

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2024-25
SUBJECT NAME CHEMISTRY (Theory) -043
(Q.P.CODE 56/5/1) 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

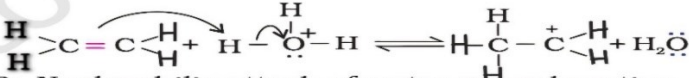
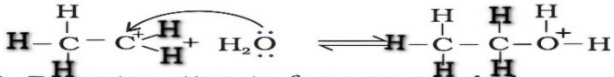
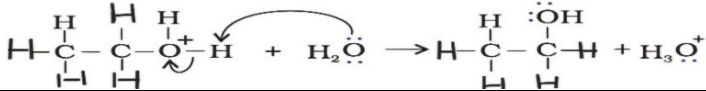
Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

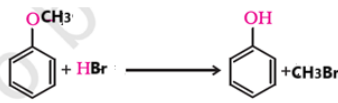
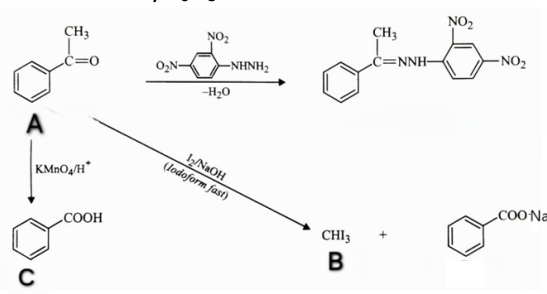
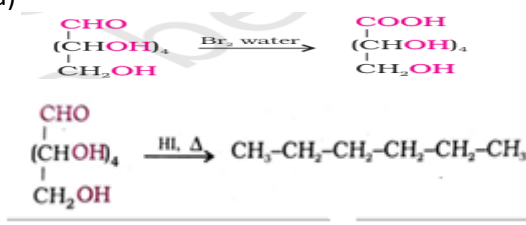
MARKING SCHEME 2024-25
CHEMISTRY(Theory)-043

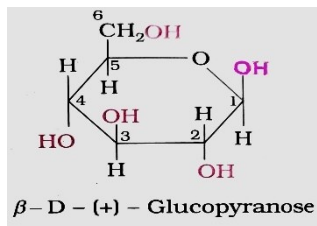
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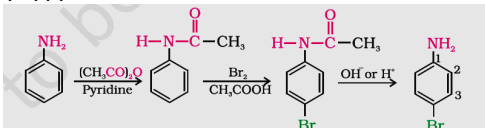
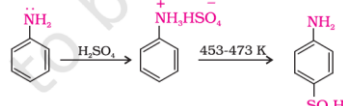
MM: 70

Q.No	Value Points	Mark
SECTION A		
1	(D)	1
2	(D)	1
3	(C)	1
4	(B)	1
5	(D)	1
6	(B)	1
7	(C)	1
8	(B)	1
9	(C)	1
10	(A)	1
11	(B)	1
12	(D)	1
13	(A)	1
14	(D)	1
15	(B)	1
16	(A)	1
SECTION B		
17	$\Delta T_b = i K_b m$ $\Delta T_b = i \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$ $i=3$ $\Delta T_b = \frac{3 \times 0.52 \times 3 \times 1000}{111 \times 260}$ $= 0.162K$	 1/2 1/2 1/2 1/2
OR		
17	Given $n_x = n_y$ $\chi_x = \chi_y = 0.5$ $P_T = p_X^0 \chi_x + p_Y^0 \chi_y$ / $P_{total} = x_1 P_1^0 + x_2 P_2^0$ $= 120 \times 0.5 + 160 \times 0.5$ $= 60 + 80$ $= 140 \text{ mm Hg}$	 1/2 1 1/2
18	Conductivity decreases with decrease in concentration Due to decrease in number of current carrying ions per unit volume. Molar conductivity increases with decrease in concentration Due to decrease in inter-ionic attraction or increase in dissociation or increase in number of ions.	1/2 1/2 1/2 1/2
19	(a) $\text{Rate} = k[\text{HI}]^0 = k$ (b) Increases with increase in temperature $k = A e^{-E_a/RT}$ / $\ln k = \ln A - E_a/RT$	1 1/2 1/2

