Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2024-25
SUBJECT NAME **CHEMISTRY (Theory) -043**

(Q.P.CODE 56/7/3) 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.

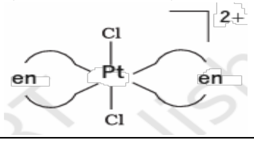
The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as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

MARKING SCHEME 2024-25

CHEMISTRY (Theory)- 043

QP CODE 56/7/3 **MM: 70**

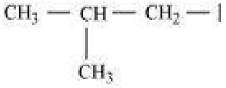
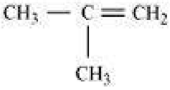
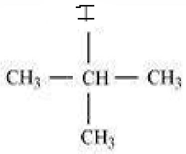
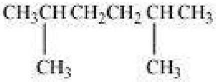
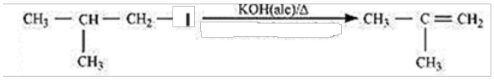
<table>
<tr><th>Q.No</th><th>Value points</th><th>Mark</th></tr>
<tr><td></td><td>SECTION A</td><td></td></tr>
<tr><td>1</td><td>A</td><td>1</td></tr>
<tr><td>2</td><td>D</td><td>1</td></tr>
<tr><td>3</td><td>B</td><td>1</td></tr>
<tr><td>4</td><td>C</td><td>1</td></tr>
<tr><td>5</td><td>B</td><td>1</td></tr>
<tr><td>6</td><td>B</td><td>1</td></tr>
<tr><td>7</td><td>A</td><td>1</td></tr>
<tr><td>8</td><td>C</td><td>1</td></tr>
<tr><td>9</td><td>B</td><td>1</td></tr>
<tr><td>10</td><td>D</td><td>1</td></tr>
<tr><td>11</td><td>C</td><td>1</td></tr>
<tr><td>12</td><td>B</td><td>1</td></tr>
<tr><td>13</td><td>D</td><td>1</td></tr>
<tr><td>14</td><td>A</td><td>1</td></tr>
<tr><td>15</td><td>B</td><td>1</td></tr>
<tr><td>16</td><td>A</td><td>1</td></tr>
<tr><td></td><td>SECTION B</td><td></td></tr>
<tr><td>17</td><td>a)
Negative deviation
Because A-B interactions are stronger than A-A and B-B interactions
b) Because of same composition in liquid and vapour phase</td><td>
½
½
1</td></tr>
<tr><td>18</td><td>Because molecularity of each elementary reaction in complex reaction may be different and hence meaningless for overall complex reaction
whereas order of a complex reaction is experimentally determined by the slowest step in its mechanism and is therefore applicable for both.</td><td>1

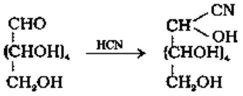
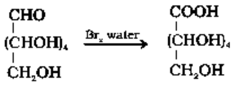
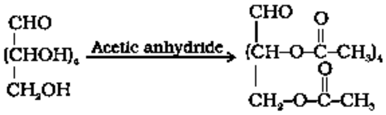
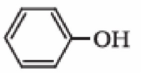
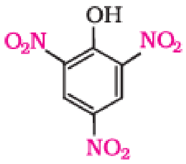
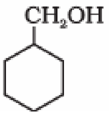
1</td></tr>
<tr><td>19</td><td>
<table>
<tr><th>DNA</th><th>RNA</th></tr>
<tr><td>Double stranded</td><td>Single stranded</td></tr>
<tr><td>Sugar is deoxyribose</td><td>Sugar is ribose</td></tr>
<tr><td>Thymine base is present</td><td>Uracil base is present</td></tr>
<tr><td>It replicates</td><td>It does not replicate</td></tr>
</table>
(Any Two)</td><td>1+1</td></tr>
<tr><td>20</td><td>a) Dichloridobis(ethane-1,2-diamine)platinum(IV) ion

 </td><td>1

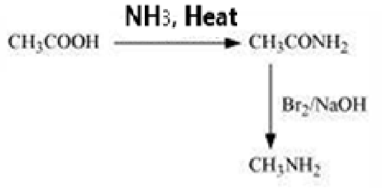
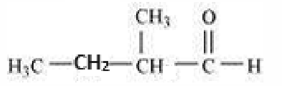
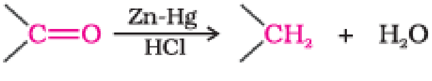
1</td></tr>
<tr><td></td><td>OR</td><td></td></tr>
<tr><td>20</td><td>i) $[Co(NH_3)_5(CO_3)]Cl$
ii) Pentaamminenitrito-O-cobalt(III) chloride</td><td>1
1</td></tr>
<tr><td>21</td><td>-Because C—X bond acquires a partial double bond character due to resonance/ sp^2 hybridized carbon of C-X bond leading to shorter bond length (Or any other suitable reason).

