



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

(For All Sessions)

Time: 20 Minutes


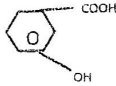

**CHEMISTRY** (Objective)

(GROUP - I)

Rwp-12-1-23

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)  $\begin{array}{c} \diagup \text{COOH} \\ \text{CH}_2 \\ \diagdown \text{COOH} \end{array}$  (B)  (C)  (D) 

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**Chemistry (Subjective)**

(For All Sessions)

(GROUP-I)

Rwp-12-1-23

Time: 2:40 Hours

Section- I

Marks:68

- 2- Write short answers of any eight parts from the following: (2 x 8 = 16)
- 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:**

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

## Chemistry (Objective)

(Group-II)

Rwp-12-2-23

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.

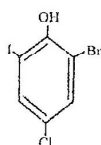
- 1.1. Which compound is the most reactive one?
- (A) Benzene (B) Ethane (C) Ethene (D) Ethyne
2. Grignard's reagent produce alkane by reacting with all except:
- (A)  $H_2O$  (B)  $NH_3$  (C)  $HCHO$  (D)  $C_2H_5OH$
3. Which enzyme is involved in fermentation of starch?
- (A) Diastase (B) Zymase (C) 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)  $\begin{array}{c} O \\ || \\ CH_3 - C - H \end{array}$  (B)  $\begin{array}{c} O \\ || \\ CH_3 - C - CH_3 \end{array}$  (C)  $\begin{array}{c} O \\ || \\ CH_3 - C - OH \end{array}$  (D)  $\begin{array}{c} O \\ || \\ CH_3 - C - CH_2 - CH_3 \end{array}$
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)  $Zn - Hg/HCl$

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

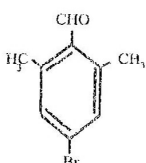
(8x2=16)

- 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)



i)



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?
- x. How suspended impurities can be coagulated from water with alum?
- xi. What is COD? How is it measured?
- xii. What are conditions for formation of smog?

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-Sendern'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 halogen's? 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.  
(b) Give the mechanism of reaction between acetic acid and thionyl chloride.