Version No.			

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Answer Sheet No._____

Sign. of Candidate _____

Sign. of Invigilator _____

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.**

Q.1 Fill the relevant bubble for each part. Each part carries one mark.

1. The first ionization energy is higher for the:
   A. Alkali metals ◯ B. Alkaline earth metals ◯
   C. Halogens ◯ D. Noble gases ◯

2. Crimson red is characteristic flame color of:
   A. Li ◯ B. Na ◯
   C. Ca ◯ D. Ba ◯

3. The catalyst used for synthesis of ammonia by Haber process is:
   A. Fe ◯ B. $TiCl_4$ ◯
   C. Cr_2O_3 ◯ D. ZnO ◯

4. Aerosols and lotions are used as:
   A. Fungicides ◯ B. Repellents ◯
   C. Herbicides ◯ D. Miticides ◯

5. Due to inert pair effect _____ oxidation state is more stable than _____ for Pb.
   A. 2+,4+ ◯ B. 1+,4+ ◯
   C. 4+,2+ ◯ D. 2+,3+ ◯

6. Ozone is destroyed by:
   A. SO_2 ◯ B. CO_2 ◯
   C. CFCs ◯ D. HCl ◯

7. Which one of the following is used as reference in NMR spectroscopy?
   A. Tetra chloromethane ◯ B. Tetra methylsilane ◯
   C. Tetra silanemethane ◯ D. Tri iodomethane ◯

8. Which one of the following technique does not involve interaction of electromagnetic radiations with matter?

A. IR spectroscopy ◯ B. NMR spectroscopy ◯
C. Mass spectroscopy ◯ D. UV spectroscopy ◯

9. Benzoic acid is obtained by oxidation of:

A. m-Xylene ◯ B. p-Xylene ◯
C. Toluene ◯ D. Phenol ◯

10. The structural formula for carboxylic anhydride is:

A. RCOOCOR ◯ B. RCOR ◯
C. RCOOR ◯ D. RCOOH ◯

11. Which one of the following is not a nucleophile?

A. H_2O ◯ B. H_2S ◯
C. BF_3 ◯ D. NH_3 ◯

12. Oxonium ion is formed when:

A. Ethanol react with Na metal ◯
B. Phenol react with NaOH ◯
C. Ether is treated with HI ◯
D. Ethanol treated with $NaOH/I_2$ ◯

13. Which one of the following reagents reacts with both aldehyde and ketone?

A. Grignard reagent ◯ B. Tollen's reagent ◯
C. Fehling's reagent ◯ D. Benedict's reagent ◯

14. Which one of the following reagents is used for reduction of carboxylic acid?

A. H_2/Ni ◯ B. H_2/Pt ◯
C. $NaBH_4$ ◯ D. $LiAlH_4$ ◯

15. Which one of the following is used as major component of soap?

A. Fatty acid ◯ B. Palm oil ◯
C. Proteins ◯ D. Saccharides ◯

16. IUPAC name of Glutaric acid is:

A. Butane dioic acid ◯ B. Pentane dioic acid ◯
C. Propane dioic acid ◯ D. Hexane dioic acid ◯

17. Which one of the following nuclei is NMR active?

A. C^{12} ◯ B. C^{13} ◯
C. O^{16} ◯ D. Ne^{10} ◯

Federal Board HSSC-II Examination
Chemistry Model Question Paper
(Curriculum 2006)

Time allowed: 2:35 hours Total Marks: 68

Note: Answer any fourteen parts from Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Write your answers neatly and legibly.

