Marking Scheme

Strictly Confidential

(For Internal and Restricted use only)

Senior School Certificate Examination,2024

SUBJECT NAME **CHEMISTRY (Theory)**
(Q.P.CODE56_5_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.

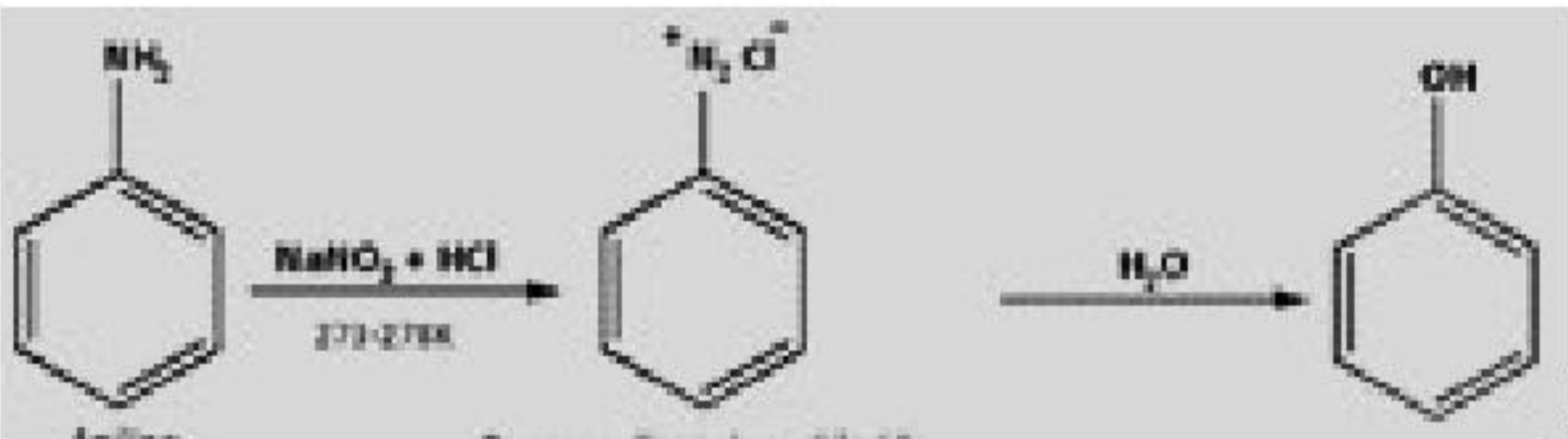*These answers are meant to be used by evaluators.*

