Marking Scheme

Strictly Confidential

(For Internal and Restricted use only)

Senior School Certificate Examination,2024

SUBJECT NAME **CHEMISTRY (Theory)**
(Q.P.CODE56_4_1,2,3)

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.

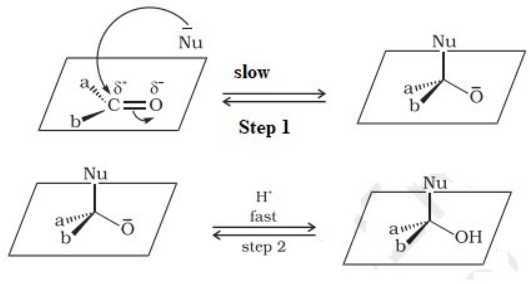
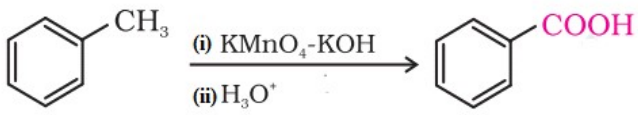
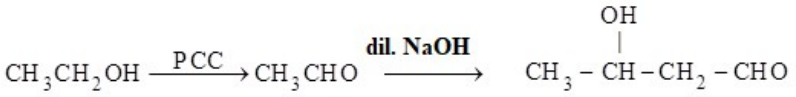
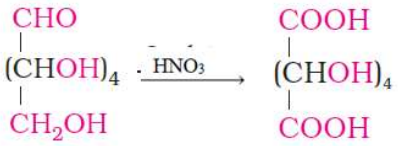
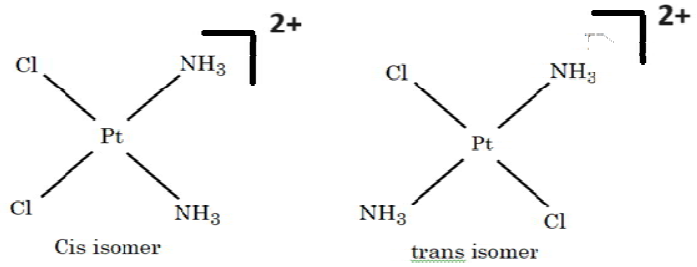
Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

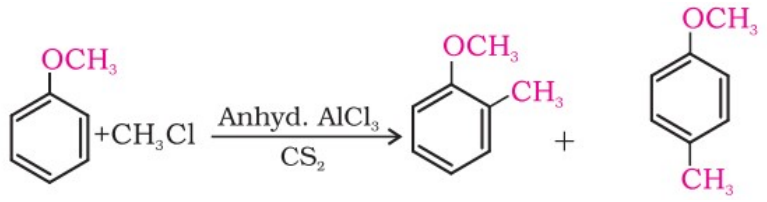
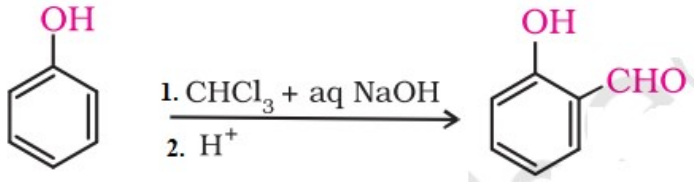
The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as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

MARKING SCHEME 2023

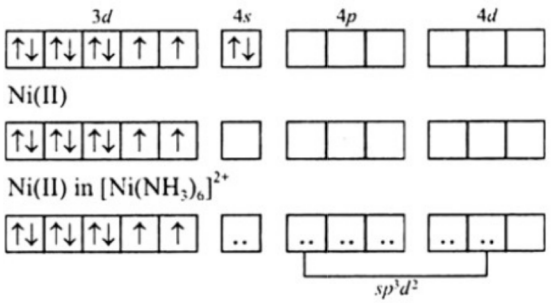
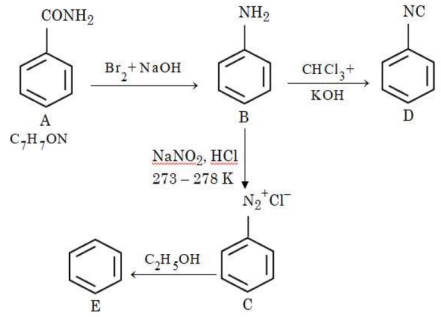
CHEMISTRY (Theory) - 043
QP CODE 56/4/3

