



**CHEMISTRY**  
**HSSC-II**  
**SECTION – A (Marks 17)**

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent.

Deleting/overwriting is not allowed.

Do not use lead pencil.

حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر نام مرکز کے حوالے کریں۔ کاٹ کر دوبارہ  
کتنے کی اجازت نہیں ہے۔ اسے پینسل کا استعمال ممنوع ہے۔

Version No.			
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ROLL NUMBER					

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

ہر سوال کے سامنے دیے گئے، کرکولم کے مطابق درست دائرہ کو پر کریں۔  
Invigilator Sign. \_\_\_\_\_

Fill the relevant bubble against each question according to curriculum:

Candidate Sign. \_\_\_\_\_

Question	A				B				C				D			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1. Which of the following has highest ionization energy?	Lithium	Boron	Oxygen	Nitrogen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Which of the following oxides is acidic?	$Na_2O$	$KO_2$	$MgO$	$NO_2$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. $Pb^{+4}$ compounds are good:	Reducing agents	Oxidizing agents	Dehydrating agents	Hydrating agents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Carboxylic acids can be prepared by the reactions of Grignard reagent with:	Oxygen	Nitrogen	Carbon dioxide	Formaldehyde	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. To what category of molecules do enzymes belong?	Carbohydrates	Proteins	Lipids	Fats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Peroxyacetyl Nitrate (PAN) is an irritant to human beings and it affects:	Eyes	Nose	Stomach	Skin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Chemically nail polish remover is:	Acetone	Acetic acid	Ethanol	Ether	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Which of the following electronic transitions requires highest amount of energy when a compound is interacted with ultraviolet radiations?	$n \rightarrow \pi^*$	$\pi \rightarrow \pi^*$	$\delta \rightarrow \delta^*$	$n \rightarrow \delta^*$	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Height of peak in mass spectrum shows:	Number of isotopes	Mass number	Relative abundance of isotopes	Number of protons	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Which of the following will NOT give iodoform test?	Formaldehyde	Acetaldehyde	Acetone	Ethanol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Oxidation of 2-Propanol gives:	Acetaldehyde	Formaldehyde	Acetone	Acetic acid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Nitration of phenol takes place at _____ than benzene.	Slower rate	Faster rate	Equal rate	Moderate rate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Reaction of alcohols with sodium metal gives:	Helium gas	Hydrogen gas	Carbon dioxide	Carbon monoxide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Geometrical isomerism is shown by:	Lactic acid	Acetic acid	1-Butene	2-Butene	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Which of the following alkynes is acidic in nature?	1-Butyne	2-Butyne	2-Pentyne	3-Hexyne	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Which type of functional group is present in compound $CH_3COOCOCH_3$ ?	Ester	Anhydride	Acid amide	Ether	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. The oxidation state of central metal (Mn) in the following complex $Na[Mn(CO)_5(F)_2]$ is:	+2	+3	-1	+1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**SUPPLEMENTARY TABLE**

—2HA-I 2309—

Atomic No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Symbol	H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca
Mass No	1	4	7	9	11	12	14	16	19	20	23	24	27	28	31	32	35.5	40	39	40



# CHEMISTRY HSSC-II

Time allowed: 2:35 Hours

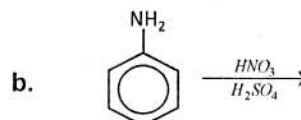
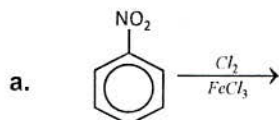
Total Marks Sections B and C: 68

**NOTE:** Answer any fourteen parts from Section 'B' and any two questions from Section 'C'. Write your answers neatly and legibly.