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.
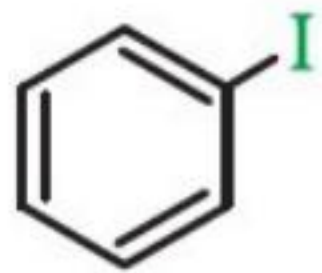
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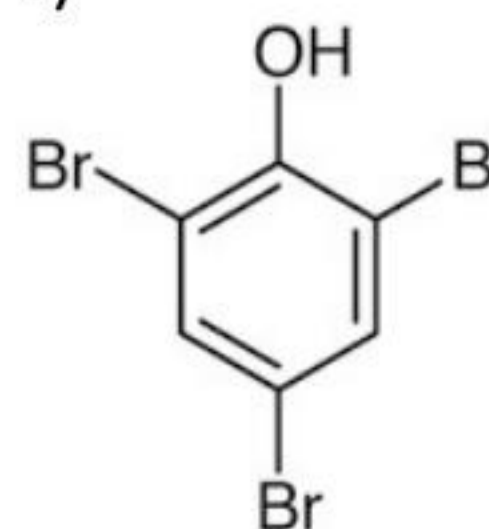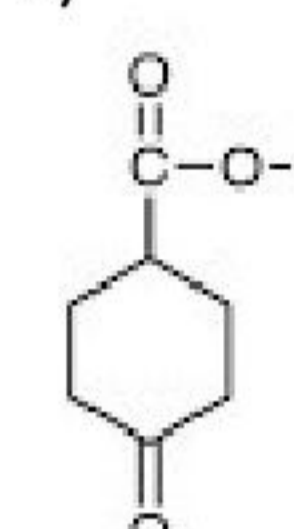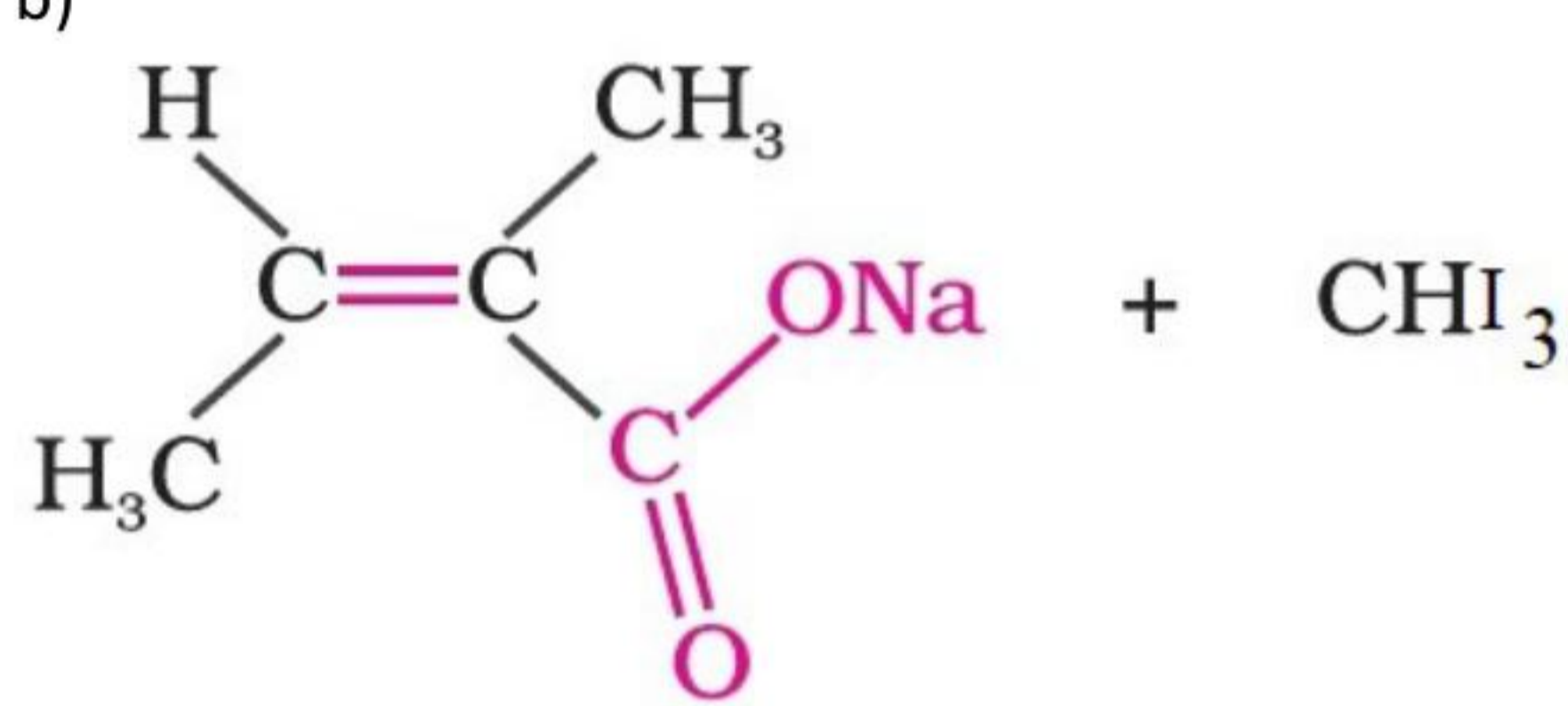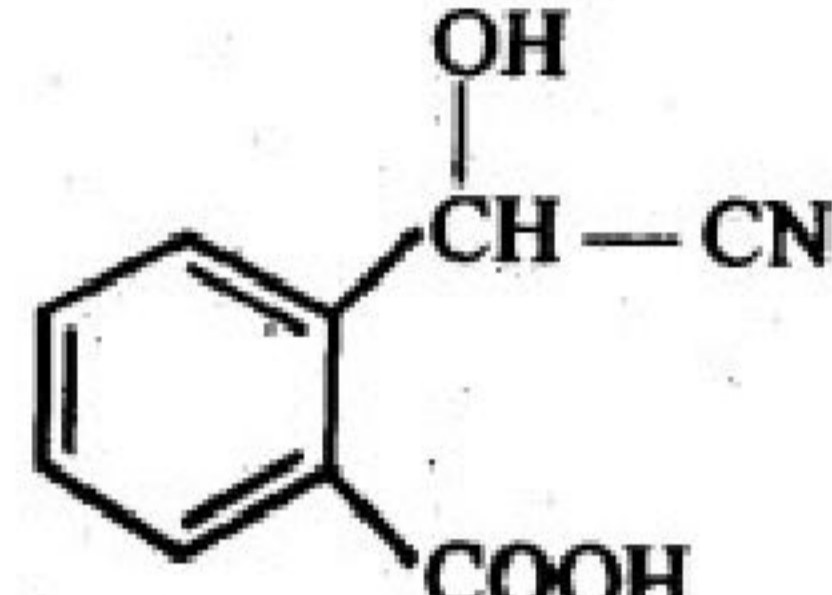| Q.No	Value Points	Marks
	SECTION A	
1	A	1
2	A	1
3	D	1
4	C	1
5	A	1
6	C	1
7	B	1
8	B	1
9	A	1
10	C	1
11	D	1
12	B	1
13	A	1
14	A OR B	1
15	C	1
16	D	1
	SECTION B	
17	a) Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte / $$\Lambda^{\circ}_m = \nu_+ \lambda^{\circ}_+ + \nu_- \lambda^{\circ}_-$$ Here, λ°_+ and λ°_- are the limiting molar conductivities of the cation and anion respectively.	1
	b) 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. / m=ZIt where m= mass of the substance deposited , Z= electrochemical equivalent, I= current, t= time.	1
18	Monosaccharides: Galactose, Glucose Disaccharides : Lactose, Maltose	½+½ ½+½
19	a) (i)	1
	(ii) Or any other suitable method)	1
	OR	
19	(b)(i) On reaction with alc. KOH and chloroform, ethanamine gives foul smelling isocyanide whereas dimethylamine does not. (Or any other suitable test)	1

