



CHEMISTRY HSSC-II

SECTION – A (Marks 17)

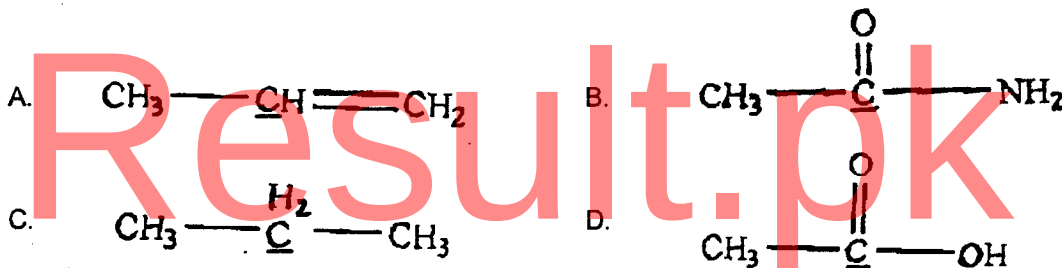
Time allowed: 25 Minutes

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.

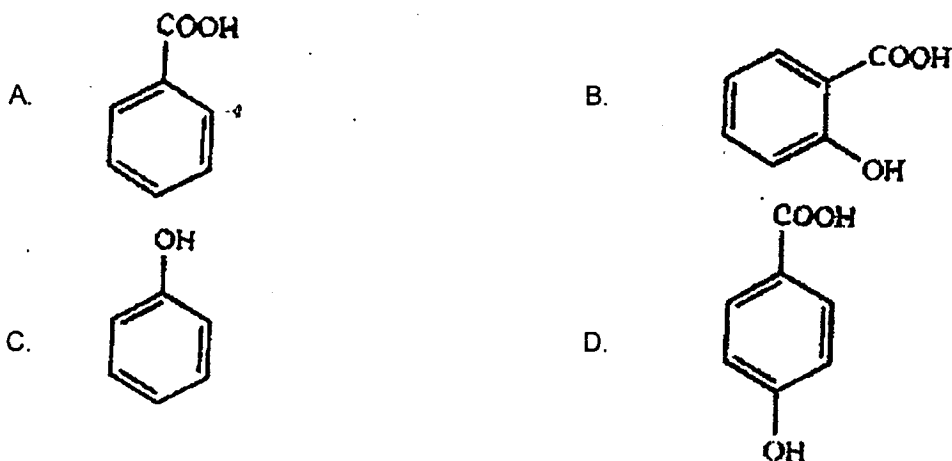
Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

- (i) The decrease in ionization energy of Alkali Metals from top to bottom in a group is due to:
- A. Shielding effect and Nuclear charge B. Atomic size and Nuclear charge
C. Shielding effect and Atomic size D. None of these
- (ii) Which of the following reacts with Alkali to give Hydrogen gas?
- A. Be B. Mg C. Ca D. Ba
- (iii) Borax, Colemanite and Orthoboric acid are the common minerals of:
- A. Aluminium B. Boron C. Sodium D. Calcium
- (iv) In contact process the catalyst used is:
- A. Fe_2O_3 B. V_2O_5 C. SO_3 D. Ag_2O
- (v) The decrease in oxidizing power of Halogens down the group is according to which of the following order?
- A. $F_2 > Cl_2 > Br_2 = I_2$ B. $F_2 > Cl_2 = Br_2 > I_2$
C. $I_2 > Cl_2 > Br_2 > F_2$ D. $F_2 > Cl_2 > Br_2 > I_2$
- (vi) Which of the following is non-typical transition element?
- A. Cr B. Mn C. Zn D. Fe
- (vii) Which of the following compounds reacts with HBr obeying Markownikov's rule?
- A. $H_2C=CH_2$
- B.
- C.
- D.
- (viii) In S_N1 reaction:
- A. Retention of configuration does not take place
B. Inversion of configuration does not take place
C. Both retention and inversion of configuration take place
D. None of these
- (ix) The product formed on reaction of Ethanol with $SOCl_2$ in the presence of pyridine is:
- A. Chloroethanol B. Chloroethane C. Chloroethanal D. Both A and C