### SECTION – B (Marks 42)

**Q. 2** Attempt any FOURTEEN parts. All parts carry equal marks. (14 x 3 = 42)

- (i) How can the following conversions be carried out?
  - a. Nitro benzene → Aniline
  - b. Acetamide → Methyl amine
- (ii) Differentiate between 'Ethanol', '2-Propanol' and '2-Methyl 2-Propanol' on the basis of Lucas test.
- (iii) Write mechanism of the reaction when two molecules of Formaldehyde react with each other in the presence of  $NaOH$ .
- (iv) Write the preparation of Ethanol and 2-Propanol from Grignard reagent.
- (v) How is Nylon 6,6 prepared by condensation polymerization? Write its equations.
- (vi) Enlist the raw materials used for the preparation of lipstick.
- (vii) Briefly explain the trends in solubility of the hydroxides and sulphates of group II elements.
- (viii) Write any three advantages of atomic emission spectroscopy.
- (ix) Identify any three types of electronic transitions in Formaldehyde ( $H-CHO$ ) when it is subjected to ultraviolet radiations
- (x) How can Ethanol and Acetone be identified by IR spectrum?
- (xi) Write chemical equations for the preparation of Acetone by hydration of a suitable alkyne.
- (xii) Briefly describe two causes that explain the inert nature of alkanes towards polar reagents.
- (xiii) Predict the major product in the following reactions



- (xiv) What is homologous series? Write its two characteristics.
- (xv) Write names of the following coordination compounds.
  - a.  $Na_4[Mn(CN)_6]$
  - b.  $Cr[(NO_2)_3(NH_3)_3]$
  - c.  $[Ni(CO)_4(F)_2]SO_4$
- (xvi) Why  $Zn^{+2}$  complexes are colorless? Explain briefly with the help of d-d transitions phenomenon.
- (xvii) Why is ionization energy of nitrogen greater than that of oxygen? Although the ionization energy increases along the period.
- (xviii) Write chemical reactions to show the amphoteric nature of  $Al_2O_3$ .
- (xix) Why  $K_2CO_3$  is more stable than  $Li_2CO_3$ ? Support your answer in terms of the polarizing ability of positive ion.
- (xx) Why is  $CCl_4$  insoluble and  $SiCl_4$  soluble in water? Explain your answer by writing mechanism for hydrolysis of group IV halides.

### SECTION – C (Marks 26)

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

- Q. 3**
  - a. Write mechanisms for nitration and alkylation of Benzene.
  - b. What is Global warming? Write three adverse effects of each 'global warming' and 'acid rain' on environment.
- Q. 4**
  - a. What is esterification? Write mechanism for the acid catalyzed reaction between methanol and acetic acid.
  - b. Briefly explain the effect of:
    - i. Temperature
    - ii. pH
    - iii. Substrate concentration
 on enzyme activity along with general graphical representation for each factor.
- Q. 5**
  - a. Differentiate beryllium ( $Be$ ) from other members of its group in terms of its behaviors of:
    - i. Nitrides
    - ii. Carbides
    - iii. Oxides
    - iv. Reaction with alkalies
    - v. Reaction with Hydrogen
    - vi. Water of crystallization and its
    - vii. Hardness.
  - b. Explain three differences using 'Kinetic evidence', 'Stereochemical evidence' and 'Structure of substrate' between  $SN_2$  and  $SN_1$  reactions.

— 2HA-I 2307 —

#### SUPPLEMENTARY TABLE

Atomic No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Symbol	H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca
Mass No	1	4	7	9	11	12	14	16	19	20	23	24	27	28	31	32	35.5	40	39	40



# CHEMISTRY HSSC-II

## SECTION – A (Marks 17)

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent.

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حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دئے کرنا ہم مرکز کے حوالے کریں۔ گات کر دہاؤ  
کھینے کی اجازت نہیں ہے۔ سبڈیشنل کا استعمال ممنوع ہے۔

Version No.			
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ROLL NUMBER					

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9	9	●	9

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9	9	9	9	9	9

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

ہر سوال کے سامنے دیئے گئے، کریکولم کے مطابق درست دائرہ کو پر کریں۔ Invigilator Sign. \_\_\_\_\_

Fill the relevant bubble against each question according to curriculum: Candidate Sign. \_\_\_\_\_

