

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)Senior
Secondary School Examination, 2023
SUBJECT: CHEMISTRY (043) (56/1/3)

General Instructions: -


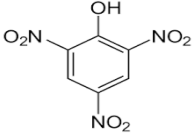
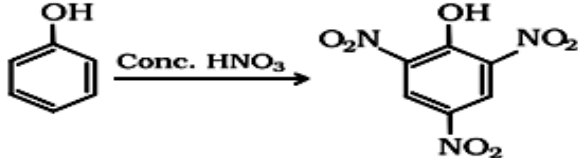
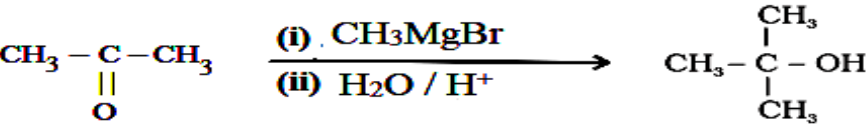
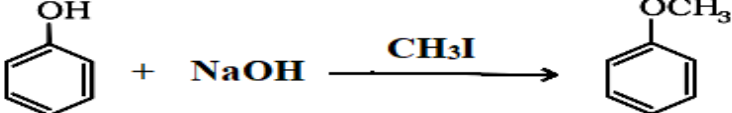
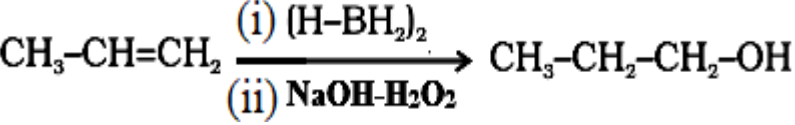
1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	“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.”
3	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-XII, 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.
4	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.
5	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.
6	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.
7	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.
8	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.

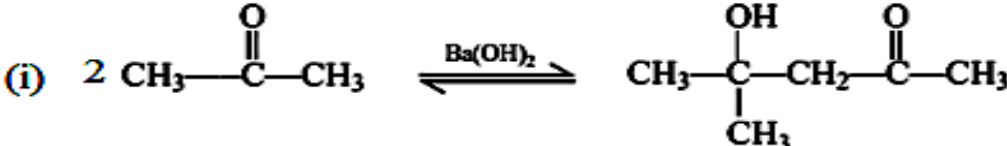
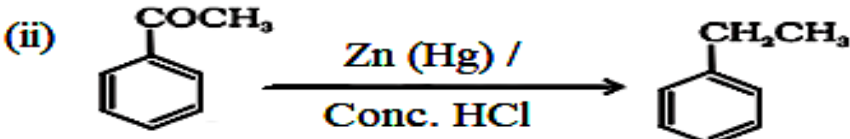
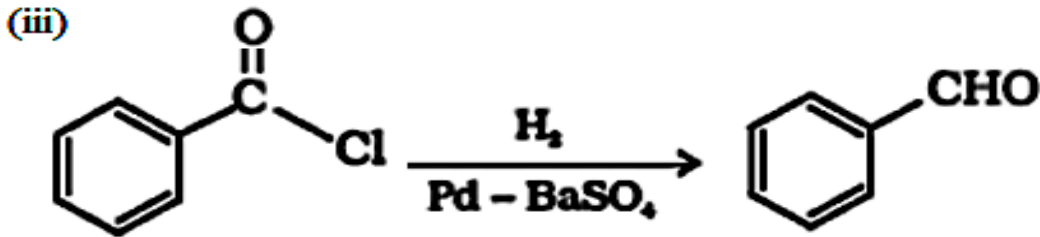
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “Extra Question” .
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	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.
13	<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.) ● Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	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.
15	Any un assessed 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.
16	The Examiners should acquaint themselves with the guidelines given in the “Guidelines for spot Evaluation” before starting the actual evaluation.
17	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.
18	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
Senior Secondary School Examination, 2023
CHEMISTRY (Subject Code–043)
[Paper Code: 56/1/3]

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
	SECTION-A	
1.	(b)	1
2.	(c)	1
3.	(b)	1
4.	(a)	1
5.	(c)	1
6.	(c)	1
7.	(c) / Award full mark if attempted (Printing error)	1
8.	(c) / Full mark to be awarded for any option.	1
9	(d)	1
10.	(b)	1
11.	(d)	1
12.	(c)	1
13.	(c)	1
14.	(a)	1
15.	(c)	1
16.	(a)	1
17.	(a)	1
18.	(c)	1
	SECTION-B	
19.	(a) $ \begin{array}{c} \text{CHO} \\ \\ (\text{CHOH})_4 \\ \\ \text{CH}_2\text{OH} \end{array} \xrightarrow{\text{HI}, \Delta} \text{CH}_3\text{--CH}_2\text{--CH}_2\text{--CH}_2\text{--CH}_2\text{--CH}_3 $ <p style="text-align: center;">(<i>n</i>-Hexane)</p> (b) Peptide linkage	1
20.	(a) $E_{\text{cell}}^{\circ} = 0.40 - (-0.76) = 1.16 \text{ V}$	$\frac{1}{2}$