Q.No	Value points	Mark
	SECTION A	
1	**(B)**	**1**
2	**(C)**	**1**
3	**(A)**	**1**
4	**(B)**	**1**
5	**(A)**	**1**
6	**(A)**	**1**
7	**(B)**	**1**
8	**(C)**	**1**
9	**(A)**	**1**
10	**(A)**	**1**
11	**(B)**	**1**
12	**(C)**	**1**
13	**(C)**	**1**
14	**(C)**	**1**
15	**(A)**	**1**
16	**(C)**	**1**
	SECTION B	
17	(a) The time in which the concentration of a reactant is reduced to one half of its initialconcentration. (b) The collisions which result in the formation of products.	1 1
18	$\Delta T_f = K_f m$ $M_B = \frac{K_f \times W_B \times 1000}{W_A \times \Delta T_f}$ $= 273 \cdot 15 - 270 \cdot 67 = 2 \cdot 48\ K$ $M_B = \frac{1 \cdot 86 \times 60 \times 1000}{250 \times 2 \cdot 48}$ = 180 g mol^{-1}	½ 1 ½ `
19	(a) $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{\vert}{\underset{\vert}{C}}}} - Br$; React more rapidly because it forms a more stable tertiary carbocation. (b) Chloromethane < Bromomethane <Dibromomethane< Bromoform	½ , ½ 1

20	a)  	1 1
	OR	
20	**(b)** **(i)**  **(ii)**  **(Or by any other suitable method)**	1 1
21.	(a)  (b) DNA has Double stranded helix structure while RNA is a single stranded helix structure. (or any other suitable difference).	1 1
	SECTION C	
22	(a)  (b) $t_{2g}^3 e_g^2$ (c) Ligand which has two different donor atoms but only one of them forms a bond with central atom at one time.	½ , ½ 1 1

23	(a) $CH_3 - CH = CH_2 \xrightarrow[2.\ H_2O_2,\ \bar{O}H]{1.\ B_2H_6} CH_3 - CH_2 - CH_2 - OH$ (b) $R{-}X + R'{-}\ddot{\underset{\cdot\cdot}{O}}^{-}\ Na^{+} \longrightarrow R{-}\ddot{\underset{\cdot\cdot}{O}}{-}R' + Na\ X$ (or any other correct equation) (c)  (d)  (Any three)	1 × 3
24	(a) (i) On adding neutral $FeCl_3$, phenol gives violet colouration whereas benzoic acid does not give violet colour. (ii) On adding Tollens reagent, propanal gives silver mirror whereas propanone does not. (or any other suitable chemical test). (b) $CH_3CHF\ CH_2COOH$; due to stronger – I effect or electron withdrawing nature of F , as F is closer to the carboxyl group.	1 1 ½ , ½
25	$k = \frac{2 \cdot 303}{t} \log \frac{[R]_0}{[R]}$ For 99 ·9 % completion Let $[R]_0 = 100,\ [R] = 100 - 99 \cdot 9\ \% = 0 \cdot 1$ $t_{99 \cdot 9\ \%} = \frac{2 \cdot 303}{k} \log \frac{100}{0 \cdot 1}$ $= \frac{2 \cdot 303}{k} \log\ 1000$ $= \frac{2 \cdot 303}{k} \times 3$ ..... (i) Let $[R]_0 = 100,\ [R] = 100 - 50 = 50$	½ ½ ½

	$t_{50\%} = \frac{2 \cdot 303}{k} \log \frac{100}{50}$ $= \frac{2 \cdot 303}{k} \log 2$ $= \frac{2 \cdot 303}{k} \times 0 \cdot 3010$ ..... (ii) Divide (i) by (ii) $\frac{t_{99 \cdot 9\%}}{t_{50\%}} = \frac{\frac{2 \cdot 303}{k} \times 3}{\frac{2 \cdot 303}{k} \times 0 \cdot 3010}$ $\frac{t_{99 \cdot 9\%}}{t_{50\%}} = 10$ or $t_{99 \cdot 9\%} = 10 t_{50\%}$ (or by any other suitable method)	½ ½ ½
26.	(a) It is an oxide linkage between two monosaccharides formed by the loss of water molecule. (b) The specific sequence in which amino acids are linked through a peptide bond. (c) They produce two molecules of monosaccharides on hydrolysis.	1 1 1
27	(a) 4–Chlorobut–1–ene (b) Because two gaseous products SO_2 and HCl are escapable, hence pure alkyl halides are obtained. (c) $CH_3 - Br + KCN \longrightarrow CH_3CN + KBr$ / Methyl cyanide / Ethane nitrile	1 1 1
28.	$E_{cell} = E^o_{cell} - \frac{0 \cdot 059}{2} \log \frac{\left[Sn^{2+}\right]}{\left[H^+\right]^2}$ $E^o_{cell} = 0 - (-0 \cdot 14\ V) = 0 \cdot 14\ V$ $E_{cell} = 0 \cdot 14 - \frac{0 \cdot 059}{2} log \frac{(0 \cdot 001)}{(0 \cdot 01)^2}$ $= 0 \cdot 14 - \frac{0 \cdot 059}{2} \log 10$ $= 0 \cdot 14 - 0 \cdot 0295 = 0 \cdot 1105\ V$ or 0.11 V (Deduct ½ marks for incorrect or no unit) (Or by any other suitable method)	1 1 1
	SECTION D	
29.	(a) It allows flow of ions and the circuit is completed / itmaintains the electrical neutrality. (or any other correct reason). (b) When $E_{ext} > E_{cell}$ (c) $E^o_{cell} = E^o_{Cu^{2+}/Cu} - E^o_{Zn^{2+}/Zn}$ $= 0 \cdot 34 - (-0 \cdot 76) = 1 \cdot 10\ V$	1 1 1

