Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2024-25
SUBJECT NAME   **CHEMISTRY (Theory) -043**
(FOR VISUALLY IMPAIRED CANDIDATES ONLY) **(Q.P.CODE 56(B))   MM: 70**

General Instructions: -

You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.

"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under various rules of the Board and IPC."

Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.**

The Marking scheme carries only suggested value points for the answers

These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.

The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after delibration and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.

Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**

If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.

If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.

If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.

No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

A full scale of marks _____(example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.

Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
● Leaving answer or part thereof unassessed in an answer book.
● Giving more marks for an answer than assigned to it.
● Wrong totaling of marks awarded on an answer.
● Wrong transfer of marks from the inside pages of the answer book to the title page.
● Wrong question wise totaling on the title page.
● Wrong totaling of marks of the two columns on the title page.
● Wrong grand total.
● Marks in words and figures not tallying/not same.
● Wrong transfer of marks from the answer book to online award list.
● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)

Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for Spot Evaluation**" before starting the actual evaluation.

Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.
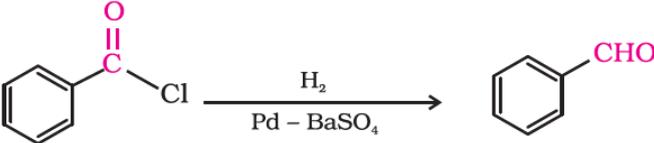
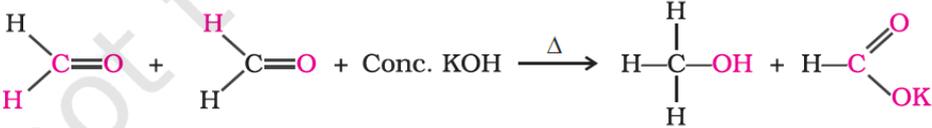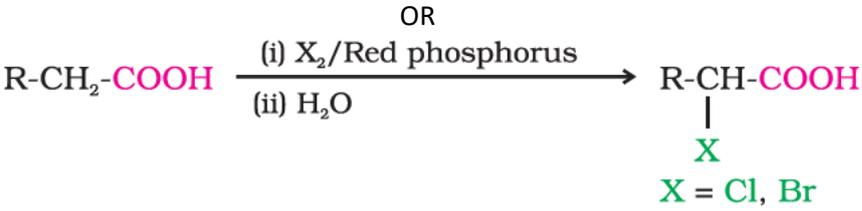| Q.No	Value points	Mark
	SECTION A	
1	C	1
2	D	1
3	C	1
4	B	1
5	B	1
6	C	1
7	B	1
8	B	1
9	D	1
10	B	1
11	D	1
12	C	1
13	A	1
14	D	1
15	A	1
16	D	1
	SECTION B	
17	a) Because overall reaction does not involve any ion in solution whose concentration can change during its life time.	1
	b)	
	$$\alpha = \frac{\Lambda_m}{\Lambda_m^\circ}$$	½
	$\alpha = \frac{50}{400}$ = 0.125	½
18	• P is the better choice for coating iron to prevent corrosion	1
	• Because it will oxidize first, protecting the iron from corrosion/ The more negative the E° value, the stronger the reducing agent./ P has a more negative E° (-2.37 V) as compared to iron (-0.44 V), which means P is a stronger reducing agent than iron.	1
19	a) Rate = k $[A]^2$ [B] = k $[2A]^2$ [2B] =8 times	1
	b) mol L^{-1} s^{-1} / mol L^{-1} $time^{-1}$	1
20	a)i) $CH_3 CN \xrightarrow[\text{Na(Hg)/C}_2\text{H}_5\text{OH}]{H_2/Ni} CH_3CH_2NH_2$ or LiAlH4	1
	ii) $\overset{+}{N_2}\overset{-}{Cl}$ (benzene ring) $\xrightarrow{CuCN /KCN}$ CN (benzene ring)	1
	OR	

