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| ☆☆☆ | Roll No _____ |
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**HSSC(Part-II)-A-2024**  
(For All Sessions)

| Subject Code | 8 | 4 | 8 | 5 |
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## Chemistry (Objective)

(GROUP-I)

Time: 20 Minutes

Marks: 17

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



## Chemistry (Subjective)

### SECTION-I

(8x2=16)

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

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

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

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

(6x2=12)

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

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



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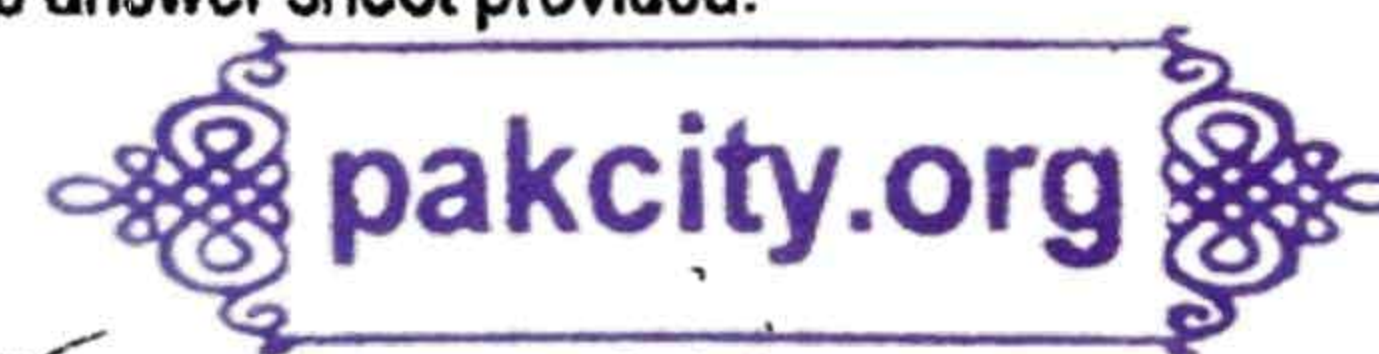
## Chemistry (Objective)

(GROUP-II)

Time: 20 Minutes

Marks: 17

**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



## Chemistry (Subjective)

### (GROUP-II)

Time: 2:40 hours

Marks : 68

#### SECTION-II

2. Write short answers of any eight parts from the following: (8x2=16)

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

3. Write short answers of any eight parts from the following: (8x2=16)

- i. Give ring test for the confirmation of the presence of nitrate ion in solution.
- ii.  $P_2O_5$  is a powerful dehydrating agent. Prove it by giving example.
- iii. Why HF is weaker acid than HCL? Justify.
- iv. What are disproportionation reactions? Give example.
- v. Write short note on steam cracking.
- vi. What are heterocyclic compounds? Give two examples.
- vii. Convert Methyl Magnesium Bromide into methane
- viii. State Markownikov's rule, give an example.
- ix. Write a short note on acidity of ethyne.
- x. How is oil spillage affecting the marine life?
- xi. Are detergents are threat to aquatic life? Justify.
- xii. 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)

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

#### SECTION-II

Note Attempt any three questions. Each question carries equal marks: (8x3=24)

5. (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)
6. (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)
7. (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)
8. (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)
9. (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)

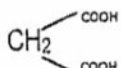
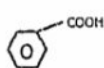
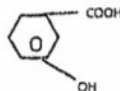



**CHEMISTRY** (Objective)

(GROUP - I)

Marks: 17

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.

