Roll No. | | | | | | | | Answer Sheet No _____

Sig. of Candidate._____ 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) Radius of fluorine atom is_____

A. 67 pm B. 79 pm

C. 72 pm D. 89 pm

(ii) _____ is amphoteric Oxide in nature.

A. BeO B. MgO

C. Li_2O D. CaO

(iii) Sn is present in group_____

A. V A B. VI A

C. III A D. IV A

(iv) Pure Sulphuric acid freezes at_____

A. 10.9^0C B. 10.5^0C

C. 9.5^0C D. 12.1^0C

(v) Radon is the α -decay product of the _____

A. Rubidium B. Radium

C. Polonium D. Helium

(vi) $[Ti(H_2O)_6]^{3+}$ absorbs the _____

A. Red light B. Green light

C. Blue light D. Yellow light

(vii) Bleaching powder when reacts with NH_3 produces_____ gas.

A. O_2 B. Cl_2

C. H_2 D. N_2

(viii) Linear shape is associated with which set of hybrid orbitals?

A. sp B. sp^2

C. sp^3 D. dsp^2

(ix) The acid which is obtained when benzene is oxidized in the presence of V_2O_5 is_____

A. Oxalic acid B. Formic acid

C. Picric acid D. Maleic acid

(x) CO_2 when reacts with C_2H_5 MgBr gives_____

A. Butanoic acid B. Ethanoic acid

C. Propanoic acid D. Pentanoic acid

(xi) While changing molasses into glucose the enzyme needed is _____

A. Zymase B. Diastase

C. Maltase D. Invertase

(xii) Paraldehyde is the polymer of_____

A. $HCHO$ B. CH_3CHO

C. CH_3-CH_2-CHO D. $CH_3-CH_2-CH_2-CHO$

(xiii) Ninhydrin test is used to identify _____

A. Fatty acids B. Carbohydrates

C. Amino acids D. Acetic acid

(xiv) Benzene-Dicarboxylic acid_____

A. 1, 2 – Benzenedicarboxylic acid B. 1, 4 Benzenedicarboxylic acid

C. 1, 3 – Benzenedicarboxylic acid D. Propanedioic acid

(xv) Starch is a mixture of two polysacchrides_____

A. Amylose and Sucrose B. Amylose and Cellulose

C. Amylose and Glycogen D. Amylose and Amylopectin

(xvi) Which three elements are needed for the healthy growth of plants?

A. N, S, P B. N, Ca, P

C. N, P, K D. N, K, C

(xvii) The 99.5% mass of the lithosphere is made of _____ elements.

A. 9 B. 10

C. 11 D. 12

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

(i)	a.	Why does H_2O have higher boiling point than HF?	**1.5**
	b.	Why are the oxides of alkali metals and alkaline earth metals basic in nature?	**1.5**
(ii)	a.	What are Polymeric halides?	**01**
	b.	Why does carbon have high melting point?	**01**
	c.	Define the term "Electron affinity".	**01**
(iii)	a.	Give the names and formulae of the minerals of Beryllium.	**01**
	b.	Give the reaction of Be with NaOH. Also give the name of the compound formed.	**01**
	c.	Why are the ionic hydrides reducing in nature?	**01**
(iv)	a.	How is the lime mortar prepared?	**1.5**
	b.	How does gypsum change into Plaster of Paris?	**1.5**
(v)	a.	How is borax prepared from colemanite? Only give reaction with the balanced equation.	**01**
	b.	How is Boric acid prepared from borax? Give reaction.	**01**
	c.	Why does Aluminium not react even with conc. HNO_3 ?	**01**
(vi)	a.	What are the allotropes of Phosphorous? Give structure.	**01**
	b.	Why are the elements of group IV A called chalogens?	**01**
	c.	What is the role of Testing Box in the contact process for the preparation of H_2SO_4 ?	**01**
(vii)	a.	How can Cl_2O_7 be prepared? Give reaction.	**01**
	b.	Define Disproportion reaction.	**01**
	c.	Why are the Oxyacids of chlorine stronger than oxyacids of Bromine and Iodine?	**01**
(viii)	a.	Give the reaction of bleaching powder with $dil\ H_2SO_4$ and NH_3 (give balanced equation of reaction)	**02**
	b.	Why does the solubility of the noble gases increase in water with increase in atomic number?	**01**
(ix)	a.	Draw the geometric shape of PCl_5 . Also give the type of hybridization in it.	**01**
	b.	What is the use of Aluminium in Bessemer's process?	**01**
	c.	Give the reaction of chromyl chloride test.	**01**
(x)	a.	Define the Reforming process.	**01**
	b.	What are alicyclic compounds? Give examples.	**02**