These answers are meant to be used by evaluators.

	(ii) *I* iodobenzene	1
20	$$t_1 = \frac{2.303}{k} \log \frac{[A]_0}{[A]}$$ Time required for the completion of 99% reaction $$t_{99\%} = \frac{2.303}{k} \log \frac{100}{1}$$ $$t_{99\%} = \frac{2.303}{k} \times 2$$ Time required for the completion of 90% reaction $$t_{90\%} = \frac{2.303}{k} \log \frac{100}{10}$$ $$t_{90\%} = \frac{2.303}{k} \log 10$$ $$t_{90\%} = \frac{2.303}{k}$$ $$\frac{t_{99\%}}{t_{90\%}} = \frac{\left(\frac{2.303}{k}\right) \times 2}{\frac{2.303}{k}}$$ $$\frac{t_{99\%}}{t_{90\%}} = 2$$ **$t_{99\%} = 2 \times t_{90\%}$**	½ ½ ½ ½
21	Cell constant = G^* = conductivity × resistance= 0.0248 S/cm × 200 ohm = 4.96 cm^{-1} Conductivity of 0.05 mol L^{-1}KCl solution = cell constant / resistance =* G/R=4.96/620= 0.008 S cm^{-1} Molar conductivity = $\Lambda_m = \frac{k \times 1000}{c}$ = 0.008 x 1000 /0.05 = 160 S cm^{2}mol^{-1}	½ ½ ½ ½
	SECTION C	
22	a) Tetraamminechloridonitrito-N-cobalt (III) chloride b) Hexaamminenickel(II) chloride c) Potassium trioxalatochromate (III) d) Dibromidobis(ethane-1,2-diamine)cobalt (III) ion (Any three)	1×3