- Nylon-6,6 is replaced by the reaction of hexamethylene diamine and \_\_\_\_\_ acid :  
 (A) Methanoic (B) Acetic (C) Adipic (D) Benzoic
- Micronutrients required for plant growth is in the range of \_\_\_\_\_ per acre.  
 (A) 5 Kg to 200 Kg (B) 6 Kg to 200 Kg (C) 6 Kg to 250 Kg (D) 7 Kg to 250 Kg
- The yellow colour in photochemical smog is due to :  
 (A) NO (B) NO<sub>2</sub> (C) N<sub>2</sub>O (D) N<sub>2</sub>O<sub>5</sub>
- Mendeleev in his periodic table arranged the elements according to their :  
 (A) Atomic number (B) Atomic mass (C) Proton number (D) None of these
- Which one of the following does not belong to alkaline earth metals :  
 (A) Be (B) Ra (C) Ba (D) Rn
- Chemical formula for colemanite is :  
 (A) Ca<sub>2</sub>B<sub>6</sub>O<sub>11</sub> . 5H<sub>2</sub>O (B) CaB<sub>4</sub>O<sub>7</sub> . 4H<sub>2</sub>O (C) Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub> . 4H<sub>2</sub>O (D) CaNaBO<sub>2</sub>
- Oxidation of NO in air produces :  
 (A) N<sub>2</sub>O (B) N<sub>2</sub>O<sub>3</sub> (C) N<sub>2</sub>O<sub>4</sub> (D) N<sub>2</sub>O<sub>5</sub>
- Correct electronic configuration of zero group elements is :  
 (A) S<sup>2</sup>P<sup>2</sup> (B) S<sup>2</sup>P<sup>4</sup> (C) S<sup>2</sup>P<sup>5</sup> (D) S<sup>2</sup>P<sup>6</sup>
- f-block elements are also called \_\_\_\_\_ transition elements.  
 (A) Non- typical (B) Outer (C) Normal (D) Inner
- The state of Hybridization in methane is :  
 (A) Sp (B) Sp<sup>2</sup> (C) Sp<sup>3</sup> (D) Sp<sup>4</sup>
- Chemical formula of chloroform is :  
 (A) CH<sub>3</sub>Cl (B) CCl<sub>4</sub> (C) CH<sub>2</sub>Cl<sub>2</sub> (D) CHCl<sub>3</sub>
- Which of the following acid acts as catalyst in Friedel-Crafts reactions.  
 (A) AlCl<sub>3</sub> (B) HNO<sub>3</sub> (C) BeCl<sub>2</sub> (D) NaCl
- Grignard reagent is reactive due to presence of \_\_\_\_\_.  
 (A) Halogen atom (B) Mg- atom (C) Polarity of C-Mg bond (D) Carbon atom
- Ethanol can be converted into ethanoic acid by :  
 (A) Hydrogenation (B) Hydration (C) Oxidation (D) Fermentation
- Which enzymes are involved in the fermentation of starch?  
 (A) Urease (B) Maltase (C) Diastase (D) Both (B) & (C)
- Aldehyde and small methyl Ketones give \_\_\_\_\_ test :  
 (A) Fehling solution (B) Silver mirror (C) Benedict's solution (D) Sodium Bisulphite
- Formula for oxalic acid :  
 (A)  (B)  (C)  (D) 

633-12-A-

## Chemistry (Subjective)

(For All Sessions)

## (GROUP-I)

Time: 2:40 Hours

## Section- I



Marks:68

(2 x 8 = 16)

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

- Why is  $\text{CO}_2$  a gas while  $\text{SiO}_2$  is a solid at room temperature?
- What is chemical Garden?
- How does borax ionize in water?
- How can you prepare the m-chloronitrobenzene in two steps from benzene?
- Differentiate between isolated and fused aromatic hydrocarbon?
- Write down the structures of following compounds:  
a) Benzoic Acid b) Benzaldehyde
- Differentiate between thermosetting and thermoplastic polymers.
- What is saponification number?
- Discuss the effect of temperature on enzymes.
- What is Chemical Oxygen Demand (COD)?
- How is oil spillage affecting the marine life?.
- Write down the human activities which lead to produce  $\text{SO}_x$ .

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

(2 x 8 = 16)

- Write the functional group with example of alkanal and alkanol.
- What do you know about position isomerism?
- How will you bring out the following conversions ?  
(a) Acetic acid to ethane (b) Methane to nitro methane
- Starting from ethene prepare:  
(i) Ethane (ii) Ethylene glycol
- Give the reactivity order of alkane, alkene and alkyne.
- How does Grignard reagent react with  $\text{CO}_2$ ?
- Write two methods for the preparation of alkyl halides from alcohols.
- Write the names of any four non woody raw material used in paper industry..
- What are the macro nutrients?
- Write any four similarities of oxygen with sulphur.
- Why does aqua regia dissolve gold?
- $\text{P}_2\text{O}_5$  is powerful dehydrating agent. Prove by giving two examples.

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

(2 x 6 = 12)

- Under what conditions does Al corrode?
- What is central metal atom?
- What is coordination sphere?
- How is phenol prepared from chlorobenzene?
- How will you distinguish between methanol and ethanol?
- How is benzene prepared from phenol?
- Give general mechanism of base catalysed addition reaction of carbonyl compounds.
- What is fehling solution test?
- How is Acetamide prepared from acetic acid?