Question	Candidate Sign.			
	A	B	C	D
1. Carboxylic acid reacts with metal to form salts with the evolution of:	$CO_2$	$H_2$	$CO$	$CH_4$
2. Reaction of Triglycerides with alkalis is called:	Hydration	Saponification	Hardening	Dehydration
3. Which of the following is correct formula of Ziegler catalyst?	$R_3Al + ZnCl_4$	$R_2Al + TiCl_4$	$R_3Al + TiCl_4$	$RAI + TiCl_4$
4. Oxidizing smog consists of high concentration of:	$O_3$	$SO_2$	$NO_2$	$Cl_2$
5. Which region of electromagnetic spectrum is involved in bonds vibrations?	Ultraviolet	Infra red	Radio waves	Microwaves
6. The characteristic signal of Carbonyl Carbon of acetone in I.R spectrum will be detected at:	$3200cm^{-1}$	$1200cm^{-1}$	$800cm^{-1}$	$1720cm^{-1}$
7. Which of the following aldehydes will be most reactive towards Nucleophiles?	Benzaldehyde	Acetaldehyde	Formaldehyde	Propanaldehyde
8. Which of the following has highest ionization energy?	$Al$	$Si$	$P$	$S$
9. Which of the following alcohols will produce least stable alkoxide ion when $O-H$ bond breaks?	Methanol	Ethanol	2-Propanol	2-Methyl 2-Propanol
10. 2,3-dimethyl-2-butene on reaction with $O_3/H_2O$ yields two molecules of:	Acetaldehyde	Acetone	Formaldehyde	Benzaldehyde
11. Which of the following alcohols cannot be synthesized when Grignard reagent reacts with aldehydes and ketones?	Ethanol	Isobutyl alcohol	Propanol	Methanol
12. No. of chiral centres in lactic acid $COOH(CH)OH$ are: $\begin{array}{c}   \\ CH_3 \end{array}$	Two	One	Three	Four
13. The general formula of cycloalkanes resembles with.	Alkenes	Alkynes	Alkanes	Benzene
14. The only alkaline earth metal which releases $H_2$ gas when reacted with alkalis is:	$Be$	$Mg$	$Ca$	$Sr$
15. Which of the following is most Paramagnetic?	$Fe^{3+}$	$Sc^{3+}$	$Ti^{4+}$	$V^{4+}$
16. Coordination sphere in $[Cu(en)_3]SO_4$ is:	Neutral	Positively charged	Negatively Charged	Amphoteric
17. Which of the following hydroxides of group II elements is least soluble in water?	$Ca(OH)_2$	$Mg(OH)_2$	$Be(OH)_2$	$Sr(OH)_2$

### SUPPLEMENTARY TABLE

—2HA-I 2309 HA—

Atomic No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Symbol	H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca
Mass No	1	4	7	9	11	12	14	16	19	20	23	24	27	28	31	32	35.5	40	39	40



# CHEMISTRY HSSC-II

26

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: Answer any fourteen parts from Section 'B' and any two questions from Section 'C'. Write your answers neatly and legibly.