20	The mechanism of the reaction involves the following three steps: Step 1: Protonation of alkene to form carbocation by electrophilic attack of H_3O^+. $\text{H}_2\text{O} + \text{H}^+ \rightarrow \text{H}_3\text{O}^+$  Step 2: Nucleophilic attack of water on carbocation.  Step 3: Deprotonation to form an alcohol. 	1/2 1/2 1
21	(a) Acetyl chloride is hydrogenated over catalyst, palladium-barium sulphate to prepare acetaldehyde / $\text{CH}_3\text{COCl} \xrightarrow[\text{Pd - BaSO}_4]{\text{H}_2} \text{CH}_3\text{CHO}$ (b) Due to less steric hinderance and greater electrophilicity of carbonyl carbon in propanal than propanone. / Due to more steric hinderance and less electrophilicity of carbonyl carbon in propanone than propanal	1 1
SECTION C		
22	(a) (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 (ii) Decrease in temperature (iii) Ethanol and acetone (or any other suitable example)	1 1 1
OR		
22	(b) (i) Salt lowers the freezing point of water and prevents formation of ice and hence its easy to clean. (ii) -Red blood cells swell up -As the solution is hypotonic, water will flow into the cell/ As the solution is hypotonic, endosmosis occurs. (iii) Desalination of sea water	1 1/2 1/2 1
23	Rate = $k[\text{A}]^x[\text{B}]^y$ Eq.1 $\text{Rate}_1 = k(0.1)^x(0.1)^y = 5.0 \times 10^{-2}$ Eq.2 $\text{Rate}_2 = k(0.2)^x(0.1)^y = 1.0 \times 10^{-1}$ Eq.3 $\text{Rate}_3 = k(0.1)^x(0.2)^y = 5.0 \times 10^{-2}$ $\frac{0.1}{0.5} = \frac{k \times 0.2^x \times 0.1^y}{k \times 0.1^x \times 0.1^y}$ Hence $x=1$ $\frac{0.05}{0.05} = \frac{k \times 0.1^x \times 0.2^y}{k \times 0.1^x \times 0.1^y}$ Hence $y=0$ Rate = $k[\text{A}]^1[\text{B}]^0$ Overall order = 1	1 1 1
24	(a) The difference of energy between the two sets of d-orbitals t_{2g} and e_g due to the presence of ligands in a definite geometry. / The energy required to split the degenerate d-orbitals into two sets of orbitals. (i) $t_{2g}^3 e_g^1$ (ii) $t_{2g}^4 e_g^0$ (b) Orbital splitting energy is not sufficiently large for causing pairing of electrons	1 1/2 1/2 1

25	(a)Due to resonance in chlorobenzene leading to partial double bond character of C-Cl bond but there is no resonance in CH ₃ Cl / sp ² hybridised carbon atom having shorter bond length between C-Cl in chlorobenzene than sp ³ hybridized carbon in methyl chloride. (b)Grignard reagent react with water to form corresponding hydrocarbon (c)Due to the formation of planar carbocation, nucleophile may attack from either side of carbocation.	1 1 1										
26	(a) 4-methylphenol < Phenol < 3,5-dinitrophenol < 2,4,6-trinitrophenol (b) (i)  Phenol $\xrightarrow{\text{Zn-dust}}$ Benzene (ii)  Anisole + HBr $\longrightarrow$ Phenol + CH ₃ Br	1 1 1										
27	A=Acetophenone/C ₆ H ₅ COCH ₃ B= Iodoform/CHI ₃ , C=Benzoic acid/C ₆ H ₅ COOH 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} \times 3$										
28	(a) Peptide linkage (b) <table border="1"><thead><tr><th>DNA</th><th>RNA</th></tr></thead><tbody><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></tbody></table> (or any two suitable differences)	DNA	RNA	Double stranded	Single stranded	Sugar is deoxyribose	Sugar is ribose	Thymine base is present	Uracil base is present	It replicates	It does not replicate	1 1+1
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Double stranded	Single stranded											
Sugar is deoxyribose	Sugar is ribose											
Thymine base is present	Uracil base is present											
It replicates	It does not replicate											
SECTION D												
29	(a)  (b)(i)Cyclic structures of glucose differ only in configuration of -OH group at C ₁ . / Stereoisomers which differ in configuration of -OH group at C ₁ or C ₂ OR	1 1 1										

