

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2024-25
SUBJECT NAME CHEMISTRY (Theory) -043
(Q.P.CODE 56/5/3) 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 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.

<p>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.</p>
<p>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”.</p>
<p>No marks to be deducted for the cumulative effect of an error. It should be penalized only once.</p>
<p>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.</p>
<p>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.</p>
<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past:-</p> <ul style="list-style-type: none"> ● 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.) <p>Half or a part of answer marked correct and the rest as wrong, but no marks awarded.</p>
<p>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.</p>
<p>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.</p>
<p>The Examiners should acquaint themselves with the guidelines given in the “Guidelines for Spot Evaluation” before starting the actual evaluation.</p>
<p>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.</p>
<p>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</p>

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.

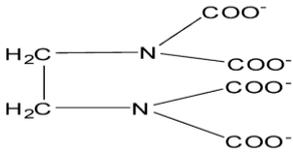
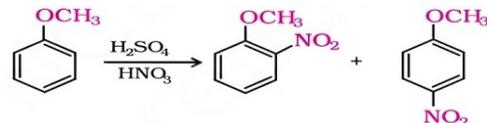
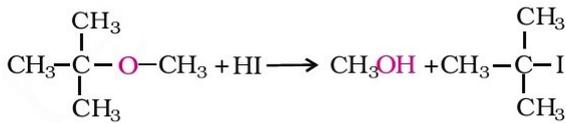
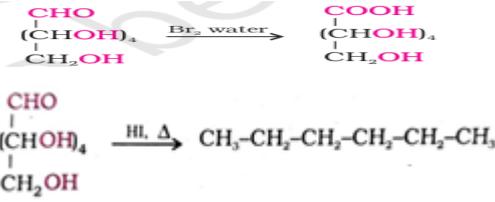
MARKING SCHEME 2025
CHEMISTRY(Theory)-043

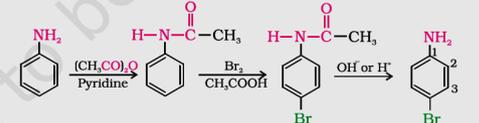
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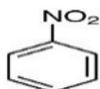
Q.No	Value Points	Mark
SECTION A		
1	(A)	1
2	(D)	1
3	(D)	1
4	(D)	1
5	(C)	1
6	(B)	1
7	(D)	1
8	(B)	1
9	(C)	1
10	(B)	1
11	(C)	1
12	(B)	1
13	(B)	1
14	(A)	1
15	(A)	1
16	(D)	1
SECTION B		
17	$\Delta T_b = i K_b m$ $\Delta T_b = i \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$ <p>i=3</p> $\Delta T_b = \frac{3 \times 0.52 \times 3 \times 1000}{111 \times 260}$ $= 0.162K$	<p>½</p> <p>½</p> <p>½</p> <p>½</p>
OR		
17	<p>Given $n_x = n_y$</p> <p>$\chi_x = \chi_y = 0.5$</p> $P_T = p_X^0 \chi_x + p_Y^0 \chi_y / P_{total} = x_1 p_1^0 + x_2 p_2^0$ $= 120 \times 0.5 + 160 \times 0.5$ $= 60 + 80$ $= 140 \text{ mm Hg}$	<p>½</p> <p>1</p> <p>½</p>
18	<p>Conductivity decreases with decrease in concentration Due to decrease in number of current carrying ions per unit volume.</p> <p>Molar conductivity increases with decrease in concentration Due to decrease in inter-ionic attraction or increase in dissociation or increase in number of ions.</p>	<p>½</p> <p>½</p> <p>½</p> <p>½</p>

