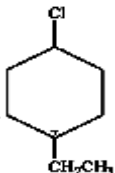


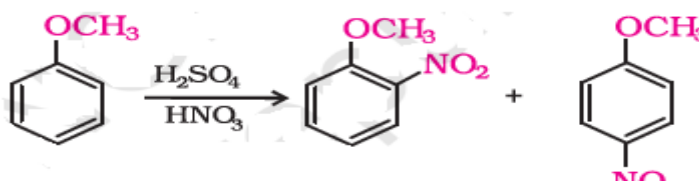
Marking Scheme Strictly Confidential (For Internal and Restricted use only) Senior Secondary School Supplementary Examination, July- 2023 SUBJECT NAME: CHEMISTRY SUBJECT CODE:043 PAPER CODE: 56/C/2	
<u>General Instructions: -</u>	
1	You are aware that evaluation is the most important process in the actual 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 totalled 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.

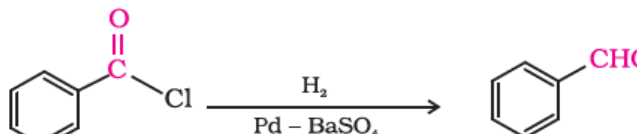
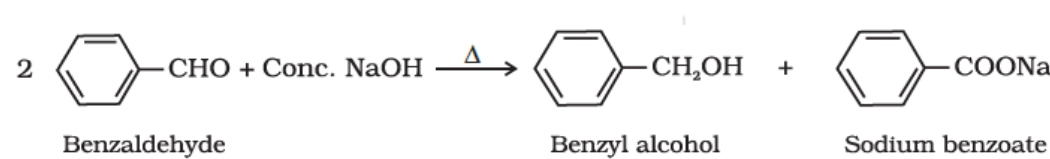
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).
13	Ensure that you do not make the following common types of errors committed by the Examiner in the past: - Giving more marks for an answer than assigned to it. • Wrong totalling 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 totalling on the title page. • Leaving answer or part thereof unassessed in an answer book. • Wrong totalling 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 totalling 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 totalled 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 Supplementary Examination, July-2023
CHEMISTRY (Subject Code-043)
[Paper Code: 56/C/2]

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
	SECTION-A	
1.	(b)	1
2.	(b)	1
3.	(d)	1
4.	(b)	1
5.	(d)	1
6.	(a)	1
7.	(a)	1
8.	(b)	1
9	(b)	1
10.	(a)	1
11.	(c)	1
12.	(d)	1
13.	(c)	1
14.	(d)	1
15.	(d)	1
16.	(a)	1
17.	(c)	1
18.	(a)	1
	SECTION-B	
19.	(a) (i) 	1

	(ii) Sulphuric acid converts KI to HI and then oxidises HI to I ₂ .	1
	OR	
19.	(b) (i) 2-chloropropane < 1-chloropropane < 1-chlorobutane (ii) A nucleophile with two nucleophilic centres. CN ⁻ / NO ₂ ⁻ (or any other suitable example).	1 ½ ½
20.	$\log \frac{k_2}{k_1} = \frac{E_a}{2.303R} \left(\frac{T_2 - T_1}{T_1 T_2} \right)$ $k_2 = 4 k_1$ $\log 4 = \frac{E_a}{2.303 \times 8.314} \left(\frac{313 - 293}{293 \times 313} \right)$ $0.6021 = \frac{20 \times E_a}{2.303 \times 8.314 \times 293 \times 313}$ $E_a = \frac{0.6021 \times 2.303 \times 8.314 \times 293 \times 313}{20}$ $E_a = 5.28 \times 10^4 \text{ J mol}^{-1} \text{ or } 52.8 \text{ kJ mol}^{-1}$	½ 1 ½
21.	(a) (i) Adenine, Guanine, Cytosine (any two) (ii) (1) Vitamin D (2) Vitamin B ₁₂	½ + ½ ½ ½
	OR	
21.	(b) (i) Due to the presence of both acidic (-COOH) and basic (-NH ₂) groups in the same molecule / they form zwitter ion which react with both acid and base. (ii)	1
	$\begin{array}{c} \text{CHO} \\ \\ (\text{CHOH})_4 \\ \\ \text{CH}_2\text{OH} \end{array} \xrightarrow{\text{NH}_2\text{OH}} \begin{array}{c} \text{CH=N-OH} \\ \\ (\text{CHOH})_4 \\ \\ \text{CH}_2\text{OH} \end{array} \quad / \text{ Glucose oxime is formed.}$	1
22.	Pentaamminechloridocobalt(III)chloride Six /6	1 1
23.	(a) It provides constant voltage / steady voltage (b) Fuel cells are pollution-free / High efficiency / no recharging required (any one).	1 1
24.	(a) $t_{1/2} = \frac{0.693}{k}$ (b) The number of collisions per second per unit volume of the reaction mixture.	1 1
25.	(a) F shows -I effect that stabilises the conjugate base (Fluoroacetate ion). (b)	1
	$\text{>C=O} \xrightarrow[-\text{H}_2\text{O}]{\text{NH}_2\text{NH}_2} \text{>C=NNH}_2 \xrightarrow[\text{heat}]{\text{KOH/ethylene glycol}} \text{>CH}_2 + \text{N}_2$ (or any other suitable chemical reaction)	1
	SECTION C	