(xi) How will you convert:

a. Succinic acid → Ethene b. Ethene → Formaldehyde **1.5+1.5**

(xii) Complete the following reactions with mechanism:

a. $C_6H_6 + SO_3 \xrightarrow{H_2SO_4}$ **1.5**

b. $C_6H_6 + CH_3COCl \xrightarrow{AlCl_3}$ **1.5**

(xiii) a. Why is Ethane a gas but Ethanol a liquid? **01**

b. Why does the solubility of higher alcohol decrease in water? **01**

c. Why does phenol show acidic nature? **01**

(xiv) a. What is Tollen's test? Also give the reaction. **02**

b. Convert aceton → acetone hydrazone. **01**

(xv) Predict the product of the following reactions:

a. $CH_3COOH + HI \xrightarrow{P}$ b. $R-\underset{\underset{NH_2}{|}}{CH}-COOH \xrightarrow[HCl]{NaNO_2}$ **01+01**

c. $CH_3COOH + NaHCO_3 \rightarrow$ **01**

(xvi) Explain condensation polymerization with example. **03**

(xvii) a. What is Pulp washing process? **02**

b. What are Micronutrients? **01**

(xviii) a. How are Leather Tanneries causing pollution in water? **02**

b. What is the role of dissolved oxygen in measuring the quality of water? **01**

(xix) a. Briefly explain the reactivity of carbonyl group. **1.5**

b. How can acetaldehyde be prepared by the dry distillation of a mixture having calcium salt of formic and acetic acid? **1.5**

SECTION – C (Marks 26)

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

Q. 3 **a.** Explain Borax-bead test with chemical reaction. **03**

b. Give peculiar behaviours of Boron. **05**

c. Explain the Electrochemical theory for protecting the metal from corrosion. **05**

Q. 4 **a.** What are β-elimination reactions? How does E_1 reaction differ from SN_1 reaction? **04**

b. Give the reactions of $C_2H_5 - Mg - Br$ with complete mechanism. **06**

(i) Ethylene Epoxide (ii) CO_2 (iii) Acetone

c. How will you convert the following:

(i) Phenol → Picric acid (ii) Ethyne → acetic acid **02**

(iii) Methylnitrile → acetic acid **01**

Q. 5 **a.** Explain the following:

(i) Condensation polymerization (ii) Polyamide Resin **2.5 + 2.5**

b. Explain bleaching process in the paper industry. **04**

c. What is Smog? Give the conditions necessary for smog formation. **04**

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CHEMISTRY HSSC–II

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) Hydration Energy of Br^- is_____

A. – 384 B. – 351

C. – 321 D. – 499

(ii) Spodumene is an important mineral of _____

A. K B. Li

C. Al D. Na

(iii) Analcite is a mineral of_____

A. Si B. C

C. Sn D. Ge

(iv) The density of Se is_____

A. 2.06 B. 6.25

C. 4.8 D. 9.4

(v) The Oxidation State of "X" in HXO_4 is_____

A. +7 B. +6

C. +4 D. +1

(vi) Charge on the coordination sphere of $[Fe(CN)_6]$ is _____

A. -4 B. $+4$

C. +6 D. -6

(vii) Geometry of the complex compound $[Co(NH_3)_6]^{3+}$ is_____

A. Bipyramidal B. Tetrahedral

C. Octahedral D. Square planar

(viii) What is the boiling point of n-butane ?

A. -0.5^oC B. 0.15^oC

C. -0.7^oC D. -11.7^oC

(ix) Carbon-carbon bond length in benzene is_____

A. $1.34\mathring{A}$ B. $1.20\mathring{A}$

C. $1.397\mathring{A}$ D. $1.54\mathring{A}$

(x) Elimination bimolecular reactions involve _____

A. First order kinetics B. Second order kinetics

C. Third order kinetics D. Zero order kinetics

(xi) Rectified spirit when redistilled changes into absolute alcohol in the presence of_____

A. K_2O B. MgO

C. CaO D. Na_2O

(xii) Which of the following is the formula of Lactic acid ?

A. $CH_3-CH_2-\overset{\overset{OH}{|}}{\underset{\underset{H}{|}}{C}}-COOH$ B. $CH_3-\overset{\overset{OH}{|}}{CH}-COOH$

C. $CH_3-\underset{\underset{NH_2}{|}}{CH}-COOH$ D. $CH_3-CH_2-\underset{\underset{COOH}{|}}{CH}-COOH$

(xiii) Acetamide is prepared by _____

A. Heating ammonium acetate B. Heating methyl cyanide

C. Heating ethyl acetate D. The hydrolysis of methyl cyanide

(xiv) Nylon – 6,6 is a polymer of_____

A. Adipic acid and Acrylic acid B. Hexamethylene diamine and fumeric acid

C. Epichlorohydrin and vinylchloride D. Adipic acid and Hexamethylene diamine

(xv) Phosphorous helps the growth of _____

A. Root B. Leaves

C. Stem D. Seed

(xvi) The normal amount of overhead ozone is about_____

A. 350 DU B. 250 DU

C. 200 DU D. 195 DU

(xvii) Lithosphere consists of rigid rocky crust of the earth and extends to the depth of _____

