

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

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

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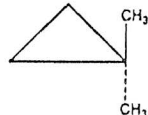
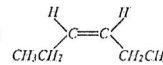
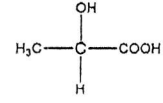
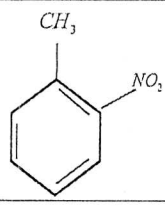
Section - A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

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

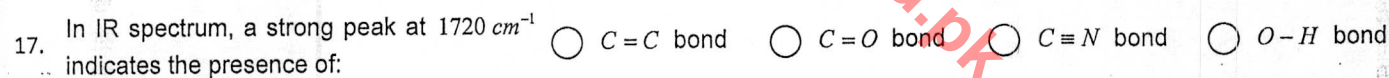
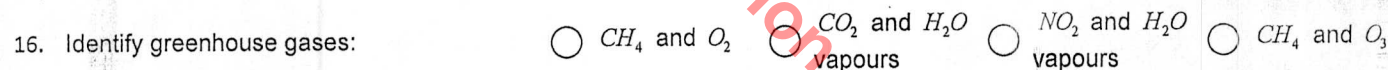
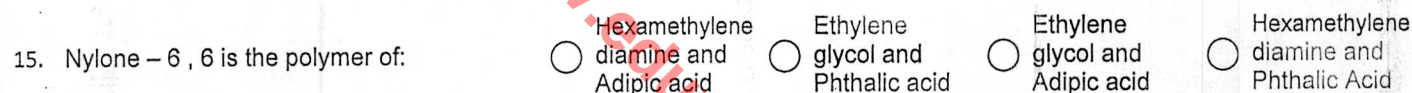
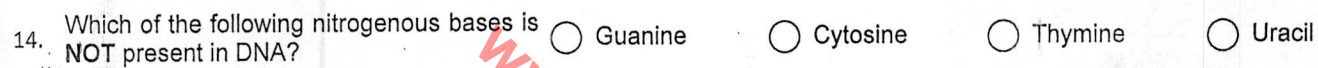
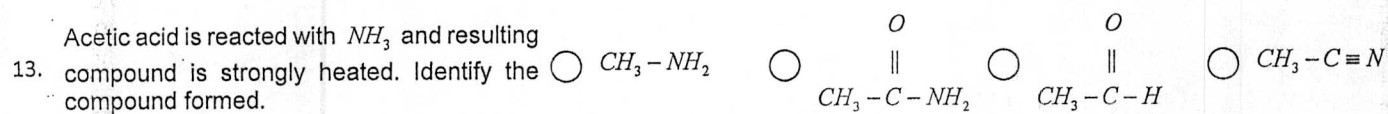
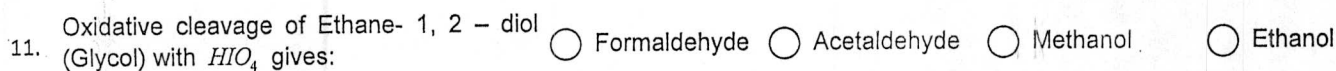
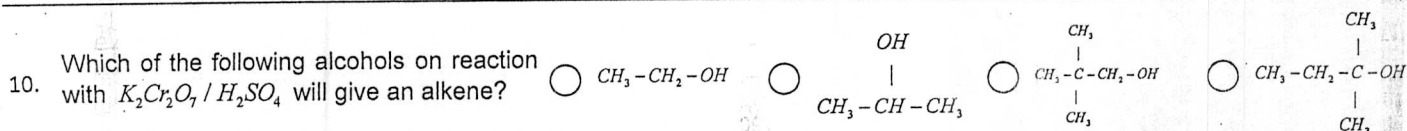
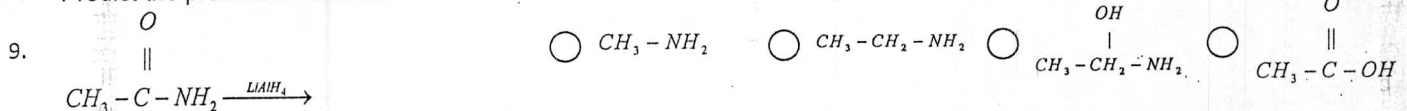
حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ گات کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پنسل کا استعمال ممنوع ہے۔

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, Coal tar, Coal gas     Methane, Coal, Coal tar     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)

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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**

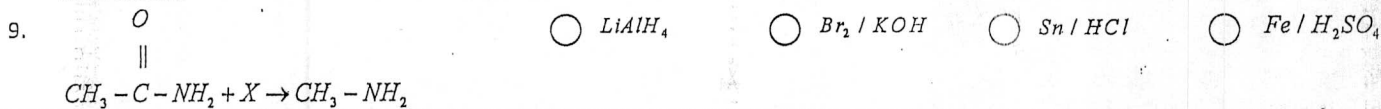
حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پینسل کا استعمال ممنوع ہے۔

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:



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        $\text{CH}_3 - \text{OH}$

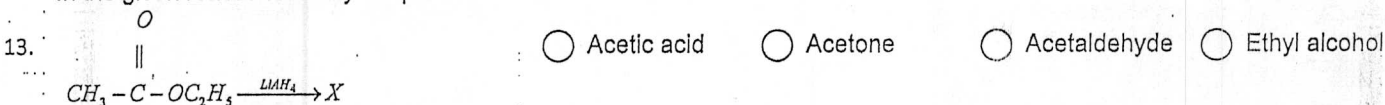
11. Identify the correct order of acidic strength of carboxylic acids, phenols and alcohols.

$R - \text{COOH} > R - \text{OH} > \text{C}_6\text{H}_5 - \text{OH}$         $R - \text{OH} > R - \text{COOH} > \text{C}_6\text{H}_5 - \text{OH}$         $\text{C}_6\text{H}_5 - \text{OH} > R - \text{OH} > R - \text{COOH}$         $R - \text{COOH} > \text{C}_6\text{H}_5 - \text{OH} > R - \text{OH}$

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:



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)