19	<p>(a)</p> <table border="1" data-bbox="228 230 1369 394"> <thead> <tr> <th data-bbox="228 230 799 275">Order of a reaction</th> <th data-bbox="799 230 1369 275">Molecularity</th> </tr> </thead> <tbody> <tr> <td data-bbox="228 275 799 315">1.Experimental quantity</td> <td data-bbox="799 275 1369 315">1.Theoretical concept</td> </tr> <tr> <td data-bbox="228 315 799 394">2.Applicable to elementary as well as complex reactions.</td> <td data-bbox="799 315 1369 394">2.Applicable to elementary reactions only.</td> </tr> </tbody> </table> <p style="text-align: center;">(or any other two correct differences)</p> <p>(b) Rate = $k[2X][3Y]$ Rate of the reaction will increase by six times</p>	Order of a reaction	Molecularity	1.Experimental quantity	1.Theoretical concept	2.Applicable to elementary as well as complex reactions.	2.Applicable to elementary reactions only.	<p>$\frac{1}{2} \times 2$</p> <p>1</p>
Order of a reaction	Molecularity							
1.Experimental quantity	1.Theoretical concept							
2.Applicable to elementary as well as complex reactions.	2.Applicable to elementary reactions only.							
20	<p><i>Step 1: Formation of protonated alcohol.</i></p> $ \begin{array}{ccc} \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\ddot{\text{O}}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \\ \text{Ethanol} \end{array} + \text{H}^+ & \xrightleftharpoons{\text{Fast}} & \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{O}^+-\text{H} \\ \quad \\ \text{H} \quad \text{H} \\ \text{Protonated alcohol} \\ \text{(Ethyl oxonium ion)} \end{array} \end{array} $ <p><i>Step 2: Formation of carbocation: It is the slowest step and hence, the rate determining step of the reaction.</i></p> $ \begin{array}{ccc} \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{O}^+-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array} & \xrightleftharpoons{\text{Slow}} & \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}^+ \\ \quad \\ \text{H} \quad \text{H} \end{array} + \text{H}_2\text{O} \end{array} $ <p><i>Step 3: Formation of ethene by elimination of a proton.</i></p> $ \begin{array}{ccc} \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C} \quad \text{C}^+ \\ \quad \\ \text{H} \quad \text{H} \end{array} & \rightleftharpoons & \begin{array}{c} \text{H} \quad \quad \text{H} \\ \diagdown \quad \diagup \\ \text{C} = \text{C} \\ \diagup \quad \diagdown \\ \text{H} \quad \quad \text{H} \\ \text{Ethene} \end{array} + \text{H}^+ \end{array} $	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p>						
21	<p>(a) In carboxylate ion, the negative charge is delocalized over two electronegative oxygen atoms, hence carboxylate ion is more stable than phenoxide ion./Due to two equivalent resonating structures of carboxylate ion.</p> <p>(b) (a) Add NaOH and iodine to both the compounds and heat, acetophenone gives yellow ppt of iodoform (CHI_3), whereas Benzaldehyde does not. (or any other suitable chemical test)</p>	<p>1</p> <p>1</p>						
SECTION C								
22	<p>(a)</p> <p>(i) The solution is non ideal, shows positive deviation from Raoult's law / A-B interactions are weaker than A-A and B-B interactions</p> <p>(ii) Decrease in temperature</p> <p>(iii) Ethanol and acetone (or any other suitable example)</p>	<p>1</p> <p>1</p> <p>1</p>						
OR								
22	<p>(b)</p> <p>(i) Salt lowers the freezing point of water and prevents formation of ice and hence its easy to clean.</p> <p>(ii) -Red blood cells swell up -As the solution is hypotonic, water will flow into the cell/ As the solution is hypotonic, endosmosis occurs.</p> <p>(iii) Desalination of sea water</p>	<p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p>						
23	<p>Rate = $k[A]^x[B]^y$</p> <p>Eq.1 Rate₁ = $k(0.1)^x(0.1)^y = 5.0 \times 10^{-2}$</p> <p>Eq.2 Rate₂ = $k(0.2)^x(0.1)^y = 1.0 \times 10^{-1}$</p> <p>Eq.3 Rate₃ = $k(0.1)^x(0.2)^y = 5.0 \times 10^{-2}$</p> $\frac{0.1}{0.5} = \frac{k \times 0.2^x \times 0.1^y}{k \times 0.1^x \times 0.1^y}$ <p>Hence $x=1$</p> $\frac{0.05}{0.05} = \frac{k \times 0.1^x \times 0.2^y}{k \times 0.1^x \times 0.1^y}$	<p>1</p>						