- (x) Epoxy resins belongs to:
 A. Thermosetting polymers
 B. Thermoplastic polymers
 C. Biopolymers
 D. None of these
- (xi) Which of the following cannot be distinguished by Iodoform test?
 A. CH_3OH and $\text{H}_3\text{C}-\text{CH}_2-\text{OH}$
 B. $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{CH}_3$ and $\text{C}_2\text{H}_5-\text{C}(=\text{O})-\text{C}_2\text{H}_5$
 C. $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{H}$ and $\text{H}-\text{C}(=\text{O})-\text{H}$
 D. $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{CH}_3$ and $\text{H}_3\text{C}-\text{C}(=\text{O})-\text{C}_2\text{H}_5$
- (xii) $\text{CH}_3\text{Cl} + \text{KCN} \xrightarrow{\text{Alcohol}} (\text{A}) \xrightarrow{\text{H}^+ / \text{H}_2\text{O}} (\text{B})$
 The end product (B) of the above reaction is:
 A. HCOOH B. CH_3NH_2 C. CH_3COOH D. CH_3OCH_3
- (xiii) Which of the following is **NOT** a Nitrogenous fertilizer?
 A. Ammonia B. Urea
 C. Ammonium Nitrate D. Calcium Super Phosphate
- (xiv) The pH range of acid rain is:
 A. 7.0 – 6.5 B. 6.5 – 6.0 C. 6.0 – 5.6 D. Less than 5.0
- (xv) In which of the following compounds, the underlined carbon has sp^3 Hybridization?



- (xvi) Total number of di-substituted products obtained from Benzene is:
 A. 2 B. 3 C. 4 D. 5
- (xvii) Choose the structure of carboxylic acid:



For Examiner's use only:

Total Marks:

17

Marks Obtained:



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21

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

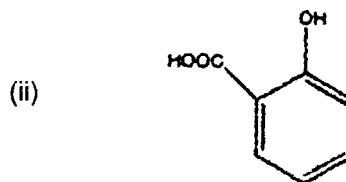
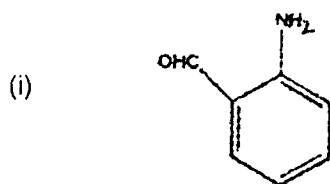
NOTE: Sections B and C comprise pages 1 – 2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 42)

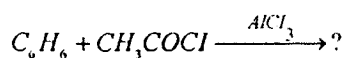
Q. 2 Answer any FOURTEEN parts. The answer to each part should not exceed 5 to 6 lines. (14 x 3 = 42)

- (i) a. ZnO is Amphoteric oxide. Justify this statement by providing two chemical reactions. 02
b. Describe the resemblance of Hydrogen with the elements of Group 1A of periodic table. (Any two points) 01
- (ii) a. What is Milk of Mangesia? 01
b. Give the chemical reactions which take place during the hardening of mortar. 02
- (iii) a. Describe the effect of heat on Boric acid with the help of two chemical equations. 02
b. Write down the chemical formula of soap stone. 01
- (iv) a. Nitrous acid (HNO_2) behaves as oxidizing as well as reducing agent. Provide two chemical equations showing this behaviour of HNO_2 . 02
b. Complete the following reaction: $2\text{H}_3\text{PO}_4 \xrightarrow{240^\circ\text{C}} (\dots) \xrightarrow{316^\circ\text{C}} (\dots)$ 01
- (v) a. Keeping in mind the system of nomenclature of oxyacids name the following compounds: 02
i. HClO (ii) HClO_2 (iii) HClO_3 (iv) HClO_4
b. Xenon tetra-fluoride can be used as fluorinating agent. Give a chemical reaction which shows this behaviour. 01
- (vi) a. Give systematic (IUPAC) names of the following complex compounds: 02
(i) $[\text{PtCl}(\text{NO}_2)(\text{NH}_3)_4]\text{SO}_4$ (ii) $\text{K}_4[\text{Fe}(\text{CN})_6]$
b. What is the difference between Wrought Iron and Cast Iron? 01
- (vii) a. Define functional group. Give structures of two nitrogen containing functional groups. 02
b. What are Heterocyclic compounds? Give structures of any one heterocyclic compound. 01
- (viii) a. Give the structural formulae of the following compounds: 02
(i) 4,5-Dimethyl-2-hexene (ii) Isopentane
b. Which Alkene gives Formaldehyde as the only product after Ozonolysis? 01
- (ix) a. Give IUPAC names of the following: 02