26.	(a) $\text{R}-\underset{\text{OH}}{\text{CH}}-\text{R}' \xrightarrow{\text{CrO}_3} \text{R}-\underset{\text{O}}{\text{C}}-\text{R}'$ (b)  (c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_3 + \text{HI} \longrightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{CH}_3\text{CH}_2\text{CH}_2\text{I}$	1 1 1
27.	(a) (i) Due to the stability of tertiary carbocation. (ii) Optically active isomers which are related to each other as non-superimposable mirror images. (iii) Because chloroform is slowly oxidised by air in the presence of light to an extremely poisonous gas, carbonyl chloride (phosgene).	1 1 1
	OR	
27.	(b) (i) Pent-2-ene / $\text{CH}_3-\text{CH}=\text{CHCH}_2\text{CH}_3$ (ii) $\text{CH}_3\text{CH}_2\text{Br}$, it is a primary alkyl halide. (iii) C-Cl bond acquires partial double bond character due to resonance. (or any other suitable reason)	1 $\frac{1}{2} + \frac{1}{2}$ 1
28.	(a) $i = 2$ (b) $M = \frac{K_b \times w_2 \times 1000}{\Delta T_b \times w_2}$ $= \frac{0.52 \times 68.4 \times 1000}{0.104 \times 1000}$ $= 342 \text{ g mol}^{-1}$	1 $\frac{1}{2}$ $\frac{1}{2}$ 1
29.	(a) Due to resonance electron density on nitrogen gets reduce and is less available for donation. (b) The extent of hydrogen bonding with water is reduced due to an increase in the size of the alkyl group. (c) Due to the salt formation with Lewis acid anhydrous AlCl_3. (d) Due to the presence of intermolecular hydrogen bonding in primary amines which is absent in tertiary amines. (any three)	1 x 3
30.	(a) d^2sp^3 (b) Octahedral, diamagnetic (c) Low spin complex	1 $\frac{1}{2} + \frac{1}{2}$ 1
	SECTION-D	
31.	(a) Solution shows a negative deviation from Raoult's law / A-A and B-B interactions are weaker than A-B interactions. (b) Carbon disulphide and acetone, Ethanol and acetone. (c) According to Raoult's law: $p_1 = p_1^0 x_1 \quad \text{or} \quad x_1 = \frac{p_1}{p_1^0}$	1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$

