Version No.			

ROLL NUMBER						

Answer Sheet No._____

Sign. of Candidate _____

Sign. of Invigilator _____

CHEMISTRY HSSC–II (3rd Set)

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) Predict the decomposition product which will give brown colored gas:

A. Na_2SO_4 ◯ B. $BaCO_3$ ◯

C. $Mg(NO_3)_2$ ◯ D. $CaSO_4$ ◯

(2) Li_2CO_3 is thermally unstable whereas other Group-I carbonates are stable. Predict the reason.

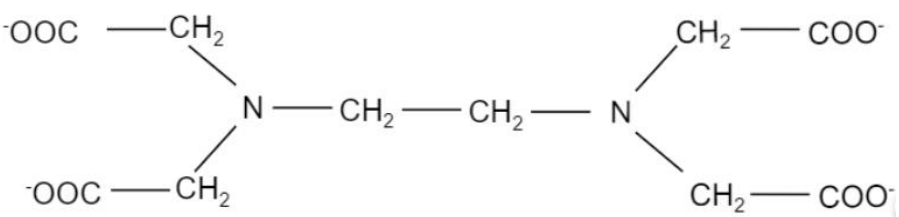
A. Li is less electropositive ◯

B. Li has low ionization potential ◯

C. Li^+ can effectively polarize CO_3^{-2} ion ◯

D. Li^+ cannot effectively polarize CO_3^{-2} ion ◯

(3) Identify the nature of the ligand



A. Monodentate ◯ B. Bidentate ◯

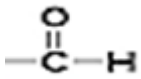
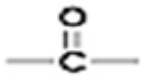
C. Tridentate ◯ D. Hexadentate ◯

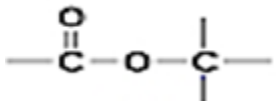
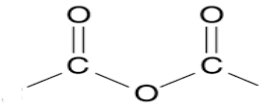
(4) Label the element in the first series of outer transition elements that has highest binding energy.

A. Titanium ◯ B. Vanadium ◯

C. Chromium ◯ D. Manganese ◯

(5) Identify the functional group present in the Anhydride.

A.  ◯ B.  ◯

C.  ◯ D.  ◯

(6) What is the IUPAC name of alkene which will give propanone and propanal on Ozonolysis?

A. 2-Butene ◯ B. 2-Methyl-2-Butene ◯

C. 2-Pentene ◯ D. 2-Methyl-2-Pentene ◯

(7) Propose the types of Isomerism shown by 1-Butanol.

A. Chain isomerism & Position isomerism ◯

B. Chain isomerism & Functional group isomerism ◯

C. Chain isomerism, Position isomerism & Functional group isomerism ◯

D. Position isomerism, Functional group isomerism & Metamerism ◯

(8) What is the name of Grignard Reagent that will give 2,2-Dimethyl Propanoic Acid on reaction with CO_2?

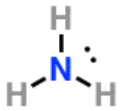
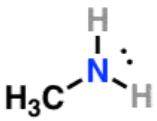
A. n-Propyl Magnesium Bromide ◯

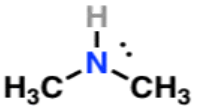
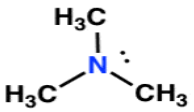
B. Iso-propyl magnesium Bromide ◯

C. N-Butyl Magnesium Bromide ◯

D. Neo-Butyl Magnesium Bromide ◯

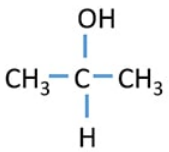
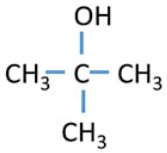
(9) Amines are basic in nature. Identify which one of the following is more basic?

A.  ◯ B.  ◯

C.  ◯ D.  ◯

(10) Identify the most reactive Alcohol with respect to the breakage of O-H bond.

A. CH_3-OH ◯ B. CH_3-CH_2 OH ◯

C.  ◯ D.  ◯

(11) Predict the product of acid hydrolysis of CH_3 -C≡C- CH_3 in the presence of $HgSO_4$ catalyst.

