

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION
CLASS: XII SUBJECT: CHEMISTRY
Syllabus-2023-2024
CLASS XII (THEORY)

Total Periods 180

Unit I: Solid State

(Periods 12)

Classification of solids based on different binding forces :molecular, ionic covalent and metallic solids, amorphous and crystalline solids(elementary idea),unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency (excluding derivations), voids , number of atoms per unit cell in a cubic unit cell, point defects, magnetic properties.

Unit II : Solutions

(Periods 12)

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, vapour pressure of liquid solutions, Raoult's law ,Ideal solutions & Non ideal solutions, colligative properties – relative lowering of vapour pressure, elevation of B.P., depression of freezing point, osmosis ,reverse osmosis & osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Vant Hoff factor(excluding numericals using vant Hoff factor).

Unit III: Electrochemistry

(Periods 14)

Redox reactions; conductance in electrolytic solutions(excluding measurement of conductivity of ionic solutions), specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), – Electrochemical cells & electrolytic cells; Galvanic cells EMF of a cell, measurement of standard electrode potential ,Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell . Batteries (only Leclanche cell & lead accumulator), fuel cells; corrosion.

Unit IV: Chemical Kinetics

(Periods 12)

Rate of a reaction (average and instantaneous), factors affecting rates of reaction: concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions); Temperature dependence of rate of reaction, effect of catalyst on rate of reaction ,Activation energy& Arrhenius equation.

Unit V: Surface Chemistry

(Periods 8)

Adsorption – physisorption and chemisorption; Adsorption Isotherms Adsorption from solution phase, catalysis :homogeneous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: distinction between true solutions, colloids and suspensions; lyophillic, lyophobic multimolecular and macromolecular colloids, Associated colloids; Preparation of colloids(only Bredig's arc method) properties of colloids; Tyndall effect, Brownian movement, charge on colloids(only examples of positively and negatively charged colloids) electrophoresis, coagulation; emulsions – types of emulsions.

Unit VI: General Principles and Processes of Isolation of Elements

(Periods 8)

Occurrence of metals, Concentration of ores, Extraction of crude metal from concentrated ore(excluding diagram of reverberatory furnace & Blast furnace),Thermodynamic principles of metallurgy(excluding Ellingham diagram),Extraction of iron from it's oxides ,Extraction of copper from

cuprous oxide, Extraction of Zinc from zinc oxide. Electrochemical principles of metallurgy -Extraction of Aluminium. Refining- Distillation, Liquation, Electrolytic refining, Zone refining, Vapour phase refining.

Unit VII: The p-Block Elements

(Periods 16)

Group 15 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties and uses; compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (only formulas); Phosphorous-allotropic forms; compounds of phosphorous: preparation and properties of phosphine .

Group 16 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; dioxygen: preparation, properties and uses, Sulphur – allotropic forms; compounds of sulphur: preparation, properties and uses of sulphur dioxide; sulphuric acid: properties and uses, oxoacids of sulphur (structures only).

Group 17 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens: preparation, properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structures only).

Group 18 elements: General introduction, electronic configuration, occurrence, trends in physical and chemical properties, Preparation, properties & structures of Xenon Fluorine compounds & Xenon Oxygen compounds.

Unit VIII: The d and f Block Elements

(Periods 12)

General introduction ,electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation. Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

Lanthanoids – electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences.

Actinoids – , Ionic sizes, oxidation states and comparison with lanthanoids .

Unit IX Coordination Compounds

(Periods 12)

Coordination compounds: Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding, Werner's theory, VBT,CFT; isomerism (structural and stereo)importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

Unit X: Haloalkanes and Haloarenes

(Periods 12)

Haloalkanes: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions. Optical rotation.

Haloarenes: Nature of C-X bond, substitution reactions(directive influence of halogen for monosubstituted compounds only). Reaction with metals.

Unit XI: Alcohols, Phenols and Ethers

(Periods 12)

Alcohols: Nomenclature, methods of preparation, physical and chemical properties ; identification

of primary, secondary and tertiary alcohols.

Phenols : Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, kolbes reaction ,Reimer Tiemann reaction, reaction with zinc dust, oxidation.

Ethers : Nomenclature, methods of preparation, physical and chemical properties.

Unit XII: Aldehydes, Ketones and Carboxylic Acids

(Periods 14)

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, nucleophilic addition(with respect to HCN , Ammonia, Hydrazine & 2,4 DNP), reduction, oxidation and reactivity of alpha and no alpha hydrogen in aldehydes, electrophilic substitution reaction.

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties.

Unit XIII: Amines

(Periods 10)

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, identification of primary secondary and tertiary amines.

Diazonium salts: Preparation, chemical reactions .

Unit XIV: Biomolecules

(Periods 10)

Carbohydrates – Classification (aldoses and ketoses), monosaccharide (glucose and fructose),

D-L configuration, oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen excluding structures)

Proteins - Elementary idea of a - amino acids classification, peptide bond, polypeptides, proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins.

Vitamins – Classification and functions.

Nucleic Acids: DNA and RNA(excluding structures).

Unit XV: Polymers

(Periods 8)

Classification based on source, structure, molecular forces and mode of polymerization, Preparation of polymers (natural and synthetic) like polythene, Teflon, PAN ,nylon, polyesters(dacron).Melamine & bakelite(excluding structures), and rubber(excluding structures for natural and vulcanized), copolymerization.: Biodegradable and non-biodegradable polymers.

Unit XVI: Chemistry in Everyday Life

(Periods 8)

1. Chemicals in medicines – analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.
2. Chemicals in food – preservatives, artificial sweetening agents.
3. Cleansing agents – soaps, types of soaps & detergents, cleansing action.(excluding equations)

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION
CLASS: XII SUBJECT: CHEMISTRY

SCHEME OF EXAMINATION AND MARKS DISTRIBUTION (2023- 24)

No	Unit	1 st Formative Test, Aug.	2 nd Formative Test Oct,	Innovative testing	Board Exam, March
1	THE SOLID STATE				4± 1
2	SOLUTIONS	5±1			5±1
3	ELECTROCHEMISTRY		5±1		5±1
4	CHEMICAL KINETICS	5±1			5±1
5	SURFACE CHEMISTRY				4±1
6	GENERAL PRINCIPLES AND PROCESSES OF ISOLATION OF ELEMENTS	4±1			4±1
7	THE P-BLOCK ELEMENTS				6±1
8	THE d-&f-BLOCK ELEMENTS		5±1		5±1
9	COORDINATION COMPOUNDS				4±1
10	HALOALKANES & HALOARENES	6±1			5±1
11	ALCOHOLS, PHENOLS AND ETHERS		6±1		5±1
12	ALDEHYDES, KETONES AND CARBOXYLIC ACIDS				6±1
13	AMINES				4±1
14	BIOMOLECULES		4±1		4±1
15	POLYMERS				2±1
16	CHEMISTRY IN EVERYDAY LIFE				2±1
	INNOVATIVE TESTING			10	
	PRACTICAL-FIRST TERM			10	
	MAXIMUM MARKS	20	20	20	70
	DURATION IN MINUTES	60	60		150
	NUMBER OF QUESTIONS	10	10		35
	MULTIPLE CHOICE QUESTION (1 MARK)	2	2		
	VERY SHORT ANSWER VSA (1 MARK)	2	2		
	SHORT ANSWER I (SA I)—2 MARKS	3	3		
	SHORT ANSWER (SA II)—3 MARKS	2	2		
	LONG ANSWER (LA) —4 MARKS	1	1		
	KNOWLEDGE %	30 ±5			30 ±5
	UNDERSTANDING %	40±5			40±5
	SKILL %	10±5			10±5
	APPLICATION %	20 ±5			20 ±5
	DIFFICULTY LEVEL %				
	EASY	30±5			30±5
	AVERAGE	50±5			50±5
	DIFFICULT	20±5			20±5