	$\Delta_r G^\circ = -nF E^\circ_{\text{cell}}$ $= -2 \times 96500 \text{ C mol}^{-1} \times 1.16 \text{ V}$ $= -223,880 \text{ J mol}^{-1} / -223.88 \text{ k J mol}^{-1}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	OR	
	OR $A = \pi r^2 = 3.14 \times (0.5)^2 = 0.785 \text{ cm}^2, \ell = 50 \text{ cm}$ $k = \frac{\ell}{R \times A}$ $= \frac{50}{0.785 \times (5.55 \times 10^{-3})}$ $= 11.47 \times 10^{-3} \text{ S cm}^{-1}$ <p style="text-align: right;">(or by any other correct method)</p>	$\frac{1}{2}$ 1 $\frac{1}{2}$
21.	<p>(a)</p> <p>(i) Because phenoxide ion is more stable due to resonance than alkoxide ion. (or any other correct explanation)</p> <p>(ii) Because branching decreases the surface area / the van der Waals force decreases with a decrease in surface area.</p>	1 1
	OR	
	<p>(b)</p> <p>(i)</p> <p style="text-align: right;">(For any two correct steps)</p> <p>(ii)</p>	$\frac{1}{2} + \frac{1}{2}$ 1
22.	<p>(a) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ / But-1-ene</p> <p>(b)</p> <p style="text-align: right;">/ Picric acid / 2,4,6-Trinitrophenol / 2,4,6-Trinitrobenzenol</p>	1 1

23.	<p>(a) $2 \text{MnO}_4^- + 5 \text{NO}_2^- + 6 \text{H}^+ \longrightarrow 2 \text{Mn}^{2+} + 5 \text{NO}_3^- + 3 \text{H}_2\text{O}$</p> <p>(b) $\text{Cr}_2\text{O}_7^{2-} + 14 \text{H}^+ + 6 \text{e}^- \longrightarrow 2 \text{Cr}^{3+} + 7 \text{H}_2\text{O}$</p>	1 1
24.	<p>(a) N-Ethyl-N-methylaniline / N-Ethyl-N-Methylbenzenamine</p> <p>(b) A = $\text{C}_6\text{H}_5\text{NH}_2$</p> <p>B = </p>	1 $\frac{1}{2}$ $\frac{1}{2}$
25.	<p>Henry's law states that the partial vapour pressure of a gas is directly proportional to the mole fraction of the gas in the solution / $p = K_H x$ where p = partial pressure of gas, x = mole fraction in solution, and K_H is Henry's constant.</p> <p>Application: To increase the solubility of CO_2 in soft drinks and soda water, the bottle is sealed under high pressure / to minimize the painful effects accompanying the decompression of deep-sea divers (bends). Oxygen diluted with less soluble helium gas is used for breathing / At higher altitudes, low blood oxygen causes climbers to become weak and unable to think clearly (<i>anoxia</i>). (Any one) (or any other correct application)</p>	1 1
SECTION-C		
26.	<p>(a) CH_3I / Iodomethane / Methyl iodide</p> <p>(b)  / Picric acid / 2,4,6-Trinitrophenol / 2,4,6-Trinitrobenzenol</p> <p>(c) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ / But-1-ene</p>	 1 x 3
27.	<p>(a) </p> <p>(b) </p> <p>(c) </p> <p>(d) </p> <p>(or by any other correct method)</p>	 1 x 3