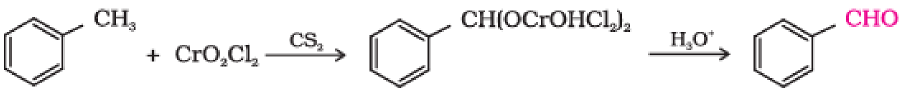
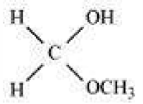
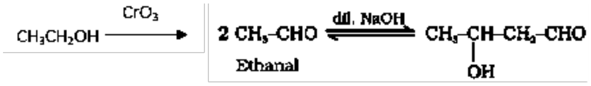
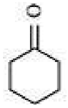
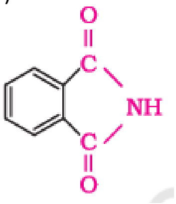
-Nitro group withdraws the electron density from the benzene ring and thus facilitates the attack of the nucleophile on haloarene / $-NO_2$ group being electron withdrawing stabilises the intermediate carbanion.</td><td>1

1</td></tr>
</table>

	SECTION C	
22	(a) Lead storage battery Anode: $Pb(s) + SO_4^{2-}(aq) \rightarrow PbSO_4(s) + 2e^-$ Cathode: $PbO_2(s) + SO_4^{2-}(aq) + 4H^+(aq) + 2e^- \rightarrow PbSO_4(s) + 2H_2O(l)$	1 1 1
	OR	
22	(b)Because at cathode the reaction with higher value of E° is preferred and therefore, the reduction of H_2O to H_2 gas is preferred whereas at anode water should get oxidised in preference to Cl^- (aq), however, on account of overpotential of oxygen, oxidation of Cl^- to Cl_2 gas is preferred. $NaCl(aq) + H_2O(l) \rightarrow Na^+(aq) + OH^-(aq) + ½H_2(g) + ½Cl_2(g)$	1 1 1
23	$\Delta T_f = iK_f m$ $\Delta T_f = i \times \frac{K_f \times w_2 \times 1000}{M_2 \times w_1}$ $0.45 = \frac{i \times 5.12 \times 0.3 \times 1000}{60 \times 30}$ $i = 0.527$ $\alpha = \frac{i-1}{1/n-1}$ $\alpha = \frac{0.527-1}{1/2-1}$ (n=2) α= 0.946 or 94.6% (Or any other suitable method)	½ 1 ½ ½ ½
24	A=  $CH_3-\underset{CH_3}{\underset{\mid}{CH}}-CH_2-I$ B=  $CH_3-\underset{CH_3}{\underset{\mid}{C}}=CH_2$ C=  $CH_3-\overset{I}{\overset{\mid}{\underset{CH_3}{\underset{\mid}{CH}}}}-CH_3$ D=  $CH_3\underset{CH_3}{\underset{\mid}{CH}}CH_2CH_2\underset{CH_3}{\underset{\mid}{CH}}CH_3$  $CH_3-\underset{CH_3}{\underset{\mid}{CH}}-CH_2-I \xrightarrow{KOH(alc)/\Delta} CH_3-\underset{CH_3}{\underset{\mid}{C}}=CH_2$ + KI + H2O	½ ½ ½ ½ 1

25	$\begin{array}{llll} & 2N_2O_5(g) \rightarrow & 2N_2O_4(g) \; + & O_2(g) \\ \text{Start } t = 0 & P_i \text{ atm} & 0 \text{ atm} & 0 \text{ atm} \\ \text{At time } t & (P_i - 2x) \text{ atm} & 2x \text{ atm} & x \text{ atm} \end{array}$ $P_t = P_i - 2x + 2x + x = P_i + x$ $x = = P_t - P_i$ $p_A = P_i - 2x$ $= P_i - 2(P_t - P_i)$ $= 3P_i - 2P_t$ $k = \frac{2.303}{t} \log \frac{p_i}{p_A}$	1
	Where pi=0.5 atm, $p_A = 3p_i - 2p_t$ $= (3X\ 0.5) - (2x0.625)$ $= 0.25 atm$ $k = \frac{2.303}{100 s} \log \frac{0.5 atm}{0.25 atm}$	1
	$= \frac{2.303}{100 s} \times 0.3010$ $= 6.93 X 10^{-3} s^{-1}$	1
26.	a)  $CHO-(CHOH)_4-CH_2OH \xrightarrow{HCN} CH(CN)(OH)-(CHOH)_4-CH_2OH$	1
	b)  $CHO-(CHOH)_4-CH_2OH \xrightarrow{Br_2\ water} COOH-(CHOH)_4-CH_2OH$	1
	c)  $CHO-(CHOH)_4-CH_2OH \xrightarrow{Acetic\ anhydride} CHO-(CH-O-\overset{O}{\overset{\parallel}{C}}-CH_3)_4-CH_2-O-\overset{O}{\overset{\parallel}{C}}-CH_3$	1
27	a) CH_3I + 	1
	b) 	1
	c) 	1