## SECTION – B (Marks 42)

Q. 2 Attempt any FOURTEEN parts. All parts carry equal marks. (14 x 3 = 42)

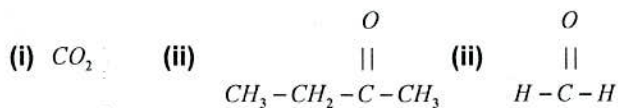
- (i) Why group II carbonates are thermally unstable as compared to group I carbonates?
- (ii) Why salts of  $Be^{+2}$  ion cannot have more than four molecules of water of crystallization?
- (iii) Write chemical reactions to show the amphoteric nature of  $BeO$ .
- (iv) Why  $CO_2$  is gas while  $SiO_2$  is solid at room temperature? Draw structural diagrams of  $CO_2$  and  $SiO_2$ .
- (v) Describe with justification of the anomalous trends in the ionization potential of 3<sup>rd</sup> period elements.
- (vi) Write IUPAC names of following coordination compounds.
  - a.  $(NH_4)_2[Pt(Cl)_6]$
  - b.  $[CO(F)_6(Br)_2]SO_4$
  - c.  $[Ni(CO)_5]$
- (vii) How  $V_2O_5$  acts as a catalyst in contact process in the given reaction?  $SO_2 + \frac{1}{2}O_2 \xrightarrow{V_2O_5} SO_3$
- (viii) What is meant by a. *Partial Synthesis* b. *Total Synthesis* of organic compounds in lab?
- (ix) Why  $Pb^{+4}$  compounds are less stable and act as an oxidizing agent? Explain with help of inert pair effect.
- (x) Why bond enthalpy of  $F-F$  is less than  $Cl-Cl$ ? Although size of Chlorine is bigger than that of Fluorine.
- (xi) Differentiate between metamerism and tautomerism with a suitable example of each.
- (xii) Which two factors determine the reactivity of alkyl halides? Write correct order of reactivity.
- (xiii) Write product and mechanism for the following reaction.  $CH_2 = CH_2 + Br_2 \rightarrow ?$
- (xiv) Differentiate between 1-butyne and 2-butyne by ozonolysis.
- (xv) Which of the following is more acidic? Give reason. a. 2-Methyl Phenol b. 2-Nitro Phenol
- (xvi) How can Ethanol and Methanol be differentiated by iodoform test? Write chemical equation for the test.
- (xvii) Briefly explain any three sources by which raw materials are obtained for chemical industries.
- (xviii) What is spectroscopy? Write its principle.
- (xix) Write three applications of atomic absorption spectroscopy.
- (xx) Differentiate between qualitative and quantitative analysis with suitable example of each.

## SECTION – C (Marks 26)

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

- Q. 3 a. What are carbohydrates? Briefly describe  
i. Monosaccharides, ii. Disaccharides and iii. Polysaccharides with suitable examples.
- b. Write mechanism for the formation of an ester by a reaction between ethanol and acetic acid catalyzed by an acid.

- Q. 4 a. What is sulphonation? Write mechanism for sulphonation of Benzene.
- b. Write reactions and predict the products when Methyl Magnesium Bromide ( $CH_3MgBr$ ) reacts with:



- Q. 5 a. What is acid rain? How it occurs? Write its four adverse effects on environment.
- b. Justify the given order of acidity with reason. *Carboxylic Acid > Phenol > Alcohol*

— 2HA-I 2309 HA —

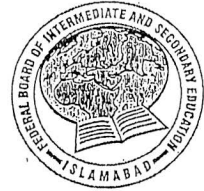
### SUPPLEMENTARY TABLE

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23

Version No.			
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ROLL NUMBER					



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

Sign. of Candidate \_\_\_\_\_

Sign. of Invigilator \_\_\_\_\_

Section - A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

**CHEMISTRY HSSC-II**  
**SECTION - A. (Marks 17)**  
**Time allowed: 25 Minutes**

حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پینسل کا استعمال ممنوع ہے۔

ہر سوال کے سامنے دیے گئے درست دائرہ کو پر کریں۔

Fill the relevant bubble against each question:

- Predict the products of reaction between  $Na_2O_2$  and ice-cold water:   $NaOH$  and  $H_2$    $NaOH$  and  $H_2O_2$    $NaOH$  and  $O_2$    $NaOH, H_2O_2, O_2$
- Identify the elements which show anomalous trend in ionization energy across the third period of periodic table:  Na and Si  Mg and P  Al and S  Si and Cl
- Which of the following compounds is used as NMR reference?  Picric acid  Tetramethyl silane  Trinitro toluene  Xylene
- Which of the following transition metals in 3<sup>rd</sup> series possesses highest binding energy?  Ti  V  Cr  Mn
- The functional group  $\begin{matrix} O \\ || \\ -C-OR \end{matrix}$  is present in:  Carboxylic acids  Esters  Ethers  Ketones
- Predict the type of isomerism shown by the following compounds  $CH_3-CH_2-OH$  and  $CH_3-O-CH_3$ .  Position isomerism  Functional group isomerism  Metamerism  Tautomerism
- Predict the products of ozonolysis of  $CH_3-CH=CH-CH_3$   Formaldehyde  Acetaldehyde  Propionaldehyde  Acetone
- Which of the following is more basic?   $CH_3-NH_2$    $CH_3-CH_2-NH_2$    $\begin{matrix} CH_3-\ddot{N}-CH_3 \\ | \\ H \end{matrix}$    $\begin{matrix} CH_3-\ddot{N}-CH_3 \\ | \\ CH_3 \end{matrix}$