SECTION – B (Marks 42)

Q.2 Attempt any **FOURTEEN** parts from the following. All parts carry equal marks. (14 × 3 = 42)

i. The thermal stability of carbonates of alkaline earth metals increases down the group. Justify this behaviour.

ii. The order as reducing agent of Halide ions is $F^- < Cl^- < Br^- < I^-$. Interpret it.

iii. Ammonia act as both ligand and base. Justify this statement by the reaction with copper ion.

iv. What are ligands? Give example of tridentate and hexadentate ligand.

v. How will you prepare glycerol from hydrolysis and saponification of fats and oils?

vi. How can nylon-6,6 be prepared from Adipic acid? Give complete chemical reaction.

vii. How does tetraethyl lead cause air pollution?

viii. What are the oxidation number and coordination number of the metals in the following complex compounds?
(a) $[Cr(H_2O)_4(OH)_2]NO_3$ (b) $K_4[Fe(CN)_6]$

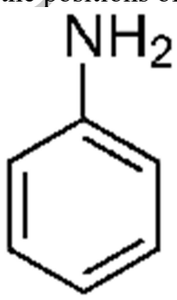
ix. What information are obtained from number of peaks and area under the peaks in NMR spectrum?

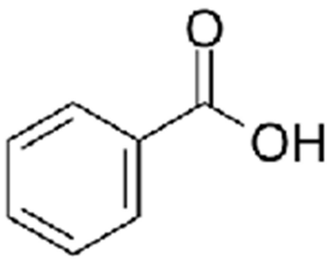
x. What are adhesives? How does hot Glue work?

xi. Summarize the concept of optical Isomerism by drawing different isomeric structures of tartaric acid showing their optical behaviour.

xii. How will you prepare following compounds starting from acetylene?
a. Acetaldehyde b. Acetic acid

xiii. The following mono substituted benzene are subjected to nitration reaction. Prioritize the positions of different products formed.

a) 

b) 

xiv. Give stereo chemical evidences of Nucleophilic Substitution reactions of alkyl halides.

xv. Identify the products when CH_3MgBr react with ethyl acetate? Give its mechanism.

xvi. How Lucas Test being employed to distinguish different types of alcohols?

xvii. Compare acidity of phenols and carboxylic acid. Support your answer by drawing resonance structures?

xviii. Discuss the reactivity order of following carbonyl compounds with reason.
Formaldehyde > Acetaldehyde > Butanone

xix. How can the following acid derivative be prepared from carboxylic acid?
a. Acid anhydride b. Acyl halide c. Acid amide

xx. How can propanoic acid be prepared from ethane?

SECTION – C (Marks 26)

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

Q.3 a. Describe the peculiar behavior of 1st member of the alkaline earth metals. Give seven main differences. **(7)**

b. How does arrangement of electrons affect the magnetic properties of transition elements. How can it be calculated? Calculate magnetic moment of Fe = 26. **(2+2+2)**

Q.4 a. Define isomerism. Make all possible structural isomers of $C_4H_{10}O$, classify each giving IUPAC names. **(1+2+2+2)**

b. What are the possible products formed when formaldehyde reacts with the following reagents? **(6)**
i. HCN ii. NaOH iii. $AgNO_3/NH_4OH$

Q.5 a. What is beta-elimination reaction? Explain reaction mechanism for the Unimolecular and Bimolecular elimination reactions of R – X. **(1+3+3)**

b. Explain the following: **(3+3)**
i. The different routes for the loss of zinc from human body.
ii. Is carbon dioxide responsible for greenhouse effect? If yes then how?

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CHEMISTRY HSSC-II
SLOs

SECTION A

1. Describe how physical properties like ionization energy changes within a group and period in the periodic table?
2. Perform flame tests and explain the appearance of colors in the flame.
3. Iron as a catalyst in Haber's Process. (Describe the important reactions and uses of V, Cr, Mn, Fe and Cu)
4. Pesticides.
5. Inert pair effect and formation of ionic bond.
6. Describe the role of CFCs in destroying ozone in the stratosphere.
7. Describe the standard scales used in proton NMR.
8. Outline the use of MS determination of relative isotopic masses and isotopic abundance.
9. Describe addition reactions of benzene and methyl benzene.
10. Describe reactions of carboxylic acid derivatives.
11. Describe the mechanism and types of nucleophilic substitution reaction.
12. Describe the preparation of phenol from benzene sulphonic acid, chloro benzene and acidic oxidation of Cumene.
13. Describe oxidation reactions of aldehydes and ketones.
14. Describe the reactivity of carboxylic acid.
15. Identify the nutritional and biological importance of lipids.
16. Nomenclature of carboxylic acid.
17. Outline in simple terms the principles of proton NMR spectroscopy.

