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Senior Secondary School Term–II Examination, 2022

Marking Scheme: CHEMISTRY (Subject Code: 043)

[Paper Code: 56/5/2]

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 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 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, marks should be awarded.**
4. 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. 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.
5. Evaluators will mark(✓) wherever answer is correct. For wrong answer ‘X’ be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. 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.
7. 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.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks 0-35 has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 30 answer books per day in main subjects and 35 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.
12. 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 a reply.
 - 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.
 - 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.
13. 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.
 14. Any unassessed 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.
 15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
 16. 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.
 17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

MARKING SCHEME

Senior Secondary School Examination TERM–II, 2022

CHEMISTRY (Subject Code–043)

[Paper Code: 56/5/2]

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks												
SECTION—A														
1.	(a) Butanone < Propanone < Propanal < Ethanal (b) 4-Methoxybenzoic acid < Benzoic acid < 4-Nitrobenzoic acid < 3,4-Dinitrobenzoic acid	1 1												
2.	(a) $\text{>C=O} \xrightarrow[\text{HCl}]{\text{Zn-Hg}} \text{>CH}_2 + \text{H}_2\text{O}$ (b) $\text{RCN} + \text{SnCl}_2 + \text{HCl} \longrightarrow \text{RCH=NH} \xrightarrow{\text{H}_2\text{O}} \text{RCHO}$ (or any other suitable equation) (If equation is not given and only explanation or statement is given, give ½ mark / Award full marks for the equation with appropriate conditions)	1 1												
3.	(a) Second order (b) Nine or 9 times (c) $k = \frac{[R]_0 - [R]}{t}$ (Any two)	1×2												
SECTION—B														
4.	(a) (i) Coagulation: The settling of colloidal particles / conversion of colloidal sol into precipitate. (ii) Hardy-Schulze rule: Greater the valence of the flocculating ion added, greater is its power to cause precipitation / Greater the charge of oppositely charged ion added, greater is its power to cause precipitation. (iii) Electrophoresis: The movement of colloidal particles under an applied electric potential.	1 1 1												
4.	OR (b) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th><th><i>Physisorption</i></th><th><i>Chemisorption</i></th></tr> </thead> <tbody> <tr> <td>1.</td><td>Arise from weak van der Waals forces</td><td>Strong chemical bonds</td></tr> <tr> <td>2.</td><td>Reversible</td><td>Irreversible</td></tr> <tr> <td>3.</td><td>Multimolecular layers</td><td>Unimolecular layer</td></tr> </tbody> </table> (or any other correct difference)		<i>Physisorption</i>	<i>Chemisorption</i>	1.	Arise from weak van der Waals forces	Strong chemical bonds	2.	Reversible	Irreversible	3.	Multimolecular layers	Unimolecular layer	1×3
	<i>Physisorption</i>	<i>Chemisorption</i>												
1.	Arise from weak van der Waals forces	Strong chemical bonds												
2.	Reversible	Irreversible												
3.	Multimolecular layers	Unimolecular layer												
5.	(a) (i) Hexaammineplatinum (IV) chloride (ii) $t_{2g}^3 e_g^1$ (iii) Complexes in which a metal atom / ion is bound to more than one kind of donor groups / ligands.	1 1 1												

5.	<p style="text-align: center;">OR</p> <p>(b) (i) (i.i) $[\text{Co}(\text{NH}_3)_5\text{NO}_2]^{2+}$ (i.ii) $[\text{Zn}(\text{OH})_4]^{2-}$</p> <p>(ii) The energy separation between t_{2g} and e_g levels (splitting of d orbitals) due to the presence of ligands.</p>	<p>1+ 1</p> <p>1</p>
6.	<p>(a) (i) Similarity in the size of the atoms of the elements belonging to same group of 2nd / 4d and 3rd / 5d transition series / the second and the third d-series exhibit similar atomic / ionic radii.</p> <p>(ii) Difficulty in separation of Lanthanoids in pure state.</p> <p>(iii) Similar physical and chemical properties.</p> <p>(iv) Basic character of the lanthanide hydroxides $\text{M}(\text{OH})_3$ decreases with increase in atomic number. (Any two consequences)</p> <p>(b) Mn, it has maximum number of unpaired electrons / It has maximum number of electrons that will participate in bonding.</p>	<p>1 x 2</p> <p>$\frac{1}{2} + \frac{1}{2}$</p>
7.	<p>(a) First order</p> <p>(b) Slope = k / 2.303</p> <p>(c) $k = \frac{0.693}{t_{1/2}}$</p>	<p>1</p> <p>1</p> <p>1</p>
8.	<p>(a) Sc has incompletely filled 3d-orbital in its ground state but Zn atom has completely filled d-orbitals in its ground state as well as in its oxidised state.</p> <p>(b) Due to d-d transition of electron in Ti^{3+} but no d-d transition in Sc^{3+} / Due to presence of unpaired electron in Ti^{3+} while Sc^{3+} does not have unpaired electrons.</p> <p>(Give one mark if question is attempted in any way because the formula of Ti complex is wrong)</p> <p>(c) Due to lanthanoid contraction / due to poor shielding effect of 4f orbitals.</p>	<p>1</p> <p>1</p> <p>1</p>
9.	<p>(a) (i) $\text{A} = \text{CH}_3\text{CHO}$, $\text{B} = \begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{C} = \text{N}-\text{OH} \\ \diagup \\ \text{H} \end{array}$</p> <p>(ii) 3-Bromobenzaldehyde / 3-Bromobenzene carbaldehyde</p> <p>(iii) Benzoic acid gives brisk effervescence liberating carbon dioxide on reaction with sodium hydrogen carbonate while phenol does not. / In terms of chemical reaction mentioning brisk effervescence. (Or any other suitable test)</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p>
9.	<p style="text-align: center;">OR</p> <p>(b) (i)</p> <div style="text-align: center;"> </div>	<p>1</p>

