Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior Secondary School Examination, 2023
SUBJECT NAME : CHEMISTRY (043)(56/1/2)

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 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.
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.

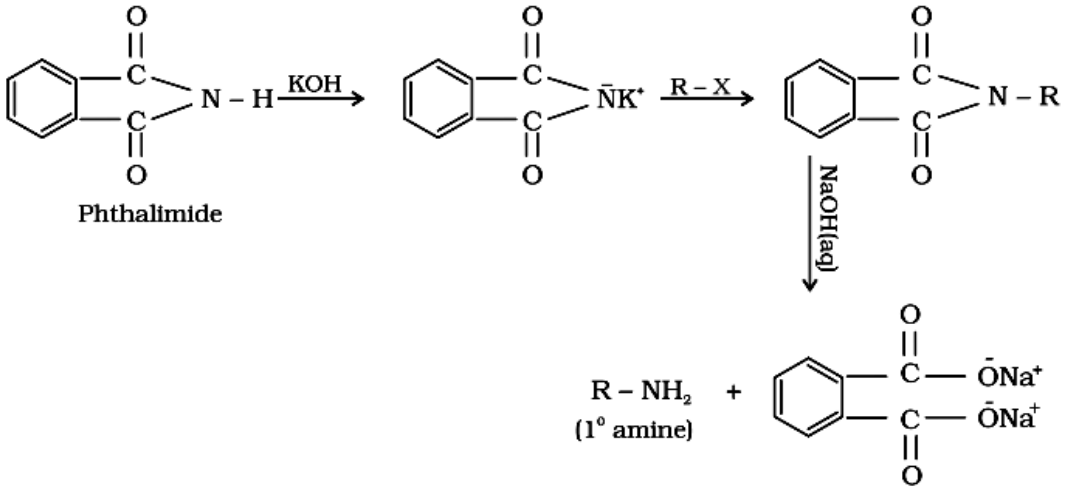
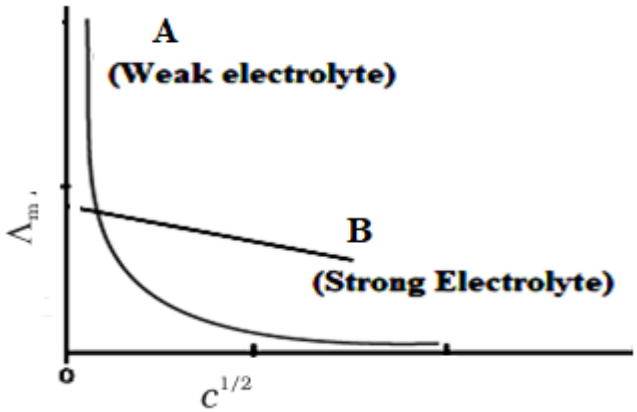
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 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	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.
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.

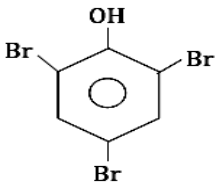
Senior Secondary School Examination, 2023

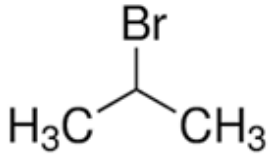
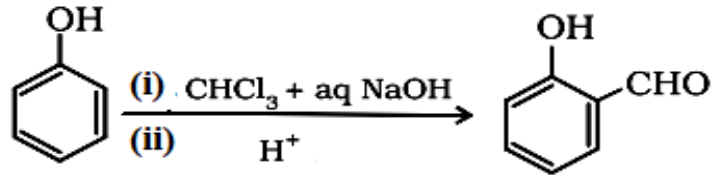
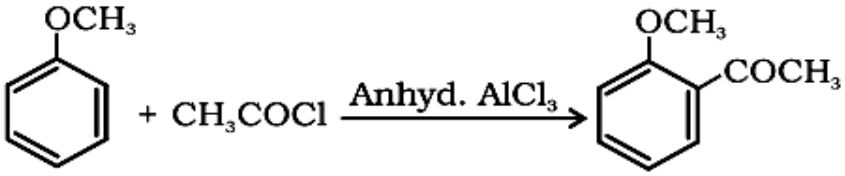
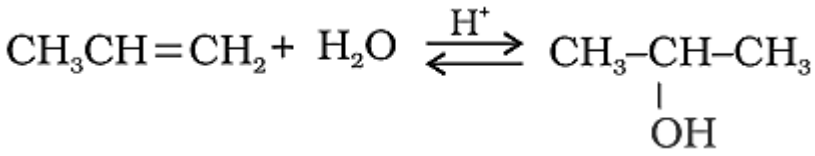
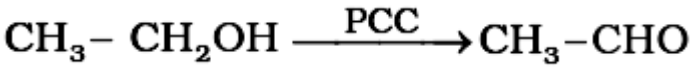
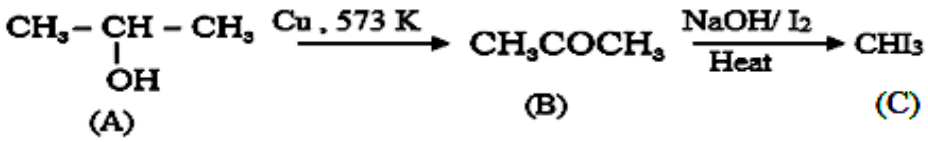
CHEMISTRY (Subject Code–043)

