Strictly Confidential: (For Internal and Restricted use only)
Senior School Certificate Examination-2020
Marking Scheme – CHEMISTRY
(SUBJECT CODE -043) (PAPER CODE – 56/3/1,2,3)

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. **Evaluation is a 10-12 days mission for all of us. Hence, it is necessary that you put in your best efforts in this process.**
2. 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.**
3. 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.
4. 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.**
5. 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.
6. 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.
7. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
8. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
9. A full scale of marks 0-70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
10. 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).
11. 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.

12. 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.

13. 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.

14. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

15. 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.

16. 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.

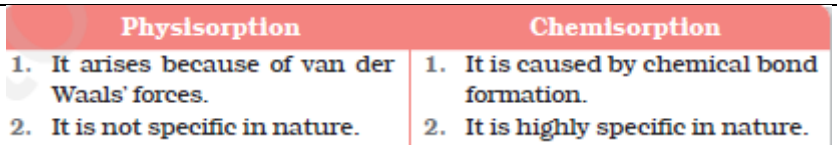
Set – 1 (56/3/1)

MARKING SCHEME

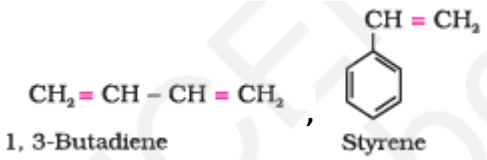
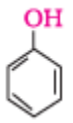
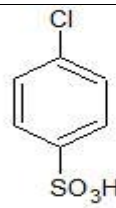
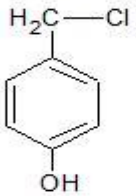
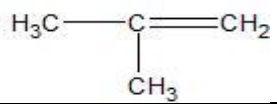
SR. SECONDARY SCHOOL EXAMINATION, 2020

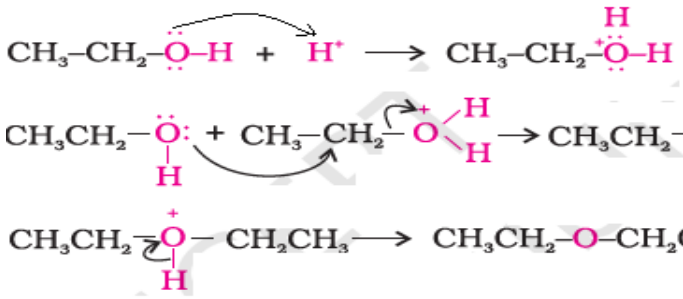
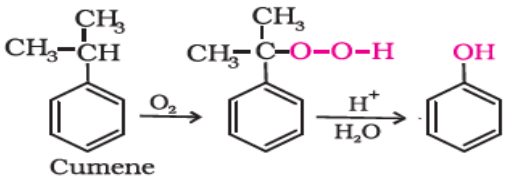
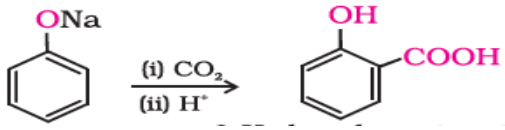
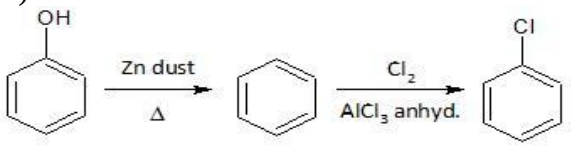
Subject: CHEMISTRY

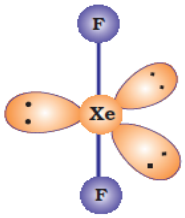
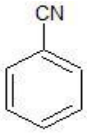
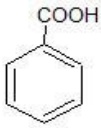
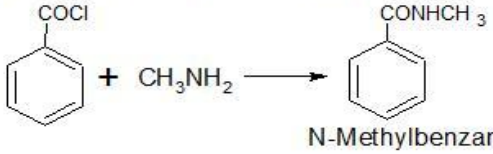
Q.No.	Expected Answer / Value Points	Distribution of Marks
	SECTION - A	
1.	Zn , Cd and Hg have completely filled d^{10} configuration in their ground state as well as in their oxidized state.	1
2.	Scandium / Sc	1
3.	Because of multiple oxidation states / ability to form complexes / having large surface area.	1
4.	Involvement of (n-1)d and ns electrons in inter atomic metallic bonding / strong metal-metal bonding.	1
5.	Presence of unpaired e^- showing d-d transition in Cu^{2+}, while in Zn^{2+} there is no unpaired electron.	1
6.	H_2 - O_2 Fuel cell	1
7.	2 x 96500 C / 193000 C	1
8.	Slope = -k	1
9.	Maltose	1
10.	Anionic detergent	1
11.	(C)	1
12.	(B)	1
13.	(B)	1
14.	(A)	1
15.	(C)	1
16.	(iii)	1
17.	(i)	1
18.	(iv)	1
19.	(i)	1
20.	(iv)	1