	<p>(ii)</p> $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} \xrightarrow[\text{2. H}_3\text{O}^+]{\text{1. Alk. KMnO}_4} \text{CH}_3\text{CH}_2\text{COOH}$ <p>(i) Br₂/Red P (ii) H₂O</p> $\text{CH}_3-\underset{\text{Br}}{\text{CH}}-\text{COOH} \leftarrow$ <p>(iii)</p> $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} \xrightarrow{\text{NaOH}} \text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$ $\text{CH}_3-\text{CH}=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} \xleftarrow{\text{heat}}$ <p>(Or any other suitable method of conversion)</p>	1
10.	<p>A = CH₃CH₂NH₂ / Ethanamine, B = (C₂H₅)₂NH / N-Ethyl ethanamine, C = C₆H₅SO₂N(C₂H₅)₂ / N, N-Diethylbenzenesulphonamide</p> $\text{CH}_3\text{CH}_2\text{NH}_2 \xrightarrow{\text{C}_2\text{H}_5\text{I}} (\text{C}_2\text{H}_5)_2\text{NH}$ $(\text{C}_2\text{H}_5)_2\text{NH} \xrightarrow{\text{C}_6\text{H}_5\text{SO}_2\text{Cl}} \text{C}_6\text{H}_5\text{SO}_2\text{N}(\text{C}_2\text{H}_5)_2$	<p>1 + ½ + ½</p> <p>½ + ½</p>
11.	<p>(a) (i) lone pair of electrons are delocalised over benzene ring due to resonance, electron density decreases and hence less available for protonation / Due to electron withdrawing nature of the aryl group in aniline while electron donating nature of methyl group in methyl amine / Aniline is a weaker base than methylamine. (ii) Aniline is a Lewis base and it reacts with AlCl₃ to form a salt / N of aniline acquires positive charge with AlCl₃ and hence is a deactivating group. (iii) Presence of intermolecular hydrogen bonding in primary amines which is absent in tertiary amines.</p>	<p>1</p> <p>1</p> <p>1</p>
11.	<p style="text-align: center;">OR</p> <p>(b) (i) (CH₃)₃N < CH₃NH₂ < (CH₃)₂NH (ii) C₆H₅SO₂Cl / Benzenesulphonyl chloride (iii) Pyridine is used to remove HCl from the reaction mixture.</p>	<p>1</p> <p>1</p> <p>1</p>
12.	<p>(a) Ag acts as cathode (b) Cell will stop working / No current flows / E_{cell} become zero / Electrical neutrality gets disturbed. (c) E_{external} > E_{cell} / E_{ext} > E_{int}. (d) (i) Concentration of Zn²⁺ and Ag⁺ ions will not change / Cell attains</p>	<p>1</p> <p>1</p> <p>1</p>

	equilibrium	1
	(ii) Because the number of ions per unit volume decreases.	
	OR	1
	$\Lambda_m = \frac{\kappa \times 1000}{M}$	½
	$\kappa = \frac{\Lambda_m \times M}{1000}$	
	$\kappa = \frac{138.9 \text{ S cm}^2 \text{ mol}^{-1} \times 1.5 \text{ mol L}^{-1}}{1000 \text{ cm}^3 \text{ L}^{-1}}$	½
	$= 0.208 \text{ S cm}^{-1}$ (Deduct ½ mark for incorrect unit or no unit)	1

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