

# GUESS PAPER 2025

## CHEMISTRY – 12<sup>th</sup>

سیکنڈ ایئر کیمسٹری

- **FSC (PRE MEDICAL / PRE ENGINEERING)**

پنجاب کے تمام بورڈز ( لاہور، ملتان، گوجرانوالہ، سرگودھا، ڈیرہ غازی خاں، فیصل آباد، ساہیوال) کے نوٹس، گیس پیپرز، چیپٹر وائز ٹیسٹ،

ہاف بک ٹیسٹ، فُل بک ٹیسٹ کے لیے ہماری ویب سائٹ [www.ntsacademy.com](http://www.ntsacademy.com) وزٹ کریں۔

**2<sup>ND</sup> year CHEMISTRY guess paper**

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#### UNIT # 1

##### Important Short Questions

1. Justify that ZnO is amphoteric in nature.
2. Although both sodium and potassium present in the same periodic table? Yet their oxides are different in nature, Na<sub>2</sub>O is basic while P<sub>2</sub>O<sub>5</sub> is acidic in character?
3. Why the ionic radii of negative ions are larger than the size of their parent atom?
4. What is electron affinity? Why is the second value of electron affinity usually shown with a positive sign?
5. What is electron affinity. Give its periodic trend?
6. Why metallic character increases from top to bottom in a group of metals?
7. Why the oxidation state of noble gases is zero?
8. Why diamond is a non – conductor while graphite is a fairly good conductor?
9. Write similarities of hydrogen with alkali metals?
10. Zn, Cd and Hg were placed in alkaline earth metals in Mendeleev's periodic table?
11. Negative ion is always bigger in size than its parent atom why?
12. Why melting and boiling points of elements belonging to VA- VIIA are lower?
13. Write two similarities and two dissimilarities of hydrogen with IV-A group elements?
14. Write two similarities and two dissimilarities of hydrogen with halogens?
15. Why metals are good conductors?
16. Why the size of anion is always greater than its parent atom?
17. Give differences of lithium from its own family members?
18. Define hydration energy. The hydration energies of the ions are in following order. Justify.  $Al^{+3} > Mg^{+2} > Na^{+}$ ?
19. Why oxidation number of noble gases is usually zero?

##### IMPORTANT LONG QUESTIONS

1. Justify the position of hydrogen at the top of IA, IVA and VIIA in the periodic table?
2. Define ionization energy. Discuss its trend in groups and periods?
3. Define hydrides. Give their classification and properties?
4. State Mendeleev's periodic law. What are the improvements made in Mendeleev's periodic table?
5. Give trends of metallic character in groups and periods and discuss the impact of atomic size on it?

#### Unit # 2

##### Important Short Questions

1. What is the role of KO<sub>2</sub> in breathing equipment? /what is the significance of KO<sub>2</sub> for mountaineers?
2. Why the aqueous solution of Na<sub>2</sub>CO<sub>3</sub> is alkaline in nature?
3. Why lime water turns milky with CO<sub>2</sub> but clear with excess CO<sub>2</sub>?
4. BeO is amphoteric oxide. Show with two suitable reactions?
5. How gypsum is converted into plaster of paris?
6. Why 2% gypsum is added in cement?
7. Why lime is added into acidic soil?
8. How lime mortar is prepared? Explain with chemical equations?
9. What is milk of magnesia and for which treatment is it used?
10. What are the advantages of down's cell for the preparation of sodium on commercial scale? NTS Academy
11. Why Down's cell preferable method for the preparation of sodium on large scale?
12. What are the main uses of plaster of paris?

13. Give two similar properties of lithium and magnesium?
14. What are two major problems faced during the working of diaphragm cell?
15. What reactions occur when (a) Lithium carbonate is heated (b) Sodium bicarbonate is heated (c) Lithium hydride is treated with water?
16. Write formulas of (a) beryl (b) asbestos (c) chrysoberyl (d) Calcite (e) barite (f) dolomite

### IMPORTANT LONG QUESTIONS

1. Explain the preparation of sodium metal by Down's cell?
2. Write a short note on the role of gypsum in agriculture?
3. Write the commercial method for the preparation of NaOH?
4. Discuss the preparation of sodium hydroxide on commercial scale diaphragm or Nelson's cell?
5. Explain peculiar behaviour of Beryllium?
6. Write four points of differences between beryllium and its group?
7. Discuss the peculiar behaviour of Lithium with respect to the other members of alkali metals?