	SECTION – B	
21.	Rate = $-\frac{\Delta[A]}{\Delta t} = -\frac{1}{3}\frac{\Delta[B]}{\Delta t} = \frac{1}{2}\frac{\Delta[C]}{\Delta t}$ (i) Rate = $\frac{1}{2}\frac{\Delta[C]}{\Delta t}$ 2x Rate = $\frac{\Delta[C]}{\Delta t}$ = 2.5 x 10^{-4} Rate = $\frac{2.5 \times 10^{-4}}{2}$ = 1.25 x 10^{-4} mol $l^{-1}s^{-1}$ ii) Rate = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ 1.25 x 10^{-4} = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ $-\frac{\Delta[B]}{\Delta t}$ = 3 x 1.25 x 10^{-4} = 3.75 x 10^{-4} mol $l^{-1}s^{-1}$	½ ½ ½ ½
22.	i) Acts as solvent / lowers the melting point of the mixture / Increases the conductivity. ii) It forms a volatile compound $Ni(CO)_4$, which decomposes at higher temperature to give pure Nickel. **OR** $Al_2O_3 + 2\ NaOH + 3H_2O \rightarrow 2\ Na\ [Al(OH)_4]$ $2Na\ [Al(OH)_4] + CO_2 \rightarrow Al_2O_3\ xH_2O + 2\ NaHCO_3$ $Al_2O_3\ xH_2O \xrightarrow{\Delta} Al_2O_3 + xH_2O$	1 1 1 ½ ½
23.	 **Physisorption** / **Chemisorption** 1. It arises because of van der Waals' forces. / 1. It is caused by chemical bond formation. 2. It is not specific in nature. / 2. It is highly specific in nature. (Or any other two correct differences) **OR**	1 1
23.	i) There are some substances which at low concentration behave as normal strong electrolytes, but at higher concentration exhibit colloidal behavior due to the formation of aggregates. Example: Micelles / soap ii) Oil is dispersed phase and water is dispersion medium. Example : Milk (or any other correct example)	½ + ½ ½ + ½
24.	a) Hexafluoridocobaltate(III) sp^3d^2 b) Isomerism – Geometrical / optical cis isomer is optically active	½ + ½ ½ + ½
25.	(i) To prevent rapid drying. (ii) Antacids will make the stomach alkaline and trigger the production of more acid.	1 1
26.	i) Carbohydrates that yield two to ten monosaccharides units on hydrolysis. ii) Hydrolysis of sucrose brings about a change in the sign of rotation, from dextro (+) to laevo (-) and the product is named as invert sugar.	1 1
27.	$6XeF_4 + 12\ H_2O \rightarrow 4Xe + 2XeO_3 + 24HF + 3O_2$ Yes Xe^{+4} changes to Xe^{o} and Xe^{+6} / Xe gets oxidized as well as reduced in the same reaction.	1 ½ ½

SECTION – C

28.	$\Delta G^o = -nF\ E^o_{cell}$ $= -2 \times 96500 \times \{0.80 - (-0.25)\}$ $= -202650$ J/ mol Maximum work = 202650 J/ mol $E^o_{cell} = \frac{0.059}{2} log Kc$ $\log Kc = \frac{2 \times 1.15}{0.059}$ $= 35.6$	½ 1 ½ 1
29.	$k = \frac{2.303}{t} \log \frac{[A]o}{[A]}$ $= \frac{2.303}{80} \log \frac{100}{60}$ $= \frac{2.303}{80} \times (1 - 0.7782)$ $= 0.0064\ min^{-1}$ $t = \frac{2.303}{k} \log \frac{[A]o}{[A]}$ $= \frac{2.303}{0.0064} \log \frac{100}{10}$ $= 360$ min (deduct ½ mark for no or incorrect unit)	½ ½ 1 1
30.	(i)  1, 3-Butadiene , Styrene ii) $HOOC(CH_2)_4COOH$, $H_2N(CH_2)_6NH_2$ Adipic acid and Hexamethylene diamine iii)  + HCHO , Phenol and formaldehyde	½ x 6
31.	i)  ii)  iii) 	1 1 1