FIRST TERM PRACTICAL EXAMINATION

VOLUMETRIC ANALYSIS	06 Marks
DETECTION OF FUNCTIONAL GROUP	02 Marks
JOURNAL + VIVA	02 Marks
TOTAL	10 Marks
DURATION	90 Minutes

FINAL HSSC PRACTICAL EXAMINATION

VOLUMETRIC ANALYSIS	08 Marks
JOURNAL + VIVA	02 Marks (01+01)
ANALYSIS OF SALT	10 Marks
TOTAL	20 Marks
DURATION	180 Minutes(Three Hours)

COMPUTATION OF INTERNAL MARKS

Examination	Max Marks	Duration
A. Formative -I Examination	20 Marks	60 Minutes
B. Formative -II Examination	20 Marks	60 Minutes
C. First term Practical examination	10 Marks	90 Minutes
D. Innovative Test	10 Marks	
TOTAL=(A+B+C+D)	60 Marks	
HSSC Internal Marks=Average=60/6 = MAX=10	10 Marks	
COMPUTATION OF CHEMISTRY MARKS FOR FINAL HSSC EXAMINATION		
HSSC Theory examination	70 Marks	150 Minutes
HSSC Practical examination	20 Marks	180 Minutes
HSSC Internal Marks	10 Marks	
Total	100 Marks	

**Goa Board of Secondary & Higher Secondary Education
Alto, Betim-Goa**

**Model Paper for First term Practical Examination-2023
CHEMISTRY**

Date:
Session:

Duration: **90** Minutes
Max. Marks: **10**

N. B.

- 1) On your answer books write your Examination Seat number and your Laboratory table number.
- 2) Get the burette reading and confirmatory tests initialed by the Examiner.
- 3) Check if the number on (i) your table (ii) answer script and (iii) the containers A, B, and F are the same. If not, report immediately to the Examiner.
- 4) Use of non - programmable calculator is allowed.

Atomic Masses:- H=1, C=12, N=14, O=16, S=32, K=39, Mn=55, Fe= 56.

SECTION – I

Q.1 You are provided with two solutions as follows:-

Container A: _____N/M stock solution of hydrated Oxalic acid / Mohr's salt.

Container B: KMnO_4 Solution

Using the stock solution from Container A, prepare 100 mL of _____N/M hydrated Oxalic acid /Mohr's salt in the given Standard Measuring flask C.

Using the solution prepared in flask C, determine N/M of the solution in container B.

Also calculate. (any one)

- The strength of the solution in container B in terms of grams per _____mL.
- The percentage purity of the solution in container B, _____g of which have been dissolved per _____mL. (6 Marks)

Q.2. Determine the functional group of the organic compound supplied to you in Container **F** bearing your table number. Give a complete report of all the tests performed. (2 Marks)

Q.3. Journal + Viva

(1+1 Marks)

Marking Scheme

Scheme for allotment of marks for First term practical examination

1. Volumetric analysis6 marks

- a. Calculation of correct volume 1 mark
- b. Titre reading 3 marks
- c. Calculations..... 1 + 1 mark (2 Marks)

2. Functional group2 marks

(Distribution of marks same as for the board examination)

1.	Carboxylic group	2 marks
2.	Phenolic/ Amino group	If not identified correctly, ½ mark to be given for reporting-COOH group as absent and 1½ marks for detecting phenolic/amino group.
3.	Amino/Phenolic group	If not identified correctly ½ mark to be given for reporting -COOH group as absent, ½ mark for reporting phenolic/amino group absent and 1 mark for detecting the phenolic/amino group correctly.
4.	Carbonyl group	If not identified correctly 1 mark for recording absence of carboxylic group, amino group and phenolic group (½ mark if only two of the groups are reported), ½ mark for detecting CO group and ½ mark for distinguishing Carbonyl group either as -CHO or -CO-
5.	Alcoholic group	If not identified correctly, 1 mark for recording carboxylic, phenolic, amino and carbonyl group as absent. (½ mark only if any of the two above groups are reported) 1 mark for recording alcoholic group correctly.

3. Journal + Viva 1+ 1 mark

SEAT NO:-

TABLE NO:-

**Goa Board of Secondary & Higher Secondary Education
Alto, Betim-Goa**

HSSC Practical Examination –March/April 2024

CHEMISTRY

Date:
Session:

Duration: 3 Hours
Max. Marks: 20

- N. B.1)** Write your Examination Seat number and your Laboratory table number on your answer book.
- 2) Get the burette reading and confirmatory tests initialed by one of the Examiner.
 - 3) Check if the number on (i) your table (ii) answer book and (iii) the containers A, B, C and D are the same. If not, report immediately to the Examiners.
 - 4) Use of non-programmable calculator is allowed.

Atomic Masses:- H=1, C=12, N=14, O=16, S=32, K=39, Mn=55, Fe= 56.

SECTION – I

Q.1 You are provided with two solutions as follows:-

Container A: _____ N/M stock solution of hydrated Oxalic acid / Mohr's salt.

Container B: KMnO_4 Solution

Using the stock solution from Container A, prepare 100 mL of _____ N/M hydrated Oxalic acid / Mohr's salt in the given Standard Measuring flask C.

Using the solution prepared in flask C, determine N/M of the solution in container B.

Also calculate. (any one)

- The strength of the solution in container B in terms of grams per _____ mL.
 - The percentage purity of the solution in container B, _____ g of which have been dissolved per _____ mL.
- (08 Marks)

Q.2 Journal + Viva

(1+1 Marks)

SECTION – II

Q.3 Analyse the inorganic salt given in container **D** bearing your table number qualitatively and detect the cation and anion present. Give a complete report of all the tests performed.

Write the formula of the compound detected.