## Section- II

(8 x 3 = 24)

NOTE : Answer any three questions from the following:

- Discuss the position of Hydrogen with Group IV-A elements.
  - Write down commercial preparation of sodium by Down's cell. (4+4)
- Describe Backmann's method for the preparation of Bleaching powder.
  - What is setting of cement? Discuss the reactions taking place between 1 – 7 days. (4+4)
- Describe two important sources of organic compounds.
  - What is meant by electrophilic substitution reaction? Explain Friedel-crafts alkylation with mechanism. (2+2+1+3)
- Prepare alkanes from:  
i) alkyl halides ( Two methods)  
ii) Kolbe's electrolysis with mechanism
  - Explain the mechanism of  $\text{E}_1$  reaction in detail. (2+2+4)
- Describe with mechanism of aldol condensation reaction. Why does formaldehyde not give this reaction.
  - Write down the mechanism of reaction between acetic acid and ethanol. (3+1+4)



# Chemistry (Objective)

## (Group-II)

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and 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 compound is the most reactive one?  
(A) Benzene (B) Ethane (C) Ethene (D) Ethyne
2. Grignard's reagent produce alkane by reacting with all except:  
(A)  $H_2O$  (B)  $NH_3$  (C)  $HCHO$  (D)  $C_2H_5OH$
3. Which enzyme is involved in fermentation of starch?  
(A) Diastase (B) Zymase (C) Urease (D) Maltase
4. Which alcohol upon oxidation gives acetone?  
(A) 2-propanol (B) 2-methyl-2-propanol (C) Methanol (D) Ethanol
5. Which of the following compound will react with tollen's reagents?  
(A)  $CH_3 - \overset{\overset{O}{\parallel}}{C} - H$  (B)  $CH_3 - \overset{\overset{O}{\parallel}}{C} - CH_3$  (C)  $CH_3 - \overset{\overset{O}{\parallel}}{C} - OH$  (D)  $CH_3 - \overset{\overset{O}{\parallel}}{C} - CH_2 - CH_3$
6. Which reagent is used to reduce acetic acid to ethyl alcohol?  
(A)  $H_2/Ni$  (B)  $H_2/Pt$  (C)  $NaBH_4$  (D)  $LiAlH_4$
7. The rate of reaction is directly proportional to which concentration of enzyme?  
(A)  $[Enzyme]^2$  (B)  $\sqrt{[Enzyme]}$  (C)  $[Enzyme]$  (D)  $[Enzyme]^3$
8. Phosphorus helps in the growth of:  
(A) Root (B) Leave (C) Stem (D) Seed
9. To avoid the formation of toxic compounds with chlorine which substance is used for disinfecting water:  
(A) Ozone (B) Alums (C) Chloramines (D)  $KMnO_4$
10. Pick the element having least ionization energy value:  
(A) Nitrogen (B) Oxygen (C) Fluorine (D) Neon
11. When gypsum ( $CaSO_4 \cdot 2H_2O$ ) is heated too strongly, it gives:  
(A) Plaster of Paris (B) Dead burnt (C) Does not affect (D)  $SO_2$  gas
12. Tincal is a mineral of:  
(A) Al (B) B (C) Si (D) C
13. Which catalyst is used in contact process?  
(A)  $Ag_2O$  (B)  $Fe_2O_3$  (C)  $SO_3$  (D)  $V_2O_5$
14. The anhydride of  $HClO_4$  is:  
(A)  $Cl_2O_7$  (B)  $Cl_2O_5$  (C)  $Cl_2O_3$  (D)  $ClO_2$
15. Bidentate ligand is:  
(A) Hydroxo (B) Cyano (C) Oxalato (D) Ammine
16. The phenomenon of isomerism occurs among ethers is:  
(A) Chain isomerism (B) Position isomerism (C) Functional group isomerism (D) Metamerism
17. The catalyst used for the conversion of acetone into propane is:  
(A)  $N_2H_4/KOH/200^\circ C$  (B)  $Pd(BaSO_4)/Quinoline$  (C)  $Na/Liq. NH_3 - 33^\circ C$  (D)  $Zn - Hg/HCl$

**SECTION-I**



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

(8x2=16)

- i. How does Orthoboric acid react with: a) NaOH b) Ethylalcohol
- ii. Why are silicones preferred over ordinary organic lubricants?
- iii. What is water glass? Give its two uses.
- iv. Write IUPAC names of the following molecules:
 

a)

b)
- v. What happens when?
  - a) Benzene is burnt in free supply of air
  - b) Chlorine is passed through benzene in sunlight.
- vi. Give the two characteristics of aromatic hydrocarbons.
- vii. What is addition polymerization? Give example.
- viii. Draw the cyclic structure of glucose and fructose.
- ix. What is the chemical composition of fats and oils?
- x. How suspended impurities can be coagulated from water with alum?
- xii. What are conditions for formation of smog?
- xi. What is COD? How is it measured?

