

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2024-25
SUBJECT NAME CHEMISTRY (Theory) -043
(Q.P.CODE 56/6/1) 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 deliberation 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.

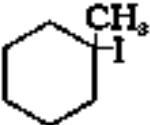
While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.

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.

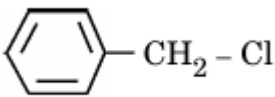
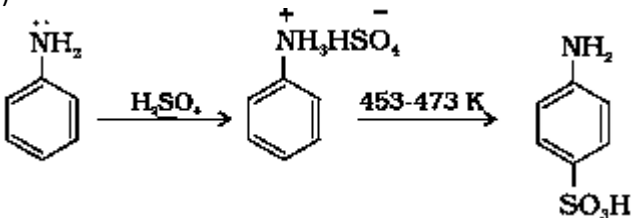
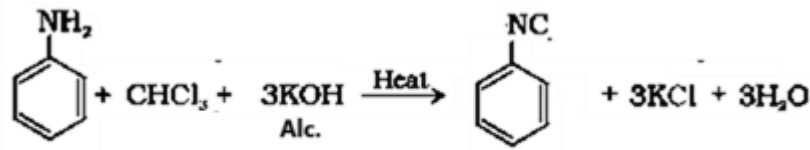
The Examiners should acquaint themselves with the guidelines given in the “**Guidelines for Spot Evaluation**” before starting the actual evaluation.

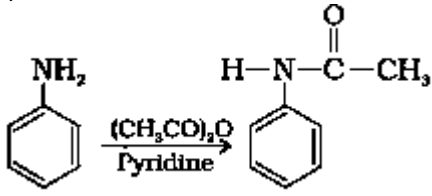
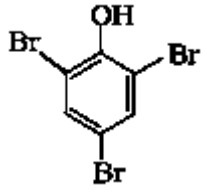
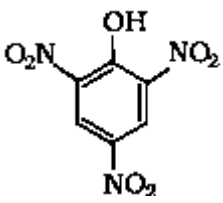
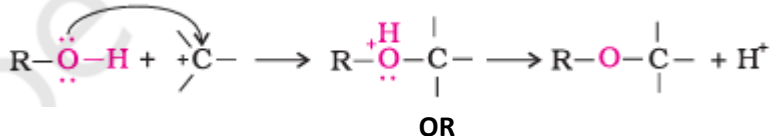
Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

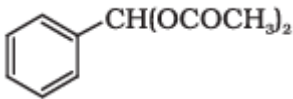
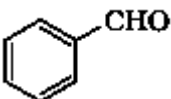
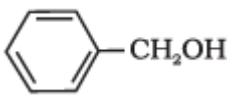
The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

Q.No	Value points	Mark
	SECTION A	1
1	B	1
2	D	1
3	A	1
4	C	1
5	A	1
6	C	1
7	B	1
8	A	1
9	C	1
10	B	1
11	C	1
12	B	1
13	B	1
14	A	1
15	D	1
16	A	1
	SECTION B	
17	- At a constant temperature, the solubility of a gas in a liquid is directly proportional to the partial pressure of the gas present above the surface of liquid or solution/ the partial pressure of the gas in vapour phase (p) is proportional to the mole fraction of the gas (x) in the solution - Because the solubility of oxygen increases with decrease in temperature/ Because of low solubility of O₂ in warm water.	1 1
18	a) First order b) Slope= k/ 2.303	1 1
19	a) i) Dichloridobis(ethane-1,2-diamine)cobalt(IV) sulphate ii) Potassium trioxalatoferrate(III)	1 1
	OR	
19	b) i) Double salts dissociate into simple ions while complex compounds do not dissociate completely into ions when dissolved in water. (Or any other suitable difference) ii) When a ligand binds through two donor atoms is called a didentate ligand while a unidentate ligand which has two different donor atoms and either of the two ligates in the complex is called ambidentate ligand.	1 1
20	a)  b) 	1 1