(10 Marks)

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HIGHER SECONDARY SCHOOL CERTIFICATE EXAMINATION

GUIDELINES FOR CONDUCT OF THE H.S.S.C. PRACTICALS IN CHEMISTRY -2024

1. Student should report in journal:

- Minimum of 4 volumetric exercises.
- Minimum 12 inorganic qualitative analysis.
- Four Physical experiments
 - To prepare lyophilic sol of starch.
 - To determine enthalpy of Neutralization.
 - To study the effect of concentration on the rate of reaction.
 - To study the role of emulsifying agents in stabilizing the emulsion of different oils.
- Minimum Five Organic compounds from the following list covering all five functional groups
(Oxalic acid, Acetic acid, Benzoic acid, β -Naphthol, Aniline, Benzaldehyde, Acetone, Ethanol)

2 List of the compounds.

<u>COMPOUND</u>	<u>COMPOUND</u>
<u>NH₄Cl</u>	<u>Zn(NO₃)₂</u>
<u>NH₄Br</u>	<u>ZnCl₂</u>
<u>(NH₄)₃PO₄</u>	<u>CoCl₂</u>
<u>(NH₄)₂CO₃</u>	<u>CoSO₄</u>
<u>Pb(NO₃)₂</u>	<u>Co(NO₃)₂</u>
<u>Pb(CH₃COO)₂</u>	<u>CaCl₂</u>
<u>CuSO₄</u>	<u>Ca(NO₃)₂</u>
<u>CuCl₂</u>	<u>Sr(NO₃)₂</u>
<u>Cu(NO₃)₂</u>	<u>SrCl₂</u>
<u>AlCl₃</u>	<u>BaCl₂</u>
<u>Al₂(SO₄)₃</u>	<u>Ba(NO₃)₂</u>
<u>Al(NO₃)₃</u>	<u>MgSO₄</u>
<u>FeCl₃</u>	<u>MgCl₂</u>
<u>Fe(NO₃)₃</u>	<u>KCl</u>
<u>MnCl₂</u>	<u>KI</u>
<u>MnSO₄</u>	<u>KBr</u>
<u>NiSO₄</u>	<u>K₂SO₄</u>
<u>NiCl₂</u>	<u>K₂CO₃</u>
<u>Ni(NO₃)₂</u>	<u>K₃PO₄</u>
<u>ZnSO₄</u>	<u>K₂C₂O₄</u>

1. Scheme for allotment of marks.

Q1. In organic Volumetric Analysis (Redox titration)

(8 marks)

- Correct observations (burette solution, solution in the flask, indicator and colour change) (1 mark)

Chemistry syllabus for 2023-2024

- (b) Calculation of correct volume (1 mark)
 (c) Range of titre reading for allotment of marks is as follows: (Maximum 4 marks)

Error in titre reading Marks

$\pm 0.2\text{mL}$	4
$\pm 0.3\text{mL}$	3
$\pm 0.4\text{mL}$	2
$\pm 0.5\text{mL}$	1

Pilot reading and a set of three concordant reading shall be recorded in the observation table and thus the concordant reading should be taken as the correct reading for assigning the marks for accuracy in the reading.

- (d) Calculations:- (2 marks)

(1) Calculation of N/M of solution in container B, by using

(1) $N_1V_1=N_2V_2$ (2) $N=aM$

$a_1M_1V_1=a_2M_2V_2$ formula/e, (a= number of electrons lost or gained per molecule).....

(1 mark)

(2) Calculate the following.....

(1 mark)

Strength of the solution in container B in terms of _____g/_____mL

Or % purity of solution in container B

N.B. In case the titre reading is not within the range of error then for calculations (correct formula) ½ mark to be allotted out of the 1 mark allotted for each calculation.

Q 2. JOURNAL+Viva

(2 Mark)

The marks are to be allotted as follows:

- I. For the experiments performed and recorded during the year. (1 mark)
 II. Viva on Physical expts (Two questions ½ marks each) (1 mark)

Q 3. Qualitative analysis of Inorganic Compound

(10 marks)

<p>Dry/Preliminary Tests (4 marks) Colour(½ mark) Heating in a dry test tube.....(½ mark) Flame test(½ mark) Test for NH_4^+(½ mark) Dil HCl test..... (½ mark) Conc H_2SO_4 (½ mark) Phosphate test(½ mark) KMnO_4 test.....(½ mark) If no anion is detected and if it is SO_4^{2-}, it need not be reported as given in the chart.</p>	<p>WET TESTS FOR CATION.....(3 marks) 1) Group separation (1 mark) 2) Identification of cation(1 mark) 3) C.T. for cation.....(1 mark)</p> <p>WET TESTS FOR ANION AND RESULT..... (2 marks) (1) Identification of anion.....(1 mark) (2) C.T. for anion..... (1 mark)</p> <p>(3) CORRECT FORMULA OF SALT (1 mark)</p>
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Chemistry syllabus for 2023-2024

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BLUEPRINT OF FIRST FORMATIVE EXAM (2023 - 2024)

STD : XII SCIENCE SUBJECT : CHEMISTRY MARKS : 20 DURATION : 60 min

	OBJECTIVES				DIFFICULTY LEVEL		
	K	U	S	A	Eas y (E)	Average (Av)	Difficul t (D)
Percentage	30%	40%	10%	20%	30%	50%	20%
Marks	6	8	2	4	6	10	4

Variation of $\pm 5\%$ is permitted in the above Objectives and Difficulty Level

Type of questions	Marks	Number of questions	Total marks
MCQ	1	2	2
VSA	1	2	2
SA – I	2	3	6
SA – II	3	2	6
LA	4	1	4
Total	10	20

MCQ = Multiple Choice Question

VSA = Very Short Answer

SA – I = Short Answer – I

SA – II = Short Answer – II

LA = Long Answer.

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Chemistry syllabus for 2023-2024

BLUEPRINT OF FIRST FORMATIVE EXAM (2023 - 2024)

Q. No.	Type	Unit No. and Name	Objectives	Difficulty level	Duration (min)	Marks
1	MCQ	2.SOLUTIONS	U	E	2	1
2	MCQ	4. CHEMICAL KINETICS	K	E	2	1
3	VSA	4. CHEMICAL KINETICS	K	E	2	1
4	VSA	6.GENERAL PRINCIPLES & PROCESSES OF ISOLATION OF ELEMENTS	S	Av	2	1
5	SA-I	2.SOLUTIONS	A	D	5	2
6*	SA-I	2.SOLUTIONS OR	K/S	Av	4	1+1=2
6*	SA-I	2.SOLUTIONS	K/S	Av	4	1+1=2
7	SA-I	10. HALOALKANES AND HALOARENES	A	D	5	2
8	SA-II	6.GENERAL PRINCIPLES & PROCESSES OF ISOLATION OF ELEMENTS	K	E	8	3
9	SA-II	4.CHEMICAL KINETICS	U	Av	8	3
10*	LA	10. HALOALKANES AND HALOARENES OR	U	Av	12	4
10*	LA	10. HALOALKANES AND HALOARENES	U	Av	12	4
TOTAL DURATION IN MINUTES AND MARKS					50 min	20mks

**Internal choice*

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Chemistry syllabus for 2023-2024

BLUEPRINT OF SECOND FORMATIVE EXAM (2023 – 2024)

STD : XII SCIENCE

SUBJECT : CHEMISTRY

MAXIMUM MARKS : 20

DURATION : 60 Min

	OBJECTIVES				DIFFICULTY LEVEL		
	K	U	S	A	EASY (E)	AVERAGE (Av)	DIFFICULT (D)
Percentage	30 %	40 %	10 %	20%	30%	50%	20%
Marks	6	8	2	4	6	10	4

Variation of $\pm 5\%$ is permitted in the above Objectives and Difficulty Level.

TYPE OF QUESTIONS	MARKS	NUMBER OF QUESTIONS	TOTAL MARKS
MCQ	1	2	2
VSA	1	2	2
SA - I	2	3	6
SA - II	3	2	6
LA	4	1	4
TOTAL	----- -	10	20

MCQ = Multiple Choice Question

VSA = Very Short Answer

SA - I = Short Answer type I

SA- II = Short Answer type II

LA = Long Answer.