32.	a.  b.  Cumene **OR**	½ 1 ½ 1
32.	i)  ii) $CH_3COCH_3 \xrightarrow{LiAlH_4} CH_3CH(OH)CH_3 \xrightarrow[443\ K]{H_2SO_{4(conc)}} CH_3CH=CH_2$ iii)  (or any other correct method)	1 1 1
33.	i) $(CH_3)_3CCH(OH)CH_2COCH_3$ ii) $(CH_3)_3CCH(OH)CN$ iii) $(CH_3)_3CCOONa + (CH_3)_3CCH_2OH$	1 1 ½ + ½
34.	Lyophobic sol is liquid or water repelling. Example: $Fe(OH)_3$ sol / gold sol (or any other suitable example) Lyophilic sol is liquid or water attracting. Example: starch sol / rubber sol (or any other suitable example) Due to the charge and solvation of the colloidal particles. **OR**	½ + ½ ½ + ½ ½ + ½
34.	i) The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. ii) The formation of micelles takes place only above a particular temperature is called Kraft temperature (T_k) iii) Process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte.	1 1 1

	SECTION – D	
35.	a) i) Due to high ionization enthalpy	1
	ii) Because of higher oxidation state of Cl in $HClO_4$ than in HOCl / ClO_4^- is more stable than ClO^-	1
	iii) Because oxygen can form pπ- pπ multiple bond effectively but sulphur can not.	1
	b) i) $Cu + 2\ H_2SO_4(conc.) \rightarrow CuSO_4 + SO_2 + 2H_2O$	1
	ii) $C_{12}H_{22}O_{11} \xrightarrow{H_2SO_4} 12C + 11H_2O$	1
	(or any other suitable reaction in both above cases)	
	OR	
35.	a) i) Because of smaller size of F^- ion than Cl^- ion.	1
	ii) Because sulphur is more stable in +6 state and Tellurium is more stable in +4 state	1
	b) $2F_2 + 2H_2O \longrightarrow 4HF + O_2$	1
	Because I_2 is a weak oxidizing agent.	1
	c) 	1
36.	a) i) Because aniline gets protonated to give anilinium ion which is deactivating in nature and is meta directing.	1
	ii) Because of combined factors of solvation and inductive effects.	1
	iii) Because it gives a mixture of amines which is difficult to separate.	1
	b) i) On heating with $CHCl_3$ and KOH (alcoholic) $CH_3CH_3NH_2$ gives a foul smelling isocyanide while $(CH_3CH_2)_2NH$ doesn't.	1
	ii) On adding benzenediazonium chloride, aniline gives a yellow coloured dye while CH_3NH_2 doesn't.	1
	(or any other suitable chemical test)	
	OR	
36.	a) i) A =  B = 	½ + ½
	ii) A = CH_3CONH_2 B = CH_3NH_2	½ + ½
	b)  N-Methylbenzamide	1
	c) $(C_2H_5)_2NH < C_2H_5NH_2 < NH_3 < C_6H_5NH_2$	1
37.	a) $\pi = i\ CRT$	½
	$4.75 = i \times \frac{5.85}{58.5} \times \frac{1}{1} \times 0.082 \times 300$	½
	$i = 1.93$	1
	$\alpha = \frac{i-1}{n-1} = \frac{1.93-1}{2-1} = 0.93$ or 93%	1
	b) Partial pressure of gas in liquid is directly proportional to its solubility or	1

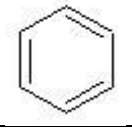
	mole fraction. To prevent 'Bends'	 1
	OR	
37.	a) $\Delta T_f = i K_f m$ $1 = i \times 1.86 \times \frac{19.5}{78} \times \frac{1000}{500}$ $i = 1.075$ $\alpha = \frac{i-1}{n-1} = \frac{1.075-1}{2-1} = 0.075$ or 7.5% b) i) Due to dissociation of KCl / number of particles in 0.1 M KCl is more. ii) Due to osmosis bacteria loses its water and dies which causes preservation.	½ ½ 1 1 1 1

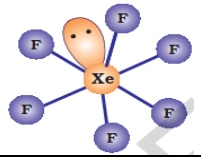
Set – (56/3/2)

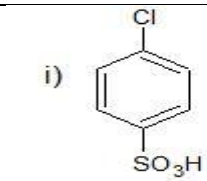
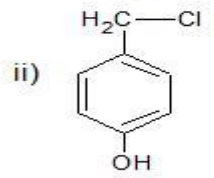
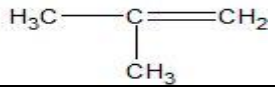
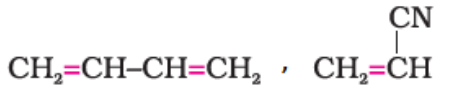
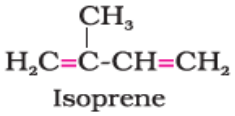
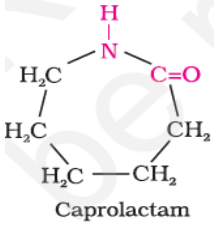
MARKING SCHEME