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

(8x2=16)

- i. Describe any two features of organic compound.
- ii. How is octane number of gasoline improved?
- iii. Write common names of  $H_2C = CH_2$  and  $H_3C - CH = CH_2$
- iv. What is Sabatier-Senderman's reaction? Give an example.
- v. How will you convert methane into ethane?
- vi. Write down four similarities between oxygen & sulphur.
- vii.  $NO_2$  is a strong oxidizing agent. Prove it by two reactions.
- viii. Write four dissimilarities between oxygen and sulphur.
- ix. Prepare two anti-knocking agents which are used in gasoline.
- x. Write a reaction of  $CH_3CH_2MgBr$  with ethylene epoxide.
- xi. Define cement. Name its two calcareous raw materials.
- xii. Mention four essential qualities of a good fertilizer.

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

(6x2=12)

- i. Why are d & f block elements called transition elements?
- ii. What is d-d transition?
- iii. What are diamagnetic substances? Give one example.
- iv. Write down structural formula for lactic acid & tartaric acid.
- v. What is Williamson's synthesis?
- vi. Give one confirmatory test for phenol.
- vii. How is propanone prepared by dry distillation method?
- viii. How is acetic acid reduced by  $LiAlH_4$ ?
- ix. How will you differentiate between methanal and ethanal by iodoform test?

**SECTION-II**

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

(8x3=24)

5. (a) Write down the similarities and dissimilarities of hydrogen with group IVA elements.  
(b) How is sodium metal produced by Dow's cell?
6. (a) What are the halogens? On what factors oxidizing power of halogen depends? Give their order of oxidizing power.  
(b) How is urea manufactured? Describe in detail.
7. (a) Explain geometric Isomerism and also discuss necessary condition to exhibit geometric isomerism.  
(b) Explain stability of benzene with the help of resonance energy.
8. (a) Explain Kolbe's electrolytic method for the preparation of ethyne along with mechanism.  
(b) Write a detail note on nucleophilic substitution bimolecular ( $S_N2$ ) reactions.
9. (a) Write down eight uses of formaldehyde.



Roll No. \_\_\_\_\_ to be filled in by the candidate.

(For all sessions)

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| Paper Code | 8 | 4 | 8 | 7 |
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## Chemistry (Objective Type)

Time: 20 Minutes

Marks: 17

**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.



- Which of the following halogen is weak oxidizing agent?  
(A)  $\text{Cl}_2$  (B)  $\text{F}_2$  (C)  $\text{I}_2$  (D)  $\text{Br}_2$
- Which of the following is a typical transition element?  
(A) Sc (B) Y (C) Ra (D) Co
- The state of hybridization of carbon atom in methane is:  
(A)  $\text{sp}^3$  (B)  $\text{sp}^2$  (C) sp (D)  $\text{dsp}^2$
- Formula of chloroform is:  
(A)  $\text{CCl}_4$  (B)  $\text{CHCl}_3$  (C)  $\text{CH}_2\text{Cl}_2$  (D)  $\text{CH}_3\text{Cl}$
- The electrophile in aromatic sulphonation is:  
(A)  $\text{H}_2\text{SO}_4$  (B)  $\text{BF}_3$  (C)  $\text{SO}_3$  (D)  $\text{SO}_3^+$
- Elimination bimolecular reaction involves:  
(A) First order kinetics (B) Second order kinetics (C) Third order kinetics (D) zero order kinetics
- Which compound shows hydrogen bonding?  
(A)  $\text{C}_2\text{H}_6$  (B)  $\text{CH}_3-\text{O}-\text{CH}_3$  (C)  $\text{C}_2\text{H}_5\text{Cl}$  (D)  $\text{C}_2\text{H}_5\text{OH}$
- Percentage of water in Formalin is:  
(A) 52% (B) 8% (C) 40% (D) 60%
- Which of the following will have the highest boiling point?  
(A) Methanal (B) Ethanal (C) Propanal (D) 2-Hexanone
- Which of the following ester gives apricot flavour?  
(A) Amyl acetate (B) Benzyl acetate (C) Amyl butyrate (D) Octyl acetate
- The solution of which acid is used for seasoning of food?  
(A) Formic acid (B) Acetic acid (C) Benzoic acid (D) Butanoic acid
- Through how many zones does the charge pass in a rotary kiln?  
(A) 4 (B) 3 (C) 2 (D) 5
- Keeping in view the size of atoms, which order is the correct one?  
(A)  $\text{Mg} > \text{Sr}$  (B)  $\text{Ba} > \text{Mg}$  (C)  $\text{Lu} > \text{Ce}$  (D)  $\text{Cl} > \text{I}$
- Which ion will have the maximum value of heat of hydration?  
(A)  $\text{Na}^+$  (B)  $\text{Cs}^+$  (C)  $\text{Ba}^+$  (D)  $\text{Mg}^{+2}$
- Which element belongs to group IVA of the periodic table?  
(A) Ba (B) I (C) Pb (D) O
- Which of the following catalyst is used in contact process:  
(A)  $\text{FeO}_3$  (B)  $\text{V}_2\text{O}_5$  (C)  $\text{SO}_3$  (D)  $\text{Ag}_2\text{O}$
- The anhydride of  $\text{HClO}_4$  is:  
(A)  $\text{ClO}_3$  (B)  $\text{ClO}_2$  (C)  $\text{Cl}_2\text{O}_5$  (D)  $\text{Cl}_2\text{O}_7$