**Internal choice*

.BLUEPRINT OF SECOND FORMATIVE EXAM (2023-2024)

Q.No.	TYPE	UNIT NUMBER AND NAME	OBJECTIVES	DIFFICULTY LEVEL	DURATION IN Min	MARKS
1	MCQ	14. BIOMOLECULES	K	E	2	1
2	MCQ	11. ALCOHOLS, PHENOLS AND ETHERS	K	E	2	1
3	VSA	14. BIOMOLECULES	K	E	2	1
4	VSA	11. ALCOHOLS, PHENOLS AND ETHERS	K	E	2	1
5	SA-1	8. <i>d</i> -AND <i>f</i> -BLOCK ELEMENTS	A	D	5	2
6	SA-1	14. BIOMOLECULES	U	E	4	2
7*	SA-1	3 ELECTROCHEMISTRY	A	D	5	2
OR						
7*	SA-1	3. ELECTROCHEMISTRY	A	D	5	2
8	SA-II	3. ELECTROCHEMISTRY	S + U	Av	8	1 + 2
9	SA-II	8. <i>d</i> -AND <i>f</i> -BLOCK ELEMENTS	S + K	Av	8	1 + 2
10*	LA	11. ALCOHOLS, PHENOLS AND ETHERS	U	Av	12	4
OR						
10*	LA	11. ALCOHOLS, PHENOLS AND ETHERS.	U	Av	12	4
TOTAL DURATION IN MINUTES AND MARKS					50 min	20mks

Blue Print of HSSC Final Examination March-2024

Q. No.	Unit No. and Name	Objective	Difficulty Level	Q-Type	Duration (min)	Marks
1	1. THE SOLID STATE	A	D	MCQ	3	1
2	4. CHEMICAL KINETICS	K	E	MCQ	1	1
3	10. HALOALKANES AND HALOARENES	U	A	MCQ	2	1
4	11. ALCOHOLS, PHENOLS AND ETHERS	U	A	MCQ	2	1
5	8. The d-& f-block elements	K	E	MCQ	1	1
6	2. SOLUTIONS	A	D	MCQ	3	1
7	13. AMINES	A	D	MCQ	3	1
8	14. BIOMOLECULES	U	A	MCQ	1	1
9	6. GENERAL PRINCIPLES & PROCESSES OF ISOLATION OF ELEMENTS	S	A	VSA	3	1
10	11. ALCOHOLS, PHENOLS AND ETHERS	U	A	VSA	3	1
11	9. COORDINATION COMPOUNDS	S	A	VSA	3	1
12	5. SURFACE CHEMISTRY	K	E	VSA	2	1
13	3. ELECTROCHEMISTRY	K	E	VSA	2	1
14	15. POLYMERS	K	E	SA-I	3	2
15	7. THE P-BLOCK ELEMENTS	U	A	SA-I	4	2
16	16. CHEMISTRY IN EVERYDAY LIFE	K	E	SA-I	2	2
17	3. ELECTROCHEMISTRY	S	A	SA-I	4	2
18	4. CHEMICAL KINETICS	U	A	SA-I	3	2
19	12. ALDEHYDES, KETONES AND CARBOXYLIC ACIDS	U	A	SA-I	3	2
20	8. The d-& f-block elements	U	A	SA-I	3	2
21	10. HALOALKANES AND HALOARENES	U	A	SA-I	4	2
22	3. ELECTROCHEMISTRY OR	A	D	SA-I	6	2
22	3. ELECTROCHEMISTRY	A	D	SA-I	6	2
23	8. The d-& f-block elements	K	E	SA-I	2	2
24	10. HALOALKANES AND HALOARENES	A	D	SA-I	5	2
25	4. CHEMICAL KINETICS	K	E	SA-I	3	2
26	6. GENERAL PRINCIPLES & PROCESSES OF ISOLATION OF ELEMENTS	K	E	SA-II	5	3
27	5. SURFACE CHEMISTRY	S + U	A	SA-II	8	1 + 2
28	9. COORDINATION COMPOUNDS	K	E	SA-II	4	3
29	14. BIOMOLECULES	K	E	SA-II	4	3
30	1. THE SOLID STATE	S + U	A	SA-II	8	1 + 2
31	11. ALCOHOLS, PHENOLS AND ETHERS OR	A	D	SA-II	8	3
31	11. ALCOHOLS, PHENOLS AND ETHERS	A	D	SA-II	8	3
32	13. AMINES	U	A	SA-II	7	3
33	2. SOLUTIONS OR	S + U	A	LA	8	1 + 3
33	2. SOLUTIONS	S + U	A	LA	8	1 + 3
34	7. THE P-BLOCK ELEMENTS OR	U	A	LA	8	4
34	7. THE P-BLOCK ELEMENTS	U	A	LA	8	4
35	12. ALDEHYDES, KETONES AND CARBOXYLIC ACIDS OR	A	D	LA	9	4
35	12. ALDEHYDES, KETONES AND CARBOXYLIC ACIDS	A	D	LA	9	4
	TOTAL DURATION (min) & Marks				140	70

Chemistry syllabus for 2023-2024

MODEL QUESTION PAPER - FINAL EXAMINATION (2023 - 2024)

STD : XII SCIENCE

SUBJECT : CHEMISTRY

MAXIMUM MARKS : 70

NUMBER OF QUESTIONS : 35

DURATION : 2 ½ hours.

INSTRUCTIONS : (i) All questions are compulsory. However Q. Nos . 22, 31, 33, 34 & 35 have

Internal choice

- (ii) Answer each question only once.
- (iii) Do not use calculators. Logarithmic tables shall be supplied on request.
- (iv) Question Nos . 1 to 13 carry one mark each.
- (v) Question Nos.14 to 25 carry two marks each.
- (vi) Question Nos. 26 to 32 carry three marks each .
- (vii) Question Nos 33, 34 & 35 carry four marks each.

Atomic mass: Na=23,Cl=35.5 u

Q.1	The number of unit cells in 58.5 g of NaCl is nearly_____ <ul style="list-style-type: none"> • 6×10^{20} • 3×10^{22} • 1.5×10^{23} • 0.5×10^{24} 	1
Q.2	Activation energy for a chemical reaction with rate constants k_1 and k_2 at temperatures T_1 and T_2 respectively is calculated using the equation..... <ul style="list-style-type: none"> • $\log \frac{k_2}{k_1} = \frac{E_a}{2.303R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$ • $\log \frac{k_1}{k_2} = \frac{E_a}{2.303R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$ • $\log \frac{k_2}{k_1} = \frac{2.303E_a}{R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$ • $\log \frac{k_2}{k_1} = \frac{2.303R}{E_a} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$ 	1
Q.3	The correct order of boiling points for the given sets of compounds is_____. <ul style="list-style-type: none"> • 1-iodopropane < 1-bromopropane < 1-chloropropane < propane. • 1-chloropropane > 1-bromopropane > 1-iodopropane > propane. • Propane < 1-chloropropane < 1-bromopropane < 1-iodopropane. • Propane > 1-iodopropane > 1-bromopropane > 1-chloropropane. 	1
Q.4	Hydroboration – oxidation of propene in presence of NaOH and hydrogen peroxide gives ---- <ul style="list-style-type: none"> • propan-1-ol • propan- 2-ol • 2- methylpropanol • 2- methylpropan-2-ol 	1
Q.5	Colour of transition metal ions are due to absorption of some wavelength. This is due to_____. <ul style="list-style-type: none"> • d-f transition • d-d transition • s-d transition • f-f transition 	1
Q.6	An unripe mango placed in a concentrated salt solution to prepare pickles shrivels because_____. <ul style="list-style-type: none"> • It gains water due to osmosis • It loses water due to reverse osmosis • It gains water due to reverse osmosis • It loses water due to osmosis 	1