## Unit # 3

### Important Short Questions

1. What is tincal. How would you prove that its aqueous solution is alkaline in nature?
2. What are silicones? Why are silicones preferred over ordinary organic lubricant?
3. Why CO<sub>2</sub> is a gas at room temperature while SiO<sub>2</sub> is a solid? /explain the structure of CO<sub>2</sub>?
4. What is chemical garden?
5. Write uses of borax and boric acid?
6. What is the chemistry of borax bead test?
7. How will you convert boric acid into borax and vice versa?
8. Write four uses of sodium silicate?
9. Write the reactions of boric acid with (a) ethyl alcohol (b) NaOH?
10. In what respects carbon behave differently from other members of group IV-A?
11. Give two similarities b/w carbon and silicon silicate?
12. Why aqueous solution of Borax is alkaline in nature?
13. Give the formulas of four boric acids with name?
14. How aluminium reacts with aqueous sodium hydroxide?
15. How is borax used as water softening agent?
16. Why are borate glazes preferred over silicate glazes?
17. What is vitreous silica? Nts Academy
18. Why are liquid silicones preferred over ordinary organic lubricants?
19. Give the names and the formulas of different acids of boron?

**This year there will be no long from this chapter.**

## Unit # 4

### Important Short Questions

1. Why does aqua regia gold and platinum?
2. Write down the dissimilarities between oxygen and sulphur?
3. Why is SO<sub>3</sub> dissolved in H<sub>2</sub>SO<sub>4</sub> dissolved in water?
4. Describe "ring test" for the confirmation of nitrate ions in solution?
5. Write down the reaction between conc. H<sub>2</sub>SO<sub>4</sub> act as dehydrating agent by writing two equations?
6. NO<sub>2</sub> is a strong oxidizing agent. Prove the truth of this statement giving example?
7. P<sub>2</sub>O<sub>5</sub> is a powerful dehydrating agent. Prove with example?
8. How does P<sub>2</sub>O<sub>5</sub> react with water in cold and hot state?
9. How does HNO<sub>3</sub> react with (a) Cu (b) Mn
10. How does NO<sub>2</sub> react with KI and H<sub>2</sub>S?

11. Write four uses of  $\text{HNO}_3$  ?
12. How does nitrogen differ from other elements of its group?
13. How  $\text{NO}_2$  is prepared from: (a) lead nitrate (b)  $\text{Cu} + \text{HNO}_3$  ?
14. Write any two methods for preparation of nitrogen oxide?
15. Write any four properties of sulphuric acid? NTS academy
16. Nitrous is a reducing as well as oxidizing agent. Justify giving chemical reaction?
17. Discuss different allotropic forms of oxygen?

**This year there will be no long from this chapter.**

## Unit # 5

### Important Short Questions

1. Give important uses of Helium?
2. What is iodized salt? Nts academy
3. What are Freons and Teflon? Give their uses?
4. Why iodine have metallic luster?
5. How are halogens acid ionized in water?
6. Halogens are strong oxidizing agents. Justify?
7. Why fluorine show peculiar behaviour? Give four reasons?
8. Why HF is a weak acid than any other halogen acids?
9. Write four properties of hydrogen fluoride?
10. Write any four applications of noble gases?
11. What is halothane give its formula?
12. How  $\text{XeF}_2$  and  $\text{XeF}_4$  can be prepared?
13. Oxidizing power of halogen depends on which factors?
14. Give reaction of chlorine with cold and hot NaOH?
15. What is bleaching powder? How bleaching powder is prepared by Hasenclever's method?
16. Write four uses of bleaching powder?