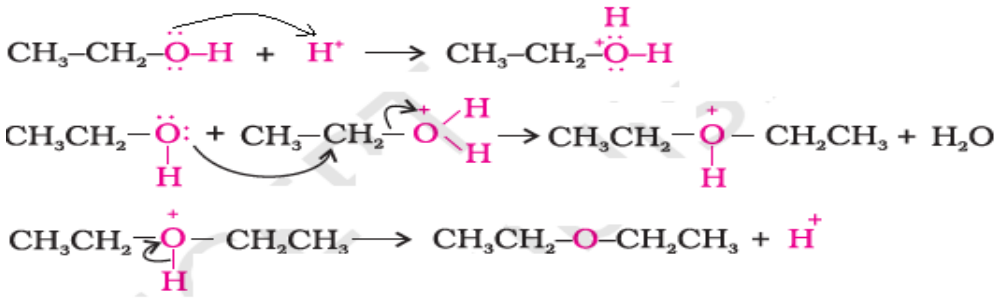
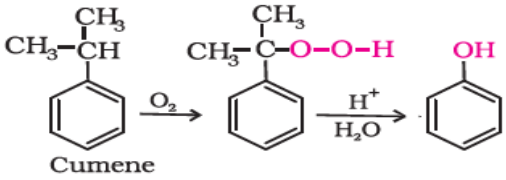
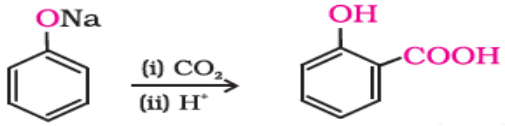
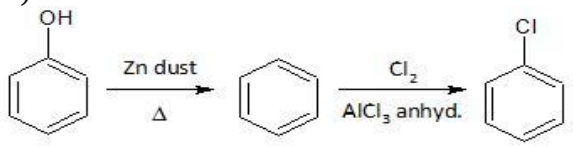
SR. SECONDARY SCHOOL EXAMINATION, 2020

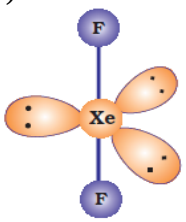
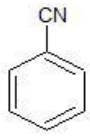
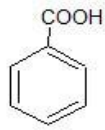
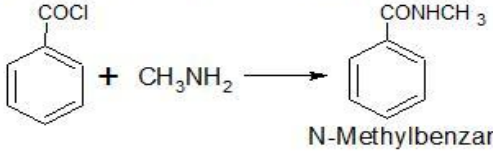
Subject: CHEMISTRY

Q.No.	Expected Answer / Value Points	Distribution of Marks
	SECTION - A	
1.	Zn , Cd and Hg have completely filled d^{10} configuration in their ground state as well as in their oxidized state.	1
2.	Scandium / Sc	1
3.	Because of multiple oxidation states / ability to form complexes / having large surface area.	1
4.	Involvement of (n-1)d and ns electrons in inter atomic metallic bonding / strong metal-metal bonding.	1
5.	Presence of unpaired e^- showing d-d transition in Cu^{2+}, while in Zn^{2+} there is no unpaired electron.	1
6.	p-dichlorobenzene	1
7.	Benzene / C_6H_6 / 	1
8.	$H_{2(g)}$ / Hydrogen gas	1
9.	Lactose	1
10.	Tranquilizers	1
11.	(D)	1
12.	(B)	1
13.	(C)	1
14.	(D)	1
15.	(C)	1
16.	(iv)	1
17.	(iii)	1
18.	(iv)	1
19.	(i)	1
20.	(i)	1
	SECTION – B	
21.	i) Acts as solvent / lowers the melting point of the mixture / Increases the conductivity.	1
	ii) It forms a volatile compound $Ni(CO)_4$, which decomposes at higher temperature to give pure Nickel.	1
	OR	
	$Al_2O_3 + 2\ NaOH + 3H_2O \rightarrow 2\ Na\ [Al(OH)_4]$	1
	$2Na\ [Al(OH)_4] + CO_2 \rightarrow Al_2O_3\ xH_2O + 2\ NaHCO_3$	½
	$Al_2O_3\ xH_2O \xrightarrow{\Delta} Al_2O_3 + xH_2O$	½