Q.7	Among the following amines, the one that will exhibit acidic nature on reaction with Hinsberg's reagent is----- <ul style="list-style-type: none"> ● Dimethyl amine ● Methyl amine ● Diethylamine ● Trimethylamine 	1
Q.8	The non-reducing sugar among the following is..... <ul style="list-style-type: none"> ● Lactose ● Maltose ● Glucose ● Sucrose 	1
Q.9	Draw a neat labeled diagram showing the zone refining process.	1
Q.10	Why does the boiling point of alcohols decrease with increase in branching?	1
Q.11	Draw the structure of Ethylenediaminetetraacetate ion.	1
Q.12	Write the mathematical expression for Freundlich adsorption isotherm.	1
Q.13	What are the products of electrolysis of molten Sodium chloride?	1
Q.14	Name the type of polythene used in manufacturing buckets and flexible pipes. Also write the names of monomers used in the preparation of Buna-N.	2
Q.15	Write the formulas of hydrides of Group 16 elements and arrange them in decreasing order of their stability.	2
Q.16	Mention the action of Aspirin and Chloramphenicol on the human body in bringing relief from a disease.	2
Q.17	Draw a neat diagram of the Dry Cell and label the composition of anode, cathode and electrolyte used in it.	2
Q.18	The rate constant for first order reaction is $4 \times 10^{-2} \text{ min}^{-1}$. The initial concentration of the reactant is 0.12 mol/L. Calculate the time required by the reactant to attain the concentration of 0.03 mol/L. (Given : $\log 4 = 0.6021$)	2
Q.19	Write chemical equations for the Clemmensen reduction of Acetophenone and Hell Volhard Zelinsky reaction of Ethanoic acid.	2
Q.20	What is Actinoid contraction? Why is it greater from element to element than lanthanoid contraction?	2
Q.21	Identify the structures and names of Compounds X and Y in the following Sequence. Benzene diazonium salt + KI \rightarrow Compound X which on \rightarrow Compound Y treatment with Na /ether	2
Q.22	Two metals E1 and E2 have their standard Reduction Potentials as -0.25 V and -2.36 V respectively. Which of the metal will spontaneously liberate bubbles of Hydrogen gas when placed in dil. Sulphuric acid? Also calculate the emf of the cell in case the two metals were used as electrodes to build an Electrochemical cell.	2

OR		
Q.22	<p>Rusting of underground iron pipe lines can be prevented by joining it with a piece of a suitable metal. Select the most suitable metal from the following for this purpose.</p> <p style="text-align: center;">Aluminium, Copper, Silver.</p> <p>Also calculate the emf obtained in case Iron and Aluminium are used as electrodes in an Electrochemical cell. (Given : Standard Reduction potentials of Fe, Al and Cu are -0.44 V, -1.66 V & 0.34 V respectively)</p>	2
Q.23	Name the element of the 3d transition series that exhibits the largest number of oxidation states and why?	2
Q.24	<p>Compound P with molecular formula C_4H_9Br is treated with aq. KOH solution.</p> <p>The rate of this reaction depends on the concentration of Compound P only. When another optically active isomer Q of this compound was treated with aq. KOH the rate of reaction was found to be dependent on concentration of both Compound Q and KOH .</p> <p>Identify the Compounds P and Q. Out of the two compounds which one will be converted to a product with total inversion in configuration?</p>	2
Q.25	Derive the Integrated rate equation for the Zero Order Reaction.	2
Q.26	<p>During the visit to the Iron and Copper industry following observations were made.</p> <ul style="list-style-type: none"> ● Iron obtained from blast furnace was cast into a variety of shapes. ● Copper was produced in the form of copper matte. <p>Name the type of iron obtained from the blast furnace and also write the % of carbon present in it.</p> <p>Write the formulae of the two types of metal sulphides present in copper matte and name the gas evolved and the type of copper formed during the extraction of copper.</p>	3
Q.27	Draw a neat labeled diagram of Bredig's arc method used for the preparation of sol. Write one point of difference between homogeneous and heterogeneous catalysis. Why is a lyophilic colloid more stable than lyophobic colloid?	3
Q.28	The outer orbital complex $[CoF_6]^{3-}$ shows octahedral geometry and has four unpaired electrons in the hybridized state. Comment on its type of hybridisation and magnetic property. Identify the type of isomerism in $[Cr(en)_3]Cl_3$. Write the name of the ligand, Coordination number and oxidation number of Chromium in the complex.	3
Q.29	What is a peptide linkage? Name the vitamins whose deficiency causes night blindness and rickets. Give one example each of fibrous & Globular proteins.	3
Q.30	Draw the structure of the fcc unit cell and calculate the total number of atoms per unit cell in it.	3
Q.31	An organic compound A having molecular formula C_3H_8O on treatment with chromic anhydride gave compound B . Compound B on treatment with Methyl magnesium bromide gives compound C , When compound C is passed through a copper tube heated at $573K$ gives 2-Methyl propene. Identify A, B, C and also write the sequence of reactions involved.	3

OR		
Q.31	An aromatic hydrocarbon M having molecular formula C_6H_6 on treatment with oleum and gave compound N . Compound N on treatment with Sodium hydroxide and acid gave compound O . Compound O on treatment with Zn dust gave compound M . Identify M, N & O and also write the sequence of reactions involved.	3
Q.32	Write chemical equations to convert Propanamide to Ethanamine, Benzene diazonium chloride to Orange dye. Why are aromatic amines weaker bases than ammonia?	3
Q.33	Show graphically the effect on the boiling point of water when a non-volatile solute is added into it. 18 grams of glucose ($C_6H_{12}O_6$) is dissolved in one Kilogram of water in a saucepan. Calculate the molality and the boiling point of the solution. (Given : K_b for water = 0.52 K/m, At. Mass of C=12, H=1, O=16)	4
OR		
Q.33	Show graphically the type of solution formed (ideal or nonideal) when ethanol and methanol are mixed together. The Vapour pressure of pure ethanol and methanol are 44.5mm and 88.7 mm of Hg respectively. A solution is prepared by mixing 60 gms of ethanol and 40 gms of methanol. Calculate the Vapour Pressure of the solution. (Given : At. mass of C = 12, H= 1, O=16)	4
Q.34	Write the general trend of group 15 elements with respect to Atomic/ionic radii and Ionization enthalpy and also write the general trend of group 17 elements with respect to electronegativity and electron gain enthalpy.	4
OR		
Q.34	Write the formula of oleum and name the gas that is dissolved in sulphuric acid to get the oleum and write the reaction for the same. Also write the formula of Xenon hexafluoride and write its reaction showing complete hydrolysis.	4
Q.35	Write the sequence of reactions involved and name the compounds W, X, Y and Z <div style="text-align: center;"> <pre> graph TD Z1[Compound Z] -- Soda lime --> W[Compound W] W -- "CO, HCl Anhyd. AlCl3/CuCl" --> X[Compound X] X -- "Conc NaOH" --> Z2[Compound Z] X -- "Conc NaOH" --> Y[Compound Y] </pre> </div>	4