	As E^{o}_{cell} = +ve, the reaction takes place, so copper sulphate cannot be stored ina zincpot. OR (c) (i) 5F (ii) 2 F	1 1 1
30	(a) Paramagnetic, F^- does not cause pairing of electrons and hence unpaired electrons are left. (b) 6 (c) (i) diamminedichloridoplatinum(IV) ion (ii) It uses inner d orbitals because NH_3 causes pairing of electrons OR c)  Shape: Octahedral ; Hybridization : sp^3d^2	½ , ½ 1 1 1 1 ½ , ½
	SECTION E	
31	 **(1 mark for identification of A, ½ + ½ each for identification and reaction of formation of B, C, D, E).**	1 x 5
	OR	
31	(b) (i) (1) Benzene Sulphonyl Chloride ($C_6H_5SO_2Cl$) (Name or formula). (2)$C_2H_5NH_2 < (C_2H_5)_2NH < (C_2H_5)_3N$ (ii) (1) In methylamine, electron donating effect of – CH_3 group increases the availability of lone pair of electrons on nitrogen of the amino group. / In aniline, benzene withdraws electrons due to resonance therefore electron pair is less easily available for protonation. (2) Due to strong activating effect of amino group. (3) Due to intermolecular hydrogen bonding in primary amines.	1 1 1 1 1

32.	(a) Zn has fully filled d-orbital configuration in ground state and in its oxidized state. (b) The filling of 4f orbital before 5d orbital results in steady decrease in atomic radii and ionic radii. / The steady decrease in the atomic radii or ionic radii of the elements with increase in atomic number. (c) In chromium an electron is removed from $4s^1$ while in Zn it is from fully filled $4s^2$orbital. (d) Due to variable oxidation state and complex formation / provide large surface area. (e) Due to d–d transition of electrons in d– orbitals / unpaired electrons in d-orbital. (f) K_2MnO_4, due to the presence of one unpaired electron. (g) $Cr_2O_7^{2-} + 14\,H^+ + 6\,e^- \longrightarrow 2\,Cr^{3+} + 7\,H_2O$ (Any five)	1 x 5
33	(a) (i) If a pressure larger than the osmotic pressure is applied to the solution side, resulting in the movement of solvent particles from solution to solvent. (ii) Solubility of gases in water decreases with rise in temperature. More oxygen will be available in the cold water. (iii) $\frac{p_1^0 - p_1}{p_1^0} = \frac{n_2}{n_1}$ $\frac{p_1^0 - p_1}{p_1^0} = \frac{w_2 \times M_1}{M_2 \times w_1}$ $\frac{32.8 - p_1}{32.8} = \frac{2 \times 18}{180 \times 100}$ $32.8 - p_1 = 0.0656$ $p_1 = 32.734$ mm Hg (Deduct ½ mark for no unit or incorrect unit)	1 1 1 1 1
	OR	
33	(a) (i) i will be less than 1. (ii) Solution which obeys Raoult's law over the entire range of concentration. (iii) i = 3 $\Delta T_f = i \times K_f \times m$ $\Delta T_f = \frac{i \times K_f \times w_B \times 1000}{M_B \times w_A}$ $2\,K = \frac{3 \times 1.86 \times w_B \times 1000}{111 \times 500}$ $w_B = \frac{2 \times 111 \times 500}{3 \times 1 \cdot 86 \times 1000}$ $= 19 \cdot 89$ g (Deduct ½ mark for no unit or incorrect unit)	1 1 1 1 1