20	b) i) Add chloroform with alc. KOH to both the compounds and heat, ethanamine will give foul smell of isocyanide while dimethylamine does not. (Or any other suitable chemical test) ii) CH_3NH_2 / methanamine is formed / $R - \overset{\overset{O}{\|}}{C} - NH_2 + Br_2 + 4NaOH \longrightarrow R - NH_2 + Na_2CO_3 + 2NaBr + 2H_2O$ (R= CH₃)	1 1
21	The hydrogen bonds are disturbed. Due to this, globules unfold and helix get uncoiled and protein loses its biological activity./ Secondary and tertiary structures get destroyed and primary remains intact. Fibrous protein- keratin/ Myosin Globular protein- Insulin / Albumin	1 ½ ½
	SECTION C	
22	a) / Propan-2-ol is formed/ b) Benzene ( ) is formed / c) / Phenol and methyl iodide are formed / 	1 1 1
23	$$\log \frac{k_2}{k_1} = \frac{E_a}{2.303R}\left[\frac{T_2 - T_1}{T_1 T_2}\right]$$ $\log \frac{0.08}{0.04} = \frac{E_a}{19.15} \frac{[310-300]}{[310 \times 300]}$ $\log 2 = \frac{E_a}{19.15} \frac{[10]}{[310 \times 300]}$ $E_a = \frac{0.3010 \times 19.15 \times 310 \times 300}{10}$ = 53606 J mol⁻¹ = 53.606 kJ mol⁻¹ (Deduct ½ mark for no or incorrect unit)	1 1 1

24	i) Due to salt formation with aluminium chloride, the Lewis acid.	1
	ii) Due to more hydration and less steric hinderance.	1
	iii) Because it can form hydrogen bonds with water molecules, while aniline does not form due to bulky benzene molecule.	1
	Note: Due to a misprint in question of English version in which reaction is stated instead of reason, full marks may be awarded for attempt)	
25	a) i) $[Co(NH_3)_6]$ Cl_3	1
	ii) Hexaamminecobalt(III) chloride	1
	iii)d^2sp^3	1
	OR	
25	b) i)Diamminechloridonitrito-O-platinum(II)	1
	ii)$[Co(en)_3]^{3+}$ contains a didentate ligand showing chelate effect / Because of chelate formation.	1
	iii)sp^3	1
26.	a)When an acid chloride is treated with H_2, Pd-BaSO$_4$ an aldehyde is formed. OR	
		1
	b)When aldehyde with no α-hydrogen atom is treated with conc.KOH, it undergoes disproportionation to form alcohol and carboxylate ion. OR	
		1
	c)When carboxylic acids having an α-hydrogen are halogenated with Cl_2/Br_2 in presence of red phosphorous, α-hhalogen acids are formed. OR	
		1
	(Or any other correct reaction)	
27	E°cell = E°cathode -E°anode	
	= 0.40-(-0.76)V	
	= 1.16 V	½
	ΔG⁰= - n F E°cell	
	= -2 × 96500 × 1.16	½
	= - 223880 J mol^{-1} or - 223.880 kJ mol^{-1}	½
	log Kc= $\frac{n \dot{E}^0_{cell}}{0.059}$	½
	= $\frac{2 \times 1.16}{0.059}$	½
	= 39.322	½
28	• The process of conversion of an enantiomer into a racemic mixture is known as racemisation.	1
	• S_N1	1
	• In S_N1 the carbocation formed is *sp²* hybridised and planar.	1
	SECTION D	

29	a)			
		Glycosidic linkage	Peptide linkage	1
		A glycosidic linkage is an oxide(-O-) linkage that joins two monosaccharides.	A peptide linkage is an amide (-CONH-) linkage that forms between two amino acids.	

<div>

• Due to absence of free —CHO group. — 1

b) Carbohydrates that yield two to ten monosaccharide units, on hydrolysis. For example- maltose/ sucrose or any other correct example. — ½ , ½

OR

b) Because it exists in zwitter ionic form which reacts with both acids and bases. — 1

c)Amino acids which contain more carboxyl groups as compared to amino groups. — 1

</div>

30	a) Because in $[Cr(NH_3)_6]^{3+}$, there are 3 unpaired electrons in the d-orbitals of the chromium ion ,while in $[Ni(CN)_4]^{2-}$, cyanide is a strong field ligand causing the d-electrons to pair up resulting in no unpaired electrons.	1,1
	b) The primary valences are normally ionisable while secondary valences are non-ionisable.	1
	c) The energy required to split the degenerate d-orbitals into two sets t_2g and eg. / The difference of energy between the two sets of d-orbitals t_2g and eg due to the presence of ligands in a definite geometry.	½ , ½
	OR	
	c) $t^4_2g\ eg^0$	1