21	a) Glucose gets oxidised to six carbon carboxylic acid (gluconic acid) on reaction with a mild oxidising agent like bromine water. This indicates the presence as an aldehydic group / $ \begin{array}{ccc} \text{CHO} & & \text{COOH} \\ & & \\ (\text{CHOH})_4 & \xrightarrow{\text{Br}_2, \text{ water}} & (\text{CHOH})_4 \\ & & \\ \text{CH}_2\text{OH} & & \text{CH}_2\text{OH} \end{array} $ b) Acetylation of glucose with acetic anhydride gives glucose pentaacetate which confirms the presence of five –OH groups / $ \begin{array}{ccc} \text{CHO} & & \text{CHO} \quad \text{O} \\ & & \quad \\ (\text{CHOH})_4 & \xrightarrow{\text{Acetic anhydride}} & (\text{CH}-\text{O}-\text{C}-\text{CH}_3)_4 \\ & & \quad \\ \text{CH}_2\text{OH} & & \text{CH}_2-\text{O}-\text{C}-\text{CH}_3 \end{array} $	1
	SECTION C	
22	$\Delta T_f = K_f m$ $m = \Delta T_f / K_f$ $m = 0.3 / 1.86$ $= 0.16m$ $m = \frac{x_2 \times 1000}{M_A}$ $x_2 = \frac{0.16 \times 18}{1000} = 2.88 \times 10^{-3}$ $\frac{p_1^0 - p_1}{p_1^0} = x_2$ $\frac{24.8 - p_1}{24.8} = 2.88 \times 10^{-3}$ $p_1^0 - p_1 = x_2 p_1^0$ $= 2.88 \times 10^{-3} \times 24.8 \text{ mm Hg}$ $= 0.07 \text{ mm Hg}$	½ ½ ½ ½ ½ ½
23	Rate = $k [A]^p [B]^q$ $5.0 \times 10^{-3} = k [0.01]^p [0.01]^q \dots \dots \dots \text{Eq 1}$ $1.0 \times 10^{-2} = k [0.02]^p [0.01]^q \dots \dots \dots \text{Eq 2}$ $5.0 \times 10^{-3} = k [0.01]^p [0.02]^q \dots \dots \dots \text{Eq 3}$ On Comparing (eq1) and (eq3) $1 = (2)^q$ $q = 0$ On Comparing (eq1) and (eq2) $(2)^1 = (2)^p$ $p = 1$ Order w.r.t A = 1	1 1

	Order w.r.t B = 0 From eq 1 $5.0 \times 10^{-3} = k [0.01]^1 [0.01]^0$ $k = 0.5 \text{ min}^{-1}$	$\frac{1}{2}$ $\frac{1}{2}$																								
24	a) Because of the formation of NaOH / Due to the formation of OH⁻ ions. b) Because the overall reaction does not involve any ion in solution whose concentration can change during its life time. c) Because the number of ions per unit volume that carry current in a solution decreases.	1 1 1																								
25	a) [FeF₆]³⁻ - sp³d² [Fe(CN)₆]⁴⁻ - d²sp³ b) [FeF₆]³⁻ - outer orbital complex [Fe(CN)₆]⁴⁻ - inner orbital complex c) [FeF₆]³⁻ - paramagnetic [Fe(CN)₆]⁴⁻ - diamagnetic	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$																								
	OR																									
25	a) It becomes colourless/ colour slowly fades away b) t_{2g}³e_g² c) sp³, diamagnetic	1 1 $\frac{1}{2} + \frac{1}{2}$																								
26.	<table border="1"> <thead> <tr> <th></th><th>S_N1</th><th>S_N2</th></tr> </thead> <tbody> <tr> <td>1</td><td>Unimolecular</td><td>Bimolecular</td></tr> <tr> <td>2</td><td>It follows first order kinetics</td><td>It follows second order kinetics</td></tr> <tr> <td>3</td><td>Retention of configuration</td><td>Inversion of configuration</td></tr> <tr> <td>4.</td><td>Racemisation occurs</td><td>No racemisation is seen</td></tr> <tr> <td>5.</td><td>Takes place through formation of carbocation</td><td>Takes place through formation of transition state</td></tr> <tr> <td>6.</td><td>Occurs in polar protic solvent</td><td>Occurs in polar aprotic solvent</td></tr> <tr> <td>7.</td><td>Rate is independent of the concentration of the nucleophile.</td><td>Rate is dependent on the concentration of the nucleophile.</td></tr> </tbody> </table> (Any TWO)  , because of the stability of benzyl carbocation		S _N 1	S _N 2	1	Unimolecular	Bimolecular	2	It follows first order kinetics	It follows second order kinetics	3	Retention of configuration	Inversion of configuration	4.	Racemisation occurs	No racemisation is seen	5.	Takes place through formation of carbocation	Takes place through formation of transition state	6.	Occurs in polar protic solvent	Occurs in polar aprotic solvent	7.	Rate is independent of the concentration of the nucleophile.	Rate is dependent on the concentration of the nucleophile.	1+1 $\frac{1}{2} + \frac{1}{2}$
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27	A = CH₃CH=CHCN / But-2-ene nitrile B = CH₃CH=CHCHO / But-2-enal $\text{CH}_3\text{CH}=\text{CHCN} \xrightarrow[2. \text{H}_2\text{O}]{1. \text{DIBAL-H}} \text{CH}_3\text{CH}=\text{CHCHO}$	1 1 1																								
28	a)  b) 	1 X 3																								

