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 (B)

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 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.

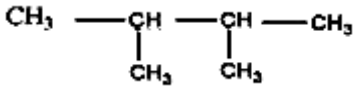
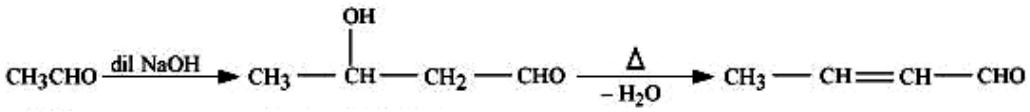
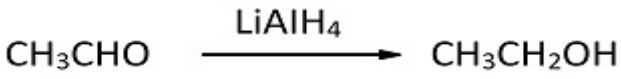
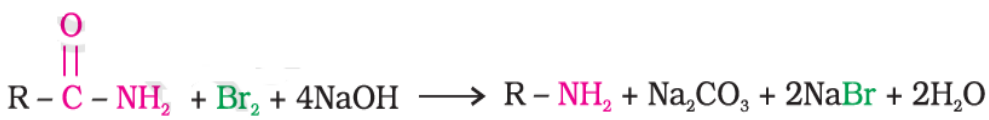
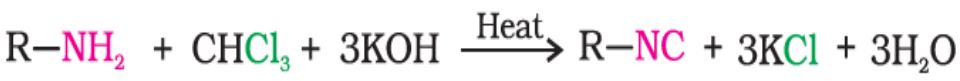
MARKING SCHEME

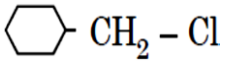
Senior Secondary School Supplementary Examination, July-2023

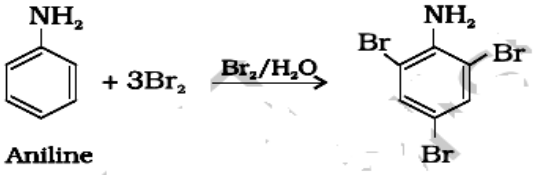
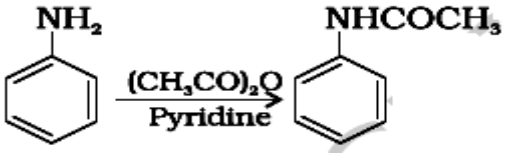
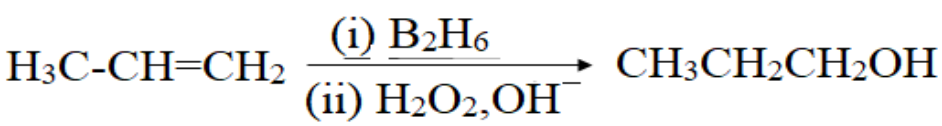
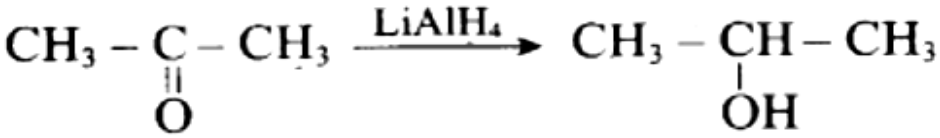
CHEMISTRY (Subject Code–043)

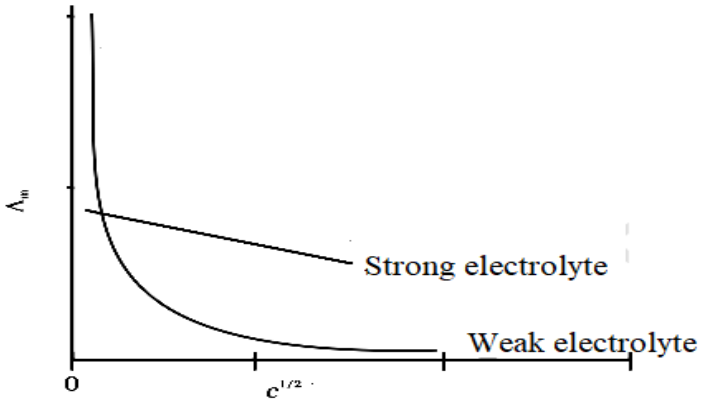
[Paper Code: 56(B)]