[Paper Code: 56/1/2]

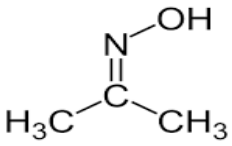
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
	SECTION-A	
1.	(c)	1
2.	(c) / Award full mark if attempted (Printing error)	1
3.	(d)	1
4.	(d) / Full mark to be awarded for any option.	1
5.	(c)	1
6.	(b)	1
7.	(a)	1
8.	(a)	1
9.	(c)	1
10.	(c)	1
11.	(c)	1
12.	(b)	1
13.	(b)	1
14.	(c) / Full mark to be awarded for any option	1
15.	(c)	1
16.	(a)	1
17.	(c)	1
18.	(c)	1
	SECTION-B	
19.	$\frac{p_A^\circ - p_A}{p_A^\circ} = \frac{\frac{w_A}{M_A}}{\frac{w_A}{M_A} + \frac{w_B}{M_B}} = \frac{\frac{w_B}{M_B}}{\frac{w_A}{M_A}}$	½

	$\frac{32 - 31{\cdot}84}{32} = \frac{\frac{10}{M_B}}{\frac{200}{18}}$ $\frac{0{\cdot}16}{32} = \frac{10}{M_B} \times \frac{18}{200}$ M_B = 180 g/mol	1 ½
20.	(a) Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form isocyanides or carbylamines which are foul-smelling substances. / $R{-}NH_2 + CHCl_3 + 3KOH \xrightarrow{Heat} R{-}NC + 3KCl + 3H_2O$ Isocyanide with an offensive smell is formed. (Explanation or reaction) (b) Phthalimide on treatment with ethanolic potassium hydroxide forms potassium salt of phthalimide which on heating with alkyl halide followed by alkaline hydrolysis produces the corresponding primary amine /  (Explanation or reaction)	1 1
21.	(a) Mn^{3+} changes to Mn^{2+} stable half-filled d^5 configuration / much larger third ionization enthalpy of Mn whereas Cr^{3+} and Fe^{3+} have stable configuration. (b) $2\,MnO_4^- + 16\,H^+ + 5\,C_2O_4^{2-} \longrightarrow 2\,Mn^{2+} + 10\,CO_2 + 8\,H_2O$	1 1
22.	'B' is a strong electrolyte.  	1 1
	OR	

	$A = \pi r^2 = 3{\cdot}14 \times (0{\cdot}5)^2 = 0{\cdot}785\ cm^2$, $\ell = 50$ cm $k = \frac{\ell}{R \times A}$ $= \frac{50}{0{\cdot}785\ X\ (5.55\ X\ 10^3)}$ $= \mathbf{11{\cdot}47\ X\ 10^{-3}}$ S cm^{-1} (or by any other correct method)	½ 1 ½
23.	(a) (i) No reaction possible at 273 K / CH_3CHO at 573 K (ii)  	1 1
	OR	
	(b) (i) $-NO_2$ group is electron withdrawing (-R /-I effect) while $-CH_3$ is electron releasing group / conjugate base of p-nitrophenoxide ion is more resonace stabilised. (ii) CH_3ONa is not only a good nucleophile but a strong base as well which favours the elimination reaction of $(CH_3)_3C$-Br rather than substitution.	1 1
24.	**(a) A =** $\mathbf{CH_3 - \underset{\displaystyle Cl}{\underset{|}{CH}} - CH_3}$ **/ 2-Chloropropane** **B =** $CH_3-\underset{\displaystyle NC}{\underset{|}{CH}}-CH_3$ **/ Isopropyl isocyanide / Propan-2-isonitrile** **(b) A =** $\mathbf{CH_3 - CH = CH_2}$ **/ Propene** **B =** $\mathbf{CH_3 - \underset{\displaystyle Br}{\underset{|}{CH}} - CH_3}$ **/ 2-Bromopropane**	½ x 4
25.	When a protein is subjected to a change in temperature or chemical change then it loses its biological activity. 2° and 3° structures are destroyed but 1° structure remains intact.	1 1
	SECTION-C	
26.	(a) Osmotic pressure is measured at room temperature / molarity of the solution is used instead of molality / as compared to other colligative properties its magnitude is large even for a very dilute solution. (b) Solubility of oxygen is higher at a lower temperature. (c) KCl being strong electrolyte dissociates into two moles of ions but sugar will not dissociate/ for KCl, i= 2 and for sugar, i=1.	1 x 3

