



Roll No.

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

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

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

## 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) What is the correct order of second ionization potential of C, N, O and F?

A.  $O > N > F > C$

B.  $O > F > N > C$

C.  $C > N > O > F$

D.  $F > O > N > C$

(ii) Epsom salt is a mineral of the metal \_\_\_\_\_

A. Calcium

B. Sodium

C. Magnesium

D. Strontium

(iii) In P-Type semiconductor, silicon is doped with \_\_\_\_\_

A. Copper

B. Nitrogen

C. Phosphorous

D. Boron

(iv) Which of the following is the strongest alkali?

A.  $Ca(OH)_2$

B.  $NaOH$

C.  $KOH$

D.  $Ba(OH)_2$

(v) Reaction of Oxalic acid with conc.  $H_2SO_4$  produces \_\_\_\_\_

A.  $CO_2$

B.  $CO$

C. Both  $CO$  and  $CO_2$

D. No reaction occurs

(vi) Which of the following is the strongest acid?

A.  $HClO$

B.  $HClO_2$

C.  $HClO_3$

D.  $HClO_4$

(vii) Polyethylene, polyvinyl acetate and starch are \_\_\_\_\_

A. Copolymers

B. Homopolymers

C. Addition polymers

D. Condensation polymers

(viii) Which is the final product of rotary kiln in cement manufacturing?

A. Cement

B. Slurry

C. Cement Clinker

D. Mortar

DO NOT WRITE ANYTHING HERE

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- (ix) Ecosystem is smaller unit of \_\_\_\_\_
- A. Lithosphere    B. Biosphere  
C. Hydrosphere                                         D. Atmosphere
- (x) Which of the following is  $\alpha$ -decay product of the radium?
- A. He    B. Kr  
C. Ne     D. Xe
- (xi) In Open Hearth process, dolomite is used if the impurities present are \_\_\_\_\_
- A. Mn, Si     B. C, Si  
C. P, S     D. P, Cl
- (xii) The compound which is **NOT** isomeric with diethyl ether is \_\_\_\_\_
- A. Butanone     B. 2-Methyl propane-2-ol  
C. Butane-1-ol                                         D. None of these
- (xiii) Which organic compound can behave as an acid too?
- A.  $C_2H_4$      B.  $CH_3 - CH = CH_2$   
C.  $CH_3 - C \equiv C - CH_3$                          D.  $CH_3 - C \equiv C - H$
- (xiv) A glyoxal is formed due to reaction of benzene with (a/an) \_\_\_\_\_
- A. Aldehyde     B. Ketone  
C. Ozone     D. Oxygen gas
- (xv) Which of the following is **NOT** a nucleophile?
- A.  $H_2O$     B.  $H_2S$   
C.  $BF_3$     D.  $NH_3$
- (xvi) Which of the following enzymes is **NOT** involved in fermentation of starch?
- A. Diastase    B. Zymase  
C. Urease     D. Maltase
- (xvii) Ketones are less reactive than aldehydes. Which of the following reagents will react with both aldehydes and ketones?
- A. Tollen's reagent                                    B. Fehling's reagent  
C. Grignard reagent                                 D. Benedict's reagent

For Examiner's use only:

Total Marks:

17

Marks Obtained:



# CHEMISTRY HSSC-II

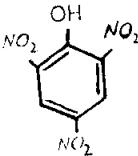
Time allowed: 2:35 Hours

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

- (i) a. Why does the metallic character increase from top to bottom in a group? 01  
b. Give reason for the statement: "Lanthanides contraction controls the atomic size of element of 6<sup>th</sup> and 7<sup>th</sup> period". 02
- (ii) a. Why is the aqueous solution of soda ash alkaline in nature? 01  
b. How is Down's cell process better than other processes used for the manufacturing of sodium metal? 02
- (iii) Discuss the anomalous behaviour of Boron with respect to the members of its own group. 03
- (iv) Why is silicone oil preferred over ordinary lubricants? 03
- (v) Both  $CO_2$  and  $SiO_2$  are oxides of group IV A elements. However,  $CO_2$  exists as a gas and  $SiO_2$  exists as a solid. Explain. 03
- (vi) How does nitric acid oxidize the non-metals? Give three examples in the form of balanced chemical equations 03
- (vii) Halogens form a homologous series but fluorine differs from the other halogens in many respects. Discuss. 03
- (viii) a. What are Chelates? Give an example. 1.5  
b. How is chromate ion ( $CrO_4^{2-}$ ) converted into dichromate ion ( $Cr_2O_7^{2-}$ )? 1.5
- (ix) a. Give all possible isomers of  $C_5H_{12}$ . 1.5  
b. What are homocyclic and heterocyclic Hydrocarbon? Give an example of each 1.5
- (x) How is 2-Butene prepared from: 03  
a. An alkyl halide                      b. Vicinal dihalide
- (xi) Briefly explain the difference between Lindlar's catalyst and Raney-Nickle catalyst with respect to their composition and use. 03
- (xii) Write the names of following aromatic compounds.  03  
 $C_6H_5 - O - C_6H_5$  ;  $C_6H_5 - CH_2 - C_6H_5$  ;
- (xiii) How is Grignard Reagent used for the preparation of alkanes? Give any three examples with reaction. 03
- (xiv) a. Absolute alcohol can not be prepared by fermentation of molasses. Give reason. 1.5  
b. How is alcohol denatured? 1.5
- (xv) Give a reaction example of disproportionation reaction of aldehyde. 03
- (xvi) Amino acids are simplest protein. Amino acids show dual character both as an acid and base. Give a reaction example to show their dual nature. 03
- (xvii) What are the responsibilities of nucleic acids? What type of nucleic acids have been discovered? 03
- (xviii) How is ozone affected by chloroflouro carbons? Briefly explain. 03
- (xix) Give a general mechanism for the base-catalysed nucleophilic addition reaction of carbonyl compounds. 03

**SECTION – C (Marks 26)**

- Note:** Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)
- Q. 3**
- a. How is bleaching powder prepared by Beckmann's method? 04
- b. What is sacrificial corrosion? Explain with an example. 03
- c. How does  $KMnO_4$  oxidize the following:
- $H_2S$  ,  $FeSO_4$  , Oxalic acid 03
- d. Determine the charge on central metal atom of the following complexes:
- $[PtCl(NO_2)(NH_3)_2]^{2+}$  ;  $[Fe(CN)_6]^{3+}$  ;  $[Ni(CO)_4]$  03
- Q. 4**
- a. Give any two chemical tests to distinguish between 1-Butene and 1-Butyne. 2+2
- b. How will you bring about the following conversion:
- (i) Methane to Ethane (ii) Ethane to Methane 2+2
- c. How do tertiary alkyl halide undergo nucleophilic substitution reaction? Give a detailed general mechanism. 03
- d. Show by diagram the industrial preparation of Methanol. 02
- Q. 5**
- a. What are Lipids? In what ways are fats and oil different? 04
- b. Discuss the hydrolysis of triglyceride and reaction of triglyceride with an alkali. 03
- c. How does acid deposition occur? What are its effects on environment? 03
- d. Write the structural formulas of the following organic compounds: 03
- Iso-butyl alcohol ; Malonic acid ; Vinyl Chloride