A. 150 km B. 175 km

C. 125 km D. 100 km

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**

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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.	Define the Modern Periodic law.	01
	b.	What are Metalloids?	01
	c.	What is Lanthanide contraction?	01
(ii)	a.	What is Shielding effect?	01
	b.	What is Hydration energy?	01
	c.	Why is AlI_3 covalent while AlF_3 purely ionic in nature?	01
(iii)	a.	Why does only Li react with N_2 and not with any other members of group IA?	01
	b.	Why is Be the least reactive metal in group IIA?	01
	c.	Why is the solution of Na_2CO_3 (aqueous) basic in nature?	01
(iv)	a.	What is Dead burnt Plaster?	01
	b.	What is Portland cement?	01
	c.	What is the use of gypsum in soil for agriculture?	01
(v)	a.	Write the names and formulae of any two minerals of carbon.	02
	b.	What is Catenation?	01
(vi)	a.	Give the balanced chemical equation of the reaction of HNO_2 with aminobenzene.	1.5
	b.	How is orthophosphoric acid converted into meta-phosphoric acid?	1.5
(vii)	a.	Why do the fluoro-compounds show inertness?	01
	b.	Why is the oxidizing power of F_2 higher than other halogen?	01
	c.	Why is HF as liquid less viscous than water?	01
(viii)	a.	What are Paramagnetic substances?	01
	b.	What is d-d transition process?	01
	c.	What are interstitial compounds?	01
(ix)	a.	What are Chelates? Give example.	01
	b.	Define Coordination sphere.	01
	c.	What are Ligands?	01
(x)	a.	What is Thermal cracking?	1.5
	b.	What is Crude oil?	1.5
(xi)	a.	How can ethane be prepared by wolf-kishner's reaction? Give the condition necessary for the reaction.	1.5
	b.	Why does sigma bond show inertness?	1.5

(xii) a. Why do alkyne show acidic nature? **1.5**

b. How will you convert acetylene into divinyl-acetylene? Give all conditions of the reaction. **1.5**

(xiii) What happen When:

a. Ethanol reacts with acetic acid in the presence of H_2SO_4 **01**

b. 2 – Methyl-2-propanol is oxidized in the presence of $K_2Cr_2O_7$ **01**

c. Ethyl ether reacts with hot PCl_5. **01**

(xiv) a. How will you identify the aldehyde as functional group in the given compound through Benedict solution? Give reaction. **1.5**

b. How will you convert acetone → acetone 2,4-dinitrophenyl hydrazine **1.5**

(xv) What are the products of the following reactions:

a. 2 – Butene $\xrightarrow{KMnO_4/OH^-}$ **01**

b. acetic acid $\xrightarrow{P_2O_5}$ **01**

c. acetic acid $\xrightarrow{LiAlH_4}$ **01**

(xvi) a. What is Cholesterol? Give its structural formula. **02**

b. What are Ligases Enzymes? **01**

(xvii) a. What are Micronutrients? **01**

b. What is the role of Phosphatic fertilizers in the plants or soil? **02**

(xviii) a. How is chloroflurocarbon destroying the ozone layer? **02**

b. Define the term atmosphere. **01**

(xix) a. How is polymer bakelite formed from formaldehyde and phenol in the presence of acid or alkali base? Give reaction. **1.5**

b. How will you prepare Ethyne from potassium maleate? Give complete reaction. **1.5**

SECTION – C (Marks 26)

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

Q. 3 **a.** What are Silicones? How are silicones formed from $SiCl_2(CH_3)_2$? Give reaction. **04**

b. Give the reactions of P_2O_5 with the following:

(i) $HNO_{3(aq)}$ (ii) $H_2SO_{4(aq)}$ (iii) CH_3COOH (iv) C_2H_5OH **04**

c. Explain the preparation of NaOH by Nelson cell. Also give the major problems and their solution in the working of the cell. **05**

Q. 4 **a.** Convert the following (write complete and balanced equations): **03**

(i) $Phenol \rightarrow Phenylacetate$

(ii) $Ethanol \rightarrow Iodoform$

(iii) $2-Butene \rightarrow Ethanoic\ acid$

b. Explain SN_1 reaction. Why are 50% inverted and 50% retention products obtained? **05**

c. Explain the stability of Benzene. **05**

Q. 5 **a.** Explain the following: **04**

(i) Biochemical Oxygen Demand (BOD) (ii) Ecosphere

b. Explain the following two steps in the pulping process: **06**

(i) Digestion (ii) Bleaching

c. Explain the purification of water through coagulation process. **03**