### IMORTANT LONG QUESTIONS

1. Discuss peculiar behaviour of fluorine?
2. How bleaching powder is prepared? Give its uses?
3. What happens when bleaching powder reacts with: dil. & conc.  $\text{H}_2\text{SO}_4$ ,  $\text{HCL}$ ,  $\text{NH}_3$ ,  $\text{H}_2\text{O}$ .
4. Discuss relative reactivities of halogens as oxidizing agent. Also describe commercial uses of halogens and their compounds?
5. Write chemical reaction of fluorides of Xenon?

## Unit # 6

### Important Short Questions

1. Why d and f block elements are called transition elements?
2. Why Transition elements compounds are coloured and variable oxidation state?
3. Differentiate b/w typical and nontypical transition elements?
4. How galvanizing helps protecting iron from rusting?  
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5. What is chromyl chloride test?
6. How chromate ions are converted into dichromate ions?
7. What are chelates? What are chelates found in transition metal complexes?
8. What is ligand? Give types of ligands?
9. Define coordination number? give example?
10. What is coordination sphere?
11. What is sacrificial corrosion?
12. Write the uses of  $\text{K}_2\text{Cr}_2\text{O}_7$ ?
13. What are interstitial compounds?
14. How entrapped bubbles of gases are removed from steel?
15. Define paramagnetic and diamagnetic substances?

16. Why does damaged tin plated iron get rusted quickly?

**This year there will be no long question from this chapter.**

### Unit # 7

#### Important Short Questions

1. What is vital force theory and why vital force theory was rejected?
2. What is catalytic cracking?
3. What is octane number and how it is improved?
4. What is destructive distillation?
5. What is natural gas. Write its two uses?
6. What are heterocyclic compounds?
7. Define aromatic compounds also give an example?
8. what are alicyclic compounds give an example?
9. Define functional group. Give two examples containing oxygen?
10. Define isomerism. Also write examples?
11. Define metamerism with example?
12. What is zwitter ion? How is it formed? write down its structural formula?
13. Define Cis- trans isomerism also give example?
14. Define geometrical isomerism. Give one example?
15. Define tautomerism by giving examples?
16. Why there is a free rotation around a single bond, but no free rotation around a double bond? For more notes, search NTS Academy on Google.

#### IMPORTANT LONG QUESTIONS

1. Explain reforming of petroleum with the help of suitable examples?
2. Define cracking and explain its type with example?
3. Define hybridization. Explain the structure of ethene and ethyne on its basis?
4. Define isomerism. Explain geometrical isomerism with example?
5. How organic compounds are classified. Give suitable example of each?

### Unit # 8

#### Important Short Questions

1. Why alkanes are less reactive than alkenes?
2. What are clemmenson and wolf kishner reduction reactions. How they differ?
3. Ethane can be converted into ethyl alcohol write equation?
4. What is Raney- nickel how it is used?
5. What is Baeyer's test? / how Baeyer's test is used to detect unsaturation of organic compounds? Nts academy.
6. Define Markownikov's rule and give one example?
7. Give mechanism of O<sub>3</sub> ozonolysis of ethane?
8. Prepare cis and trans alkenes from alkyne along with chemical equation?
9. How is ethyne is converted into ethanol?
10. Convert CH triple bond CH into oxalic acid?
11. How ethyne is converted to (a) acetaldehyde (b) benzene
12. Convert methane into (a) formaldehyde (b) nitro methane
13. Synthesize (a) benzene (b) oxalic acid from ethyne
14. Define polymerization. How can we convert ethene into polythene?
15. How would you convert 2-butyne into cis and trans 2- butene?
16. How does alkane show un reactivity?
17. Why pi bond is more reactive than sigma bond?
18. What is hydrogenolysis?
19. How do you distinguish between ethene and ethyne?
20. Convert methane into formic acid?
21. Convert ethyne into acetaldehyde?
22. Covert 1-butene to 1- butyne?
23. Give four uses of methane?

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### IMPORTANT LONG QUESTIONS

1. Describe any four methods for the preparation of alkenes?
2. Prepare alkenes from Kolbe's electrolytic method? Write down its mechanism?
3. Describe with example the acidic nature of alkynes?
4. Give comparison of reactivity of alkanes, alkenes and alkynes?
5. State Markownikov's rule? Give reactions of HBr with (a) propene (b) 2-butene (c) 1-butene?