A. Acetaldehyde ◯ B. Propanal ◯

C. 2-Butanol ◯ D. Butanone ◯

(12) When secondary alcohol reacts with NaOH to produce yellow ppt, it is called:

A. Lucas test ◯ B. Benedict test ◯

C. Toulen test ◯ D. Iodoform test ◯

(13) Identify the name of the compound which will give acetamide on heating?

A. Ethyl amine ◯ B. Ethyl Nitrile ◯

C. Ethyl Diazonium Chloride ◯ D. Ammonium Acetate ◯

14. Predict which maltose is the disaccharide of

A.	Glucose only	◯	B.	Galactose only	◯
C.	Glucose & Fructose	◯	D.	Galactose & Fructose	◯

(15) Predict which one of the following substance is used as film forming agent in nail polish?

A.	Nitrocellulose	◯	B.	Ethyl acetate	◯
C.	Butyl stearate	◯	D.	Glycerol	◯

(16) Identify which one of the following water pollutant is Carcinogenic?

A.	Polycyclic hydrocarbons	◯
B.	Mineral acids	◯
C.	D.D.T	◯
D.	Nitrate fertilizers	◯

(17) Mass spectrum of Magnesium shows that it contains three isotopes. Mg-24 (78.70%), Mg-25 (10.13%) & Mg-26(11.17%). The average atomic mass of Mg is:

A.	24.32 amu	◯	B.	25.32 amu	◯
C.	26.32 amu	◯	D.	27.32 amu	◯

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

Time allowed: 2:35 hours Total Marks: 68

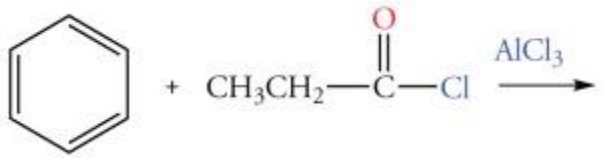
Note: Answer any fourteen parts from Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Write your answers neatly and legibly.

SECTION – B (Marks 42)

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

i. List three raw materials of nail polish.

ii. Propose reaction mechanism of following.



iii. Describe the significance of catalytic converter and give reactions involved in it.

iv. Demonstrate reaction of 1-Butyne with ammonical silver nitrate and cuprous chloride.

v. Illustrate one method of preparation of diazonium salt.

vi. Briefly describe contact adhesives.

vii. Briefly describe the oxidative cleavage of 1,2 -diol. Give valid chemical reaction.

viii. Differentiate between C_6H_5OH and $C_6H_{13}OH$ by chemical reaction.

ix. Demonstrate the oxidation of:
$CH_3\text{-}CH_2\text{-}CH_2\text{-}CHO$ and $CH_3\text{-}\overset{\overset{O}{\|}}{C}\text{-}CH_2CH_3$ by chemical reactions.

x. Propose reaction mechanism of 2,2 -Dimethyl butanal with sodium hydroxide.

xi. Briefly discuss reactivity of Ethanoic acid with phenol.

xii. Explain briefly the role of inhibitors in enzyme catalyzed reactions.

xiii. List down all the various raw materials for petrochemical industry.

xiv. Recognize and briefly describe water pollutants.

xv. State the regions electromagnetic spectrum used in IR and UV spectroscopy.

xvi. Explain briefly the trends of oxidation states in groups IA, IIA, IVA, and VIIA of the periodic table.

xvii. Demonstrate the reaction of potassium dichromate with oxalic acid by balanced chemical equation.

xviii. List three uses of plants as a source organic compound.

xix. Interpret why SN_2 mechanism is chosen rather than SN_1 in the preparation of primary alkyl halides?

xx. Identify 'A' and 'B' by completing reactions.
$CH_3CH_2CH_2OH \xrightarrow{K_2Cr_2O_7/H_2SO_4} A \xrightarrow{NaHSO_3} B$

SECTION – C (Marks 26)

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

Q.3 a. Propose reaction mechanism of free radical with ethane. (06)

b. Identify factors that affect enzyme activity such as temperature and p^H. Describe the components of complex compounds. (2+2+3)

Q.4 a. Demonstrate by the balanced chemical reaction of potassium manganate (VII) with the following: (2+2+2)