OR		
Q.35	<p>Write the sequence of reactions involved and name the compounds E,F,G and H</p>	4

ANSWER KEY TO MODEL QUESTION PAPER OF FINAL EXAMINATION (2023 - 2024)

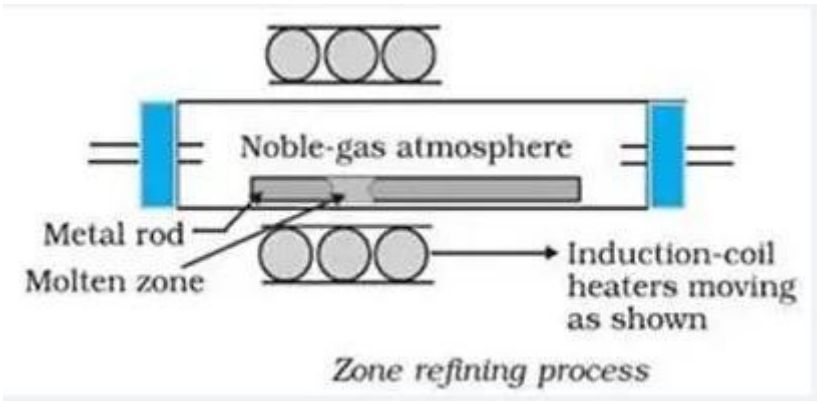
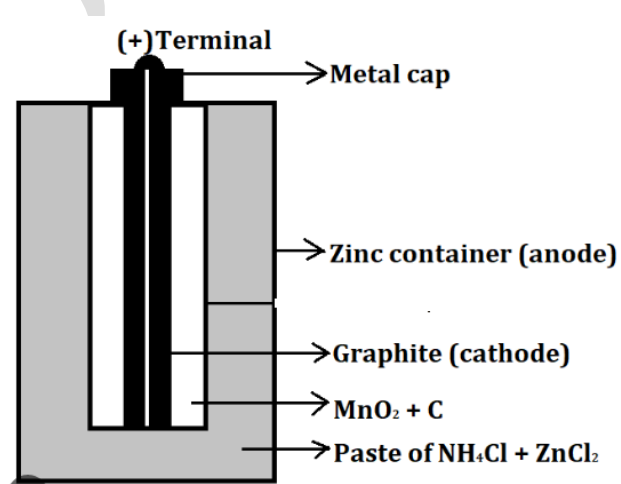
STD : XII SCIENCE

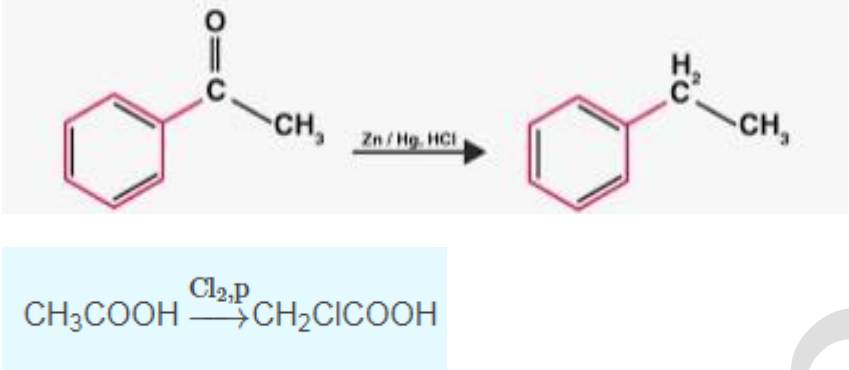
SUBJECT : CHEMISTRY

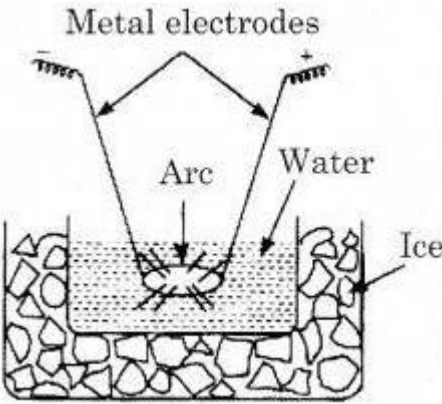
MAXIMUM MARKS : 70

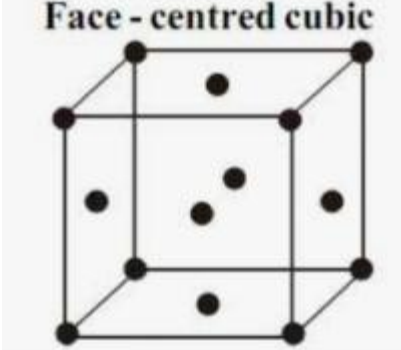
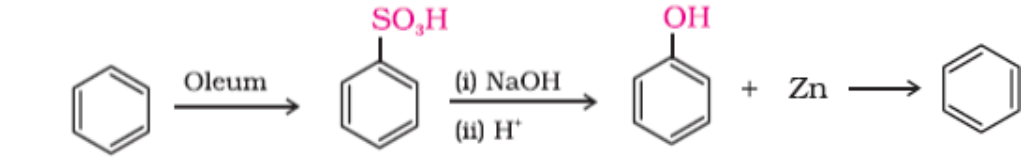
DURATION : 2 ½ hours