**Roll No.** \_\_\_\_\_ *to be filled in by the candidate.*

**(For all sessions)**

# Chemistry (Essay Type)

**Time: 2:40 Hours**

**Marks: 68**

## Section - I



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

**2 x 8 =16**

- i. Why the second value of ionization energy is always greater than first ionization energy values?
- ii. The hydration energies of Ions are in the given order:  $Al^{+3} > Mg^{+2} > Na^{+}$ . Explain.
- iii. Write down the problems faced during the working of diaphragm cell.
- iv. What happens when Lithium hydride is treated with water? Give reaction.
- v. What is the action of an aqueous solution of borax on litmus and why?
- vi. How does Aluminium react with non-metals? Give any two reactions.
- vii. Phosphorus element can form five covalent bonds; nitrogen cannot, why?
- viii. What is Laughing gas? How is it prepared? Give one reaction.
- ix. Discuss the peculiar behaviour of Carbon.
- x. Give the importance of Nitrogen fertilizers.
- xi. Write down the steps for the manufacturing of urea.
- xii. Describe the composition of good portland cement.

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

**2 x 8 =16**

- i. Compare the physical states and colours of halogens at room temperature.
- ii. What is the reason for variations of oxidation states of transition elements?
- iii. What happens when the given compounds are heated? (a) Calcium Acetate. (b) Ammonium Acetate.
- iv. Write down the Mechanism of the reaction between acetic acid and ethanol.
- v. How Iodoform is prepared from acetaldehyde and Ethyl alcohol?
- vi. Prepare m-chloronitrobenzene from benzene in two steps.
- vii. Why HF is weaker acid than HCl?
- viii. What are interstitial compounds?
- ix. Halogens are strong oxidizing agents. Justify.
- x. What are fatty acids? Give an example.
- xi. Give mechanism of nitration of benzene.
- xii. Write four important uses of Acetaldehyde.

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

**2 x 6 =12**

- i. What is the excellent method for the preparation of Alkyl iodide?
- ii. Write reactions of methyl chloride and ethyl chloride with Sodium Lead Alloy.
- iii. What do you know about the Vital Force Theory?
- iv. What is Stream Cracking?
- v. Why Alkanes are also called Paraffins?
- vi. What is hydrogenolysis? Give an example.
- vii. Give two uses of Methane.
- viii. Give classification of Monohydric Alcohols.
- ix. What do you know about Denaturing of Alcohol?

## Section - II

**NOTE: Answer any three questions from the following.**

**8x3=24**

- 5.(a) Write the essential features of all periodic tables in periodic table. 4
- (b) Write the peculiar behaviour of "Be". 4
- 6.(a) Write down two reactions in which  $HNO_2$  acts as an oxidizing agent and two reactions in which  $HNO_2$  acts as reducing agent. 4
- (b) Write four common properties of transition elements. 4
- 7.(a) What is Isomerism? Discuss position isomerism and geometrical isomerism. 4
- (b) How does acetaldehyde react with (i)  $CH_3CH_2MgBr$  (ii)  $NaHSO_3$  (iii)  $NH_2OH$  (iv)  $N_2H_4$ . 4
- 8.(a) Explain Halogenation of Alkanes with mechanism. 4
- (b) Differentiate between  $E_1$  and  $E_2$  reactions. 4
- 9.(a) Write any four methods of preparation of Benzene. 4
- (b) Write reactions of alcohol in which C-O bond and O-H bond breaks (Two reactions in each case). 4

634-012-A----





Roll No. \_\_\_\_\_ to be filled in by the candidate.

