

# Chemistry (Objective)

(GROUP-I)

Time: 20 Minutes

Marks: 17

RWP-1-24

NOTE: Write answers to the questions on objective answer sheet provided. Four possible answers A, B, C & D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with marker or pen ink on the answer sheet provided.

- The geometry of carbonium ion formed in  $SN^1$  mechanism is:  
(A) Tetrahedral (B) Square planar (C) Triangular planar (D) Hexagonal
- Ethanol can be converted into ethanoic acid by:  
(A) Hydrogenation (B) Hydration (C) Oxidation (D) Fermentation
- Ketones are prepared by the oxidation of:  
(A) Primary alcohol (B) Secondary alcohol (C) Tertiary alcohol (D) Long chain primary alcohol
- Which of the following derivatives cannot be prepared directly from acetic acid?  
(A) Acetamide (B) Acetyl Chloride (C) Acetic Anhydride (D) Ethyl Acetate
- Which one of the following elements is **NOT** present in all proteins?  
(A) Carbon (B) Hydrogen (C) Nitrogen (D) Sulphur
- Which is **NOT** a calcareous material?  
(A) Lime (B) Clay (C) Marble (D) Marine shell
- Peroxyacetyl nitrate (PAN) is an irritant to human beings and it affects:  
(A) Eyes (B) Ears (C) Stomach (D) Nose
- The main cause of reducing smog is combustion of:  
(A) Oils (B) Coal (C) Natural gas (D) Gasoline
- Ionization energy of an atom does not depend on:  
(A) Magnitude of nuclear charge (B) Size of atom (C) Physical state (D) Shielding effect
- The oxide of Beryllium is:  
(A) Acidic (B) Basic (C) Amphoteric (D) Strongly acidic
- The chief ore of Aluminium is:  
(A)  $Na_3AlF_6$  (B)  $Al_2O_3 \cdot 2H_2O$  (C)  $Al_2O_3$  (D)  $Al_2O_3 \cdot H_2O$
- The oxidation of "NO" in air produces:  
(A)  $N_2O$  (B)  $NO_2$  (C)  $N_2O_3$  (D)  $N_2O_5$
- Hydrogen bond is the strongest between the molecules of:  
(A) HF (B) HCl (C) HBr (D) HI
- Coordination number of  $[Pt(OH)_2(NH_3)_4]SO_4$  is:  
(A) II (B) III (C) IV (D) VI
- The state of hybridization of carbon atom in ethane is:  
(A)  $SP^3$  (B)  $sp^2$  (C) SP (D)  $dsp^2$
- Preparation of vegetable ghee involves:  
(A) Halogenation (B) Hydrogenation (C) Hydroxylation (D) Dehydrogenation
- Aromatic hydrocarbons are the derivatives of:  
(A) Normal series of paraffins (B) Alkenes (C) Benzene (D) Cyclohexane

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**Chemistry** (Subjective)

## SECTION-I

RWP-1-24

2. Write short answers of any eight parts from the following:

(8x2=16)

- Define hydration energy. How does it vary from top to bottom in I – A and II – A groups?
- Why do the fluorides show the highest melting and boiling points as compared to other halides?
- What are the products formed when lithium and sodium nitrates are decomposed?
- Why is  $Mg(OH)_2$  sparingly soluble in water while  $Ba(OH)_2$  most soluble?
- What is the difference between paramagnetic and diamagnetic substances? Give brief description.
- What is meant by co-ordination number and co-ordination sphere?
- How is ethane prepared from ethyl bromide?
- How  $CH_3 - CHO$  react with ethyl magnesium bromide followed by acid hydrolysis?
- What is difference between Hydrolases and Lysases?
- Why are lipids important?                      xi. How temperature and radiation affect the enzymes?
- What is an acid rain? Give brief description about its impact on our environment.

3. Write short answers of any eight parts from the following:

(8x2=16)

- Write down any four similarities between oxygen and sulphur.
- Give two methods of preparation of  $NO_2$ .
- What are Freons and Teflons?
- Give chemical reaction of  $NaOH$  and  $Cl_2$  in hot state ( $70^\circ C$ ).
- What is modern definition of organic chemistry?
- Define functional group isomerism with one example.
- Differentiate between saturated and unsaturated hydrocarbons.
- What is catalytic oxidation of  $CH_4$  upto the formation of  $HCHO$ ?
- The reaction of propene with  $HBr$  follow Markownikov's rule. Justify the statement by giving reaction.
- Define environmental pollutant.                      xi. Write down any two harmful effects of acid rain.
- How are leather tanneries responsible for pollution of water?

