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Answer Sheet No. \_\_\_\_\_

Sig. of Candidate. \_\_\_\_\_

Sig. of Invigilator. \_\_\_\_\_

## CHEMISTRY HSSC-II

### SECTION – A (Marks 17)

Time allowed: 25 Minutes

(Revised Syllabus)

NOTE: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

- (i)  $3Ca + N_2 \rightarrow ?$   
A.  $Ca_2N_3$       B.  $CaN_2$       C.  $Ca_3N_2$       D.  $Ca_3N$
- (ii) In the organic compounds, the carbon atom generally forms:  
A. Covalent bond      B. Hydrogen bond      C. Ionic bond      D. Metallic bond
- (iii) Which one of the following oxides is basic in nature?  
A.  $Na_2O$       B.  $Al_2O_3$       C.  $P_4O_{10}$       D.  $SO_3$
- (iv) Due to inert pair effect, the elements of group IV having electronic configuration  $ns^2, np^2$  will form:  
A.  $M^{3+}$  cation      B.  $M^{4+}$  cation      C.  $M^+$  cation      D.  $M^{2+}$  cation
- (v) The oxidation states  $-1, +1, +3, +5$  and  $+7$  are shown by all the halogens except:  
A. Fluorine      B. Bromine      C. Iodine      D. Chlorine
- (vi) Pale-green is a characteristic flame colour of:  
A. Strontium      B. Sodium      C. Calcium      D. Barium
- (vii) Group VIII elements are generally called:  
A. Coinage elements      B. Halogens  
C. Alkali metals      D. Noble gases
- (viii) The functional group having structure  $\begin{array}{c} \text{O} \\ \parallel \\ \text{C} - \text{C} \end{array}$  represents the family called:  
A. Carboxylic acid      B. Ketones      C. Ethers      D. Esters
- (ix) The IUPAC name of the compound  $HC \equiv C - CH = CH - CH_3$  is:  
A. Penta-2-ene-4-yne      B. Penta-3-ene-5-yne  
C. Penta-3-ene-1-yne      D. Penta-4-ene-2-yne
- (x) The compounds, n-Butane and Isobutane are best considered as:  
A. Functional group isomers      B. Chain isomers  
C. Positional isomers      D. Metamers
- (xi) Reduction of Alkyl Nitriles gives:  
A. Sec: amines      B. Alcohols      C. Alkanes      D. Primary amines
- (xii) Acetone can be obtained by the oxidation of:  
A. 2-propanol      B. Propanal      C. Ethanol      D. 1-propanol
- (xiii) The Nitration of phenol at  $25^\circ C$  produces:  
A. Phenol nitrate      B. Toluene      C. O-nitrophenol      D. Benzene
- (xiv) The long chains of monosaccharides are called:  
A. Proteins      B. Vitamins      C. Oils      D. Carbohydrates
- (xv) Which of the following is **NOT** an Alternative to ozone depleting Chlorofluorocarbon (CFCs)?  
A. Hydrocarbons      B.  $CO_2$   
C. Hydrofluorocarbons (HFCs)      D. Perfluorocarbons (PFCs)
- (xvi) Which of the following technique **DOES NOT** involve electromagnetic radiations?  
A. Nuclear magnetic resonance spectroscopy  
B. Ultraviolet  
C. Infrared spectroscopy  
D. Mass spectroscopy
- (xvii) Double bond is formed as a result of:  
A. Addition reaction      B. Polymerization reaction  
C. Substitution reaction      D. Elimination reaction

For Examiner's use only:

Total Marks:

17

Marks Obtained:



27

# CHEMISTRY HSSC-II

(Revised Syllabus)