(For all Sessions)

Paper Code 8 4 8 1

## Chemistry (Objective Type)



Time: 17 Minutes

Marks: 20

**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.

- Keeping in view the size of atoms, which order is the correct one:  
(A)  $Mg > Sr$  (B)  $Ba > Mg$  (C)  $Lu > Ce$  (D)  $Cl > I$
- Tinocal is a mineral of:  
(A) Al (B) Si (C) B (D) C
- Laughing gas is chemically:  
(A) NO (B)  $NO_2$  (C)  $N_2O_4$  (D)  $N_2O$
- Which one of the following hydrogen halides is the weakest acid in aqueous solution?  
(A) HF (B) HCl (C) HBr (D) HI
- Which one of the following sulphate is insoluble in water?  
(A) Sodium sulphate (B) Potassium sulphate (C) Zinc sulphate (D) Barium sulphate
- Which one of the following is a typical transition metal?  
(A) Sc (B) Y (C) Co (D) Ra
- Which set of hybrid orbital has planar triangular shape?  
(A)  $sp$  (B)  $sp^2$  (C)  $sp^3$  (D)  $dsp^2$
- Formula of chloroform is:  
(A)  $CHCl_3$  (B)  $CH_2Cl_2$  (C)  $CH_3Cl$  (D)  $CCl_4$
- During nitration of benzene, the active nitrating agent is:  
(A)  $NO_2$  (B)  $NO_2^+$  (C)  $NO_2^-$  (D)  $HNO_3$
- For which mechanism, the first step involved is the same?  
(A) E1 and E2 (B) E2 and  $S_N2$  (C)  $S_N1$  and E2 (D) E1 and  $S_N1$
- Ethanol can be converted into ethanoic acid by:  
(A) Hydrogenation (B) Hydration (C) Oxidation (D) Fermentation
- The carbon atom of a carbonyl group is:  
(A)  $sp^2$  hybridized (B)  $sp^3$  hybridized (C)  $sp$  hybridized (D)  $dsp^2$  hybridized
- Which reagent is used to reduce carboxylic group to alcoholic group?  
(A)  $H_2/Ni$  (B)  $H_2/Pt$  (C)  $H_2/Fe$  (D)  $LiAlH_4$
- Which one of the following polymers is an addition polymer?  
(A) nylon-6,6 (B) polystyrene (C) terylene (D) epoxy resin
- Micronutrients are required in quantity ranging from:  
(A) 4-40 gm (B) 6-200 kg (C) 6-200 gm (D) 4-40 kg
- Peroxyacetylnitrate (PAN) is an irritant to human beings and it affects:  
(A) eyes (B) ears (C) stomach (D) nose
- Newspaper can be recycled again and again by how many times?  
(A) 4 (B) 5 (C) 2 (D) 3



# Rawalpindi Board-2019

Part (II) A 2019

Roll No. \_\_\_\_\_

(For all Sessions)

## Chemistry (Essay Type)



Time: 2:40 Hours

Marks: 68

### Section - I

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

2 x 8 = 16

- How do you justify the position of hydrogen at the top of VIIA group?
- Why does metallic character increase from top to bottom in a group of metals?
- Why does lime water turn milky with  $\text{CO}_2$  but becomes clear with excess  $\text{CO}_2$ ?
- Give equations to represent the given reaction Borax is heated with  $\text{CaO}$ .
- $\text{NO}_2$  is strong oxidizing agent, prove it with two examples.
- $\text{P}_2\text{O}_5$  is a powerful dehydrating agent, show it with two examples.
- What are Silicones?
- What are Silicates?
- Write four uses of  $\text{HNO}_3$ .
- What is Biosphere?
- What is BOD?
- What are Isomers? Write isomers of pentane.

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

2 x 8 = 16

- How acid and base catalyses the reactivity of carboxyl compound?
- Write two examples of Monodentate ligands.
- Write correct names of compounds by I.U.P.A.C system (A) 4-methyl pentane (B) 3,3,5-Trimethyl hexane
- Write effect of branching on melting point of alkanes.
- What informations do we get from x-ray analysis of benzene.
- Convert (a)  $\text{C}_3\text{H}_7\text{Cl} \Rightarrow \text{CH}_3 - \text{CH} = \text{CH}_2$  (b)  $\text{C}_3\text{H}_7\text{Cl} \Rightarrow \text{CH}_3 - \text{CH}_2 - \text{CH}_2\text{OH}$
- Write down structures of (a) Vinyl alcohol (b) Lactic acid
- Point out difference between symmetric and unsymmetric ehte.
- Write chemistry of chromyl chloride test.
- Write four uses of formaldehyde.
- Draw structures of (a) Alanine (b) Valine
- Draw structures of Dimer of Carboxylic acid.