(i) Ferrous Sulphate (ii) Oxalic acid (iii) Mohr's salt

b. Describe the trend in solubility of the hydroxides sulphates and carbonates of group IIA. (2+2+3)

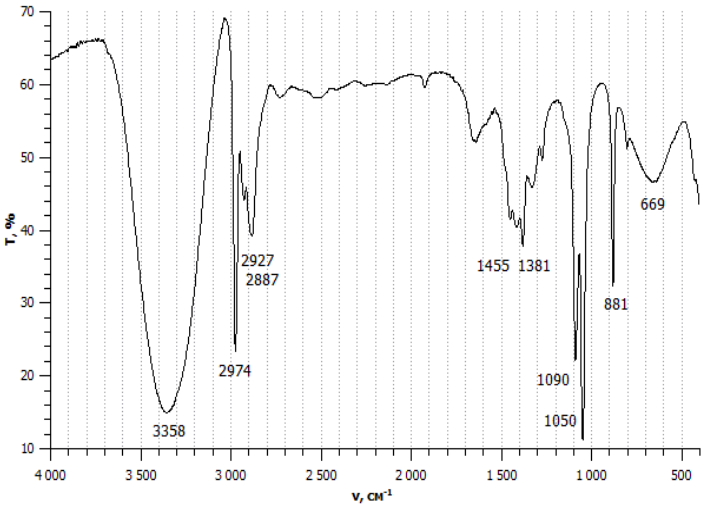
Q.5 a. Identify A and B compounds by completing the chemical reactions. Also write IUPAC names of A and B. (2.5+2.5+2)

(i) $CH_3\text{-}CH_2C(=O)\text{-}O\text{-}C(=O)\text{-}CH_2\text{-}CH_3 + CH_3\text{-}O\text{-}H \longrightarrow A+B$

(ii) $CH_3\text{-}CH_2C(=O)\text{-}O\text{-}C(=O)\text{-}CH_2\text{-}CH_3 + H_2O \longrightarrow A+B$

(iii) $CH_3\text{-}CH_2C(=O)\text{-}O\text{-}C(=O)\text{-}CH_2\text{-}CH_3 + CH_3\text{-}CH_2\text{-}NH_2 \longrightarrow A+B$

b. Analyze the ethanol Infrared spectrum by using following data. (06)



Wavenumber (cm^{-1})	Bond	Functional Group
3400–3250 (m)	N–H stretch	primary, secondary amines, amides
3500–3200 (s,b)	O–H stretch, H–bonded	alcohols, phenols
2260–2100 (w)	–C (triple bond) C– stretch	alkynes
1650–1580 (m)	N–H bend	primary amines
1300–1150 (m)	C–H wag (–CH_2X)	alkyl halides
1360–1290 (m)	N–O symmetric stretch	nitro compounds
1335–1250 (s)	C–N stretch	aromatic amines
1320–1000 (s)	C–O stretch	alcohols, carboxylic acids, esters, ethers

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CHEMISTRY HSSC-II (3rd Set)
Student Learning Outcomes Alignment Chart

SECTION A

Q.1

1. Discuss the trends in thermal stability of the nitrates and carbonates of Group-II elements.
2. Explain the effect of heat on carbonates of Group-I elements.
3. Explain the shapes, origin of colors and nomenclature of coordination compounds.
4. Describe electronic structure of elements and ions of d-block elements.
5. Explain nomenclature and structure of aldehydes.
6. Describe the chemistry of alkenes by ozonolysis.
7. Define and explain with suitable examples the term isomerism
8. Discuss chemistry of Grignard reagent by the addition of carbon dioxide.
9. Discuss basicity of Amines.
10. Explain reactivity of alcohols.
11. Discuss the chemistry of Alkynes by hydrohalogenation.
12. Identify alcohols using Idoform Test.
13. Describe preparation of Amides.
14. Explain the basis of classification of carbohydrates.
15. Describe preparation of nail polish.
16. Recognize and describe various water pollutants.
17. Outline the use of MS in determination of relative isotopic masses and isotopic abundance.