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

**NOTE:** Sections B and C comprise pages 1 – 2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

### SECTION – B (Marks 42)

- Q. 2 Answer any FOURTEEN parts. The answer to each part should not exceed 5 to 6 lines. (14 x 3 = 42)**
- (i) a. Why are the elements of group I called alkali metals? 01
  - b. How do the elements of group I resemble with group II elements? 02
  - (ii) Write down the chemical reactions of the following elements of 3rd period with chlorine: 03
    - a. Sodium
    - b. Aluminum
    - c. Silicon
  - (iii) Briefly discuss the metallic and Non-metallic character of group IV elements. 03
  - (iv) Why is Zinc group included in transition elements? Give reason. 03
  - (v) What is the trend of following properties of group VII elements? 03
    - a. Atomic radius
    - b. Melting and Boiling points
  - (vi) Write down the procedure for the detection of carbon and hydrogen in the organic compound. 03
  - (vii) a. Define the term homologous series. 01
  - b. Give four characteristics of Homologous series. 02
  - (viii) How can alkenes be used to prepare? 03
    - a. Vicinal dibromide
    - b. Alkyl halides
    - c. Alkane
  - (ix) Predict the major product of bromination of following compounds by their reactions: 03
    - a. Toluene
    - b. Nitrobenzene
    - c. Benzene
  - (x) Write down condensation reactions: 03
    - a. Between two identical ketones
    - b. Between aldehyde and ketone
  - (xi) Starting from Ethyl chloride, how will you prepare: 03
    - a. Ethanol
    - b. Primary Amines
    - c. n-Butane
  - (xii) How is phenol prepared from? 03
    - a. Chlorobenzene
    - b. Sodium Benzene sulphonate
    - c. Aryldiazonium salt
  - (xiii) a. What are alkanolic acids? 01
  - b. Write down the reactions for the preparation of its two derivatives 02
  - (xiv) Give step-wise mechanism for Alcohol condensation to give an ether. 03
  - (xv) a. What is the difference between organic and inorganic compounds? 01
  - b. Write down four uses of organic compounds in our daily life. 02

- |         |  |       |
|---------|--|-------|
| (xvi)   | Define and give one example of each the following:                 | 03    |
|         | a. Dyes  |       |
|         | b. Thermosetting polymers  |       |
|         | c. Petro Chemicals   |       |
| (xvii)  | What are Ethers? Give their classification.                        | 01+02 |
| (xviii) | a. What is acid rain?  | 01    |
|         | b. Write down two adverse effects of acid rain on our environment. | 02    |
| (xix)   | a. What are proteins?  | 01    |
|         | b. Give two important functions of proteins in the human body.     | 02    |

**SECTION – C (Marks 26)**

**Note:** Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)

- |             |  |       |
|-------------|--|-------|
| <b>Q. 3</b> | a. Explain the periodicity of following properties of 3rd period elements of periodic table:                                       |       |
|             | (i) Atomic radius  | 02    |
|             | (ii) Ionization Energy   | 02    |
|             | (iii) Electrical Conductivity  | 02    |
|             | b. Discuss the trends in solubility of Hydroxides of group II elements.  | 04    |
|             | c. What is spectroscopy? Name four spectroscopic techniques used in modern methods of analysis.                                    | 01+02 |
| <b>Q. 4</b> | a. Give a flow-sheet diagram for the classification of Hydrocarbons on the basis of structure. Also give one example of each type. | 05    |
|             | b. Write down the steps of free radical chain mechanism for the bromination of methane.  | 04    |
|             | c. Write down two chemical reactions in which Benzene behaves as an unsaturated compound.  | 04    |
| <b>Q. 5</b> | a. Distinguish Primary, Secondary and Tertiary alcohols with the help of reactions.  | 04    |
|             | b. Write down the structures of following compounds:   | 04    |
|             | (i) Trans-Butene dioic acid  |       |
|             | (ii) n-Butyl bromide   |       |
|             | (iii) 3-Methyl – 1 – Butyne  |       |
|             | (iv) Cyclo-1, 3-hexadiene  |       |
|             | c. Explain the following with the help of suitable examples:   |       |
|             | (i) Metamerism   | 02    |
|             | (ii) Geometrical Isomerism   | 03    |