4. Write short answers of any six parts from the following:

(6x2=12)

- What chemical garden?
- Write down four uses of Sodium Silicate.
- Why is the aqueous solution of Borax alkaline in nature?
- Prepare Glyoxal from benzene.
- How are ethers prepared by Williamson's synthesis?
- Why is phenol acidic in nature?
- Give the reactions of Formaldehyde with: (i)  $HCN$  (ii)  $NH_2 - OH$ .
- How is acetamide prepared from acetic acid?
- Give the two reactions in which H-atom of carboxylic acid is involved.

## SECTION-II

Note Attempt any three questions. Each question carries equal marks:

(8x3=24)

- Write a note on oxides as a periodic relationship in compounds. (4)
  - Why Lithium shows peculiar behaviour? Give its any seven differences from other alkali metals. (4)
- Give eight uses of Nobel gases. (b) How is urea fertilizer is prepared in Pakistan? Describe the process in detail. (4+4)
- Discuss structure of methane on the basis of hybridization. (4)
  - How Propyl Magnesium Bromide reacts with following? (i)  $CH_3COCH_3$  (ii)  $CO_2$ . (2+2)
- How does ethyne react with (i) Hydrogen (ii) Halogen acid (iii) alkaline  $KMnO_4$  (iv)  $10\% H_2SO_4 + HgSO_4$ . (1x4)
  - How sodium bisulphite reacts with (i) Formaldehyde (ii) Acetone Also write the general mechanism. (4)
- Define Friedel-Crafts acylation alongwith its example and mechanism. (4)
  - How can you prepare the following from Phenol? (i) Benzene (ii) Cyclohexanol (iii) 2, 4, 6-tribromophenol (1x4)

# Chemistry (Objective)

(GROUP-II)

Time: 20 Minutes

Marks: 17

RWP-2-24

NOTE: Write answers to the questions on objective answer sheet provided. Four possible answers A, B, C & D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with marker or pen ink on the answer sheet provided.

- 1.1. Which one of the following is **NOT** present in all proteins?  
 (A) Carbon (B) Hydrogen (C) Nitrogen (D) Sulphur
2. For which crop, Ammonium Nitrate fertilizer is **NOT** used?  
 (A) Cotton (B) Wheat (C) Sugarcane (D) Paddy rice
3. PAN is an irritant to human beings and it affects:  
 (A) Eyes (B) Ears (C) Stomach (D) Nose
4. In purification of potable water, the coagulant used is:  
 (A) Nickel Sulphate (B) Copper Sulphate (C) Barium Sulphate (D) Aluminium Sulphate
5. The correct statement is:  
 (A)  $Na^+ < Na$  (B)  $Na^+ > Na$  (C)  $Cl^- < Cl$  (D)  $Cl^- = Cl$
6. The oxide of Be is:  
 (A) Acidic (B) Basic (C) Amphoteric (D) Neutral
7. The aluminium oxide is:  
 (A) Acidic (B) Amphoteric (C) Basic (D) Neutral
8. The laughing gas is chemically:  
 (A) NO (B) NO<sub>2</sub> (C) N<sub>2</sub>O<sub>4</sub> (D) N<sub>2</sub>O
9. Which halogen occurs naturally in a positive oxidation state?  
 (A) I<sub>2</sub> (B) F<sub>2</sub> (C) Br<sub>2</sub> (D) Cl<sub>2</sub>
10. The strength of binding energy of transition elements depends upon:  
 (A) No. of electron pairs (B) No. of protons (C) No. of neutrons (D) No. of unpaired electrons
11. The chemist who synthesized urea from ammonium cyanate was:  
 (A) Berzelius (B) Kolbe (C) Wohler (D) Lavoisier
12. Synthetic rubber is made by polymerization of:  
 (A) Chloroform (B) Acetylene (C) Divinyl acetylene (D) Chloroprene
13. During nitration of benzene, the active nitrating agent is:  
 (A) NO<sub>3</sub> (B) NO<sub>2</sub> (C) NO<sub>2</sub> (D) HNO<sub>3</sub>
14. For which mechanisms, the first step involved is the same:  
 (A) E<sub>1</sub> and E<sub>2</sub> (B) E<sub>2</sub> and SN<sub>2</sub> (C) SN<sub>1</sub> and E<sub>2</sub> (D) E<sub>1</sub> and SN<sub>1</sub>
15. Ethanol can be converted into ethanoic acid by:  
 (A) Hydrogenation (B) Hydration (C) Oxidation (D) Fermentation
16. Ketones are prepared by the oxidation of:  
 (A) Primary alcohol (B) Secondary alcohol (C) Tertiary alcohol (D) Dimethyl ether
17. Which of the following is not a fatty acid?  
 (A) Propanoic acid (B) Acetic acid (C) Phthalic acid (D) Butanoic acid