-4



- b. Give name and structure of the product of the following reaction: 01



- (x) How will you synthesize the following compounds starting from $\text{CH}_3 - \text{CH}_2 - \text{Mg} - \text{Br}$? 03
- a. Propanoic Acid
b. 1-Propanol
c. 2-Butanol

(xi)	a.	Describe the acidic behaviour of Phenol.	02
	b.	Arrange the following in decreasing order of acidity:	01
	(i)	Alcohol	
	(ii)	Phenol	
	(iii)	Carboxylic acid	
	(iv)	Water	
(xii)	a.	Define condensation reaction.	01
	b.	Give chemical equation which involves the reaction of 2 moles of Acetaldehyde in the presence of NaOH. Also name the chemical reaction.	02
(xiii)	a.	What is Glacial Acetic Acid?	01
	b.	How Alanine can be prepared by Ethanal? Also give the name of the reaction.	02
(xiv)	a.	Name the major classes of organic compounds in living cell.	01
	b.	Define the term lipids.	01
	c.	What are the primary building blocks of lipids?	01
(xv)	a.	What is meant by Prilling of Urea?	01
	b.	Why is cement often called Portland Cement?	02
(xvi)		Explain the following terms:	03
	a.	Biochemical Oxygen Demand (BOD)	
	b.	Chemical Oxygen Demand (COD)	
(xvii)	a.	Write down the chemical reactions involved in the preparation of Ethanol from Starch.	02
	b.	Absolute Alcohol cannot be obtained by Fermentation process. Give reason.	01
(xviii)	a.	Give two applications of Argon.	02
	b.	Write down the chemical reactions of Tin with:	01
	(i)	$\text{HNO}_3(\text{dil})$	
	(ii)	$\text{HNO}_3(\text{conc})$	
(xix)		Why do the transition metals give coloured compounds. Explain with an example.	03
SECTION – C (Marks 26)			
Note: Attempt any TWO questions. All questions carry equal marks.			(2 x 13 = 26)
Q. 3	a.	Point out the factors causing peculiar behavior of Fluorine.	04
	b.	Explain sacrificial corrosion.	04
	c.	Describe the preparation of Sodium (Na) metal, by DOWN'S CELL.	05
Q. 4	a.	Describe the preparation of Ethyne by Kolbe's Electrolysis.	04
	b.	Point out the differences between $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reactions.	06
	c.	Write the names and structures of the Monomers of the following Polymers:	03
	(i)	PVC	
	(ii)	Nylon-6,6	
	(iii)	Polystyrene	
Q. 5	a.	Explain the following terms:	06
	(i)	Hydrosphere	
	(ii)	Incineration of the Municipal Solid Waste	
	b.	Write down any three essential qualities of a good Fertilizer.	03
	c.	Explain Addition Polymerization with mechanism.	04



Roll No.

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Sig. of Candidate.

Answer Sheet No.

Sig. of Invigilator.

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SECTION – A (Marks 17)

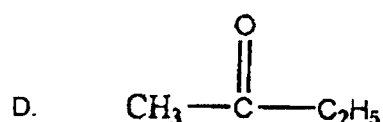
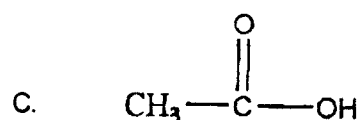
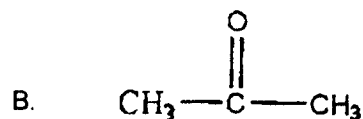
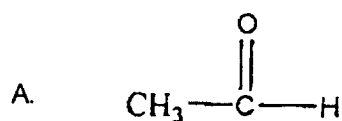
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Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