## Unit # 9

### Important Short Question

1. Discuss the objections to the Kekulé's model of benzene. / what arguments were given by Kekule to confirm the regular hexagonal structure of benzene?
2. Write down the resonance structure of benzene.
3. Define resonance energy. NTS ACADEMY
4. What is the Wurtz-Fittig reaction? Give an example?
5. Give the mechanism of nitration and halogenation of benzene?
6. Explain the sulphonation of benzene with the mechanism of reaction.
7. What happens when ozone is reacted with benzene?
8. Prepare m-chloronitrobenzene from benzene in two steps?
9. Benzene can be prepared commercially from acetylene. Give reaction with conditions?
10. How is benzene converted into maleic acid by catalytic oxidation?
11. Draw the structure of (a) naphthalene, (b) anthracene
12. What are polycyclic aromatic hydrocarbons?
13. Discuss the x-ray structure of benzene.
14. How can we prepare benzene from (a) n-hexane (b) benzene sulphonic acid.
15. Write the general mechanism for the electrophilic substitution reaction of benzene.
16. What happens when chlorine is passed through benzene in sunlight?
17. Write any four para-directing groups?

### IMPORTANT LONG QUESTIONS

1. Explain the structure of benzene on the basis of atomic orbital treatment?
2. Write down four methods of preparation of benzene?
3. What are Friedel-Craft reactions? Explain mechanism of alkylation and acylation of benzene?
4. Detail out two reactions in which benzene behaves as a saturated hydrocarbon and two reactions in which it behaves as an unsaturated hydrocarbon?
5. Write down mechanisms of following reactions (a) nitration of benzene (b) sulphonation

## Unit # 10

### Important Short Questions

1. What are primary and tertiary alkyl halides? Give one example each?
2. Convert ethyl bromide into (a) n-butane (b) ethene (c) ethyl alcohol (d) propene
3. What is Wurtz-Fittig reaction. Give its importance?  
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4. Give two examples of nucleophilic substitution reaction?
5. What is  $\beta$ -elimination reaction?
6. How is tetraethyl tetramethyl lead prepared?
7. How would you prepare alkyl halide from alcohol and thionyl chloride?
8. What are elimination reactions. Give examples of E1 and E2 reaction?
9. Write the mechanism of SN1 reaction?
10. What are electrophile and nucleophile?
11. Justify given order of reactivity on the basis of bond energy  $R-I > R-Br > R-Cl > R-F$ ?

12. Give methods to prepare alkyl halides from alcohols?
13. What is Grignard reagent?
14. Convert ethyl alcohol into their respective halides by using  $\text{PCl}_3$  and  $\text{PCl}_5$ ?
15. Starting from  $\text{C}_2\text{H}_4\text{Br}$  how will you prepare ethene and ethane?
16. How do we get alkyl nitriles from Grignard reagents?

### IMPORTANT LONG QUESTIONS

1. What is  $\beta$ - elimination reaction? Difference between  $\text{E}_1$  and  $\text{E}_2$  reaction?
2. What are  $\text{S}_\text{N}$  reactions? Differentiate between  $\text{S}_\text{N}1$  and  $\text{S}_\text{N}2$  reaction?
3. What is Grignard reagent? How these react with carbonyl compounds?
4. How does ethyl magnesium bromide react with (a)  $\text{CO}_2$  (b)  $\text{CH}_3\text{COCH}_3$
5. Explain nucleophilic substitution unimolecular reaction ( $\text{S}_\text{N}1$ ) with example?
6. Discuss  $\text{S}_\text{N}2$  reactions of alkyl halide in detail?

