or Nelson cell.

CHAPTER NO. 3

GROUP III A AND GROUP IV A ELEMENT.

SHORT QUESTIONS.

1. Why is the action of an aqueous solution of borax on litmus?
2. What is chemical garden?
3. Give the names and the formulas of different acids of boron.
4. Write four uses of sodium silicate.
5. Give two uses of silicones.
6. What is chemistry of Borax-bead test?
7. Write two uses of borax.
8. Why white lead is not suitable for use as a good pigment?
9. Write formulas for Bauxite and Corundum.
10. Discuss use of PbCrO_4 in paints.

LONG QUESTIONS.

1. Compare the physical and chemical properties of alkali metal with these of alkaline earth metal.

CHAPTER NO. 4

GROUP VA AND VIA ELEMENTS.

SHORT QUESTIONS:

1. Draw the structure of N_2O and N_2O_5
2. Give two reaction which show oxidizing behavior of NO
3. How nitrogen dioxide is prepared from. i. Lead nitrate ii. $\text{Cu} + \text{HNO}_2$
4. How aqua regia dissolve gold and platinum in it.
5. Give two similarities and dissimilarities of oxygen and sulphur
6. H_2SO_4 is called king of chemicals.
7. Give two reactions which show oxidizing behavior of NO.
8. How H_2SO_4 dehydrate formic acid and oxalic acid.
9. Describe ring test for the confirmation of nitrate ion in the solution.
10. How PCl_3 and PCl_5 can be used for preparation of other chemical compound?
11. What is the effect of heat on NO_2
12. Write names of two any acids of nitrogen and draw their structures. 1. Nitrous acid 2. Nitric acid

LONG QUESTIONS:

1. What happen when dil HNO_3 and Conc. HNO_3 react with the following i. Cu ii. Hg iii. Sn iv. Zn
2. How is nitric acid prepared industrially? Give all equations involved.
3. How sulphuric acid is manufactured by contact process on industrial scale.
4. Give four reactions of H_2SO_4 as an acid.

CHAPTER NO. 5

GROUP VA AND VIA ELEMENTS.

SHORT QUESTIONS:

1. What is "iodized salt"?
2. What are Freons and Teflon?
3. Why iodine has metallic luster?
4. How halogen acids are ionized in water?
5. Due to which reasons fluorine shows peculiar behavior from other family members.
6. Give the reactions for the preparation of XeO_4
7. What is disproportionation reaction? Give example
8. What is halothane? Write its formula.
9. Due to which reasons fluorine shows peculiar behavior from other family members.
10. Give two application of Radon gas.
11. What is available chlorine?
12. Write the reaction of NaOH with Cl_2 in cold state.

LONG QUESTIONS:

1. Write a brief note on nomenclature of oxyacid's of halogens.
2. How bleaching powder is prepared by Hasenclever's method? Give its reaction with HCl and NH_3 .
3. What is bleaching power? How is it prepared Commercially? Give its uses.

CHAPTER NO. 6

TRANSITION ELEMENTS.

SHORT QUESTIONS:

1. How galvanizing helps protecting iron from rust.
2. What is chromyl chloride Test?
3. Give the formula of magnetite and hematite.
4. Write carbon content in pig iron and wrought iron.
5. What is ligand? Give types of ligands.
6. Define coordination number? Give example.
7. What is coordination sphere?
8. What are substitution Alloy?

LONG QUESTIONS:

1. What is corrosion? Discuss the electro chemical theory for corrosion?
2. Explain the following properties for transition element i. paramagnetic ii. Colour of complex.
3. Explain the following terms giving examples:
a. Ligands b. Coordination sphere c. Substitution alloy d. Central metal atom. E. Chelates

CHAPTER NO. 7

FUNDAMENTAL PRINCIPLES OF ORGANIC CHEMISTRY.

SHORT QUESTIONS:

1. Define tautomerism. Give an example.
2. Differentiate between homocyclic and heterocyclic compound.
3. Define orbital hybridization and give its two types.
4. What do you mean by knocking in internal combustion engine?
5. What is an octane number and how it is improved?
6. Why there is a free rotation around single bond. But on free rotation around double bond?
7. What is metamerisms?
8. Give structures of Anthracene and Naphthalene.
9. Describe position isomerism with example.
10. Define functional group. Give two examples containing oxygen.
11. What is carbonization of coal?