- (i) Oxidation state of the elements of group IA is:
A. +1 B. -1 C. 0 D. Both A and B
- (ii) Plaster of paris is formed by the removal of:
A. Two quarter of the water of crystallization from Gypsum
B. Three quarter of the water of crystallization from Gypsum
C. Two quarter of the water of crystallization from Soda Ash
D. Three quarter of the water of crystallization of Soda Ash
- (iii) Borax is the sodium salt of:
A. Tetraboric Acid B. Metaboric Acid
C. Pyroboric Acid D. Orthoboric Acid
- (iv) Aqua Regia is prepared by mixing:
A. One volume of HCl and three volume of HNO_3
B. Three volume of HCl and one volume of HNO_3
C. One volume of HCl and three volume of H_2SO_4
D. Three volume of HCl and one volume of H_2SO_4
- (v) Which of the following can react directly with Noble gases?
A. Fluorine B. Chlorine
C. Bromine D. Iodine
- (vi) The coordination number of Fe in $\text{K}_4[\text{Fe}(\text{CN})_6]$ is:
A. 4 B. 5 C. 6 D. 7
- (vii) n-Pentane and 2,2-dimethylpropane are:
A. Chain isomers B. Position isomers
C. Functional group isomers D. Metamers
- (viii) Which of the following does **NOT** show Acidic nature?
A. Acetylene B. Vinyl Acetylene
C. Divinyl Acetylene D. Ethyl Acetylene
- (ix) The Meta Directing groups:
A. Increase the chemical reactivity of Benzene
B. Decrease the chemical reactivity of Benzene
C. Do not affect the chemical reactivity of Benzene
D. Sometimes increase sometimes decrease the chemical reactivity of Benzene
- (x) The first step is same in which of the following:
A. E1 and E2 reactions B. $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ reactions
C. E1 and $\text{S}_\text{N}1$ reactions D. $\text{S}_\text{N}1$ and E2 reactions

- (xi) The correct decreasing order of the relative acidic strength of Alcohol, Phenol, Water and Carboxylic acid is:
- A. Carboxylic acid>Phenol>Water>Alcohol
B. Alcohol>Water>Phenol>Carboxylic acid
C. Phenol>Carboxylic acid>Water>Alcohol
D. Water>Carboxylic acid>Phenol>Alcohol
- (xii) Which of the following will give Positive Tollen's test?



- (xiii) Phthalic acid is also named as:
- A. 1,2-Benzendicarboxylic acid
B. 1,3-Benzendicarboxylic acid
C. 1,4-Benzendicarboxylic acid
D. Benzoic Acid
- (xiv) Starch is the polymer of:
- A. α -D-Glucose
B. β -D-glucose
C. Amino acids
D. Esters
- (xv) Which woody material is used for the manufacturing of Paper Pulp?
- A. Cotton
B. Bagasse
C. Poplar
D. Rice Straw
- (xvi) A single Chloride free radical can destroy up to:
- A. 100 Ozone molecules
B. 1,000 Ozone molecules
C. 10,000 Ozone molecules
D. 100,000 Ozone molecules
- (xvii) Synthetic Rubber is made by Polymerization of:
- A. Chloroform⁻⁴
B. Acetylene
C. Divinylacetylene
D. Chloroprene

For Examiner's use only:

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17

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CHEMISTRY HSSC-II

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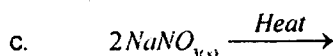
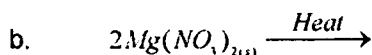
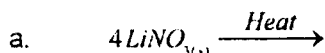
Total Marks Sections B and C: 68

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. What is Hydration Energy? Explain with an example. 02
b. Why is PbCl_2 mainly ionic and PbCl_4 mainly covalent in nature? 01
(ii) Complete the following reactions: 03



- (iii) a. The Aluminium is said to be corrosion free. Briefly describe this behaviour. 02
b. Point out the use of Boric Acid in medicine field. 01

- (iv) Ortho Phosphoric Acid is Tri-Basic Acid. Justify this statement by providing chemical evidences. 03

- (v) a. Arrange the following according to the increasing acidic strength also give reason. 02
 HClO , HClO_2 , HClO_3 , HClO_4

- b. Why does the solubility of noble gases in H_2O increase from top to bottom in a group of periodic table. 01

- (vi) a. What are Chelates? Give one example. 02

- b. Complete the following reaction $4\text{KMnO}_4 + 4\text{KOH} \longrightarrow ?$ 01

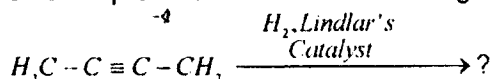
- (vii) a. What is the purpose of Cracking? 01

- b. Give the name of possible compounds obtained after cracking of n-Hexadecane. 01