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Answer Sheet No. \_\_\_\_\_

Sig. of Candidate. \_\_\_\_\_

Sig. of Invigilator. \_\_\_\_\_

28

## CHEMISTRY HSSC-II

### SECTION - A (Marks 17)

Time allowed: 25 Minutes

(Old Syllabus)

**NOTE:** Section-A is compulsory and comprises pages 1-2. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

**Q. 1** Circle the correct option i.e. A / B / C / D. Each part carries one mark.

- (i) Keeping in view the size of atoms which order is correct?  
A.  $Mg > Sr$     B.  $Ba > Mg$     C.  $Lu > Ce$     D.  $Cl > I$
- (ii) Rock salt (Halite) is a mineral containing \_\_\_\_\_ metal.  
A.  $K$     B.  $Ca$     C.  $Na$     D.  $Mg$
- (iii) Which acid can dissolve vitreous silica?  
A.  $HClO_4$     B.  $HNO_3$     C.  $HOF$     D.  $HF$
- (iv) Coating of which element upon iron can lead to sacrificial corrosion if damaged:  
A.  $Sn$     B.  $Zn$     C.  $Pb$     D.  $Cu$
- (v) Which compound of xenon requires more severe conditions if prepared by direct combination of xenon and molecular fluorine?  
A.  $XeOF_2$     B.  $XeF_2$     C.  $XeF_4$     D.  $XeF_6$
- (vi) The brown gas formed when metal reduces conc. Nitric acid is:  
A.  $N_2O_5$     B.  $N_2O_3$     C.  $NO_2$     D.  $NO$
- (vii) 1-Butene and 2-Butene are \_\_\_\_\_ isomers of each other.  
A. Functional group    B. Tautomeric    C. Positional    D. Chain
- (viii)  $\beta, \beta'$  - Dichloroethyl sulphide is commonly known as:  
A. Mustard gas    B. Laughing gas    C. Phosgene gas    D. March gas
- (ix) Which of the following compounds can produce white precipitates with ammonical silver Nitrate?  
A. Ethyne    B. Ethene    C. Ethane    D. 2-Butyne
- (x) Which one is ortho and para directing group in electrophilic substitution reactions of benzene?  
A.  $-NR_3^+$     B.  $-COR$     C.  $-N(CH_3)_2$     D.  $-NO_2$
- (xi) When  $CO_2$  is made to react with ethyl magnesium iodide followed by acid hydrolysis, the product formed is:  
A. Propane    B. Propanoic acid    C. Propanal    D. Propanol
- (xii) Which of the following alcohols will immediately form oily layer with *conc. HCl* in anhydrous  $ZnCl_2$ ?  
A. Ethanol    B. 1-propanol  
C. 2-propanol    D. 2-methyl-2-propanol
- (xiii) Acetone can be prepared by dry distillation of:  
A. Calcium formate    B. Calcium oxalate  
C. Calcium acetate and calcium formate    D. Calcium Acetate
- (xiv) An aqueous solution of an organic compound reacts with  $Na_2CO_3$  to produce carbondioxide. Which one of the following could be the organic compound?  
A.  $CH_2 = CH - CH_3$     B.  $CH_3CHO$   
C.  $CH_3COOC_2H_5$     D.  $CH_3COOH$
- (xv) Which one of these polymers is an addition polymer?  
A. Nylon-6,6    B. Polystyrene    C. Epoxyresin    D. Polyester
- (xvi) Which one of the following is not micronutrient for plants?  
A.  $Fe$     B.  $Cl$     C.  $Zn$     D.  $S$
- (xvii) Which substance acts as catalyst in the depletion of Ozone layer?  
A. Chlorofluoro carbons    B. Atomic oxygen  
C. Atomic chlorine    D. Peroxy acetyl nitrate

For Examiner's use only:

Total Marks:

17

Marks Obtained:



# CHEMISTRY HSSC-II

(Old Syllabus)

29

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: Sections B and C comprise pages 1 – 2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