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
	SECTION-A	
1.	(c)	1
2.	(b)	1
3.	(a)	1
4.	(c)	1
5.	(c)	1
6.	(d)	1
7.	(c)	1
8.	(a)	1
9	(c)	1
10.	(b)	1
11.	(a)	1
12.	(c)	1
13.	(d)	1
14.	(a)	1
15.	(c)	1
16.	(b)	1
17.	(a)	1
18.	(d)	1
	SECTION-B	
19.	Positive deviation The addition of acetone breaks some of the hydrogen bonds of ethanol resulting in an increase in vapour pressure / Ethanol-Acetone interactions are weaker than those between acetone-acetone and ethanol-ethanol.	1 1
20.	(a) Cathode: $O_2(g) + 2H_2O(l) + 4e^- \longrightarrow 4OH^-(aq)$ Anode: $2H_2(g) + 4OH^-(aq) \longrightarrow 4H_2O(l) + 4e^-$ Overall reaction being: $2H_2(g) + O_2(g) \longrightarrow 2H_2O(l)$	 ½ ½ 1

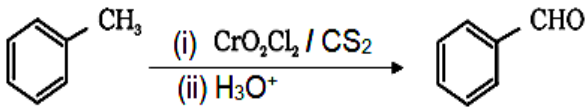
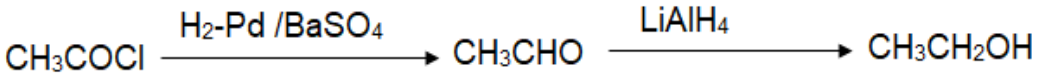
	OR	
20.	(b) (i) The amount of chemical reaction which occurs at any electrode during electrolysis by a current is proportional to the quantity of electricity passed through the electrolyte. (ii) Due to the decrease in the number of ions per unit volume.	1 1
21.	(i) 4 times / rate increases by 4 times (ii) ¼ times / rate decreases by 4 times	1 1
22.	(a) (i) Dibromidobis-(ethane-1,2-diamine)cobalt (III) (ii) Potassium trioxalatocobaltate(III)	1 1
	OR	
22.	(b) Ligands can be arranged in a series in the order of increasing field strength / Series based on the absorption of light by complexes with different ligands. **Weak field ligand** | **Strong field ligand** $\Delta_o < P$ | $\Delta_o > P$ Does not favour the pairing of electrons in d orbitals | Does favour the pairing of electrons in d orbitals (any one difference)	1 1
23.	 (a) 2, 3-Dimethylbutane is formed / (b) Ethyl isocyanide / Ethylisonitrile /CH_3NC is formed.	1 1
24.	(a)  (b)  (or any other suitable method)	1 1
25.	(a)  (b)  (or any other correct equation)	1 1

	SECTION-C	
26.	$\Delta T_b = i \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$	½
	$\Delta T_b = i \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$	½
	$i = 2$	
	$T_b - T_b^0 = \frac{2 \text{ x } 0.52 \text{ x } 4 \text{ x } 1000}{120 \text{ x } 100}$	1
	$T_b - 373 \text{ K} = 0.346 \text{ K}$	
	$T_b = 373.346 \text{ K}$	1
27.	$\log \frac{k_2}{k_1} = \frac{E_a}{2.303 R}\left(\frac{T_2 - T_1}{T_1 T_2}\right)$	½
	$k_2 = 2\ k_1$	
	$\log 2 = \frac{E_a}{19.15}\left(\frac{310 - 300}{300 \text{ x } 310}\right)$	1
	$0.3010 = \frac{10 \text{ x } E_a}{300 \text{ x } 310 \text{ x } 19.15}$	½
	$E_a = \frac{0.3010 \text{ x } 19.15 \text{ x } 300 \text{ x } 310}{10}$	
	E_a = 53606 J mol^{-1} or 53.6 kJ mol^{-1}	1
28.	(a) (i) d^2sp^3 , diamagnetic	1
	(ii) sp^3d^2 , paramagnetic	1
	(iii) sp^3 , diamagnetic	1
	OR	
28.	(b) (i) (i) Strong field ligand : $t_{2g}^5\ e_g^0$	1
	(ii) Weak field ligand : $t_{2g}^3\ e_g^2$	1
	(ii) Cl^- is a weak field ligand and does not pair the electrons in Ni^{2+} ions while CO is strong field ligand and pair up the electrons of Ni.	1
29.	(a)  , it is primary alkyl halide.	½ + ½
	(b) p-nitrochlorobenzene, $-NO_2$ group is an electron withdrawing group.	½ + ½
	(c) 2-Bromopentane, it contains chiral carbon.	½ + ½
	(d) A nucleophile with two nucleophilic centres.	
	CN^- / NO_2^- (or any other suitable example).	½ + ½
	(any three)	