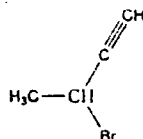
- c. Give the structure of Imino group. 01

- (viii) a. Mustard gas can be produced from Ethene. Provide chemical equation. 01

- b. Give the product formed in the following reaction: 01



- c. Give IUPAC name of the following: 01



- (ix) a. Arrange the following according to the increasing order of reactivity towards electrophilic substitution reaction and also justify the reactivity order by giving valid reason: 03

- (i) Phenol (ii) Benzaldehyde (iii) Benzene

- (x) a. What is Grignard's reagent? 01

- b. How can Grignard's reagent be prepared? 01

- c. How can ethane be prepared from Grignard's reagent? 01

- (xi) How does ethyl alcohol react with the following? 03

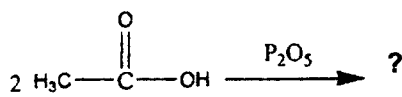
- a. Na b. SOCl_2 c. $\text{H}_2\text{SO}_4(\text{conc.})$ at 180°C

- (xii) a. How does Formaldehyde react with NaHSO_3 ? 01

- b. Give two uses of Acetaldehyde in medical field. 01

- c. What happens when calcium acetate is heated? 01

- (xiii) a. How can one visualize the amino acids separated by paper chromatography? 01
 b. Write down the structural formula of Aspartic Acid. 01
 c. Complete the following reaction. 01



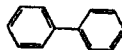
- (xiv) a. What is meant by saponification number? 01
 b. Define steroids. 01
 c. Give the structure of Steroid Nucleus. 01
 (xv) a. Define the term "Cement". 01
 b. What are macro-nutrients? Give examples. 02
 (xvi) a. Define the following terms: (i) Reducing Smog (ii) Oxidizing Smog 02
 b. How are marine organisms affected by oil spillage? 01
 (xvii) a. Give systematic names of the following complexes: 02
 (i) $\text{Na}_3[\text{CoF}_6]$ (ii) $[\text{Pt}(\text{OH})_2(\text{NH}_3)_4]\text{SO}_4$
 b. Radon can be produced from Radioactive decay. Give chemical equation. 01
 (xviii) a. Define Degree of Polymerization (DP). 01
 b. Find the molecular mass of Polyvinyl chloride. If its DP is 1000 and molecular mass of Repeating unit is 63. 01
 c. What is Denaturing of Protein? 01
 (xix) a. For what are the following chemical tests used? 02
 (i) Baeyer's Test (ii) Lucas Test
 (iii) Tollen's Test (iv) Iodoform Test
 b. Write down the chemical formula of Histidine. 01

SECTION – C (Marks 26)

Note:

Attempt any TWO questions. All questions carry equal marks.

(2 x 13 = 26)

- Q. 3** a. Explain the variation of melting points along the short periods. 06
 b. Complete and balance the following chemical equations: 04
 (i) $\text{NO} + \text{Cl}_2 \longrightarrow$ (ii) $\text{KNO}_3 + \text{H}_2\text{SO}_4 \longrightarrow$
 (iii) $\text{HNO}_2 + \text{HI} \longrightarrow$ (iv) $\text{H}_2\text{S} + \text{NO} \longrightarrow$
 c. What happens when bleaching powder reacts with the following reagents? 03
 (i) H_2SO_4 (conc.) (ii) NH_3 (iii) CO_2
Q. 4 a. Write the structural formula for each of the following compounds: 04
 (i) Ethylene glycol
 (ii) 2-Amino-5-bromo-3-nitrobenzenesulphonic acid
 (iii) Butyric acid
 (iv) 2-Chlorobutanal
 b. Write IUPAC names of the following: 03
 (i) $(\text{CH}_3)_3\text{CCH}_2\text{CH}_3$ (ii) $\text{CH}_2 = \text{CH} - \text{C} \equiv \text{CH}$ (iii) 
 c. Describe the following: 06
 (i) Friedel Craft's Acylation (ii) Reforming
Q. 5 a. How do enzyme concentration, temperature and pH affect the Enzymatic reactions? 06
 b. Explain the term Landfill. 03
 c. Neutral Sulphite Semi Chemical (NSSC) process is one of the chemical pulping processes. List all the steps involved in this process. 04