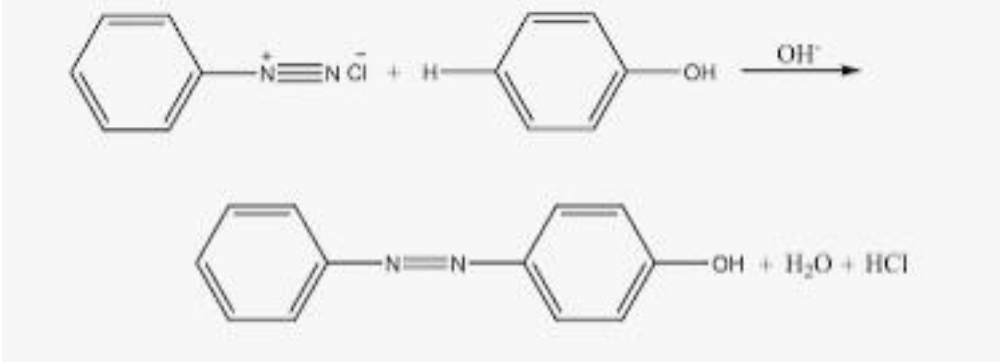
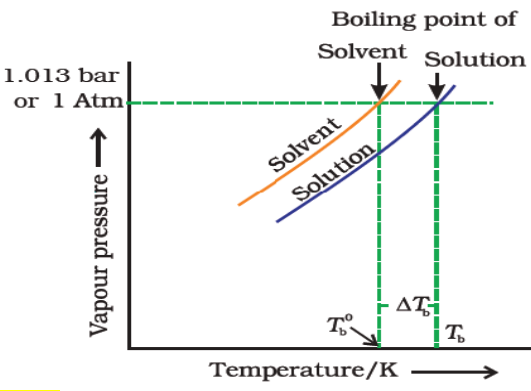
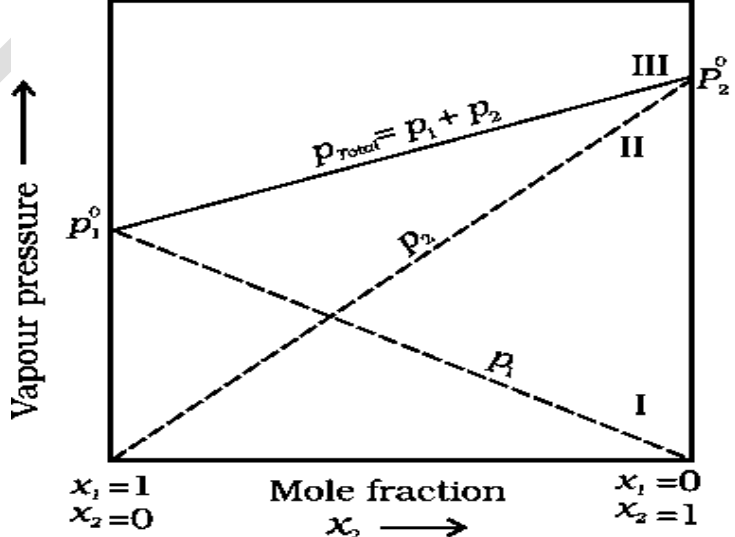
Q.1	<p>The molar mass of NaCl is $\Rightarrow 23 + 35.5 = 58.5$ g.</p> <p>Thus, 58.5 g of NaCl corresponds to 1 mole of NaCl and contains 6.023×10^{23} molecules.</p> <p>One unit cell of NaCl (fcc structure) has 4 NaCl molecules. Hence, 1 mole of NaCl will contain $\frac{6.023 \times 10^{23}}{4} \approx 1.5 \times 10^{23}$ unit cells.</p> <p>The number of unit cells in 58.5 g of NaCl is nearly 1.5×10^{23}.</p> <p>Correct answer: 1.5×10^{23}</p>	1mk
Q.2	$\log \frac{k_2}{k_1} = \frac{E_a}{2.303R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$	1mk
Q.3	<ul style="list-style-type: none"> Propane < 1-chloropropane < 1-bromopropane < 1-iodopropane 	1mk
Q.4	Propan-1-ol	1mk
Q.5	Correct answer: d-d transition	1mk
Q.6	<ul style="list-style-type: none"> It loses water due to osmosis. 	1mk
Q.7	Methyl amine	1mk

Q.8	sucrose	1mk
Q.9		1mk
Q.10	Due to increase in branching there is decrease in surface area.	1mk
Q.11	$ \begin{array}{c} \text{H}_2\text{C} - \text{N} \begin{cases} \text{CH}_2\text{COO}^- \\ \text{CH}_2\text{COO}^- \end{cases} \\ \\ \text{H}_2\text{C} - \text{N} \begin{cases} \text{CH}_2\text{COO}^- \\ \text{CH}_2\text{COO}^- \end{cases} \end{array} $	1mk
Q.12	$x/m = k.p^{1/n} (n > 1)$	1mk
Q.13	Sodium metal and Chlorine gas (½ mk for each)	1mk
Q.14	Buckets- high density polythene(½ mk) Flexible pipes- low density polythene(½ mk) Monomers used in preparation of Buna -N are 1,3-Butadiene and Acrylonitrile.....(½ mk for each)	2mks
Q.15	Hydrides of group 16 elements are H ₂ O, H ₂ S , H ₂ Se , H ₂ Te & H ₂ Po Thermal stability decreases down the group Hence, we have order of thermal stability as H ₂ O > H ₂ S > H ₂ Se > H ₂ Te > H ₂ Po	2 mks
Q.16	Aspirin is used as an analgesic as well as antipyretic. It is also used in prevention of heart attack. Chloramphenicol is a broad spectrum antibiotic. It is rapidly absorbed from the gastrointestinal tract and hence can be given orally in case of typhoid, dysentery, acute fever, certain form of urinary infections, meningitis and pneumonia.(any one)	1 mk each
Q.17	Dry Cell/ Leclanche Cell: 	
	Diagram = ½ mk Anode = Zinc (½ mk) , cathode = Carbon (½ mk) , Electrolyte = paste of ammonium chloride and Zinc chloride (½ mk.)	

Q.18	$k = \frac{2.303}{t} \log \frac{[R]_0}{[R]} \dots\dots\dots(1/2 \text{ mk})$ $4 \times 10^{-2} = \frac{2.303}{t} \log \frac{0.12}{0.03} \dots\dots\dots(1/2 \text{ mk})$ $t = \frac{2.303 \log 4}{4 \times 10^{-2}}$ $= \frac{2.303 \times 0.6021 \times 10^2}{4} = 34.665 \text{ min} \dots (1 \text{ mk for ans with units})$	2mks
Q.19		1mk 1mk
Q.20	<p>Actinoid contraction refers to the gradual decrease in the ionic radii with increase in atomic number of actinoids. It is more as compared to lanthanoid contraction because 5f electrons have more poor shielding effect as compared to 4f electrons. Therefore, the effect of increased nuclear charge leading to contraction in size is more in case of actinoid elements.</p>	1mk 1mk
Q.21	<p>Compound X = Iodobenzene (naming 1/2 mk + structure 1/2 mk) Compound Y = Biphenyl (naming 1/2 mk + structure 1/2 mk)</p>	2 mks
Q.22	<p>E2 will liberate Hydrogen gas..... (1 mk) EMF = E(higher reduction) - E(lesser reduction) = [(-0.25 V) - (-2.36 V)] = 2.11V(1mk)</p>	2mks
OR		
Q.22	<p>Suitable metal for prevention of corrosion = Aluminium (1mk) EMF = E(higher reduction) - E(lesser reduction) = [-0.44 V - (-1.66 V)] = 1.22 V(1mk)</p>	2mks
Q.23	<p>Manganese (Z = 25) shows maximum number of O.S. This is because its outer EC is 3d⁵4s². As 3d and 4s are close in energy, it has a maximum number of e⁻s to lose or share (<i>participation of both 3d and 4s electrons</i>). Hence, it shows O.S. from +2 to +7 which is the maximum number.</p>	2mks
Q.24	<p>Compound P = 2-bromo-2-methylpropane or tert-butyl bromide (either structure or name = 1/2 mk) Compound Q = 2-bromobutane or sec-butyl bromide (either structure or name = 1/2 mk) Compound Q or 2-bromobutane or sec-butyl bromide will be converted to a product with total inversion in configuration..... 1 mk</p>	2mks
Q.25	<p>Let [R] be the concentration of the reaction. For zero order reaction the rate of the reaction is independent of concentration of R. Thus,</p>	(1/2)