### Unit # 11

#### Important Short Question

1. What do you mean by denaturing of alcohols?
2. Give structural formula of : (a) Lactic acid (b) Tartaric acid (c) Picric acid (d)  $\text{P}$ -hydroxy benzyl alcohol (f) carbonic acid?
3. Absolute alcohol can not be prepared from fermentation process why?
4. Explain Williamson synthesis for the preparation of ethers?
5. Define fermentation? What are essential conditions for fermentation process?
6. Ethyl alcohol is a liquid while methyl chloride is a gas, why?
7. How phenol is prepared by Dow's method?
8. Give two methods for the preparation of phenol?
9. Prepare Bakelite from phenol?
10. Give the reactions of phenol with conc.  $\text{H}_2\text{SO}_4$  and acetyl chloride?
11. How does picric synthesis take place?
12. Ethanol gives different products with conc.  $\text{H}_2\text{SO}_4$  under different conditions. Justify?
13. What is Lucas test?
14. How can we distinguish between methanol and ethanol?
15. Convert methanol into ethanol and acetone into ethyl alcohol?
16. How chloro benzene is converted into phenol?
17. Give reactions of alcohol in which C O bond break?
18. Why water has higher boiling point than ethanol?
19. What is wood-spirit? How is it prepared from water gas?
20. What are rectified spirit, absolute alcohol and commercial alcohol?
21. Define fermentation? Give its

### IMPORTANT LONG QUESTIONS

1. Describe the industrial method of preparation of methanol with diagram?
2. Give the reactions of phenol with the following:  $\text{Zn}$ ,  $\text{NaOH}$ , bromine water,  $\text{HNO}_3$ ,  $\text{H}_2\text{SO}_4$ ,  $\text{CH}_3\text{COCl}$   
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3. Convert: (a) Ethanol into methane (b) Methanal into ethanal
4. What is fermentation? How ethanal is prepared from molasses and starch?
5. How ethyl alcohol is obtained by the fermentation of molasses and starch?
6. Give two methods for the preparation of phenol?

### Unit # 12

#### Important Short Questions

1. What is Cannizzaro's reactions? Write one example?
2. What is silver mirror / Tollen's test?
3. What is Fehling's solution test of aldehyde test?
4. Write four uses of formaldehyde?
5. Write four uses of acetaldehyde?

6. What is idoform test? Give its uses? / how idoform is prepared from acetaldehyde and ethyl alcohol?
7. Write the mechanism of the reaction of HCN with carbonyl compounds?
8. What is formalin?
9. Prepare acetone from calcium acetate?
10. Give industrial preparation of formaldehyde?
11. What is Haloform reaction? Give its uses?
12. How acetaldehyde is converted into lactic acid?
13. How the aldehydic group can be prevented against oxidising agents?
14. How acetaldehyde reacts with ethyl alcohol?
15. How Aldehydes can be distinguished by Benedict's solution test?

### IMPORTANT LONG QUESTIONS

1. Write a note on cannizzarro's reaction?
2. What type of aldehydes give cannizzarro's reaction/ give its mechanism?
3. What is Aldol condensation? Give mechanism?
4. Write four tests by which aldehyde can be distinguished from ketones?
5. How 2,4 – dinitrophenyl hydrazones are prepared?
6. Write mechanism of ammonia derivatives carbonyl compound in general?
7. Describe the mechanism of the reaction of sodium bisulphite with acetone?

## Unit # 13

### Important Short Questions

1. What are essential and nonessential amino acids?
2. What is zwitter ion and how they are produced? Write its structural formula?
3. Explain acidic and basic behaviour of amino acids?
4. How acetic anhydride is prepared from acetic acid?
5. What are amino acids? Give two example?
6. Define neutral amino acids also give example?
7. Write formula of glycine, alanine, melonic acid and phthalic acid?
8. Write down the mechanism of ester formation?
9. How would you convert  $\text{CH}_3\text{COOH}$  to  $\text{CH}_3\text{CONH}_2$ ?
10. How amino acid is synthesized. Give example?
11. What is peptide bond? Write formula of a dipeptide?
12. How would you prepare carboxylic acid from Grignard reagent?
13. What are acid anhydride? How can we prepare acetic anhydride?
14. Write important uses of acetic acid?
15. How carboxylic acids are prepared by oxidative cleavage of alkenes?