Identify the reactant  $X$  in the following conversion:

9. 
$$\begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{C} - \text{NH}_2 + X \rightarrow \text{CH}_3 - \text{NH}_2 \end{array}$$
   $\text{LiAlH}_4$    $\text{Br}_2 / \text{KOH}$    $\text{Sn} / \text{HCl}$    $\text{Fe} / \text{H}_2\text{SO}_4$

10. Which of the following alcohols is most reactive in a reaction involving the cleavage of C-O bond?  t-alcohol  Sec-alcohol  Pri-alcohol   $\text{CH}_3 - \text{OH}$

11. Identify the correct order of acidic strength of carboxylic acids, phenols and alcohols.   $R - \text{COOH} > R - \text{OH} > \text{C}_6\text{H}_5 - \text{OH}$    $R - \text{OH} > R - \text{COOH} > \text{C}_6\text{H}_5 - \text{OH}$    $\text{C}_6\text{H}_5 - \text{OH} > R - \text{OH} > R - \text{COOH}$    $R - \text{COOH} > \text{C}_6\text{H}_5 - \text{OH} > R - \text{OH}$

12. Which of the following organic compounds will undergo Cannizzaro's reaction?   $\begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{C} - \text{H} \end{array}$    $\begin{array}{c} \text{O} \\ || \\ \text{H} - \text{C} - \text{H} \end{array}$    $\begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{C} - \text{CH}_3 \end{array}$    $\begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{H} \end{array}$

In the given reaction identify the product - X:

13. 
$$\begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{C} - \text{OC}_2\text{H}_5 \xrightarrow{\text{LiAlH}_4} X \end{array}$$
  Acetic acid  Acetone  Acetaldehyde  Ethyl alcohol

14. Sucrose is the disaccharide of:  Glucose and Fructose  Glucose and Maltose  Glactose and Fructose  Glucose and Glactose

15. Nail polish remover is the mixture of:  Ethanol and Acetone  Acetone and Acetic Acid  Acetone and Ethyl Acetate  Ethanol and Ethyl Acetate

16. Which of following parameters indicates the concentration of oxidizable material in water?  D.O.  C.O.D.  B.O.D.  T.D.S.

17. Co-ordination number of Cobalt in  $[\text{Co}(\text{en})_2\text{Cl}_2]\text{Cl}$  is:  2  4  6  8

—2HA-I 2209-4091 (L)—

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# CHEMISTRY HSSC-II

24

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: 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. Statistical table will be provided on demand.