	$\text{Rate} = \frac{-d[R]}{dt} = K [R]^0$ $\frac{-d[R]}{dt} = K$ $-d[R] = K dt$ <p>Integrating both sides</p> $\int d[R] = -K \int dt$ $[R] = -Kt + I \dots\dots\dots (1)$ <p>At t = 0, the concentration of the reactant</p> $[R] = [R]_0$ <p>∴ Equation (1) becomes,</p> $[R]_0 = I \dots\dots\dots (2)$ <p>Substitute the value of I in the equation (1).</p> $[R] = -Kt + [R]_0 \dots\dots\dots (3)$ $Kt = [R]_0 - [R]$ $K = \frac{[R]_0 - [R]}{t}$	<p>(1/2)</p> <p>(1/2)</p> <p>(1/2)</p>
Q.26	Pig iron (1/2 mk) 4% (1/2mk) Cu ₂ S and FeS (1/2 mk each) Sulphur dioxide gas and blister copper (1/2mk each)	2mks
Q.27	 <p>Diagram 1/2mk any 2 labelings 1/2 mk</p> <p>In homogeneous catalysis, the catalyst and reactants are in the same phase, usually a gas or liquid. In heterogeneous catalysis, the catalyst and reactants are in different phases. 1mk</p> <p>Lyophilic sols are more stable than lyophobic sols because lyophilic sols are extensively solvated. They are covered by a sheath of liquid in which they are dispersed. 1mk</p>	3 mks
Q.28	Hybridisation: sp ³ d ² 1/2 mk Magnetic property: Paramagnetic 1/2 mk Optical isomerism 1/2 mk Ethylenediamine/ Ethane-1,2-diamine 1/2 mk Coordination no. of Cr : +6 1/2 mk Oxidation No. of Cr : +3 1/2 mk	3mks
Q.29	It is an amide linkage formed between the -COOH group of one amino acid & NH ₂ group of the other amino acid by loss of water molecule. 1mk Deficiency of Vitamin D causes rickets and deficiency of Vitamin A causes night blindness. (1/2 mk + 1/2 mk) Examples of Fibrous protein: keratin /myosin (any one) 1/2 mk Examples of Globular protein: Insulin /albumins (any one) 1/2 mk	3mks

<p>Q.30</p>	<p>Face - centred cubic</p>  <p>Step-1: Number of corners = 8</p> <p>Step-2: The contribution of corner = $\frac{1}{8}$</p> <p>Step-3: Number of faces = 6</p> <p>Step-4: Contribution at the face = $\frac{1}{2}$</p> <p>Step-5: Number of particle in FCC</p> <p>8 corners $\times \frac{1}{8}$ size of atom per corner = $8 \times \frac{1}{8} = 1$</p> <p>6 faces $\times \frac{1}{2}$ size of atom per face = $6 \times \frac{1}{2} = 3$ atoms</p> <p>No. of particles in the unit cell of FCC = $\left(8 \times \frac{1}{8}\right) + \left(6 \times \frac{1}{2}\right) = 1 + 3 = 4$ atoms.</p>	<p>1+2</p>
<p>Q.31</p>	<div style="text-align: center;"> $\text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \text{CH}_3 \xrightarrow{\text{CrO}_3} \text{CH}_3 - \underset{\text{O}}{\text{C}} - \text{CH}_3$ <p>Sec- alcohol Acetone</p> <p>M N</p> </div> <div style="text-align: center; margin-top: 20px;"> $\text{CH}_3 - \underset{\text{O}}{\text{C}} - \text{CH}_3 \xrightarrow{\text{CH}_3\text{MgBr}} \text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} - \text{OH}$ <p>Acetone O</p> </div> <div style="text-align: center; margin-top: 20px;"> $\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} - \text{OH} \xrightarrow[573\text{K}]{\text{Cu}} \text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} = \text{CH}_2$ </div> <p>M=Propan-2-ol N= Propanone/Dimethyl ketone/Acetone O=Tert-butyl alcohol</p>	<p>each equati on 1/2 mark (1/2×3= 1 1/2mks) each label 1/2mark. (1/2×3= 1 1/2marks) 1 1/2+1 1/2 = Total 3 Mks</p>
<p>OR</p>		
<p>Q.31</p>	<div style="text-align: center;">  <p>M=Benzene N=Benzene sulphonic acid O=Phenol</p> </div>	

<p>Q.32</p>	<p>$\text{CH}_3\text{CH}_2\text{CONH}_2 + \text{Br}_2 + 4\text{NaOH} \xrightarrow{\Delta} \text{CH}_3\text{CH}_2\text{NH}_2 + 2\text{NaBr} + \text{Na}_2\text{CO}_3 + 2\text{H}_2\text{O}$</p>  <p>Aromatic amines are weaker bases than ammonia due to the electronwithdrawing nature of the aryl group.</p>	<p>1 mk 1mk 1 mk</p>
<p>Q.33</p>	 <p>Graph 1mk</p> <p>Molality = mass of solute / Molar mass of solute x mass of solvent in Kg (½ mk)</p> <p>= $18/180 \times 1 = 0.1 \text{ m}$ (½ mk)</p> <p>$\Delta T_b = K_b \times W_2 \times 1000 / M_2 \times W_1$ (½ mk formula) = $0.52 \times 18 \times 1000 / 180 \times 1000$ (½ mk substitution) = 0.052 K (½ mk) $\Delta T_b = T_b - T_b^\circ = T_b - 373 \text{ K} = 0.052$ i.e. $T_b = 373 + 0.052 = 373.052 \text{ K}$ or 100.052° C (½ mk)</p>	<p>4 mks</p>
<p>OR</p>		
<p>Q.33</p>		

	<p>Sodium benzoate $\xrightarrow{\text{CaO, heat}}$ Benzene</p> <p>W- Benzene X-Benzaldehyde Y- Benzyl alcohol Z- Sodium benzoate ½ mk each</p>	½ mk
OR		
Q.35	<p>$\text{CH}_3\text{-CH}_2\text{-C(=O)-OH} \xrightarrow[\text{② H}_3\text{O}^+]{\text{① LiAlH}_4} \text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (Propanoic acid) (propanol)</p> <p>E= Propanoic acid F=Propan-1-ol</p> <p>$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + [\text{O}] \xrightarrow[\text{H}_2\text{SO}_4]{\text{Na}_2\text{Cr}_2\text{O}_7} \text{CH}_3\text{CH}_2\text{CHO} + \text{H}_2\text{O}$ G= Propanal</p> <p>$\text{CH}_3\text{CH}_2\text{CHO} + \text{CH}_3\text{CH}_2\text{CHO} \xrightarrow{\text{dil NaOH}} \text{CH}_3\text{CH}_2\text{-}\overset{\text{OH}}{\underset{ }{\text{CH}}}\text{-}\overset{\text{CH}_3}{\underset{ }{\text{CH}}}\text{-CHO}$ Propanal Propanal 3-hydroxy-2-methylpentanal</p> <p>H-3-Hydroxy -2-methylpentanal</p> <p>$\text{CH}_3\text{CH}_2\text{-}\overset{\text{OH}}{\underset{ }{\text{CH}}}\text{-}\overset{\text{CH}_3}{\underset{ }{\text{CH}}}\text{-CHO} \longrightarrow \text{CH}_3\text{CH}_2\text{-}\overset{\text{CH}_3}{\underset{\text{H}}{\text{C}}}=\overset{\text{CH}_3}{\text{C}}\text{-CHO} + \text{H}_2\text{O}$</p> <p>E-Propanoic acid/Propionic acid F- Propan-1-ol/n-propyl alcohol G- Propanal /Propionaldehyde H-3-Hydroxy -2-methylpentanal</p>	½ mk ½ mk ½ mk ½ mk

Note: Teachers kindly set the papers as per the pattern of questions given in the Model paper of XII for all the examinations of both XI and XII so that students get some idea about the Board paper pattern.