Section B

Q2:

i. Discuss the trends in thermal stability of the nitrates and carbonates of Group II elements.
ii. Explain the relative behavior of halogens as oxidizing agents and reducing agents.
iii. Describe important reactions and uses of copper.
iv. Explain nomenclature of coordination compounds.
v. Describe basics of classification and structure-function relationship of lipids.
vi. Describe the formation and uses of Nylon.
vii. Recognize that the release of COx, SOx, NOx, VOCs are associated with the combination of hydro carbon based fuels.
viii. Explain nomenclature of coordination compounds.
ix. Explain how chemical environment of proton affects the magnetic field it experiences and hence the absorption of energy at resonance frequency.
x. Describe types and applications of synthetic adhesives.
xi. Explain what is meant by a chiral center and show that such a center gives rise to optical isomerism.
xii. Discuss chemistry of Alkynes by hydrogenation, ozonolysis, hydration etc.

xiii. Apply the knowledge of position of substituent in the electrophilic substitution of benzene.
xiv. Describe the mechanism and types of nucleophilic substitution reactions.
xv. Discuss chemistry of Grignard's reagent by the addition of esters.
xvi. Explain the reactivity of alcohols.
xvii. Explain the acidity of phenols.
xviii. Describe the reactivity of Aldehydes and Ketones and their comparison.
xix. Describe the chemistry of carboxylic acids by conversion to carboxylic acid derivatives.
xx. Describe preparation of carboxylic acid by carbonation of Grignard's reagent.

SECTION C

Q3:

a. Differentiate beryllium from other members of its group.
b. Magnetic properties of transition elements. (Describe the electronic structures of elements and ions of d-block elements)

Q4:

a. Define and explain with suitable examples the terms isomerism and structural isomerism.
b. Describe acid and base catalyzed addition reactions of aldehydes and ketones.

Q5:

a. Describe the mechanism and types of elimination reactions.
b. i. Identify the sources of minerals such as zinc.
ii. Explain greenhouse effect and global warming as resulting in climate change.

CHEMISTRY HSSC-II

TABLE OF SPECIFICATION

Topics/Subtopics	**s and p block elements**	**d and f block elements**	**Organic compounds**	**Hydro carbons**	**Alkyl halides and amines**	**Alcohol phenyl and ether**	**Aldehyde and ketones**	**Carboxylic acids**	**Bio chemistry**	**Industrial chemistry**	**Environmental chemistry**	**Analytical chemistry**	**Total marks for each Assessment Objective**	**%age**
(Knowledge based)	1-2(01) 3a(07)	1-3(01) 2-iii(03) 2-iv(03)	1-10(01)		2-xiv(03)		1-13(01) 4b(06)	1-14(01)		1-4(01)	1-6(01)	1-7(01)	30	25.9%
(Understanding based)	1-1(01) 1-5(01) 2-ii(03)	3b(06)		2-xi(03) 4a(07)	1-11(01) 2-xv (03) 5a(07)	1-12(01) 2-xvi(03) 2-xvii(03)	2-xviii(03)	2-xix(03) 2-xx(03)	1-15(01) 2-v(03)	2-vi(03) 2-x(03)	2-vii(03)	1-8(01) 1-17(01)	63	54.3%
(Application based)	2-i(03)	2-viii(03)		1-9(01) 2-xii(03) 2-xiii(03)				1-16(01)	5b-i(03)		5b-ii(03)	2-ix(03)	23	19.8%
Total marks for each Topic/Subtopic	16	16	01	17	14	07	10	08	07	07	07	06	116	100%

KEY:

1-1(01)

Question No-Part No. (Allocated Marks)