22.	Rate = $-\frac{\Delta[A]}{\Delta t} = -\frac{1}{3}\frac{\Delta[B]}{\Delta t} = \frac{1}{2}\frac{\Delta[C]}{\Delta t}$ (i) Rate = $\frac{1}{2}\frac{\Delta[C]}{\Delta t}$ 2x Rate = $\frac{\Delta[C]}{\Delta t}$ = 2.5 x 10^{-4} Rate = $\frac{2.5 \times 10^{-4}}{2}$ = 1.25 x 10^{-4} mol $l^{-1}s^{-1}$ ii) Rate = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ 1.25 x 10^{-4} = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ $-\frac{\Delta[B]}{\Delta t}$ = 3 x 1.25 x 10^{-4} = 3.75 x 10^{-4} mol $l^{-1}s^{-1}$	½ ½ ½ ½
23.	a) Hexafluoridocobaltate(III) sp^3d^2 b) Isomerism – Geometrical / optical Cis isomer is optically active	½ + ½ ½ + ½
24.	<table><tr><th>Physisorption</th><th>Chemisorption</th></tr><tr><td>1. It arises because of van der Waals' forces.</td><td>1. It is caused by chemical bond formation.</td></tr><tr><td>2. It is not specific in nature.</td><td>2. It is highly specific in nature.</td></tr></table> (or any other two correct differences) **OR**	1 1
24.	iii) There are some substances which at low concentration behave as normal strong electrolytes, but at higher concentration exhibit colloidal behavior due to the formation of aggregates. Example: Micelles / soap iv) Oil is dispersed phase and water is dispersion medium. Example : Milk (or any other correct example)	½ + ½ ½ + ½
25.	$XeF_6 + 2H_2O \longrightarrow XeO_2F_2 + 4HF$ No.  	1 ½ ½
26.	i) A linkage between two monosaccharide units through oxygen atom. ii) Protein having a unique three-dimensional structure and biological activity.	1 1
27.	i) Because these are biodegradable ii) Because it is unstable at cooking temperature	1 1
28.	k = $\frac{2.303}{t}\log\frac{[A]o}{[A]}$ = $\frac{2.303}{80}\log\frac{100}{60}$ = $\frac{2.303}{80}$ x (1- 0.7782) = 0.0064 min^{-1} t = $\frac{2.303}{k}\log\frac{[A]o}{[A]}$ = $\frac{2.303}{0.0064}\log\frac{100}{10}$ = 360 min	½ ½ 1 1

29.	$\Delta G^o = -nF\ E^o_{cell}$ $= -2 \times 96500 \times \{0.80 - (-0.25)\}$ $= -202650$ J/ mol Maximum work = 202650 J/ mol $E^o_{cell} = \frac{0.059}{2} log Kc$ $\log Kc = \frac{2 \times 1.15}{0.059}$ $= 35.6$	½ 1 ½ 1
30.	i)  ii)  iii) 	1 1 1
31.	i)  1,3-Butadiene Acrylonitrile ii)  Isoprene iii)  Caprolactam or $NH_2(CH_2)_5COOH$ and Aminocaproic acid	½ + ½ ½ + ½ ½ + ½
32.	Lyophobic sol is liquid or water repelling. Example: $Fe(OH)_3$ sol / gold sol (or any other suitable example) Lyophilic sol is liquid or water attracting. Example: starch sol / rubber sol (or any other suitable example) Due to the charge and solvation of the colloidal particles. **OR** i) The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. ii) The formation of micelles takes place only above a particular temperature is called Kraft temperature (T_k) iii) Process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte.	½ + ½ ½ + ½ ½ + ½ 1 1 1

33.	a.  b.  Cumene **OR** i)  ii) $CH_3COCH_3 \xrightarrow{LiAlH_4} CH_3CHOHCH_3 \xrightarrow[443\ K]{H_2SO_{4(conc)}} CH_3CH=CH_2$ iii) 	½ 1 ½ 1 1 1 1
34.	i) $(CH_3)_3CCH(OH)CH_2COCH_3$ ii) $(CH_3)_3CCH(OH)CN$ iii) $(CH_3)_3CCOONa + (CH_3)_3CCH_2OH$	1 1 ½ + ½
	SECTION – D	
35.	a) $\pi = i\ CRT$ $4.75 = i \times \frac{5.85}{58.5} \times \frac{1}{1} \times 0.082 \times 300$ $i = 1.93$ $\alpha = \frac{i-1}{n-1} = \frac{1.93-1}{2-1} = 0.93$ or 93% b) Partial pressure of gas in liquid is directly proportional to its solubility or mole fraction. To prevent 'Bends' **OR**	½ ½ 1 1 1 1
35.	a) $\Delta T_f = i\ K_f\ m$ $1 = i \times 1.86 \times \frac{19.5}{78} \times \frac{1000}{500}$ $i = 1.075$ $\alpha = \frac{i-1}{n-1} = \frac{1.075-1}{2-1} = 0.075$ or 7.5% b) i) Due to dissociation of KCl / number of particles in 0.1 M KCl is more. ii) Due to osmosis bacteria loses its water and dies which causes preservation.	½ ½ 1 1 1 1 1