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

2 x 6 = 12

- What is meant by degree of polymerization. Give an example.
- Write different stages in the manufacture of cement by wet process
- Give trend of oxidizing power of halogens Write any two factors on which oxidizing power of halogens depends.
- Write main raw materials used in the production of pulp and paper in Pakistan
- Define saponification number and iodine number of a fat or an oil.
- How are polyamide resins prepared? Give an example.
- Write any two applications of noble gases.
- Write any two methods of preparation of chlorinedioxide.
- Write any two essential qualities of a good fertilizer

### Section - II

NOTE: Answer any three questions from the following.

8x3=24

- (a) Discuss the position of hydrogen over IA and VII A group of periodic table. 4  
(b) Explain the preparation of Na metal by Down cell. 4
- (a) What do you mean by corrosion. Explain electrochemical theory in detail. 4  
(b) Discuss in detail any two components of the environment 4
- (a) Define Isomerism. Explain position isomerism and functional group isomerism with one example each. 4  
(b) Discuss atomic orbital treatment of Benzene. 4
- (a) Explain free radical mechanism for the reaction of chlorine with methane in the presence of Sunlight. 4  
(b) Write down important physical properties and uses of phenols. How Bakelite is prepared from it (Phenol)? 4
- (a) How will you make the following conversions from ethyl bromide? 4  
i. Propane ii. Propanoic acid iii. Ethene iv. Ethyl cyanide  
(b) Describe the mechanism of aldolcondensation reaction? Why does formaldehyde not give this reaction? 4

634-012-A-





Roll No. \_\_\_\_\_ to be filled in by the candidate.

Rawalpindi Board-2018

|            |   |   |   |   |
|------------|---|---|---|---|
| Paper Code | 4 | 4 | 8 | 3 |
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Sessions; 2015-2017 &amp; 2016-2018

**Chemistry** (Objective Type)

Time: 20 Minutes

Marks: 17

**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.

- Which one of the following nitrogenous bases is not present in RNA?  
(A) Cytosine (B) Adinine (C) Thiamine (D) Uracil
- Micronutrients are required in quantity ranging from:  
(A) 4-40 g (B) 6-200 g (C) 6-200 kg (D) 4-40 kg
- The pH range of acid rain is:  
(A) 7-6.5 (B) 6-5.6 (C) less than 5 (D) 6.5-6
- Which one of the following is a secondary pollutant?  
(A) CO (B) NO<sub>x</sub> (C) SO<sub>x</sub> (D) PAN
- Which of the following statement is incorrect?  
(A) All the metals are good conductor of Heat (B) All the metals are good conductor of Electricity  
(C) All the metals form positive ion (D) All the metals form acidic oxides
- Which of the following is not an alkali metal?  
(A) Francium (B) Cesium (C) Rubidium (D) Radium
- Tincal is a mineral of  
(A) Al (B) B (C) Si (D) C
- The brown gas formed, when metal reduces HNO<sub>3</sub> to:  
(A) N<sub>2</sub>O<sub>5</sub> (B) N<sub>2</sub>O<sub>3</sub> (C) NO<sub>2</sub> (D) N<sub>2</sub>O<sub>4</sub>
- Which halogen occurs naturally in a positive oxidation state?  
(A) Fluorine (B) Chlorine (C) Bromine (D) Iodine
- Which of the following is a non-typical transition element?  
(A) Cr (B) Mn (C) Zn (D) Fe
- Ethers show the phenomenon of:  
(A) Position isomerism (B) Metamerism (C) Cis-trans isomerism (D) Functional group isomerism
- Characteristic reactions of Alkenes are:  
(A) Nucleophilic addition (B) Electrophilic addition (C) Nucleophilic substitution (D) Free radical substitution
- During nitration of benzene, the active nitrating agent is:  
(A) NO<sub>3</sub><sup>-</sup> (B) NO<sub>2</sub><sup>+</sup> (C) NO<sub>2</sub><sup>-</sup> (D) HNO<sub>3</sub>
- The rate of E<sub>1</sub> reaction depends upon:  
(A) The concentration of substrate (B) The concentration of nucleophile  
(C) The concentration of substrate as well as nucleophile (D) none of these
- Which compound is more soluble in water?  
(A) C<sub>2</sub>H<sub>5</sub>OH (B) C<sub>6</sub>H<sub>5</sub>OH (C) CH<sub>3</sub>COCH<sub>3</sub> (D) n-Hexanol
- Cannizzaro's reaction is not given by:  
(A) Formaldehyde (B) Acetaldehyde (C) Benzaldehyde (D) Trimethyl acetaldehyde
- Which is basic amino acid?  
(A) Glycine (B) Alanine (C) Aspartic acid (D) Lysine