### IMPORTANT LONG QUESTIONS

1. Write down any four methods of the preparation of acetic acid with reactions?
2. Define zwitter ion. Discuss effect of acidic and basic medium on the dipoler ion structure of amino acid?
3. Convert acetic acid into (a) Methane (b) Acetyl chloride
4. Write a short note on acidic and basic character of amino acids?
5. Write down the reactions of acetic acid with:  $\text{Na}_2\text{CO}_3$ ,  $\text{PCl}_5$ ,  $\text{C}_2\text{H}_5\text{OH}$ ,  $\text{NH}_3$ ,  $\text{SOCl}_2$ , HI/P

## Unit # 14

### Important Short Questions

1. What is meant by rancidity of fats and oil. Why it occurs?
2. Write any two differences b/w DNA and RNA?
3. In what way oil, fats are different?
4. What is condensation polymerization? Give an example?
5. How proteins are denatured?
6. Write down the importance of proteins?
7. Write four uses of lipids?

8. Give two differences b/w fats and oil?
9. Define saponification number and iodine number?
10. What are thermosetting polymers. Give two examples?
11. What is meant by hardening of oils and fats? / how oils are converted into fats?
12. What is saponification number?
13. How PVC is prepared. Also give its uses?
14. What is chemical nature of enzymes. Classify them?
15. Write down the mechanism of addition polymerization?

**This year, there will be no long from this chapter.**

### Unit # 15

#### Important Short Questions

1. What are fertilizers? Why are they needed?
2. What are micronutrients?
3. What are macro nutrients? Name any three?
4. Write any four points of essential qualities of a good fertilizer?
5. Give the important properties of fertilizers?
6. Why ammonium nitrate is not added to the crop of paddy rice?
7. What are phosphatic fertilizers? What is their role in plants growth?
8. Give two formulas of phosphatic fertilizer?
9. What are potassium fertilizer? Write its importance?
10. What is cement. Which raw materials are used for its preparation?
11. What do you mean by setting of cement. Write down the reactions taking place in first 24 hours?
12. Define paper?
13. Write any four non woody raw materials for the production of paper and pulp?
14. How bleaching of pulp is done in Pakistan?
15. What is cement? Write down the raw materials used for the manufacturing of cement?
16. What is clinker?
17. Why cement is called portland cement?
18. What is the role of nitrogenous fertilizers for the growth of plant?

#### IMPORTANT LONG QUESTIONS

1. What are fertilization. Discuss the classification of fertilizers and its uses?
2. Nitrogenous fertilizers is an important class of fertilizers for crop. Discuss?
3. How urea is manufactured in the industry? Support your answer with chemical equation?
4. Describe the manufacturing process of cement?

### Unit # 16

#### Important Short Questions

1. What are leachates?
2. How detergents are threat to aquatic life?
3. What is acid rain. How it effects the environment?
4. Explain the BOD? / what is biological oxygen demand?
5. What is acid rain?
6. How chlorofluro- carbons destroy the ozone layer?
7. Discuss detergents as water pollutant?
8. Write down the effects on human health of CO?
9. What do you know about water pollution? how is water polluted by industrial effluents?
10. Name four components of environment?
11. What are primary and secondary pollutants. Give one example of each?
12. What is chemical oxygen demand. How it is measured?
13. How oil spoilage effects the aquatic life on earth?



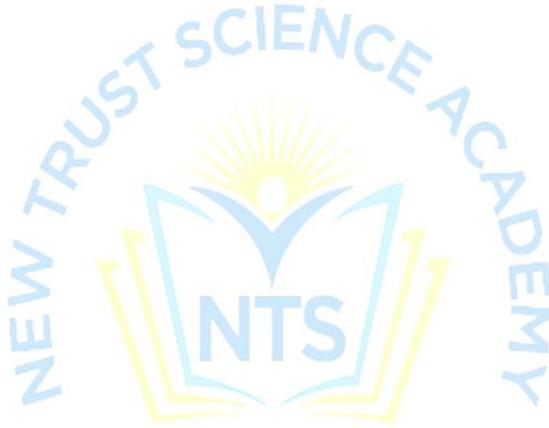
14. How is water purified by (a) aeration (b) Coagulation  
15. What is smog. Under what conditions it is formed?

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