23	a)CH$_3$CH(OH)CH$_3$ b) CH$_3$CH(OH)CH$_2$CH$_3$	1 1
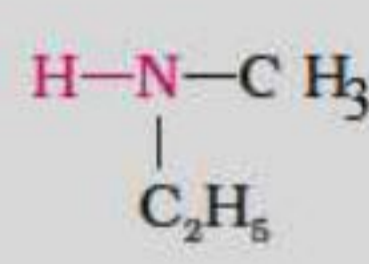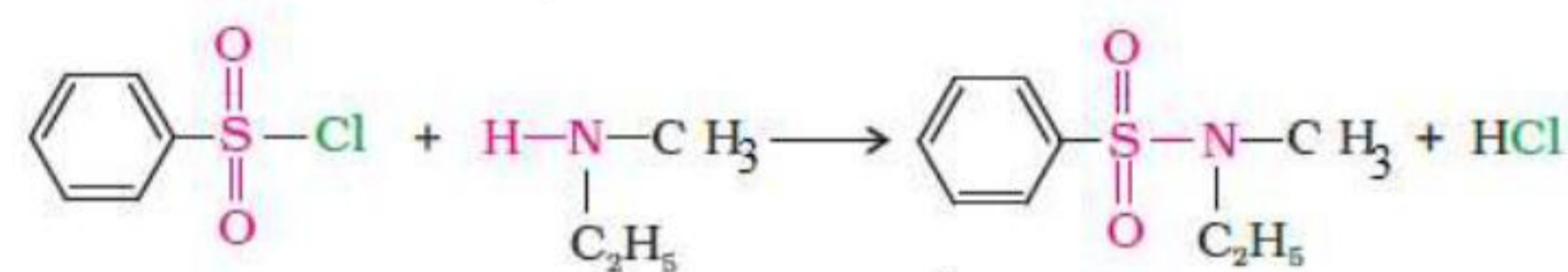
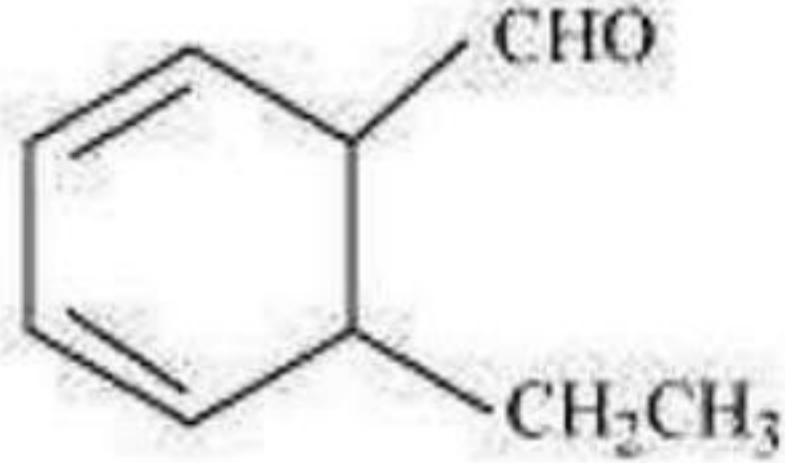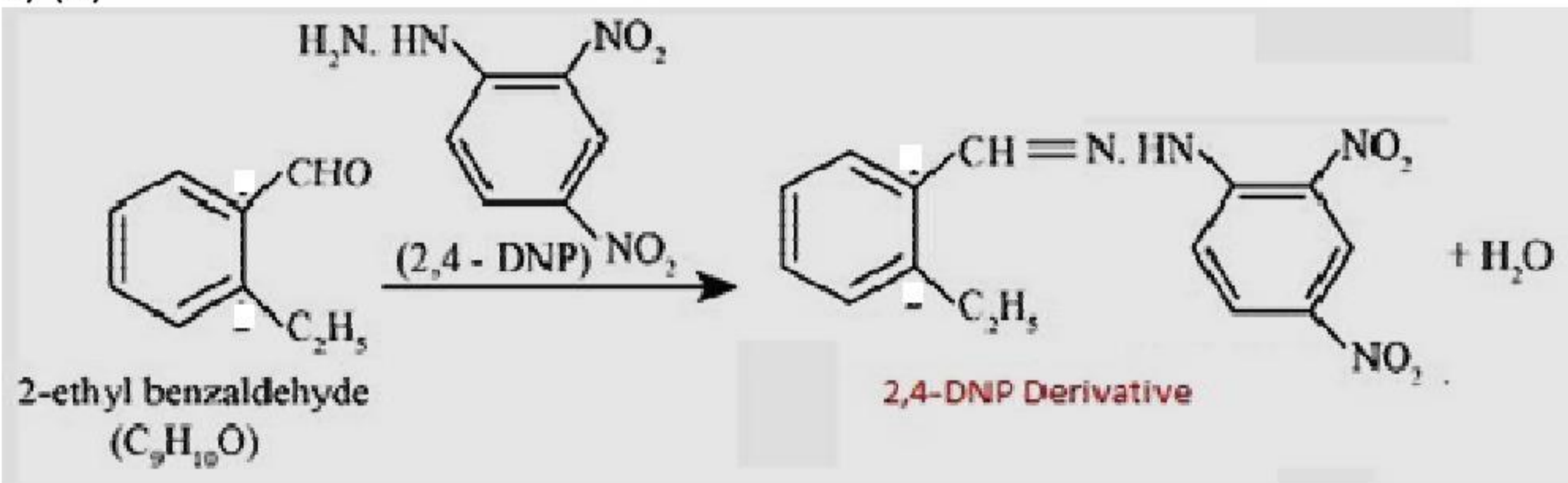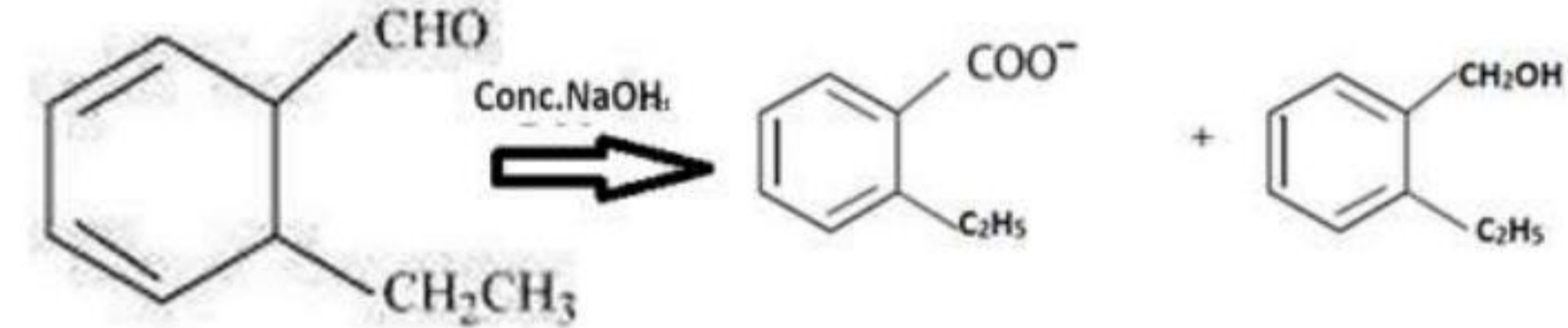|		
	c)	1
24	a)	1
	b)	½+½
	c)	1
25	$E^o{}_{cell}$=1.05 V E_{cell}=1.05$-\dfrac{0.059}{2}$ log $\dfrac{[Ni]^{2+}}{[Ag+]^2}$ =1.05$-$0.059/2 log $\dfrac{(0.1)}{(0.01)^2}$ =1.05$-$0.0825 =0.9615 V(Deduct ½ mark for incorrect unit or no unit)	1 1 1
26.	a) AgCN is mainly covalent in nature and only nitrogen is free to donate electron pair forming isocyanide as the main product. b) Allyl carbocation formed isresonance stabilized./ c)Due to Resonance, a partial double bond is formedbetween C-X / sp² hybridization of carbon atom in C—X bond / Instability of phenyl cation.	1 1 1
27	$\log \dfrac{k_2}{k_1} = \dfrac{E_a}{2.303\,R}\left(\dfrac{T_2-T_1}{T_1T_2}\right)$ It is given that, $k_2 = 4k_1$	1