LONG QUESTIONS:

1. Explain cracking of hydrocarbons giving its two types.
2. What is orbital hybridizing? Explain sp -hybridization of carbon.
3. What is orbital hybridization explain sp^3 - hybridization with the formation of
4. Define Isomerism. Explain different types of structural isomerism with examples.

CHAPTER NO. 8

ALIPHATIC HYDROCARBONS.

SHORT QUESTIONS:

1. Why alkanes are called paraffin's?
2. Sigma bond are inert in alkanes. Justify.
3. Describe nitration of methane.
4. State Markownikor's rules, give product formed when H-Br is added in propene.
5. What is Baeyer's test? Convert ethane into ethylene glycol.
6. What is mustard gas, how is it prepared from ethane?
7. Why alkynes are less reactive than alkene.
8. How acetylene is converted into benzene. Write equation.
9. Mention uses of ethane.
10. Give mechanism of Kolbe's electrolytic method for the preparation of ethane.
11. 1- alkyne is weakly acidic. Give reasons.
12. Discuss hydroxylation of ethane.
13. How is water added to propyne. Give reaction.
14. Give four uses of ethyne
15. What is ozonolysis.

LONG QUESTIONS:

1. How does propyne react with the following reagents?
a. $\text{AgNO}_3/\text{NH}_4\text{OH}$ b. $\text{Cu}_2\text{Cl}_2/\text{NH}_4\text{OH}$ c. $\text{H}_2\text{O}/\text{H}_2\text{SO}_4, \text{HgSO}_4$
2. Compare the reactivity of ethane, ethene and ethyne.

CHAPTER NO. 9

AROMATIC HYDROCARBONS.

SHORT QUESTIONS:

1. What are aromatic hydrocarbons?
2. Differentiate between isolated and fused polycyclic aromatic compounds.
3. Give two reactions in support of Kekulé's cyclic structure of benzene.
4. What is meant by aromatization, give example?
5. How is benzene nitrated, give mechanism.
6. Give major products of bromination of nitrobenzene.
7. Prepare benzene from acetylene.
8. Write down mechanism of nitration in benzene.
9. Explain the term oxidation with one example using benzene.
10. Convert benzene into maleic acid.
11. What are aromatic hydrocarbons? How are they classified?

LONG QUESTIONS:

1. What is meant by the terms: a) Aromatic b. Oxidation c. Sulphonation d. Nitration.
e. Halogenation.
2. Give the general mechanism of the electrophilic aromatic substitution reaction.
3. What are Friedel-Crafts reactions? Give mechanism with example of the following reaction.
i) Friedel-Crafts alkylation reaction
ii) Friedel-Crafts acylation reaction.
4. Starting from ethyne, how can you synthesize the following compounds?
i. Acetaldehyde ii. Oxalic acid iii. Benzene iv. Methyl nitrite.
5. Discuss the structure of benzene according to atomic orbital treatment.

CHAPTER NO. 10

ALKYL HALIDES

SHORT QUESTIONS:

1. How can ethane be converted into quaternary ethyl ammonium bromide.
2. What are elimination reactions? Give example of E_1 reaction.
3. What is the nature of C-Mg bond in R-Mg-X ?
4. Apply your knowledge to convert formaldehyde into ethyl alcohol.
5. Why dry ether is used for preparation of Grignard's reagent.
6. Differentiate between E_1 and E_2 .
7. Differentiate between $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reaction.
8. How are tetraethyl lead and tetramethyl lead prepared?
9. How can 1-chloropropane be converted to propane?
10. What is Wurtz-Fittig reaction? Give its importance.

LONG QUESTIONS:

1. Write down the difference between $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reactions.
2. What is B_{12} -elimination reaction?
3. Difference between E_2 and E_1 reaction.
4. Grignard reagents are so reactive organic compounds. Justify?

CHAPTER NO. 11

ALCOHOLS, PHENOLS AND ETHERS.

SHORT QUESTIONS:

1. Define fermentation. What are the essential conditions for fermentation process?
2. Give two methods for the preparation of phenol.
3. Why ethanol has greater B.P. than diethyl ether?
4. Convert phenol into a. 2,4,6 – Tribromophenol b. Cyclohexanol.
5. Why absolute alcohol cannot be prepared by fermentation?
6. Give preparation of methanol by reaction of CO and H₂.
7. Distinguish ethanol and tertiary butyl alcohol by Lucas Test.
8. Compare reactivity of conc. H₂SO₄ with ethyl alcohol and phenol.