30.	(a)  Aniline / **2,4,6-Tribromoaniline is formed.** (b) p-Benzoquinone / award full mark, if attempted. (c)  **/ Acetanilide is formed**	1 1 1
	SECTION-D	
31.	(i) o-nitrophenol, $-NO_2$ is an electron withdrawing group and stabilises the phenoxide ion whereas $-OCH_3$ is an electron donating group. (ii) Due to hydrogen bonding in propanol. (iii) (1) CrO_3 / PCC (2) Conc. H_2SO_4 / 85 % H_3PO_4	1 1 1 1
	OR	
	(iii) (1)  (2)  (or any other suitable method of conversion)	1 1
32.	(i) Polymer of nucleotide. (ii) Nucleoside: Base + Sugar, Nucleotide: Base + Sugar + Phosphate (iii) **DNA** / **RNA** Double-strand helix structure / Single strand helix Thymine base / Uracil base 2-Deoxyribose sugar / Ribose sugar (any two)	1 1 1+1

	OR	
	(iii) (1) The hydrogen bonds are formed between specific pairs of bases / Thymine forms H bonds with adenine while Guanine forms H bonds with cytosine of the other strand. (2) Basis of hereditary characters.	1 1
	SECTION-E	
33.	(a) $\Delta_r G^\ominus = -nFE^\ominus_{(cell)}$ = - 2 x 96500 x (0.80+0.25) = -202650 J mol^{-1} Maximum work = + 202,650 J mol^{-1} $\log K_c = \frac{n E^\ominus_{(cell)}}{0.059}$ $\log K_c = \frac{2 \times 1.05}{0.059}$ **= 35.59**	½ ½ ½ ½ ½ ½
	OR	
	(b)  on dilution, Λ_m decreases slowly for strong electrolytes while it increases sharply for weak electrolytes.	1 1

34.	(a) (i) (1) Due to the absence of an unpaired electron in Ti^{4+} / absence of d-d transition. (2) Because Mn is in +7 oxidation state in Mn_2O_7 i.e., higher the oxidation state, higher the acidic character. (3) Due to the comparable energies of 5f, 6d and 7s orbitals. (ii) $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$ $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$ (Balancing of the equation may be ignored) (or any other suitable method of preparation) **(Word equation may be accepted)**	1 1 1 1 1
	OR	
34.	(b) (i) The steady decrease in the atomic/ionic radii of the lanthanoid series with the increase in atomic number. (1) 4d and 5d series elements have almost identical atomic radii. (2) Difficulty in the separation of Lanthanoids. (3) Similar physical and chemical properties. (4) Basic character of the lanthanide hydroxides $M(OH)_3$ decreases with an increase in atomic number. (Any two consequences) • Due to the poor shielding effect of 5f in comparison to 4f. (ii) $4\ FeCr_2O_4 + 8\ Na_2CO_3 + 7\ O_2 \rightarrow 8\ Na_2CrO_4 + 2\ Fe_2O_3 + 8\ CO_2$ $2Na_2CrO_4 + 2\ H^+ \rightarrow Na_2Cr_2O_7 + 2\ Na^+ + H_2O$ (Balancing of the equation may be ignored) **(Word equation may be accepted)**	1 ½ + ½ 1 1 1
35.	(a) (i) **$HCOO^-\ Na^+$ + CH_3OH / Sodium formate + Methanol** (ii) **$HCH{=}NNHCONH_2$** / Methanal semicarbazone (iii) **CH_3CH_2OH** / Ethanol (ii) (1) $R\text{-}CH_2\text{-}COOH \xrightarrow[(ii)\ H_2O]{(i)\ X_2/\text{Red phosphorus}} R\text{-}\underset{\displaystyle X}{\underset{|}{CH}}\text{-}COOH$ X = Cl, Br (2) $R\text{-}COONa \xrightarrow[\text{Heat}]{NaOH\ \&\ CaO} R\text{-}H + Na_2CO_3$ (or any other suitable equation)	1 1 1 1 1

	OR	
35.	(b) (i) (1)  / By adding CrO_2Cl_2 /CS_2 followed by hydrolysis (H_3O^+). (2)  / By adding H_2-Pd/$BaSO_4$ followed by reduction with $LiAlH_4$. (or any other suitable method) (ii) (1) Add Iodine (I_2) and NaOH to both the test tubes containing the given organic compounds and heat. Pentan-2-one gives a yellow precipitate (CHI_3) while Pentan-3-one will not. (2) Add $NaHCO_3$ in both the test tube containing the given organic compounds. Benzoic acid will give brisk effervescence of CO_2 and benzaldehyde will not. (or any other suitable chemical test) (c) Due to -I effect of Cl which stabilises the conjugate base (chloroacetate ion).	1 1 1 1 1

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