27.	(a) (A) = **CH_3-CH=CH_2,** (B) =  (b) (A) = $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$, (B) = $CH_3-\underset{\underset{Cl}{|}}{CH}-CH_3$, (B) = $CH_3-\underset{\underset{CH_3-CH-CH_3}{|}}{CH}-CH_3$	1 ½ ½ x 3
28.	(a)  (b)  (c)  (d)  (or by any other correct method)	1 x 3
29.	(a) (i) Glucose and Galactose (ii) Glucose and Glucose (b) Starch is a polymer of α-glucose while cellulose is a polymer of β-glucose (or any other correct structural difference)	1+1 1
30.	(a) (i) because it is an electron-withdrawing group / deactivating group / -R effect, electrophilic substitution takes place at the m-position. (ii) because aldehydes & ketones form an addition compound with $NaHSO_3$ which on hydrolysis forms pure aldehydes & ketones. (iii) Due to resonance, carboxylic carbon becomes less electrophilic.	1 x 3
	OR (b)  (or explanation with correct structures of A, B, and C)	1 x 3

	SECTION-D	
31.	(i) $[Pt(NH_3)_2Cl_2]$	1
	(ii) 6	1
	(iii) (1) $Fe_4[Fe(CN)_6]_3$	
	(2) Pentamminechloridocobalt(III) chloride.	1,1
	OR	
	(iii) dsp^2, diamagnetic	1,1
32.	(i) Change in the concentration of a reactant or product per unit time.	1
	(ii) Concentration of reactants, Surface area, catalyst and temperature (any two).	1
	(iii) (1) rate is independent of the concentration of reactant(s) /rate remains constant / rate = k	
	(2) mol L^{-1} s^{-1}	1+1
	OR	
	(iii) (1) 3/2 / 1.5	1
	(2) A reaction that appears to be of higher order but follows first-order kinetics. Example: Hydrolysis of an ester. (or any other correct example)	½ , ½
	SECTION-E	
33.	(i) Due to the participation of all 3d and 4s electrons in bond formation /due to the presence of maximum number of unpaired electrons.	1
	(ii) Due to variable oxidation state / due to the ability to adopt multiple oxidation states / due to the large surface area / due to complex formation.	1
	(iii) Cr^{2+} changes from d^4 to stable half-filled t_{2g}^3 configuration while Mn^{3+} changes to stable half-filled d^5 configuration.	1
	(iv) Due to the absence of unpaired electrons and weak interatomic interactions.	1
	(v) Cu^+ ion (aq.) undergoes disproportionation to Cu^{2+} (aq.) and Cu / $2\,Cu^+(aq.) \longrightarrow Cu^{2+}(aq.) + Cu(s)$	1
34.	(a) (i) (1) $CH_3CHO \xrightarrow{\text{dil. NaOH}} CH_3CH(OH)—CH_2—CHO \xrightarrow[-H_2O]{\Delta} CH_3—CH=CH—CHO$	1
	(2) $CH_3CH_2-COOH \xrightarrow[(ii)\ H_2O]{(i)\ Cl_2/Red\ P} CH_3-\underset{Cl}{CH}-COOH$	1
	(ii) A = $CH_3—CH=\underset{CH_3}{C}—CH_3$ / 2-Methylbut-2-ene	
	B = $H_3C—CHO$ / Ethanal / Acetaldehyde	
	C = $O=\underset{CH_3}{C}—CH_3$ / Propanone / Acetone	1 x 3

	OR (b) (i) (1) Add Iodine (I_2), NaOH, and heat both the test tubes containing the given organic compounds. Butanone gives yellow precipitate (CHI_3) while butanal will not give the positive iodoform test. (2) Add $NaHCO_3$ in both the test tube containing the given organic compounds. Ethanoic acid will give brisk effervescence of CO_2 and ethanal will not. (or any other suitable chemical test) (ii)  (iii) A = **CH_3COCl**, B = **CH_3CHO**, C = **$(CH_3)_2CH(OH)$**, D = **CH_3CH_2OH**	1 1 1 ½ x 4
35.	(a) (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. Λ_m° **(CH_3COOH) = λ° CH_3COO^- + λ° H^+** (ii) $\Delta_r G^\circ = -nF E^\circ_{cell}$ Maximum work = $-\Delta_r G^\circ = nF E^\circ_{cell}$ $= 2 \times 96500\ C\ mol^{-1} \times (0{\cdot}80 + 0{\cdot}25)\ V$ $= 2 \times 96500 \times 1{\cdot}05\ J\ mol^{-1}$ $= 202{,}650\ J\ mol^{-1}$ or $202{\cdot}65\ kJ\ mol^{-1}$ $\log K_C = \frac{nE^\circ_{cell}}{0{\cdot}059}$ $= \frac{2 \times 1{\cdot}05}{0{\cdot}059} = 35{\cdot}6$ **OR** (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. 2F charge is required. (ii) $E_{cell} = E^\circ_{cell} - \frac{0{\cdot}0591}{2} \log \frac{[Mg^{2+}]}{[Cu^{2+}]}$ $= 2{\cdot}71\ V - \frac{0{\cdot}0591}{2} \log \frac{0{\cdot}1}{0{\cdot}01}$ $= 2{\cdot}71\ V - \frac{0{\cdot}0591}{2} \log 10$ $= 2{\cdot}71\ V - 0{\cdot}0295$ $= 2{\cdot}68\ V.$ (Deduct ½ mark for no or incorrect unit)	1 1 ½ ½ 1 ½ 1 1 1 1 1 1

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