28	a) Because the carboxyl group is deactivating and the catalyst aluminium chloride (Lewis acid) gets bonded to the carboxyl group.(forms salt) b) Because carbonyl carbon of HCHO is more electrophilic than CH_3CHO/ due to +I effect of methyl group/ steric effect of methyl group, CH_3CHO is less reactive. c) Because of greater electronegativity of sp^2 hybridised carbon to which carboxyl carbon is attached.	1 1 1
	SECTION D	
29	a) Due to presence of one unpaired electron in t_{2g} which gets excited to e_g / Due to excitation energy $t_{2g}{}^{1} \rightarrow e_g{}^{1}$, it gives colour. (d-d transition) When heated, water is lost therefore crystal field splitting does not occur and it becomes colourless. b) The energy required to split the degenerate d-orbitals into two sets of orbitals (t_2g and e_g). /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 . **OR** b) (ii) $\Delta_o < P$, weak filed ligand $\Delta_o > P$, strong field ligand c) Because the orbital splitting energies are not sufficiently large for forcing pairing / Due to low crystal field splitting energy.	1 1 1 ½ + ½ 1
30	a) (i)  (ii)  (or by any other method) **b)** Aniline undergoes resonance and as a result the electrons on the N-atom are less available for donation. **c)** (i) $(CH_3)_3N < CH_3NH_2 < (CH_3)_2NH$ OR c) (ii) A= $C_6H_5NH_2$; B= =$C_6H_5N_2^+Cl$	1 1 1 1 ½ + ½
	SECTION E	
31	(a) (i) (I) $(CH_3)_3C-CHO$ (II)  (III) $CH_3-CO-CH_2CH_2CH_3$ (ii) (I)  	1 1 1 1

	(II) 	1
	OR	
31	(b) i)  ii) Because semicarbazide undergoes resonance involving only one of the two - NH_2 groups, which is attached directly to the carbonyl-carbon atom. iii)  $CH_3CH_2OH \xrightarrow{CrO_3}$ $2\ CH_3\text{-}CHO \xrightleftharpoons{dil.\ NaOH} CH_3\text{-}CH(OH)\text{-}CH_2\text{-}CHO$ Ethanal iv)  v) 	1 1 1 1 1
32	**(a) (i)** $E_{Cell} = (E^o{}_c - E^o{}_a) - \frac{0\cdot059}{2}\log\frac{[Zn^{2+}]}{[H^+].^2}$ $= [(0)-(-0\cdot76)] - \frac{0\cdot059}{2} log\frac{0\cdot1}{(0\cdot01).^2}$ = 0.76 - 0.0295 log 10^3 = 0.76 – 0.0885 = 0.6715 V or 0.67 V (Deduct ½ mark for no or incorrect unit) (ii) The amounts of different substances liberated by the same quantity of electricity passing through the electrolytic solution are proportional to their chemical equivalent weights. 6F	1 1 1 1 1
	OR	

32	(b) (i)	
	$\Lambda_m = \frac{K}{C} \times 1000$	½
	$\Lambda_m = \frac{2.48 \times 10^{-2}}{0.2} \times 1000$	
	$= 124\ S\ cm^2\ mol^{-1}$	½
	$\Lambda_m^\circ = \lambda^\circ_{K^+} + \lambda^\circ_{Cl^-}$	
	$= 73.5 + 76.5$	
	$= 150\ S\ cm^2\ mol^{-1}$	
	$\alpha = \frac{\Lambda_m}{\Lambda_m^\circ}$	½
	$= \frac{124}{150}$	
	$= 0.827$	½
	(ii) $E^0_{cell} = E^0_{cathode} - E^0_{anode}$	½
	$= 0.34 - (-2.37)$	
	$= 2.71V$	½
	$\Delta_r G^0 = -nFE^0_{cell}$	½
	$= -2 \times 96500 \times 2.71$	
	$= -523030\ Jmol^{-1}$ or $-523.03\ kJmol^{-1}$	½
	(iii)	
	Primary cell	½
	Maintains constant potential throughout its usage/ longer lifespan	½
33	(a) (i)	
	(I) Because Mn^{2+} is more stable than Mn^{3+} due to extra stable half-filled d^5 configuration.	1
	(II) Due to comparable energies of 5f, 6d and 7s orbitals	1
	(III) Due to the involvement of greater number of electrons from (n-1)d in addition to the ns electrons in the inter-atomic metallic bonding.	1
	(ii)	
	(I) $5SO_3^{2-} + 2MnO_4^- + 6H^+ \longrightarrow 2Mn^{2+} + 3H_2O + 5SO_4^{2-}$	1
	(II) $2MnO_4^- + H_2O + I^- \longrightarrow 2MnO_2 + 2OH^- + IO_3^-$	1
	OR	
33	b)	
	(i) Mn, Zn, Ni, Cu (any two)	½ , ½
	(ii) K_2MnO_4, due to presence of one unpaired electron	½ , ½
	(iii) Similar radii of 4d and 5d series elements/ similar properties/ difficulty in separation of lanthanoids (or any other relevant consequence)	1
	(iv) It is prepared by fusion of MnO_2 with an alkali metal hydroxide and an oxidising agent / $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$	1
	(v) because of the ability of oxygen to form multiple bonds with metal	1