## SECTION – B (Marks 42)

Q. 2 Answer any FOURTEEN parts. The answer to each part should not exceed 5 to 6 lines. (14 x 3 = 42)

- (i) Give reasons for the following:
- a. The oxidation states vary in a period but remain almost constant in a group. 1.5
- b. Metallic characters decrease from left to right in a period. 1.5
- (ii) Mention three differences between Lithium and other alkali metals. 03
- (iii) How is ordinary mortar prepared? Also mention reactions which take place when mortar hardens? 03
- (iv) a. What are Silicones? 01
- b. Why are silicones preferred over ordinary organic Lubricants? 02
- (v) How can Nitric acid be prepared by Birkeland and Eyde's process? 03
- (vi) Prove by writing chemical equations that  $KMnO_4$  and  $K_2Cr_2O_7$  can oxidize ferrous sulphate to ferric sulphate in the presence of sulphuric acid. 03
- (vii)  $Cl_2$  can displace bromide and iodide ions from aqueous solutions of their salts but can not displace fluoride ions from aqueous solution of sodium fluoride. Why? 03
- (viii) Write IUPAC names of the following complexes: 03
- a.  $[Pt(C_2O_4)_2]^{-2}$  b.  $[PtCl(NO_2)(NH_3)_4]SO_4$  c.  $[Fe(CO)_5]$
- (ix) In the following reactions identify each lettered product.
- a. Ethyl alcohol  $\xrightarrow[180^\circ C]{conc. H_2SO_4}$  A  $\xrightarrow{Br_2}$  B  $\xrightarrow[alcohol]{KOH}$  C 1.5
- b. Propene  $\xrightarrow{Br_2}$  D  $\xrightarrow[alcohol]{KOH}$  E  $\xrightarrow{HCN}$  F 1.5
- (x) Write mechanism when benzene reacts with chloromethane in the presence of Aluminum Chloride. 03
- (xi) How will you carry out the following conversions?
- a. Methane to propanoic acid 02
- b. n-propyl chloride to propene 01
- (xii) a. Define fermentation. 01
- b. How is Molasses is converted to ethanol by fermentation? 02
- (xiii) Why Ketones do not undergo oxidation easily as compared to aldehydes? 03

- |         |   |     |
|---------|---|-----|
| (xiv)   | Using Ethyne as starting material how would you get acetaldehyde and Acetone?                           | 03  |
| (xv)    | a. Write neutral structure and Zwitter ion structure for general formula of $\alpha$ -amino acid.       | 01  |
|         | b. How can Alanine be prepared by strecker synthesis?   | 02  |
| (xvi)   | Define the following terms:   |     |
|         | a. Saponification number of Fats  | 1.5 |
|         | b. Rancidity of Fats and Oils   | 1.5 |
| (xvii)  | What is acid rain? Briefly describe its harmful effects.  | 1+2 |
| (xviii) | Describe the steps of digestion in the preparation of pulp.   | 03  |
| (xix)   | Describe mechanism for the preparation of ethane by electrolysis of sodium salt of monocarboxylic acid. | 03  |

**SECTION – C (Marks 26)**

**Note:** Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)

- |             |   |    |
|-------------|---|----|
| <b>Q. 3</b> | a. How is steel manufactured by open hearth process?  | 05 |
|             | b. How does chlorine react with hot and cold sodium hydroxide?  | 04 |
|             | c. What is Aqua Regia? For what purpose is it employed?   | 04 |
| <b>Q. 4</b> | a. Write in detail the differences between $SN_1$ and $SN_2$ mechanisms of nucleophilic substitution reactions with reference to alkyl halides. | 06 |
|             | b. How were straight chain structures of benzene ruled out?   | 04 |
|             | c. Write structural formula for the following compounds?  | 03 |
|             | (i) Picric acid                      (ii) Lactic acid                      (iii) 2,4,6-Trinitrotoluene (TNT)                                    |    |
| <b>Q. 5</b> | a. What are proteins? Briefly describe various types of proteins.   | 04 |
|             | b. How does oil spillage affect marine life?  | 03 |
|             | c. Enlist two similarities and two differences between Hydrogen and halogens.   | 04 |
|             | d. Complete and balance the following reactions:  | 02 |
|             | (i) $KO_2 + CO_2 \longrightarrow$   |    |
|             | (ii) $Mg_3N_2 + H_2O \longrightarrow$   |    |