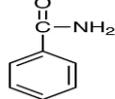
	Hence $y=0$ Rate= $k[A]^1[B]^0$ Overall order=1	1 1
24	(a) Ethylenediamine tetraacetate ion /EDTA ⁴⁻  (b) Oxidation state of Nickel is +2, CN ⁻ being a strong ligand results in pairing of electrons, hybridization is dsp^2 , hence geometry is Square planar whereas in Ni(CO) ₄ , oxidation state of Nickel is 0 (Zero), hybridization is sp^3 , hence geometry is tetrahedral. (Or Diagrammatic explanation for both)	$\frac{1}{2}$ $\frac{1}{2}$ 1 1
25	(a) Due to resonance in haloarene leading to partial double bond character of C-X bond / sp^2 hybridised carbon atom leading to shorter C-X bond length in haloarene / instability of phenyl carbocation / Electron-rich benzene ring repels nucleophile. (b) Due to symmetry of p-dichlorobenzene it fits better in the crystal lattice. (c) Tertiary carbon atom is more sterically hindered for the attack of nucleophile.	1 1 1
26	(a) (i)  (ii)  (b) 	1 1 1
27	(a) $CH_3CH=NNHCONH_2$ (b) $CH_3CH(OH)CH_2CHO$ (c) $ClCH_2COOH$	1 1 1
28	(a) Vitamin K (b) The loss in biological activity of native protein when it is subjected to physical or chemical change / Disruption in secondary and tertiary structures of protein when subjected to physical or chemical change. Example: coagulation of egg on boiling. (or any other suitable example)	1 1 1
SECTION D		
29	(a) 	1 1

	(III) Sc has incompletely filled d orbital ($3d^1$) in its ground state whereas Zn has completely filled d orbital ($3d^{10}$) in ground state as well as in its oxidized state.	
32	<p>(a)</p> <p>(i) (II) will remain as reduction reaction / (II) (I) will be reversed to become an oxidation reaction Due to low reduction potential of Cr</p> <p>(ii) Cell representation $Mg(s)/Mg^{2+}(aq,0.100M) Ag^+(aq,0.001M)/Ag(s)$</p> <p>$n=2$</p> $E_{cell} = E^{\circ}_{cell} - \frac{2.303RT}{nF} \log \frac{[Mg^{2+}]}{[Ag^+]^2}$ $= 3.17 - \frac{0.059}{2} \log \frac{0.100}{(0.001)^2}$ $= 3.17 - \frac{0.059}{2} \log 10^5$ $= 3.17 - 0.0295 \times 5$ $= 3.17 - 0.1475$ $= 3.0225 \text{ V or } 3.02 \text{ V}$	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p>
OR		
32	<p>(b)(i) Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. To determine -1. Limiting molar conductivity of an electrolyte. 2. Dissociation constant of a weak electrolyte (or any other two suitable applications)</p> <p>(ii) $\Lambda^{\circ}mNH_4OH = \Lambda^{\circ}mNH_4Cl + \Lambda^{\circ}mNaOH - \Lambda^{\circ}mNaCl$ $= 129.8 + 217.4 - 108.9$ $= 238.3 \text{ Scm}^2\text{mol}^{-1}$</p> $\alpha = \frac{\Lambda m^c}{\Lambda^{\circ}m}$ $= \frac{9.33}{238.3}$ $= 0.039 / 3.9\%$	<p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>1</p>
33	<p>(a)(i) Amine 'X' react with $C_6H_5SO_2Cl$ to give a compound, soluble in NaOH so amine 'X' is primary amine, $CH_3CH_2NH_2$/Ethanamine/Ethyl amine</p> <p>(ii) $(CH_3)_2NH < CH_3NH_2 < (CH_3)_3N < NH_3 < C_6H_5NH_2$</p> <p>(iii) In the strongly acidic medium, aniline is protonated to anilinium ion, which is meta-directing.</p> <p>(iv)(I)</p>  <p>(II)</p> $C_6H_5NH_2 + NaNO_2 + 2HCl \xrightarrow{(0-5^{\circ}C)} C_6H_5N_2^+Cl^- \xrightarrow{H_2O, 283K} C_6H_5OH$	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
OR		
33	<p>(b)(i)</p> $CH_3CH_2NH_2 + CHCl_3 + 3KOH(EtOH) \xrightarrow{\Delta} C_2H_5NC + 3KCl + 3H_2O$	<p>1</p>

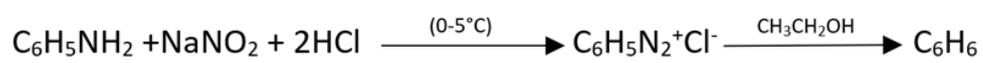
(ii)A =



B =



(iii)



(I)

(II)



1

1

1

1