## SECTION - B (Marks 42)

Q. 2 Attempt any FOURTEEN parts. All parts carry equal marks. (14 x 3 = 42)

- (i) Justify why  $AlCl_3$  is non-conductor in both solid and molten states (under high pressure) whereas  $NaCl$  is conductor in molten state.
- (ii) Give reasons for:
  - a.  $BeO$  is amphoteric
  - b.  $BeO$  is covalent in nature but has high melting point.
- (iii) a. Why  $PbCl_4$  is thermally unstable whereas  $PbCl_2$  is stable?  
b. Why  $CCl_4$  does not undergo hydrolysis?
- (iv) Write down the chemical reactions to show the oxidation of  $[Cr(H_2O)_6]^{3+}$  to  $CrO_4^{2-}$  in three steps.
- (v) Describe how  $Fe^{+2}$  acts as a catalyst in reaction between peroxodisulphate ion ( $S_2O_8^{2-}$ ) and iodide ion ( $I^-$ )
- (vi) Why the concept of functional group is important in organic chemistry?
- (vii) Differentiate between structural and stereo isomerism.
- (viii) Give chemical reactions to predict the products of reaction between 1-Butene and:
  - a.  $Br_2 / CCl_4$
  - b.  $Cl_2 + H_2O$
  - c.  $\begin{array}{c} O \\ || \\ C_6H_5 - C - O - O - H \end{array}$
- (ix) What is the trend of halide ions as reducing agents? Justify your answer.
- (x) What are diazonium salts? How can this salt be prepared from Aniline? What happens when this salt is heated above  $10^\circ C$ ?
- (xi) Write down the mechanism for dehydration of excess of Ethanol with conc.  $H_2SO_4$  at  $140^\circ C$ .
- (xii) Describe Kolbe-Schmitt reaction of phenol.
- (xiii) Write down two tests to differentiate between Aldehydes and Ketones.
- (xiv) Write down the reactions for following conversions:
  - a. Acetamide into Ethyl amine
  - b. Acetyl chloride into acetic anhydride
  - c. Calcium acetate into acetone
- (xv) How can  $CH_3COOH$  be prepared from:
  - a. A Grignard reagent
  - b. A Nitrile
  - c. An Alcohol
- (xvi) Write down three differences between DNA and RNA.
- (xvii) How can petrochemical raw materials be classified?
- (xviii) What is meant by refining of petroleum? State its basic principle.
- (xix) What type of electronic transition takes place when an organic compound is subjected to visible radiation in the wave length range of 200 – 800 nm?
- (xx) Differentiate between Atomic emission spectroscopy and Atomic absorption spectroscopy.

## SECTION - C (Marks 26)

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

Q. 3 a.  $CO_2$  is gas whereas  $SiO_2$  is solid. Explain with the help of their structures. (06)

- b. Define and explain the mechanism for reaction between  $\begin{array}{c} CH_3 \\ | \\ CH_3 - C - CH_3 \\ | \\ Cl \end{array}$  and  $\bar{O}H$  ion

in aqueous medium. Give two evidences in the support of this mechanism. (1+4+2)

Q. 4 a. What is geometrical isomerism? Write down its conditions. Explain with reference to Alkenes and Cyclo alkanes giving one example for each. (1+2+4)

b. What is meant by inhibition of enzymes? Explain giving its types. (06)

Q. 5 a. What is iodoform test? Give its any three application. (06)

b. What is Ozone hole? Describe three reasons for its formation. How ozone layer can be protected? (07)

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

Sign. of Candidate \_\_\_\_\_

Sign. of Invigilator \_\_\_\_\_

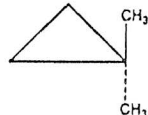
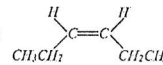
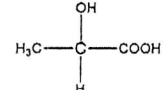
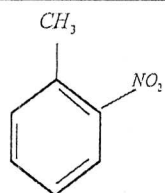
Section - A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