	(b)(ii)  β-D-(+)-Glucopyranose	1						
	(c)Hydrolysis of dextrorotatory sucrose brings a change in the sign of rotation or inverts the optical rotation from dextro to laevo. The product of hydrolysis is invert sugar.	1						
30	(a) (i) $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl}$ (ii) 6 (b) Double salts dissociate into simple ions while complex compounds do not dissociate completely into ions when dissolved in water. (Or any other suitable difference) (c) (i) $[\text{Cr}(\text{NH}_3)_3\text{Cl}_3] < [\text{Cr}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2 < [\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$ OR (c)(ii) <table><tr><th>Primary Valency</th><th>Secondary Valency</th></tr><tr><td>1.Ionisable</td><td>1. Non-ionisable</td></tr><tr><td>2.Satisfied by negative ions</td><td>2. Satisfied by negative ions or neutral molecules</td></tr></table> (or any other two suitable differences)	Primary Valency	Secondary Valency	1.Ionisable	1. Non-ionisable	2.Satisfied by negative ions	2. Satisfied by negative ions or neutral molecules	1 1 1 1 $\frac{1}{2}+\frac{1}{2}$
Primary Valency	Secondary Valency							
1.Ionisable	1. Non-ionisable							
2.Satisfied by negative ions	2. Satisfied by negative ions or neutral molecules							
	SECTION E							
31	(a) (i) (II) will remain as reduction reaction / (II) (I) will be reversed to become an oxidation reaction Due to low reduction potential of Cr (ii) Cell representation $\text{Mg}(\text{s})/\text{Mg}^{2+}(\text{aq},0.100\text{M})\parallel\text{Ag}^+(\text{aq},0.001\text{M})/\text{Ag}(\text{s})$ $n=2$ $E_{\text{cell}} = E^{\circ}\text{cell} - \frac{2.303RT}{nF} \log \frac{[\text{Mg}^{2+}]}{[\text{Ag}^+]^2}$ $= 3.17 - \frac{0.059}{2} \log \frac{0.100}{(0.001)^2}$ $= 3.17 - \frac{0.059}{2} \log 10^5$ $= 3.17 - 0.0295 \times 5$ $= 3.17 - 0.1475$ $= 3.0225 \text{ V or } 3.02 \text{ V}$	$\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2}$ 1 $\frac{1}{2}$						
	OR							
31	(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) (ii)$\Lambda^{\circ}\text{mNH}_4\text{OH} = \Lambda^{\circ}\text{mNH}_4\text{Cl} + \Lambda^{\circ}\text{mNaOH} - \Lambda^{\circ}\text{mNaCl}$ $= 129.8 + 217.4 - 108.9$ $= 238.3 \text{ Scm}^2\text{mol}^{-1}$ $\alpha = \frac{\Lambda_m^c}{\Lambda_m^{\circ}}$	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$						

	$= \frac{9.33}{238.3}$ $= 0.039 / 3.9\%$	1
32	(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 (ii) $(CH_3)_2NH < CH_3NH_2 < (CH_3)_3N < NH_3 < C_6H_5NH_2$ (iii) In the strongly acidic medium, aniline is protonated to anilinium ion, which is meta-directing. (iv)(I)  (II) $C_6H_5NH_2 + NaNO_2 + 2HCl \xrightarrow{(0-5^\circ C)} C_6H_5N_2^+Cl^- \xrightarrow{H_2O, 283K} C_6H_5OH$	$\frac{1}{2} + \frac{1}{2}$ 1 1 1
	OR	
32	(b)(i) $CH_3CH_2NH_2 + CHCl_3 + 3KOH(EtOH) \xrightarrow{\Delta} C_2H_5NC + 3KCl + 3H_2O$ (ii) A =  B =  (iii) (I) $C_6H_5NH_2 + NaNO_2 + 2HCl \xrightarrow{(0-5^\circ C)} C_6H_5N_2^+Cl^- \xrightarrow{CH_3CH_2OH} C_6H_6$ (II) 	1 1 1 1 1
33	(a)(i) (I) A - K_2MnO_4 B- $KMnO_4$ (II) $MnO_4^- + 5Fe^{2+} + 8H^+ \longrightarrow Mn^{2+} + 5Fe^{3+} + 4H_2O$ (ii) (I) Gets reduced to +3 common oxidation state. (II) Due to poorer shielding offered by 5f electrons than 4f. (III) Due to completely filled d- subshell (d^{10}) in zinc whereas in Cu, due to high enthalpy of atomization and low enthalpy of hydration.	$\frac{1}{2} + \frac{1}{2}$ 1 1 1 1
	OR	
33	(b)(i) (I) Lanthanoid contraction. The steady decrease in atomic and ionic radii in lanthanoid series. (II) Decrease in basic character from left to right in lanthanoid series. (any other correct consequence)	$\frac{1}{2}$ $\frac{1}{2}$ 1

	(ii) (I) They have the ability to exhibit variable oxidation states/ tendency to form complex compounds/ large surface area. (II) Due to involvement of (n-1) d and ns electrons which results in strong metallic bond and strong interatomic bonding. (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.	1 1 1
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