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Answer Sheet No. \_\_\_\_\_

Sig. of Candidate. \_\_\_\_\_

Sig. of Invigilator. \_\_\_\_\_

## CHEMISTRY HSSC-II

### SECTION – A (Marks 17)

Time allowed: 25 Minutes

(Revised Syllabus)

NOTE: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

- (i) Which one of the following oxides is acidic?  
A.  $Al_2O_3$       B.  $BeO$       C.  $CO_2$       D.  $MgO$
- (ii)  $CaO + SO_3 \rightarrow CaSO_4$   
The above reaction is a type of:  
A. Acid-Base reaction      B. Redox reaction  
C. Precipitation reaction      D. Sulphonation reaction
- (iii) Chlorine (VII) oxide ( $Cl_2O_7$ ) reacts with water to give a strong acid:  
A.  $HClO$       B.  $HClO_2$       C.  $HClO_3$       D.  $HClO_4$
- (iv) The oxidation number of central metal ion in the complex  $Na[Mn(CO)_5]$  is:  
A. +1      B. +2      C. -1      D. +5
- (v) Bronze is an alloy of:  
A. Cu and Sn      B. Cu and Zn      C. Ni, Cr and Fe      D. Cu and Ca
- (vi) The refining of petroleum is carried out by the process called:  
A. Vacuum distillation      B. Fractional distillation  
C. Destructive distillation      D. Steam distillation
- (vii) The electrophile in aromatic sulphonation is:  
A.  $H_2SO_4$       B.  $HSO_4^-$       C.  $SO_3$       D.  $SO_4^{2-}$
- (viii) Chose the mismatched pair from the following:
- | Polymer      | Monomer         |
|--------------|-----------------|
| A. Starch    | Glucose         |
| B. Protein   | Amino acid      |
| C. Polythene | Ethene          |
| D. PVC       | Phenyl chloride |
- (ix) Water adds to acetylene in the presence of mercuric sulphate dissolved in  $Conc : H_2SO_4$  to give a stable product called:  
A. Acetaldehyde      B. Acetic acid      C. Ethyl alcohol      D. Ethylene glycol
- (x) Formaldehyde on reaction with methyl magnesium bromide produces:  
A. Methanol      B. Ethanol      C. 1-propanol      D. 2-propanol
- (xi) Isobutyric acid is also called:  
A. 2-methyl propanoic acid      B. Butanoic acid  
C. Propan-dioic acid      D. 2,2 dimethyl propan-dioic acid
- (xii) The formation of soap by the reaction of Fat and Sodium hydroxide is called:  
A. Hydrogenation      B. Neutralization      C. Saponification      D. Esterification
- (xiii) Isomers of a substance must have:  
A. Same chemical properties      B. Same Molecular weight  
C. Same structural formula      D. Same functional group
- (xiv) Cyclopropane is an example of:  
A. Aromatic compounds      B. Alicyclic compounds  
C. Aliphatic compounds      D. Heterocyclic compounds
- (xv) Ecosystem is the smallest unit of:  
A. Lithosphere      B. Hydrosphere      C. Atmosphere      D. Biosphere
- (xvi) Mass spectroscopy is used to determine:  
A. Molecular weight      B. Molecular formula  
C. Molecular structure      D. Alignment of nuclei in magnetic field
- (xvii) Benzene can Undergo all the following reactions except:  
A. Elimination      B. Substitution      C. Oxidation      D. Addition

For Examiner's use only:

Total Marks:

17

Marks Obtained:

— 2HA 1609 (ON)\* —



# CHEMISTRY HSSC-II

(Revised Syllabus)

31

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: Sections B and C comprise pages 1 – 2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