**CHEMISTRY HSSC-II**  
**SECTION - A (Marks 17)**  
**Time allowed: 25 Minutes**

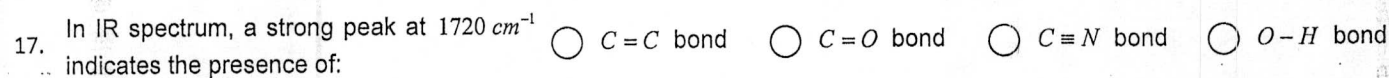
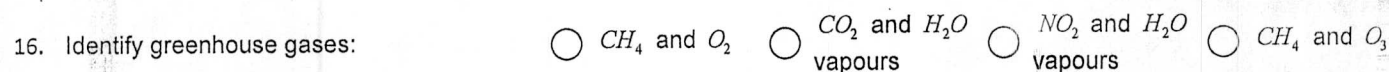
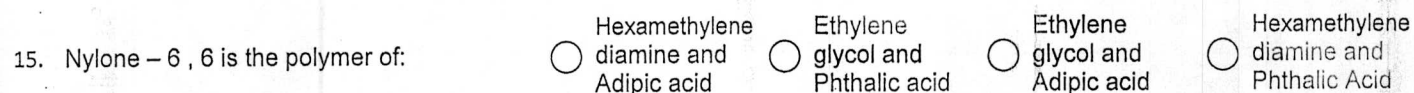
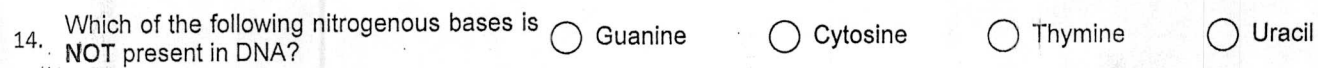
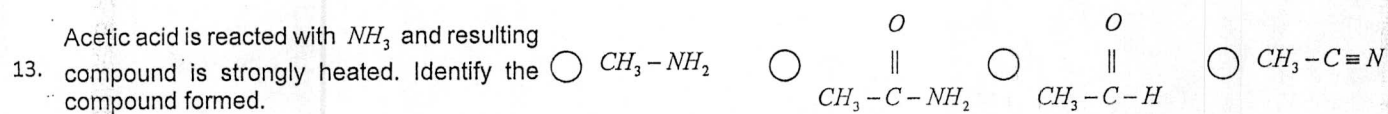
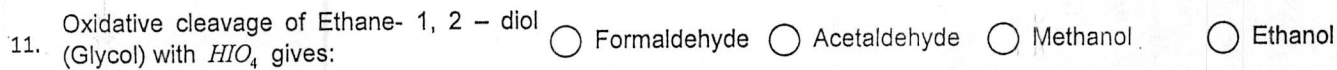
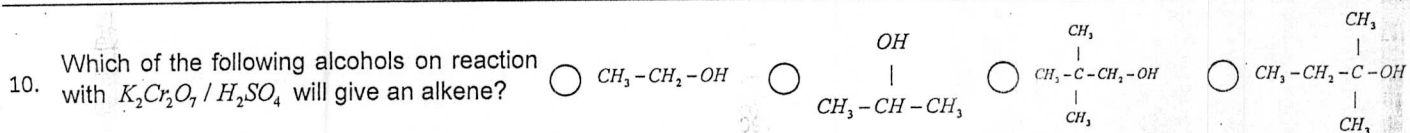
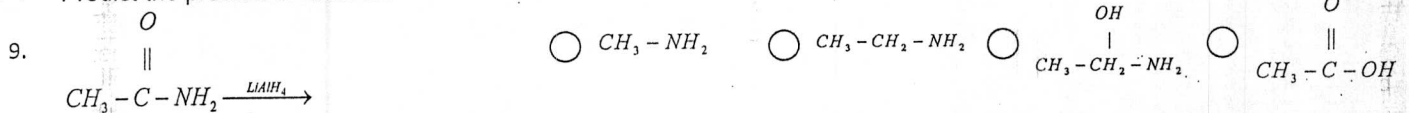
حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ گات کردوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پنسل کا استعمال ممنوع ہے۔

Fill the relevant bubble against each question:

ہر سوال کے سامنے دیے گئے درست دائرہ کو پر کریں۔

- Which of the following carbides is decomposed by water to form  $CH_4$  gas?   $Be_2C$       $CaC_2$       $MgC_2$       $SrC_2$
- $HI$  is a stronger base. It reduces  $H_2SO_4$  to:   $S$       $SO_2$       $H_2SO_3$       $H_2S$
- Which of the following will form yellow coloured complex compound?   $Sc^{+3}$       $Cu^{+1}$       $Fe^{+3}$       $Zn^{+2}$
- Geometry of  $[Pt(NH_3)_4]^{2+}$  is square planar. Hybridization of Pt in the complex ion is:   $sp^3$       $dsp^2$       $d^2sp^3$       $dsp^3$
- In destructive distillation, Coal is heated at  $500-1000^\circ C$  in the absence of air. It gives:  Coke, Coaltar, Coal gas     Methane, Coal, Coaltar     Carbon monoxide, Methane, Hydrogen gas     Phenol, Coke, Hydrogen gas
- Identify the compound which shows geometrical isomerism:                 
- Which of the following is meta directing group in the electrophilic substitution reactions of Monosubstituted Benzene?   $-NH_2$       $-OCH_3$       $-SO_3H$       $-OH$
- Which of the following base will favour substitution reaction as compared to the elimination reaction?   $\bar{O}H$       $\bar{O}R$       $\bar{N}H_2$       $I^{-1}$

Predict the product of reaction:



—2HA-I 2209-8091 (HA)—

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# CHEMISTRY HSSC-II

26

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: 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. Statistical table will be provided on demand.