36.	a) i) Due to high ionization enthalpy	1
	ii) Because of higher oxidation state of Cl in $HClO_4$ than in HOCl / ClO_4^- is more stable than ClO^-	1
	iii) Because oxygen can form pπ- pπ multiple bond effectively but sulphur can not.	1
	b) i) $Cu + 2\ H_2SO_4(conc.) \rightarrow CuSO_4 + SO_2 + 2H_2O$	1
	ii) $C_{12}H_{22}O_{11} \xrightarrow{H_2SO_4} 12C + 11H_2O$ (or any other suitable reaction in both above cases)	1
	OR	
36.	a) i) Because of smaller size of F^- ion than Cl^- ion.	1
	ii) Because sulphur is more stable in +6 state and Tellurium is more stable in +4 state	1
	b) $2F_2 + 2H_2O \longrightarrow 4HF + O_2$	1
	Because I_2 is a weak oxidizing agent.	1
	c) 	1
37.	a) i) Because aniline gets protonated to give anilinium ion which is deactivating in nature and is meta directing.	1
	ii) Because of combined factors of solvation and inductive effects.	1
	iii) Because it gives a mixture of amines which is difficult to separate.	1
	b) i) On heating with $CHCl_3$ and KOH (alcoholic) $CH_3CH_3NH_2$ gives a foul smelling isocyanide while $(CH_3CH_2)_2NH$ doesn't.	1
	ii) On adding benzenediazonium chloride, aniline gives a yellow coloured dye while CH_3NH_2 doesn't. (or any other suitable chemical test)	1
	OR	
37.	a) i) A =  B = 	½ + ½
	ii) A = CH_3CONH_2 B = CH_3NH_2	½ + ½
	b) 	1
		1
	c) $(C_2H_5)_2NH < C_2H_5NH_2 < NH_3 < C_6H_5NH_2$	1

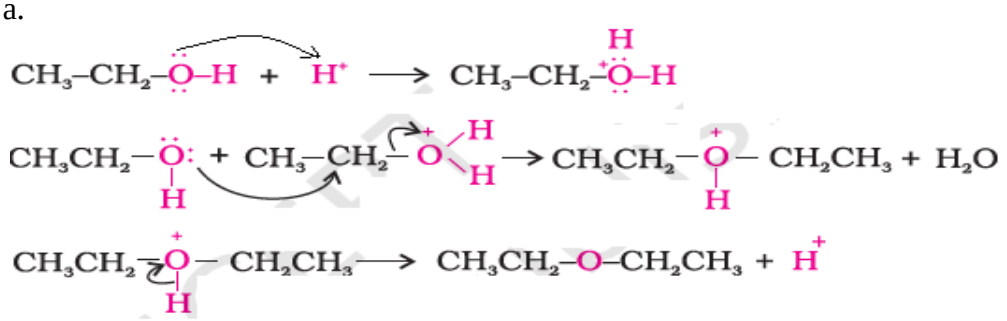
Set – (56/3/3)

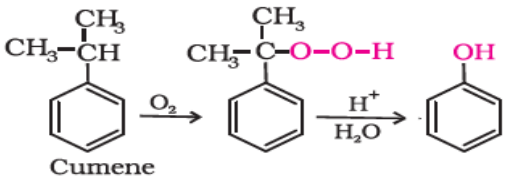
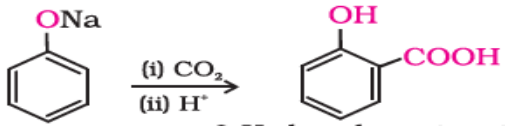
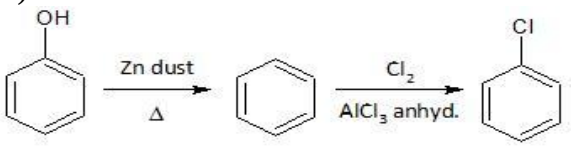
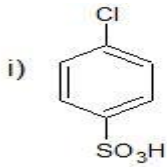
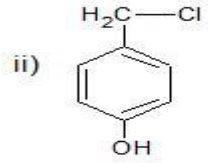
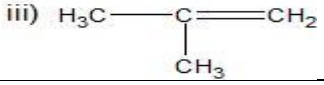
MARKING SCHEME

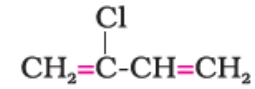
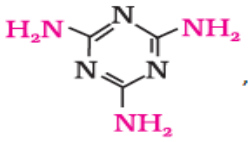
SR. SECONDARY SCHOOL EXAMINATION, 2020

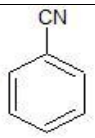
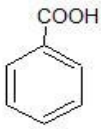
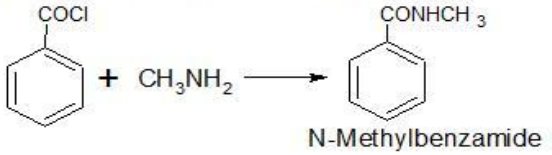
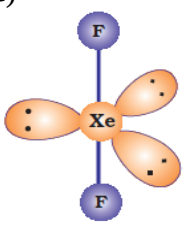
Subject: CHEMISTRY