28.	<p>(a)</p> <table><thead><tr><th>Ideal Solution</th><th>Non-ideal solution</th></tr></thead><tbody><tr><td>The solution obeys Raoult's law at all concentrations.</td><td>The solution does not obey Raoult's law.</td></tr><tr><td>$\Delta V_{\text{mixing}} = 0$ and $\Delta H_{\text{mixing}} = 0$</td><td>$\Delta V_{\text{mixing}} \neq 0$ and $\Delta H_{\text{mixing}} \neq 0$. (Any one)</td></tr></tbody></table> <p>(or any other correct difference)</p> <p>(b)</p> $\frac{P_A^0 - P_A}{P_A^0} = \frac{\frac{W_B}{M_B}}{\frac{W_B}{M_B} + \frac{W_A}{M_A}}$ $1 - \frac{P_A}{23.8} = \frac{\frac{30}{60}}{\frac{30}{60} + \frac{846}{18}} \quad \text{or} \quad 1 - \frac{P_A}{23.8} = \frac{\frac{30}{60}}{\frac{846}{18} + \frac{30}{60}}$ $P_A = \frac{46.5}{47} \times 23.8 = 23.5 \text{ mm Hg} \quad \text{or} \quad P_A = \frac{47}{47.5} \times 23.8 = 23.5 \text{ mm Hg}$ <p>(Full marks may be awarded if the student substitutes M_B for molar mass as the molar mass of urea is not given in the question).</p>	Ideal Solution	Non-ideal solution	The solution obeys Raoult's law at all concentrations.	The solution does not obey Raoult's law.	$\Delta V_{\text{mixing}} = 0$ and $\Delta H_{\text{mixing}} = 0$	$\Delta V_{\text{mixing}} \neq 0$ and $\Delta H_{\text{mixing}} \neq 0$. (Any one)	<p>1</p> <p>½</p> <p>1</p> <p>½</p>
Ideal Solution	Non-ideal solution							
The solution obeys Raoult's law at all concentrations.	The solution does not obey Raoult's law.							
$\Delta V_{\text{mixing}} = 0$ and $\Delta H_{\text{mixing}} = 0$	$\Delta V_{\text{mixing}} \neq 0$ and $\Delta H_{\text{mixing}} \neq 0$. (Any one)							
29.	<p>(a)</p> <p>(i) Because it is an electron-withdrawing group / deactivating group / -R effect , electrophilic substitution takes place at the m-position.</p> <p>(ii) Because aldehyde & ketones form addition compound with NaHSO_3 which on hydrolysis forms pure aldehyde & ketones.</p> <p>(iii) Due to resonance, carboxylic carbon becomes less electrophilic.</p>	<p>1 x 3</p>						
	<p style="text-align: center;">OR</p> <p>(b)</p> <p>(i) </p> <p>(ii) </p> <p>(iii) </p>	<p>1 x 3</p>						
30.	<p>(a) Saccharic acid / $\text{HOOC}-(\text{CHOH})_4-\text{COOH}$</p> <p>(b) Due to the presence of $-\text{COOH}$ and $-\text{NH}_2$ group / Due to the formation of Zwitter ion.</p> <p>(c) α-helix has intramolecular H-bonding and β-helix has intermolecular H-bonding.</p>	<p>1</p> <p>1</p> <p>1</p>						

34.	<p>(a) (i) Copper, Copper, due to high $\Delta_{\text{sub}}H$ and low $\Delta_{\text{Hyd}} H$ / The sum of enthalpies of sublimation and ionisation of copper is not balanced by the hydration enthalpy.</p> <p>(ii) Cerium /Terbium</p> <p>(b)</p> <p>(i) Due to ability of oxygen to form multiple bonds with transition metals.</p> <p>(ii) KMnO_4 being an oxidising agent oxidises HCl to chlorine (Cl_2).</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
35.	<p>(a)</p> <p>(i) Molar conductivity of an electrolyte, at infinite dilution can be expressed as the sum of the contributions from its individual ions.</p> $\Lambda_m^\circ \text{CH}_3\text{COOH} = \lambda_m^\circ \text{CH}_3\text{COO}^- + \lambda_m^\circ \text{H}^+$ <p>(ii)</p> $\Delta_r G^\circ = -nF E_{\text{cell}}^\circ$ <p>Maximum work = $-\Delta_r G^\circ = nF E_{\text{cell}}^\circ$</p> $= 2 \times 96500 \text{ C mol}^{-1} \times (0.80 + 0.25) \text{ V}$ $= 2 \times 96500 \times 1.05 \text{ J mol}^{-1}$ $= 202,650 \text{ J mol}^{-1} \text{ or } 202.65 \text{ kJ mol}^{-1}$ $\log K^c = \frac{nE_{\text{cell}}^\circ}{0.059}$ $= \frac{2 \times 1.05}{0.059} = 35.6$ <p style="text-align: center;">OR</p> <p>(b) (i) It states that the mass of a substance deposited /liberated at the electrodes is directly proportional to the charge/quantity of electricity passed through the electrolyte.</p> <p>2F charge is required.</p> <p>(ii)</p> $E_{\text{cell}} = E_{\text{cell}}^\circ - \frac{0.0591}{2} \log \frac{[\text{Mg}^{2+}]}{[\text{Cu}^{2+}]}$ $= 2.71 \text{ V} - \frac{0.0591}{2} \log \frac{0.1}{0.01}$ $= 2.71 \text{ V} - \frac{0.0591}{2} \log 10$ $= 2.71 \text{ V} - 0.0295$ $= 2.68 \text{ V.} \quad (\text{Deduct } \frac{1}{2} \text{ mark for no or incorrect unit})$	<p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

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