<div align="center">SECTION E</div>

31	A)a) i) They have the ability to exhibit variable oxidation states/ tendency to form complex compounds/ provide large surface area.	1
	ii)Because Mn^{+2} is more stable in +2 due to stable $3d^5$ configuration.	1
	iii)Because it undergoes disproportionation reaction/ $2Cu^+ \rightarrow Cu^{2+} + Cu$	1
	b) Potassium permanganate is prepared by fusion of MnO_2 with an alkali metal hydroxide and an oxidising agent. This produces K_2MnO_4 which disproportionates in a neutral or acidic solution to give permanganate. /	2

$$2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$$
$$3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O \quad /$$

$$MnO_2 \xrightarrow[\text{with air or KNO}_3]{\text{Fused with KOH, oxidised}} MnO_4^{2-} \quad ; \quad MnO_4^{2-} \xrightarrow[\text{alkaline solution}]{\text{Electrolytic oxidation in}} MnO_4^-$$
$$\text{manganate ion} \quad \text{manganate} \qquad \text{permanganate ion}$$

<div align="center">(Balancing may be ignored)</div>

<div align="center">OR</div>

31	B)i) Dichromates are generally prepared from chromate, which in turn are obtained by the fusion of chromite ore ($FeCr_2O_4$) with sodium or potassium carbonate in free access of air./	2

$$4\ FeCr_2O_4 + 8\ Na_2CO_3 + 7\ O_2 \rightarrow 8\ Na_2CrO_4 + 2\ Fe_2O_3 + 8\ CO_2$$

$$2Na_2CrO_4 + 2\ H^+ \rightarrow Na_2Cr_2O_7 + 2\ Na^+ + H_2O$$

<div align="center">(Balancing may be ignored)</div>

ii) The steady decrease in atomic radii in lanthanoid series. / steady decrease in ionic radii or atomic radii across the 4f series — 1

Consequence : 4d and 5d elements have similar radii and similar properties. — ½ +½

<div align="center">(Or any other correct consequence)</div>

iii)Cr and Cu — ½+½

32	A)a)i)A: $CH_3CH_2CH_2CHO$, B: $CH_3COCH_2CH_3$	½ , ½
	ii)n-Butane is formed / Chemical equation	1
	iii) $CH_3-CO-CH_2-CH_2-CH_3 \xrightarrow{NaOH / I_2} CHI_3 + CH_3CH_2CH_2COONa$	1
	b)i)ethanal < ethanol < ethanoic acid	1
	ii)acetone < ethanal < methanal	1
	OR	
32	B)a) Aldehydes and ketones having at least one α-hydrogen undergo a reaction in the presence of dilute alkali to form β-hydroxy aldehydes (aldol) or β-hydroxy ketones (ketol), respectively.	1
	$2\ CH_3-CHO \xrightleftharpoons{dil.\ NaOH} CH_3-CH-CH_2-CHO$ Ethanal, OH (Or any other correct example)	1
	• Due to the strong electron withdrawing effect of the carbonyl group and resonance stabilisation of the conjugate base.	1
	b)i)Add $NaHCO_3$ to both the compounds, benzoic acid gives brisk effervescence while benzaldehyde does not.	1
	ii)Add NaOH and I_2 to both the compounds and heat, ethanal forms yellow precipitate of iodoform while propanal does not. (or any other suitable chemical test)	1
33	A)a)i=2	½
	$\Delta T_b = \dfrac{i \times Kb \times wB \times 1000}{M_B \times w_A}$	½
	$= \dfrac{2 \times 0.52 \times 6 \times 1000}{120 \times 200}$	½
	$= 0.26K$	½
	$\Delta T_b = T_b - T^o_b$	½
	$0.26 = T_b - 373.15$	
	$T_b = 373.41\ K$	½
	Or	
	$0.26 = T_b - 100^oC$	
	$T_b = 100.26\ ^oC$	
	ii)	
	• For a solution of volatile liquids, the partial vapour pressure of each component of the solution is directly proportional to its mole fraction present in solution.	1
	• $p = p^0\ x$; $p = K_H\ x$ When $p^0 = K_H$ $p\ \alpha\ \chi$ for both.	1
	OR	
33	B) a)	
	$\Delta T_f = \dfrac{i \times Kf \times wB \times 1000}{M_B \times w_A}$	½
	$2.94 = \dfrac{i \times 4.9 \times 5 \times 1000}{122 \times 35}$	1
	$i = \dfrac{2.94 \times 122 \times 35}{4.9 \times 5 \times 1000}$	
	$i = 0.512$	½
	$\alpha = \dfrac{i-1}{\frac{1}{n}-1}$	½

$$= \frac{0.512 - 1}{\frac{1}{2} - 1}$$

= 0.976

α (%) = 97.6%

b)i) The solutions which obey Raoult's law over the entire range of concentration.

ii) Extra(excess) pressure which needs to be applied to a solution to stop the flow of solvent across a semipermeable membrane.

½

1

1