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

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# 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) Amount of ozone in the atmosphere is expressed in \_\_\_\_\_
- |                |                 |
|----------------|-----------------|
| A. Debye unit  | B. Mole/ $dm^3$ |
| C. Dobson unit | D. Decibel unit |
- (ii) Which of the following is a condensation polymer?
- |                 |                |
|-----------------|----------------|
| A. PVC          | B. Polystyrene |
| C. Polyethylene | D. Nylon       |
- (iii) Organic compounds 'X' and 'Y' react together to form another organic compound 'Z'. What type of compounds X, Y and Z are?
- |                                 |                                 |
|---------------------------------|---------------------------------|
| A. X(alcohol) Y(ester) Z (acid) | B. X(acid) Y(ester) Z (alcohol) |
| C. X(ester) Y(alcohol) Z (acid) | D. X(alcohol) Y(acid) Z (ester) |
- (iv) Which of the following is **NOT** Calcareous material?
- |           |          |
|-----------|----------|
| A. Lime   | B. Clay  |
| C. Marble | D. Nylon |
- (v) Reaction between acetone and HCN is an example of \_\_\_\_\_
- |  |
|--|
| A. Electrophilic addition reaction     |
| B. Electrophilic substitution reaction |
| C. Nucleophilic addition reaction      |
| D. Nucleophilic substitution reaction  |
- (vi) Ethers are organic compounds which do **NOT** react with \_\_\_\_\_
- |                    |                      |
|--------------------|----------------------|
| A. Hydrogen iodide | B. $PCl_5$           |
| C. Ammonia         | D. Hydrogen chloride |
- (vii) Which of the following compounds is electrophile?
- |           |           |
|-----------|-----------|
| A. $H_2O$ | B. $H_2S$ |
| C. $BF_3$ | D. $NH_3$ |
- (viii) Which of the following compounds undergoes electrophilic substitution more easily?
- |                 |                  |
|-----------------|------------------|
| A. Acetophenone | B. Benzene       |
| C. Phenol       | D. None of these |
- (ix) Following are some organic compounds. Which one behaves as an acid too?
- |                       |                               |
|-----------------------|-------------------------------|
| A. $C_2H_4$           | B. $CH_3 - C \equiv C - CH_3$ |
| C. $CH_3 - CH = CH_2$ | D. $CH_3 - C \equiv C - H$    |

- (x) Which of the following compounds does **NOT** have any position isomer?  
A. Butyne  
B. Propanol  
C. Propene  
D. Dichlorobenzene
- (xi) Which of the following is the purest form of iron?  
A. Cast iron  
B. Pig iron  
C. Wrought iron  
D. Steel
- (xii) Halogen acids are strong acids. Which of the following halogen acids can **NOT** be kept in the glass bottle?  
A. *HCl*  
B. *HF*  
C. *HBr*  
D. *HI*
- (xiii) Moist ammonia gas can only be dried up by \_\_\_\_\_  
A. Quick lime  
B. Ortho Sulphuric acid  
C. Nitric acid  
D. Anhydrous calcium sulphate
- (xiv) Metals can displace hydrogen from acid. However, which of the following metals can **NOT** displace hydrogen from dilute nitric acid?  
A. *Mg*  
B. *Mn*  
C. *Cu*  
D. *Na*
- (xv) Trona is a mineral of \_\_\_\_\_  
A. Potassium  
B. Sodium  
C. Magnesium  
D. None of these
- (xvi) Oxides of strongly electronegative elements are \_\_\_\_\_  
A. Basic  
B. Acidic  
C. Neutral  
D. Amphoteric
- (xvii) China-ware are made from a mixture of Kaolin, bone ash and \_\_\_\_\_  
A. Sodium silicate  
B. Talc  
C. Feldspar  
D. Quartz

For Examiner's use only:

Total Marks:

17

Marks Obtained:

— 2HA 1309 (ON) —



# CHEMISTRY HSSC-II

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

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

## SECTION - B (Marks 42)

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

- (i) Melting and boiling points of elements increase from left to right up to middle of the periodic table and decrease onward. Give reason. 03
- (ii) Briefly explain the Borax bead test and its chemistry. 03
- (iii) Sodium metal is obtained on commercial level by the Down's cell. Draw a labelled diagram of Down's cell which clearly elaborates the extraction of sodium metal. 03
- (iv) What is Mortar? 03
- (v) Nitric acid is mostly used in the manufacture of fertilizers and explosive. However, it can also be used to dissolve noble metals such as gold and platinum. Briefly explain the chemistry of this property. 03
- (vi) a Orthophosphoric acid is a deliquescent crystalline solid. On heating it, about at  $316^{\circ}\text{C}$ , what changes are produced in its composition. 01  
b Oil of vitriol is extensively used in industrial processes. However, it can also be used as dehydrating agent. Give two examples of this property. 02
- (vii) All the free halogens act as oxidizing agent when they react with metals or non-metals. Give order of oxidizing power of halogens. Also briefly explain the factors which are responsible for oxidizing power. 03
- (viii) Give systematic IUPAC names to the following compounds: 03  
 $K_4[Fe(CN)_6]$  ;  $[Fe(CO)_5]$  ;  $[PtCl(NO_2)(NH_3)_4]SO_4$
- (ix) a Coal is an important solid fuel and becomes a source of organic compounds when subjected to destructive distillation. Briefly express. 01  
b Give structures and IUPAC names of geometric isomers of the following:  
2 - Pentene ; 1-Bromo-2-chloropropene. 02
- (x) Halogenation of alkanes is believed to proceed through free radical mechanism. How is this reaction completed? Give all possible steps with mechanism. 03
- (xi) What happens when: 03  
a A mixture of benzene vapours and air passes over heated vanadium penta oxide  
b Chlorine is passed through benzene in sunlight  
c Benzene is treated with ozone
- (xii) How will you carry out the following conversions: 01  
a  $CH_3-CH_2-CH_2-Cl \rightarrow CH_3-CH=CH_2$   
b  $CH_3-CH_2-Br \rightarrow CH_3-CI_3$  02
- (xiii) Grignard reagent is a reactive organic compound. Briefly discuss the reactivity and structure of Grignard reagent. 03

- (xiv) How will you distinguish among the Primary, Secondary and Tertiary alcohols? Give a chemical test. 03
- (xv) What is an Aldol? Give the reaction mechanism for the formation of an aldol. 03
- (xvi) a. Classify the following as thermoplastic and thermosetting plastic:  
Bakelite, PVC, Polyethene, Epoxy resin 01
- b. What is Condensation polymerization? Give an example. 02
- (xvii) Explain the manufacture of urea by a flow-sheet diagram. 03
- (xviii) Detergents are washing agents. How do detergents affect the environment badly? 03
- (xix) a. How are amino acids visualized during paper chromatography? 01
- b. What are Peptides? How are they formed? 02

**SECTION – C (Marks 26)**

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

- Q. 3** a. Explain the following with reason:
- (i) Why does the damaged tin plated iron get rusted quickly? 02
- (ii) How does the process of galvanizing protect iron from rusting? 02
- b. Give the possible geometry of the following complexes:  
 $[Cu(NH_3)_4]^{2+}$ ,  $PCl_5$ ,  $[MnCl_4]^{2-}$ ,  $[Co(NH_3)_6]^{3+}$  02
- c. Give the order of strength of oxy acid of halogen. Also explain the order of strength of oxy acids. 03
- d. How does Nitrogen differ from other elements of its group? 04
- Q. 4** a. How does Friedal-Craft acylation take place? Give an example with mechanism. 03
- b. Write the structural formula of the following organic compounds:  
Pyridine, p-xylene, Picric acid 03
- c. Three different alkenes yield 2-Methylbutane when they are hydrogenated in the presence of a metal catalyst. Give their structures and write the equation for the reactions too. 03
- d. Show by means of chemical reactions how the following conversion takes place:  
*Propane* → *Propene* → *Propyne*. 04
- Q. 5** a. Write the IUPAC names of the following compounds:
- (i)  $CH_3 - CH_2 - CH(OCH_3) - C_2H_5$  (ii)  $C(CH_3)_3 - \overset{O}{\underset{||}{C}} - C(Cl)_3$
- (iii)  $CH_3 - CH(NH_2) - CH_2COOH$  (iv)  $C_6H_5 - CH_2 - C_6H_5 - CH_2 - C_6H_5$  04
- b. (i) How are proteins denatured? 02
- (ii) What is rancidity of fats and oils? 02
- c. What do you understand by the term "setting of cement"? Also discuss the changes which take place in first 24 hours. 02
- d. What is Smog? Explain the different types of smog. 03