These answers are meant to be used by evaluators.

	$$\text{Therefore, } \log \frac{4k_1}{k_1} = \frac{E_a}{2.303 \times R} \left(\frac{320-300}{320 \times 300} \right)$$ $$0.60 = \frac{20 \times E_a}{19.15 \times 320 \times 300}$$ $$E_a = \frac{0.60 \times 19.15 \times 320 \times 300}{20}$$ $$= 55152 \quad \text{J mol}^{-1} \quad \textbf{or}$$ $$= 55.152 \text{ kJ mol}^{-1}$$ (Deduct ½ mark for no or incorrect unit)	1 1
28	X= IUPAC name of the product- N-Ethyl-N-methylbenzene sulphonamide	1 1 1
SECTION D		
29	a) Ligand which has two different donor atoms and either of the two ligates in the complex. Examples :- NO_2^- / SCN^- / CN^- (any one) b) Ionization isomerism c) When a bi-dentate or polydentate ligand ligates to the metal atom or ion that forms a ring. More is the chelation more is the stability. OR c)Coordination number: 6 Oxidation state : +3	½ , ½ 1 1 1 1+1
30	a) Pyridoxine b) Vitamin K c) Vitamin A Sources-Fish liver oil, carrots. (Any other suitable sources) OR c) Water soluble and are readily excreted in urine Scurvy	1 1 1 ½ , ½ 1+1
SECTION E		
31	a) Ce(IV) ion has more stable configuration ($4f^0$) than Ce(III)ion. b) Due to extra stability of half filled (d^5) orbitals in Mn^{2+} c) Zinc, due to completely filled d-orbitals/ weak metallic bonding. d) It gets converted to sodium dichromate/colour changes fromyellow to orange/ correct equation. e) Due to completely filled d-orbitals/ weak metallic bonding f) HCl is oxidized by $KMnO_4$ to Cl_2. g) Lower oxides of transition metals are ionic& ionic character decreases orcovalent character increasewith increase in oxidation state.(Any five)	1×5
32	a) (i) $\Delta T_f = 2.8^0C$ $\Delta T_f = K_f \times w_B / M_B \times W_A$ (kg) $2.8 = 1.86 \times w_B / 62 \times 1$ $w_B = (2.8 \times 62)/1.86$ $w_B = 93.33$ g(Deduct ½ mark for incorrect unit or no unit) (ii) Positive deviation Interaction between ethanol-ethanol is stronger than ethanol-acetone.	1 1 1 1 1
OR		

32	b) (i) $\Delta T_b = 100 - 99.68\,^0C = 0.32\,^0C$	1
	$\Delta T_b = K_b \times w_B / M_B \times W_A$ (kg)	1
	$0.32 = 0.52 \times w_B \times 1000 / 342 \times 500$	
	$w_B = 0.32 \times 342 / 0.52 \times 2 = 105.23$ g (Deduct ½ mark for incorrect unit or no unit.)	1
	(ii) At a constant temperature, the solubility of a gas in a liquid is directly proportional to the partial pressure of the gas present above the surface of liquid or solution. / The partial pressure of the gas in vapour phase (*p*) is proportional to the mole fraction of the gas (*x*) in the solution.	1+1
	Application: To increase the solubility of CO_2 in soft drinks and soda water, the bottle is sealed under high pressure. (or any other)	
33	a) (i)	
	2 – Ethylbenzaldehyde (A)	1+1
	ii) (1)	
		1
	(2) Aromatic aldehydes do not give fehling's test ,**1 mark to be given if attempted in any way**.	1
	(iii)	
		1
	OR	
33	b) (i) (1) Electron withdrawing nature of carbonyl group/ Due to resonance stabilization of the conjugate base.	1
	(2) Due to cleavage of C-H bond in aldehydes is easier than C-C bond in ketones.	1
	(ii) (1) propanal> benzaldehyde > Acetone	1
	(2) Propane < dimethyl ether <propanal< ethanol	1
	(iii) Benzoic acid will give brisk effervescence on reacting with sodium bicarbonate whereas benzaldehyde does not. (or any other suitable test)	1

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