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HSSC-(P-II)-A/2024

(For All Sessions)

# Chemistry (Subjective)

(GROUP-II)

Time: 2:40 hours

Marks : 68

SECTION-II

RWP-2-24

2. Write short answers of any eight parts from the following:

(8x2=16)

- What are polymeric hydrides? Give example.
- What are the oxidation states of group VII A, and VIII A?
- What happens when Lithium Hydroxide is heated to red hot?
- Why is the aqueous solution of  $Na_2CO_3$  alkaline in nature?
- Why metal chelates are more stable than metal complexes?
- How Potassium Permanganate oxidizes oxalic acid?
- Give IUPAC names of following compounds: (i)  $(CH_3)_2CHBr$  (ii)  $CH_2Cl_2$
- How is carboxylic acid prepared from carbon dioxide and Grignard's reagent?
- What are the reasons for rancidity of oils and fats?
- Write down any two functions of DNA.
- What is the repeating unit of polystyrene and Teflon?
- What are fertilizers? Why do we need them?

3. Write short answers of any eight parts from the following:

(8x2=16)

- Give ring test for the confirmation of the presence of nitrate ion in solution.
- $P_2O_5$  is a powerful dehydrating agent. Prove it by giving example.
- Why HF is weaker acid than HCL? Justify.
- What are disproportionation reactions? Give example.
- Write short note on steam cracking.
- What are heterocyclic compounds? Give two examples.
- Convert Methyl Magnesium Bromide into methane.
- State Markownikov's rule, give an example.
- Write a short note on acidity of ethyne.
- How is oil spillage affecting the marine life?
- Are detergents are threat to aquatic life? Justify.
- Mention any two conditions which are required for the formation of smog.

4. Write short answers of any six parts from the following:

(6x2=12)

- What is water glass and how it is prepared?
- Why aluminium is used in making petrol and milk storage tanks?
- How is boric acid dehydrated stepwise when heated strongly?
- Give two objections to Kekule's formula of benzene.
- Why are lower alcohols readily soluble in water?
- How would you prepare Bakelite from phenol?
- Prepare acetaldehyde and acetone by dry distillation method.
- Give two reactions of amino acids.
- Differentiate between complete reduction and partial reduction of acetic acid.

SECTION-II

Note Attempt any three questions. Each question carries equal marks:

(8x3=24)

- (a) Write down two similarities and two dissimilarities of hydrogen with Group IA elements. (04)  
(b) Give the four points in which Beryllium differs from the other members of its own family. (04)
- (a) Explain relative reactivities of the halogens as oxidizing agent. (04)  
(b) Explain the process of setting of cement & give reactions taking place in first 24 hours and 1-7 days. (04)
- (a) Discuss the structure of ethyne on the basis of hybridization. (04)  
(b) Discuss two main factors which govern the reactivity of alkyl halides. (2+2=4)
- (a) Explain free radical mechanism for the reaction of chlorine with methane in the presence of sunlight. (04)  
(b) How HCN reacts with (i) Formaldehyde (ii) Acetone? Also write down the mechanism. (2+2=4)
- (a) Predict the major products of bromination of the following compounds: (04)  
(a) Toluene (b) Nitrobenzene (c) Phenol (d) Benzaldehyde  
(b) What are the alcohols? Write the reaction of alcohols which show: (i) Oxidation (ii) Dehydration (iii) Substitution (04)

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