## SECTION – B (Marks 42)

Q. 2 Answer any FOURTEEN parts. The answer to each part should not exceed 5 to 6 lines. (14 x 3 = 42)

- (i) a. Why the elements of group I Form  $M^+$  but not  $M^{2+}$  ? 01  
b. Why do group I metals show strong reducing properties? Explain. 02
- (ii) Complete the following reactions of 3rd period elements with water: 03  
a.  $2Na + 2H_2O \xrightarrow{\text{Cold}} ?$   
b.  $Mg + 2H_2O \xrightarrow{\text{Steam}} ?$   
c.  $2Cl_2 + 2H_2O \xrightarrow{\text{Sunlight}} ?$
- (iii) Explain why  $CO_2$  is gas while  $SiO_2$  is solid, although both carbon and silicon belong to same group. 03
- (iv) Write down the chemical formulae of the following complex compounds: 03  
a. Potassium hexacyanoferrate (II)  
b. Tetraammine copper (II) sulphate  
c. Dichlorotetraammine cobalt (II) chloride
- (v) Discuss the effect of adding  $H^+$  ions and  $OH^-$  ions on the equilibrium of following reaction: 03  
 $2CrO_4^{2-} + 2H^+ \rightleftharpoons Cr_2O_7^{2-} + H_2O$
- (vi) Why Lithium salts are more covalent than the salts of other alkali metals? Explain. 03
- (vii) How will you detect the presence of Nitrogen in the organic compound using Lassaign's solution? 03
- (viii) How acetone reacts with: 03  
a. Hydroxylamine  
b. Iodine in the presence of  $NaOH$  or  $Na_2CO_3$   
c. Hydrazine
- (ix) Starting from Ethyne, how will you synthesize the following compounds: 03  
a. Ethane  
b. 1,1-dibromoethane  
c. Disilver acetylide
- (x) How alkyl halides react with: 03  
a. Alcohol  
b. Mg in the presence of ether  
c. Ammonia
- (xi) Write down step-wise mechanism for alcohol condensation to form alkene. 03
- (xii) Phenol is more reactive towards electrophilic aromatic substitution reactions. Explain why? 03
- (xiii) Justify the following decreasing order of reactivity: 03  
Alkenes > Alkynes > Alkanes
- (xiv) How are the Carboxylic acids obtained from? 03  
a. Nitriles  
b. Grignard's reagent  
c. Aldehydes



- (xv) a. What are amines? 01  
 b. Amines are more basic than corresponding alcohols. Why? 02
- (xvi) a. Define is spectroscopy. 01  
 b. Describe the principle of spectroscopy. 02
- (xvii) Write down the structures of following compounds: 03  
 a. Vinyl alcohol  
 b. 1, 3, 5 - cyclohexatriene  
 c. Carbolic acid
- (xviii) a. What are Hydrocarbons? 01  
 b. Why is Benzene called aromatic Hydrocarbon? 02
- (xix) "High concentration of  $CO_2$  in the atmosphere is responsible for the climatic changes". Comment. 03

**SECTION – C (Marks 26)**

**Note:** Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)

- Q. 3** a. How does Beryllium differ from other elements of its own group? 06  
 b. The Acidic character of Hydrides of group VII elements increases on descending down the group. Why? 04  
 c. How is  $V_2O_5$  used as a catalyst for the oxidation of  $SO_2$  to  $SO_3$ ? 03
- Q. 4** a. Discuss the following factors affecting substitution versus elimination reactions of alkyl halides: 06  
 (i) Structure of substrate  
 (ii) Nature of base  
 (iii) Temperature  
 b. Give two chemical reactions in which Benzene behaves as a saturated compound. 04  
 c. How is Grignard's reagent used to prepare Primary, Secondary and Tertiary alcohols? 03
- Q. 5** a. Discuss the chemistry and mechanism of Cannizzaro's reaction. 03  
 b. Differentiate between: 06  
 (i) Paraffins and olefins  
 (ii) Position and Functional group isomerism  
 (iii) Thermoplastic and thermosetting polymers  
 c. What are carbohydrates? Give three major functions of carbohydrates in human body. 01+03

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