Q.No.	Expected Answer / Value Points	Distribution of Marks
	SECTION - A	
1.	Zn , Cd and Hg have completely filled d^{10} configuration in their ground state as well as in their oxidized state.	1
2.	Scandium / Sc	1
3.	Because of multiple oxidation states / ability to form complexes / having large surface area.	1
4.	Involvement of greater no. of electrons in inter atomic metallic bonding / strong metal-metal bonding.	1
5.	Presence of unpaired e^- showing d-d transition in Cu^{2+}, while in Zn^{2+} there is no unpaired electron / has d^{10} configuration.	1
6.	Iodobenzene	1
7.	N-Phenylethanamide	1
8.	Zn	1
9.	B_6 / Pyridoxine	1
10.	Bithional	1
11.	(C)	1
12.	(C)	1
13.	(B)	1
14.	(D)	1
15.	(A)	1
16.	(ii)	1
17.	(i)	1
18.	(iii)	1
19.	(iv)	1
20.	(i)	1
	SECTION – B	
21.	i) Acts as solvent / lowers the melting point of the mixture / Increases the conductivity. ii) It forms a volatile compound $Ni(CO)_4$, which decomposes at higher temperature to give pure Nickel. **OR** $Al_2O_3 + 2\ NaOH + 3H_2O \rightarrow 2\ Na\ [Al(OH)_4]$ $2Na\ [Al(OH)_4] + CO_2 \rightarrow Al_2O_3\ xH_2O + 2\ NaHCO_3$ $Al_2O_3\ xH_2O \xrightarrow{\Delta} Al_2O_3 + xH_2O$	1 1 1 ½ ½
22.	**Physisorption** / **Chemisorption** 1. It arises because of van der Waals' forces. / 1. It is caused by chemical bond formation. 2. It is not specific in nature. / 2. It is highly specific in nature. (or any other two correct differences) **OR**	1 1

22.	i) There are some substances which at low concentration behave as normal strong electrolytes, but at higher concentration exhibit colloidal behavior due to the formation of aggregates. Example: Micelles / soap ii) Oil is dispersed phase and water is dispersion medium. Example : Milk (or any other correct example)	½ + ½ ½ + ½
23.	Rate = $-\frac{\Delta[A]}{\Delta t} = -\frac{1}{3}\frac{\Delta[B]}{\Delta t} = \frac{1}{2}\frac{\Delta[C]}{\Delta t}$ (i) Rate = $\frac{1}{2}\frac{\Delta[C]}{\Delta t}$ 2x Rate = $\frac{\Delta[C]}{\Delta t}$ = 2.5 x 10^{-4} Rate = $\frac{2.5 \times 10^{-4}}{2}$ = 1.25 x 10^{-4} mol $l^{-1}s^{-1}$ (ii) Rate = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ 1.25 x 10^{-4} = $-\frac{1}{3}\frac{\Delta[B]}{\Delta t}$ $-\frac{\Delta[B]}{\Delta t}$ = 3 x 1.25 x 10^{-4} = 3.75 x 10^{-4} mol $l^{-1}s^{-1}$	½ ½ ½ ½
24.	i) Chemical compounds which reduce or abolish pain Example: aspirin / paracetamol. (or any other suitable example) ii) Quaternary ammonium salts with acetate / chloride/ bromide Example: cetyltrimethylammonium bromide. (or any other suitable example)	½ + ½ ½ + ½
25.	(a) On adding $AgNO_3$, $[Co(NH_3)_5(SO_4)]Cl$ will give white ppt of AgCl but $[Co(NH_3)_5Cl]\ SO_4$ doesn't / On adding $BaCl_2$, $[Co(NH_3)_5Cl]\ SO_4$ will give white ppt of $BaSO_4$ but $[Co(NH_3)_5(SO_4)]Cl$ doesn't. (b) $K_3[Cr(C_2O_4)_3]$ / $K_3[Cr(ox)_3]$	1 1
26.	a) The pentaacetate of glucose does not react with hydroxylamine / HCN / Schiff's reagent indicating the absence of free —CHO group. b) Adenine, Guanine, Uracil and Cytosine Uracil	1 ½ ½
27.	$6XeF_4 + 12\ H_2O \rightarrow 4Xe + 2XeO_3 + 24HF + 3O_2$ Yes Xe^{+4} changes to Xe^{o} and Xe^{+6} / Xe gets oxidized as well as reduced in the same reaction.	1 ½ ½
28.	a. 	½ 1 ½

