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Version No.			
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ROLL NUMBER					

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 اوّل لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کاٹ 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 پُر کریں۔

1. 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 ● $NaOH, H_2O_2, O_2$

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

3. Which of the following compounds is used as NMR reference? ○ Picric acid ● Tetramethyl silane ○ Trinitro toluene ○ Xylene

4. Which of the following transition metals in 3rd series possesses highest binding energy? ○ Ti ● V ○ Cr ○ Mn

5. The functional group $\overset{O}{\overset{\|}{-C-OR}}$ is present in: ○ Carboxylic acids ● Esters ○ Ethers ○ Ketones

6. 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

7. Predict the products of ozonolysis of $CH_3-CH=CH-CH_3$ ○ Formaldehyde ● Acetaldehyde ○ Propionaldehyde ○ Acetone

8. Which of the following is more basic? ○ CH_3-NH_2 ○ $CH_3-CH_2-NH_2$ ● $CH_3-\underset{\underset{H}{|}}{\ddot{N}}-CH_3$ ○ $CH_3-\underset{\underset{CH_3}{|}}{\ddot{N}}-CH_3$

9. Identify the reactant X in the following conversion:

$$CH_3-\overset{O}{\overset{\|}{C}}-NH_2+X\rightarrow CH_3-NH_2$$

○ $LiAlH_4$ ● Br_2/KOH ○ Sn/HCl ○ Fe/H_2SO_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 ○ CH_3-OH

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

○ $R-COOH > R-OH > C_6H_5-OH$ ○ $R-OH > R-COOH > C_6H_5-OH$ ○ $C_6H_5-OH > R-OH > R-COOH$ ● $R-COOH > C_6H_5-OH > R-OH$

12. Which of the following organic compounds will undergo Cannizzaro's reaction?

○ $CH_3-\overset{O}{\overset{\|}{C}}-H$ ● $H-\overset{O}{\overset{\|}{C}}-H$ ○ $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$ ○ $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-H$

13. In the given reaction identify the product – X:

$$CH_3-\overset{O}{\overset{\|}{C}}-OC_2H_5 \xrightarrow{LiAlH_4} X$$

○ 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 $[Co(en)_2Cl_2]Cl$ is:

○ 2 ○ 4 ● 6 ○ 8

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CHEMISTRY HSSC–II

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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. $C_6H_5 - \overset{\overset{O}{\|}}{C} - O - O - H$

(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 $10°C$?

(xi) Write down the mechanism for dehydration of excess of Ethanol with conc. H_2SO_4 at $140°C$.

(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 $CH_3.COOH$ 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 $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{Cl}{|}}{C}} - CH_3$ and $\overline{O}H$ 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)**