SECTION-B

Q.2

i. Describe preparation and applications of various cosmetics like nail varnish, nail polish remover and lipstick.
ii. Discuss chemistry of benzene and methyl benzene by Friedal Craft's Alkylation and Acylation.
iii. List possible alternatives to the use of CFSs.
iv. Discuss chemistry of Alkynes by hydrogenation, hydration, bromination and reaction with metals.
v. Describe chemistry of Amines by alkylation of amines with RX, reactions with aldehydes, ketones, preparation of amides and diazonium salts.
vi. Describe the types and applications of synthetic adhesives.
vii. Describe the chemistry of alcohols by oxidative cleavage of 1, 2-diols.
viii. Differentiate between alcohol and phenol.
ix. Describe oxidation reactions of aldehydes and ketones.
x. Describe acid and base catalyzed nucleophilic addition reactions of aldehydes and ketones.
xi. Discuss reactivity of phenol and carboxylic acid.
xii. Explain the role of inhibitors of enzyme catalyzed reactions.
xiii. List the various raw materials for photo chemical industry.
xiv. Recognize and describe various water pollutants.
xv. State the regions of electromagnetic spectrum used in IR and UV visible spectrum.

xvi. Explain the trends in physical properties and oxidation states in group I, II, IV and VI of Periodic table.
xvii. Describe the reactions of potassium dichromate with oxalic acid.
xviii. Explain the use of plants as a source of organic compounds.
xix. Describe the mechanism and types of nucleophilic substitution reactions.
xx. Reactivity of alcohols (oxidation).

SECTION-C

Q.3 a. Describe the mechanism of free radical substitution in ethane.
b. Identify factors that affect enzyme activity such as effect of temperature and PH

Q.4 a Describe the reactions of potassium manganite VII with ferrous sulphate, oxalic acid and Mohr's salt.
b. Describe the trend in solubility of hydroxides, sulphates and carbonates of Group II elements.

Q.5 a. Describe the reactions of carboxylic acid derivatives.
b. Determine the structure of ethanol from its IR spectrum.

CHEMISTRY HSSC-II (3rd Set)

TABLE OF SPECIFICATION

Topics/Sub topics	**s and p block elements 13**	**d and f block elements 14**	**Organic compounds 15**	**Hydro carbons 16**	**Alkyl halides and amines 17**	**Alcohol phenyl and ether 18**	**Aldehyde and ketones 19**	**Carboxylic acids 20**	**Bio chemistry 21**	**Industrial chemistry 22**	**Environmental chemistry 23**	**Analytical chemistry 24**	**Total marks for each Assessment Objective**	**%age of cognitive level**
(Knowledge based)	4 b(7)	1(4)(1)	2 xviii(3)	1(6)(1)	1(8)(1)	1(12)(1) 2 vii(3)		1(13)(1)		2 i(3) 2 vi(3)	2 iii(3) 2 xiii(3) 2 xiv(3)	2 xv(3)	36	31%
(Understanding based)	1(1)(1) 1(2)(1) 2 xvi(3)	1(3)(1) 2 xvii(3) 4 a(6)	1(5)(1)	1(11)(1) 2 iv(3)	1(9)(1) 2 xix(3) 3 b(7)	1(10)(1) 2 viii(3) 2 xi(3) 2 xx(3)	2 ix(3)	5 a(7)	1(14)(1) 2 xii(3)	1(15)(1)	1(16)(1)		57	49.1%
(Application based)				1(7)(1) 2 ii(3) 3 a(6)	2 v(3)		2 x(3)					1(17)(1) 5 b(6)	23	19.8%
Total marks for each Topic/Subtopic	12	11	04	15	15	14	06	08	04	07	10	10	116	100%

KEY:

1(1)(1)

Question No. (Part No.) (Allocated Marks)

Note: (i) The policy of FBISE for knowledge based questions, understanding based questions and application based questions is approximately as follows:

a) 30% knowledge based.
b) 50% understanding based.
c) 20% application based.

(ii) The total marks specified for each unit/content in the table of specification is only related to this model question paper.

(iii) The level of difficulty of the paper is approximately as follows:

a) 40% easy
b) 40% moderate
c) 20% difficult