	c) 	
	SECTION D	
29	a) i)  / 2,4,6-Tribromophenol is formed ii)  / 2,4,6-Trinitrophenol / Picric acid is formed. b) (i)  OR b)(ii) due to sp^2 hybridisation leading to shorter bond length / Due to resonance leading to partial double bond character of C-OH bond c) 2-Methylpropan-2-ol gives turbidity immediately whereas butan-1-ol does not react.	1 1 1 1 1 1
30	a) (i) A linkage which joins amino acids through -CO-NH- bond (ii) When a protein in its native form, is subjected to physical change like change in temperature or chemical change like change in pH, it loses its biological activity. b) Due to zwitter ion formation which can react with both acids and bases./ Due to the presence of both carboxylic group and amino group. c) (i) Fibrous protein: parallel polypeptide chain structure / insoluble in water Globular protein: spherical polypeptide chain structure/ soluble in water (Any one difference) OR c) (ii) α-helix and β-pleated sheet	1 1 1 1 $\frac{1}{2} + \frac{1}{2}$
	SECTION E	
31	(a) (i) $E_{\text{Cell}} = (E^{\circ}_c - E^{\circ}_a) - \frac{0.059}{2} \log \left[\frac{Zn^{2+}}{Pb^{2+}} \right]$ $= [(-0.13) - (-0.76)] - \frac{0.059}{2} \log \frac{0.1}{0.02}$ $= 0.63 - 0.0295 \log 5$ $= 0.63 - 0.0295 \times 0.699$ $= 0.63 - 0.02$ $= 0.61V$ (Deduct $\frac{1}{2}$ mark for no or incorrect unit)	1 1 1

	(ii) The amount of chemical reaction which occurs at any electrode during electrolysis by a current is proportional to the quantity of electricity passed through the electrolyte. 5F	1 1
	OR	
31	(b) (i) $k = G^*/R$ $G^* = k \times R = 0.125 \times 10^{-3} \times 1000$ $= 0.125 \text{ cm}^{-1}$ (ii) $E_{\text{Mg}^{2+}/\text{Mg}} = E^0_{\text{Mg}^{2+}/\text{Mg}} - \frac{0.059}{2} \log \frac{1}{[\text{Mg}^{2+}]}$ $= 2.36 \text{ V} - \frac{0.059}{2} \log \frac{1}{10^{-4}}$ $= 2.36 - 0.0295 \times 4 \log 10$ $= 2.242 \text{ V}$ (iii) It decreases with increase in temperature	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ 1
32	(a) (i) (I) Due to formation of chromate / CrO_4^{2-} ion (II) Due to completely filled d-orbitals in ground state as well as oxidised state. (III) Because Mn^{2+} is more stable due to stable $3d^5$ configuration whereas Cr^{3+} is more stable due to stable t_{2g}^3 configuration. (ii) (I) it changes to permanaganate ion / MnO_4^- is formed / $3\text{MnO}_4^{2-} + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$ (II) Potassium manganate/ K_2MnO_4 is formed / $2\text{KMnO}_4 \rightarrow \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$	1 1 1 1 1
	OR	
32.	(b) i) - An alloy of lanthanoid / an alloy of lanthanoid and iron with traces of S, C, Ca and Al. - used in making bullets/shells/ lighter flint ii) CrO_4^{2-} / $\text{Cr}_2\text{O}_7^{2-}$ iii) variable oxidation state of vanadium / large surface area /Complex formation iv) Because of large number of unpaired electrons in their atoms they have stronger interatomic interaction or strong metallic bonding v) by acidification of Na_2CrO_4 / $2\text{Na}_2\text{CrO}_4 + 2 \text{H}^+ \rightarrow \text{Na}_2\text{Cr}_2\text{O}_7 + 2 \text{Na}^+ + \text{H}_2\text{O}$	$\frac{1}{2} + \frac{1}{2}$ 1 1 1 1
33	(a) (i)  A=  B=  C= (ii) (I) Because carbon of carboxyl group is less electrophilic due to resonance with -OH group. (II) Because ethanoate ion is more stable than ethoxide ion due to resonance.	1 1 1 1 1

	OR	
33	(b) i) (I) $\text{CH}_3-\text{C} \begin{array}{c} \diagup \text{O} \diagdown \\ \diagdown \text{O} \diagup \end{array} \text{C}-\text{CH}_3 \quad / \quad (\text{CH}_3\text{CO})_2\text{O}$ (II) $\text{C}_6\text{H}_5-\text{C}(=\text{O})-\text{CH}_3$ (III) $\text{C}_6\text{H}_4-\text{C}(=\text{O})-\text{NH}-\text{C}(=\text{O})-\text{C}_6\text{H}_4$ (ii) (I) $\text{>C=O} \xrightarrow[-\text{H}_2\text{O}]{\text{NH}_2\text{NH}_2} \text{>C=NNH}_2 \xrightarrow[\text{heat}]{\text{KOH/ethylene glycol}} \text{>CH}_2 + \text{N}_2$ (II) $\text{R-COONa} \xrightarrow[\text{Heat}]{\text{NaOH \& CaO}} \text{R-H} + \text{Na}_2\text{CO}_3$	1 1 1 1 1