	$x_1 = \frac{750}{760} = 0.987$ $x_2 = 1 - x_1$ $= 1 - 0.987 = 0.013$ (or any other suitable method)	$\frac{1}{2}$ 1						
	OR							
	(c) NaCl is a non-volatile solute, when it is added to water the vapour pressure decreases and hence boiling point increases. Methanol is a volatile solute and its addition to water increases the total vapour pressure of the solution and hence boiling point decreases.	1 1						
32.	(a) Glycosidic linkage (b) D-(+)-Glucose and D-(-)-fructose (c) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th>Amylose</th> <th>Amylopectin</th> </tr> <tr> <td>Soluble in water</td> <td>Insoluble in water</td> </tr> <tr> <td>Linear long chain polymer</td> <td>Branched chain polymer</td> </tr> </table> (or any other two correct differences)	Amylose	Amylopectin	Soluble in water	Insoluble in water	Linear long chain polymer	Branched chain polymer	1 $\frac{1}{2} + \frac{1}{2}$ 1 x 2
Amylose	Amylopectin							
Soluble in water	Insoluble in water							
Linear long chain polymer	Branched chain polymer							
	OR							
	(c) (i) Sugars which reduce Fehling's / Tollen's reagents. (ii) Hydrolysis of sucrose gives dextrorotatory glucose and laevorotatory fructose. But the laevorotation of fructose is more than the dextrorotation of glucose. Hence, the mixture is laevorotatory.	1 1						
	SECTION-E							
33.	(a) A = Benzoyl chloride / C₆H₅COCl B = Benzaldehyde / C₆H₅CHO C = Benzyl alcohol / C₆H₅CH₂OH D = Sodium Benzoate / C₆H₅COONa   Add Iodine (I₂) and NaOH in both the test tubes containing the given organic compounds and heat. Propanone gives +ve iodoform test i.e., CHI₃ (yellow ppt.) while benzaldehyde does not. OR	$\frac{1}{2} \times 4$ 1 1 1						
33.	(a) A = Ethanol / CH₃CH₂OH B = Ethanal / CH₃CHO C = 3-Hydroxybutanal / CH₃CH(OH)CH₂CHO D = Ethanoic acid / CH₃COOH	$\frac{1}{2} \times 4$						

	$\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{PCC}} \text{CH}_3\text{CHO} \xrightarrow{\text{KMnO}_4} \text{CH}_3\text{COOH}$ $\text{CH}_3\text{CHO} \xrightarrow{\text{KMnO}_4} \text{CH}_3\text{COOH}$ $\text{CH}_3\text{CHO} \xrightarrow{\text{Dil. NaOH}} \text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_2-\text{CHO}$ (Award full mark if student attempts identification of compound D and the chemical equation in the oxidation of B to C in any way).	1 x 3
34.	(a) Because many of the actinoids are radioactive and have the ability to exist in different oxidation states. (b) Mn^{3+} can be easily reduced to Mn^{2+} due to stable d^5 configuration / Much larger third ionization enthalpy of Mn. (c) Small size of atoms and ions /availability of d-orbitals for bond formation / High ionic charge. (d) $5\text{Fe}^{2+} + \text{MnO}_4^- + 8\text{H}^+ \longrightarrow \text{Mn}^{2+} + 4\text{H}_2\text{O} + 5\text{Fe}^{3+}$ (e) $\mu = \sqrt{n(n+2)}$, $n=5$ $= \sqrt{5(5+2)}$ $= 5.91 \text{ BM}$	1 1 1 1 ½ ½
35.	(a) (i) $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \longrightarrow \text{Cu}(\text{s})$ (ii) $\Delta_r G^\ominus = -RT \ln K$. (iii) $E_{\text{cell}} = (E^\ominus_{\text{cathode}} - E^\ominus_{\text{anode}}) - \frac{0.059}{2} \log \frac{[\text{Mg}^{2+}]}{[\text{Cu}^{2+}]}$ $E_{\text{cell}} = 0.34 - (-2.37) - \frac{0.059}{2} \log \frac{[10^{-1}]}{[10^{-3}]}$ $E_{\text{cell}} = 2.71 - \frac{0.059}{2} \log 10^2$ $E_{\text{cell}} = 2.71 - \frac{0.059}{2} \times 2 \log 10$ $E_{\text{cell}} = 2.71 - 0.059$ $E_{\text{cell}} = 2.65 \text{ V}$ (Deduct ½ mark, if no or incorrect unit)	1 1 1 ½ ½ 1
	OR	
35.	(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. (ii) According to the question, $\text{Al}^{3+} + 3\text{e}^- \longrightarrow \text{Al}$ 27 g Electricity required to produce 27 g of Al = 3 F Therefore, electricity required to produce 40 g of Al = $\frac{3 \times 40}{27} \text{ F} = 4.44 \text{ F}$ (iii) $\log K_c = \frac{nE^\ominus_{\text{cell}}}{0.059}$ $E^\ominus_{\text{cell}} = 0.34 - (-0.76) \text{ V}$ $= 1.10 \text{ V}$ $n = 2$ $\log K_c = \frac{2 \times 1.10}{0.059}$ $= 37.22$	1 ½ ½ ½ ½ ½ 1