LONG QUESTIONS:

1. Draw the structures of Lactic Acid and Tartaric Acid.
2. Write down reactions of phenol with a. Zn/Heat b. Acetyl chloride/NaOH.
3. Explain Williamson synthesis for the preparation of ethers?
4. How can you bring about the following conversions?
Ethanol into methanol, formaldehyde into ethanol

CHAPTER NO. 12

ALDEHYDES AND KETONS

SHORT QUESTIONS:

1. Write the general mechanism of a base catalyzed addition reaction.
2. What are Haloform reactions? Give its synthetic importance.
3. How aldehydes can be distinguished by Fehling's solution test.
4. Give four important uses of formaldehyde.
5. Explain oxidation of aldehyde.
6. How aldehydes react with phenyl hydrazine? Give its mechanism.
7. How does acetaldehyde react with (I) C₂H₅MgI (II) K₂Cr₂O₇/H₂SO₄
8. How formaldehyde is prepared on the commercial scale from methyl alcohol?

LONG QUESTIONS:

1. Write a brief note on haloform reaction.
2. What is Cannizzaro's reaction? AND Aldehyde with NH₂-OH-
3. How acid and base catalyse the nucleophilic addition reactions of carbon compounds? Give general mechanism of each reaction.

CHAPTER NO. 13.

CARBOXYLIC ACIDS.

SHORT QUESTIONS:

1. Justify that Zwitter ions amino acids are Amphoteric in nature.
2. What is peptide bond? Write the formula of a dipeptide?
3. Write the mechanism for formation of ammonium acetate?
4. Prepare ethane from acetic acid by reduction with H₂/P.
5. How you will convert acetic acid into methane and acetic anhydride?
6. How Acetic acid is prepared from methyl nitrite?
7. Convert Acetylene into Acetic Acid.
8. Write down structure formulas of Glycerin and Amino Acid.

LONG QUESTIONS:

1. What are amino acids? Explain their different types with one example to each case.
2. Give the uses of Acetic Acid.

CHAPTER NO. 14

MACROMOLECULES.

SHORT QUESTIONS:

1. Differentiate between homopolymer and co-polymers.
2. Differentiate between thermoplastic polymer and thermosetting polymers? With example.
3. What are thermoplastic polymers?
4. What are polysaccharides give their properties and example.
5. Proteins are denatured?
6. Draw structures of fat and oil. How they are different?
7. What is meant by hardening of oil?
8. Define enzyme. Name their two properties.
9. Difference between DNA and RNA.

LONG QUESTIONS:

1. Give structure of glucose and fructose.
2. Define enzyme, Name their two properties. Discuss classification.
3. Difference between DNA and RNA.
4. Difference between glucose and Fructose.

CHAPTER NO. 15

COMMON CHEMICAL INDUSTRIES IN PAKISTAN.

SHORT QUESTIONS:

1. What are micronutrients and macronutrients?
2. Write mention four qualities of a good fertilizers.
3. Why potassium fertilizers are important for plants.
4. What is the composition of good Portland cement?
5. Define the term "setting of cement". Also describe reaction taking place in first 24 hours.
6. Name two woody and non-woody raw materials.
7. What reaction take place in decomposition zone during manufacturing cement.

LONG QUESTIONS:

1. Describe the composition of a good Portland cement.
2. What are fertilizers? Discuss the classification of fertilizers and their uses.

CHAPTER NO. 16

ENVIRONMENTAL CHEMISTRY

SHORT QUESTIONS:

1. Describe environmental chemistry. Name four components of Environments.
2. What is BOD?
3. Write difference conditions for the formation of smog.
4. What is the role of chloroflouro carbons in destroying ozone?
5. Write a note on hydrosphere.
6. How is oil spillage affecting marine life?
7. How water is purified by aeration.

LONG QUESTIONS:

1. What is acid rain? Explain the causes and effects of acid on the environment.
2. What is reducing and oxidizing smog how is form Explain.
3. Why is ozone layer depleting? What will happen when the concentration of ozone will be decreased?