28.	b.  Cumene **OR** i)  ii) $CH_3COCH_3 \xrightarrow{LiAlH_4} CH_3CHOHCH_3 \xrightarrow[443\ K]{H_2SO_{4(conc)}} CH_3CH=CH_2$ iii) 	1 1 1 1
29.	i)  ii)  iii) 	1 1 1
30.	$\Delta G^o = -nF\ E^o_{cell}$ $= -2 \times 96500 \times \{0.80 - (-0.25)\}$ $= -202650$ J/ mol Maximum work = 202650 J/ mol $E^o_{cell} = \frac{0.059}{2} logKc$ $\log Kc = \frac{2 \times 1.15}{0.059}$ $= 35.6$	½ 1 ½ 1
31.	$k = \frac{2.303}{t} \log \frac{[A]o}{[A]}$ $= \frac{2.303}{80} \log \frac{100}{60}$ $= \frac{2.303}{80} \times (1 - 0.7782)$ $= 0.0064\ min^{-1}$ $t = \frac{2.303}{k} \log \frac{[A]o}{[A]}$ $= \frac{2.303}{0.0064} \log \frac{100}{10}$ $= 360$ min	½ ½ 1 1

32.	i)  Chloroprene / 2-Chloro-1, 3-butadiene ii)  , HCHO Melamine Formaldehyde iii) $CF_2=CF_2$, Tetra fluoroethene	½ + ½ ½ + ½ ½ + ½
33.	Lyophobic sol is liquid or water repelling. Example: $Fe(OH)_3$ sol / gold sol (or any other suitable example) Lyophilic sol is liquid or water attracting. Example: starch sol / rubber sol (or any other suitable example) Due to the charge and solvation of the colloidal particles. **OR**	½ + ½ ½ + ½ ½ + ½
33.	i) The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. ii) The formation of micelles takes place only above a particular temperature is called Kraft temperature (T_k) iii) Process of converting a precipitate into colloidal sol by shaking it with dispersion medium in the presence of a small amount of electrolyte.	1 1 1
34.	i) $(CH_3)_3CCH(OH)CH_2COCH_3$ ii) $(CH_3)_3CCH(OH)CN$ iii) $(CH_3)_3CCOONa + (CH_3)_3CCH_2OH$	1 1 ½ + ½
	SECTION – D	
35.	a) i) Because aniline gets protonated to give anilinium ion which is deactivating in nature and is meta directing. ii) Because of combined factors of solvation and inductive effects. iii) Because it gives a mixture of amines which is difficult to separate. b) i) On heating with $CHCl_3$ and KOH (alcoholic) $CH_3CH_3NH_2$ gives a foul smelling isocyanide while $(CH_3CH_2)_2NH$ doesn't. ii) On adding benzenediazonium chloride, aniline gives a yellow coloured dye while CH_3NH_2 doesn't. (or any other suitable chemical test) **OR**	1 1 1 1 1

35.	a) i) A =  B =  ii) A = CH_3CONH_2 B = CH_3NH_2 b)  N-Methylbenzamide c) $(C_2H_5)_2NH < C_2H_5NH_2 < NH_3 < C_6H_5NH_2$	½ + ½ ½ + ½ 1 1 1
36.	a) $\pi = i\,CRT$ $4.75 = i \times \frac{5.85}{58.5} \times \frac{1}{1} \times 0.082 \times 300$ i = 1.93 $\alpha = \frac{i-1}{n-1} = \frac{1.93-1}{2-1} = 0.93$ or 93% b) Partial pressure of gas in liquid is directly proportional to its solubility or mole fraction. To prevent 'Bends' OR 36. a) $\Delta T_f = i\,K_f\,m$ $1 = i \times 1.86 \times \frac{19.5}{78} \times \frac{1000}{500}$ i = 1.075 $\alpha = \frac{i-1}{n-1} = \frac{1.075-1}{2-1} = 0.075$ or 7.5% b) i) Due to dissociation of KCl / number of particles in 0.1 M KCl is more. ii) Due to osmosis bacteria loses its water and dies which causes preservation.	½ ½ 1 1 1 ½ ½ 1 1 1 1
37.	a) i) Due to high ionization enthalpy ii) Because of higher oxidation state of Cl in $HClO_4$ than in HOCl / ClO_4^- is more stable than ClO^- iii) Because oxygen can form pπ- pπ multiple bond effectively but sulphur can not. b) i) $Cu + 2\,H_2SO_4(conc.) \rightarrow CuSO_4 + SO_2 + 2H_2O$ ii) $C_{12}H_{22}O_{11} \xrightarrow{H_2SO_4} 12C + 11H_2O$ (or any other suitable reaction in both above cases) **OR** 37. a) i) Because of smaller size of F^- ion than Cl^- ion. ii) Because sulphur is more stable in +6 state and Tellurium is more stable in +4 state b) $2F_2 + 2H_2O \longrightarrow 4HF + O_2$ Because I_2 is a weak oxidizing agent. c) 	1 1 1 1 1 1 1 1 1