Roll No. \_\_\_\_\_

Rawalpindi Board-2018

Sessions; 2015-2017 &amp; 2016-2018

**Chemistry** (Essay Type)

Time: 2:40 Hours

Marks: 68

**Section - I****2- Write short answers of any eight parts from the following.****2 x 8 = 16**

- Why do the boiling points of halogens increase down the group in periodic table?
- Define the following terms: (a) Lanthanide contractions (b) Hydration energy
- Justify with chemical reaction that reaction of alkali metal oxide with water is Acid-Base reaction.
- Aluminium when burn in oxygen an Intense white light is produced. Explain.
- Give the chemical reactions of Boric Acid with (a)  $C_2H_5OH$  (b)  $Na_2CO_3$
- Compare the properties of carbon and silicon. Give four points of difference.
- Prepare aqua Regia. How does it dissolve the Noble metal  $Au_{(s)}$  and why?
- What are the various allotropic forms of Group VIA elements of periodic table?
- What are sulphate aerosols? How do they effect the older people?
- Prepare each of the following compounds from Ethene ( $CH_2 = CH_2$ ). (a)  $CH_3CH_2OH$  (b)  $\begin{array}{c} CH_2-CH_2 \\ | \quad | \\ O \end{array}$
- How does  $P_2O_5$  react with water in cold and hot state?
- What are essential conditions for smog formations?

**3- Write short answers of any eight parts from the following.****2 x 8 = 16**

- Define non-typical transition elements with two examples.
- How is wood spirit prepared from water gas?
- How is acetyl chloride prepared from acetic acid?
- Name the following complexes according to IUPAC system. (i)  $[Pt(Cl)(NO_2)(NH_3)_4]SO_4$  (ii)  $[Fe(CO)_5]$
- Name the following compounds according to IUPAC system. (i)  $(H_3C)_2C=CH-CH_3$   
(ii)  $(H_3C)_2CH.CH(C_2H_5)(CH_2)_2.CH.(CH_3)_2$
- How is trans-2-Butene prepared from an alkyne? Give its chemical reaction.
- Write down structural formulae of following compounds: (a) Biphenyl (b) Diphenylmethane
- How does KOH react with ethyl bromide in two different ways? Justify your answer with chemical reactions.
- Why are lower alcohols more soluble in water than higher alcohols?
- How is formaldehyde prepared in laboratory? Give its chemical reaction.
- How will you distinguish chemically between methanol and ethanol?
- What are fatty acids? Why is this name used? Give two examples.

**4- Write short answers of any six parts from the following.****2 x 6 = 12**

- What are epoxy resins? How are they prepared?
- What is meant by denaturation of proteins?
- In what ways fats and oils are different?
- What are fertilizers? Why are they needed?
- Define cement. Give its essential components.
- What are micronutrients?
- Why has iodine metallic luster?
- HF is less viscous liquid than water. Why?
- What are disproportionation reactions? Give an example.

**Section - II****Note : Attempt any three questions from the following.**

- (a) What are oxides? Describe their classification on the basis of their acidic and basic behaviour. **4+4=8**  
(b) Describe the commercial preparation of sodium by Down's cell with diagram and chemical reactions.
- (a) Explain the following terms giving examples. **4+4=8**  
(i) Ligand (ii) Central metal atom (iii) Coordination sphere (iv) Substitutional alloy  
(b) What are Lipids? Write two different characteristics of lipids.
- (a) Explain structure of  $C_2H_4$  using idea of hybridization. **4+4=8**  
(b) Describe structure of Benzene on the base of Atomic orbital treatment.
- (a) How does ethyne react with: **4+4=8**  
(i) Alkaline  $KMnO_4$  (ii) 10%  $H_2SO_4$  in the presence of  $HgSO_4$  (iii)  $HBr$  (iv)  $NH_3$   
(b) How is ethyl alcohol prepared from molasses and starch?
- (a) Using ethyl bromide as a starting material, how will you prepare the following compounds? **4+4=8**  
(a) n-Butane (b) ethyl alcohol (c) propanoic acid (d) ethene  
(b) Define canizzaro's reaction with an example, also give its mechanism.