## SECTION - B (Marks 42)

Q. 2 Attempt any FOURTEEN parts. All parts carry equal marks. (14 x 3 = 42)

- (i) Why thermal stability of carbonates of Group-II elements increases down the group? Describe by giving examples.
- (ii) Explain the regular and anomalous trends in ionization energies of elements of 3<sup>rd</sup> period.
- (iii) Write down the reactions of  $[Fe(H_2O)_6]^{3+}$  with  $NH_3$ ,  $CO_3^{2-}$  and  $SCN^{-1}$ .
- (iv) Why transition elements show variable oxidation states?
- (v) What is homologous series? Draw structures of first four members of homologous series of Acid amides.
- (vi) How can 1 - Butyne be prepared from:  
a. A vicinal dihalide      b. A geminal dihalide
- (vii) Why the salts of  $Be^{+2}$  cannot have more than four water molecules of crystallization?
- (viii) Differentiate between Propyne and propene by giving two chemical tests.
- (ix) Write down the mechanism of  $E_1$  reaction and support it by giving one evidence.
- (x) Write down the reactions of  $CH_3 - Mg - Cl$  with:  
a.  $CH_3CHO$       b.  $\begin{array}{c} O \\ || \\ CH_3 - C - CH_3 \end{array}$
- (xi) Compare basicity of following compounds by giving reasons:  
a.  $CH_3 - CH_2 - NH_2$       b.  $\begin{array}{c} C_2H_5 - N - C_2H_5 \\ | \\ H \end{array}$       c.  $\begin{array}{c} C_2H_5 - N - C_2H_5 \\ | \\ C_2H_5 \end{array}$
- (xii) Why is Phenol more acidic than Alcohols?
- (xiii) How can Primary, Secondary and Tertiary alcohols be differentiated by Lucas test?
- (xiv) Write down the reactions of Acetaldehyde with:  
a.  $Zn / Hg - HCl$       b. 2,4 - DNPH      c.  $C_2H_5OH$
- (xv) Write down the reactions of Acetic anhydride with:  
a.  $H_2O$       b.  $C_2H_5OH$       c.  $NH_3$
- (xvi) How can  $CH_3COOH$  be converted into:  
a.  $CH_3CH_2OH$       b.  $\begin{array}{c} CH_3 - C - CH_3 \\ || \\ O \end{array}$
- (xvii) Differentiate between primary, secondary and tertiary structures of proteins.
- (xviii) What are the raw materials required for manufacturing of hair dye?
- (xix) Differentiate between oxidizing and reducing smog.
- (xx) Write down three differences between U.V and IR spectroscopy.

## SECTION - C (Marks 26)

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

- Q. 3 a. How tetrahalides of Group-IV elements react with  $H_2O$ ? Write down the mechanism of this reaction. Why this reaction is not shown by  $CCl_4$  under normal conditions? (1+4+2)
- b. What is polymerization? What are its types? Explain each by giving one example. (06)
- Q. 4 a. What is optical isomerism? Write down the conditions for existence of this isomerism in an organic compound. Draw optically active as well as inactive isomers of tartaric acid. (1+3+3)
- b. What is Aldol condensation reaction? Write down this reaction for condensation between two molecules of:  
(i) Acetaldehyde      (ii) Acetone  
Also illustrate the mechanism of this reaction. (1+2+3)
- Q. 5 a. What is mass spectroscopy? Explain the working of a mass spectrometer and write down its one application. (1+4+2)
- b. Describe Greenhouse effect. How it results in global warming? Also describe the role of Chlorofluoro carbons in destroying the ozone layer. (06)

