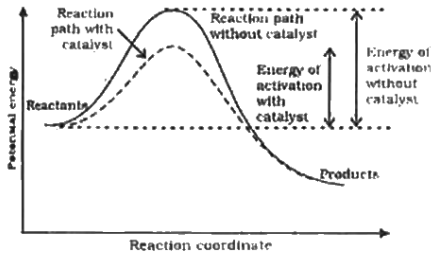
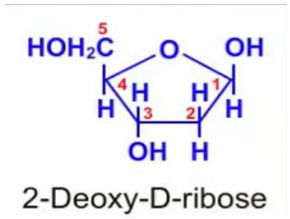
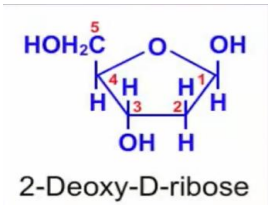
COMMON PRE-BOARD EXAMINATION 2022-23

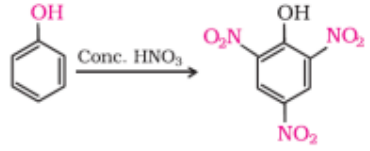
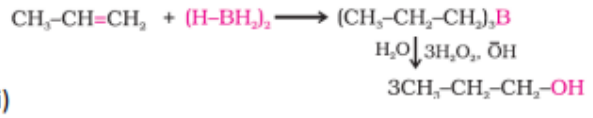
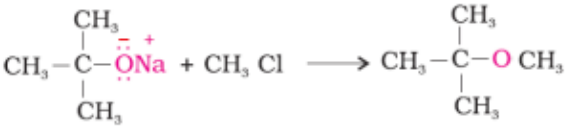
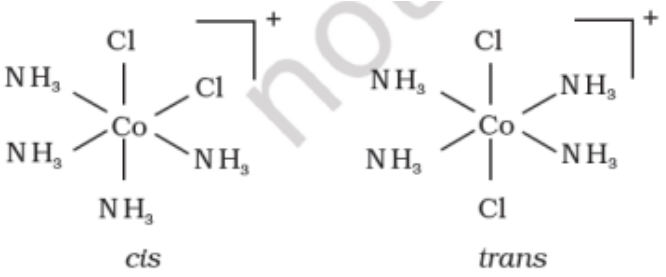
Subject: Chemistry(043)

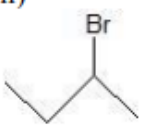
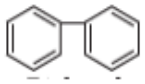
Class: XII Date :

MARKING SCHEME

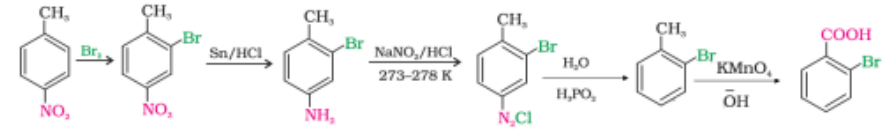
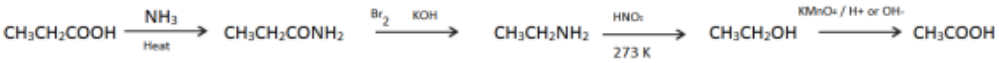
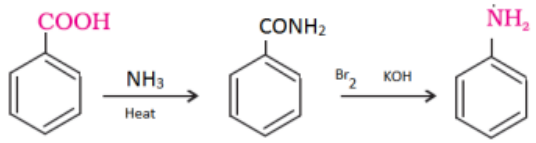
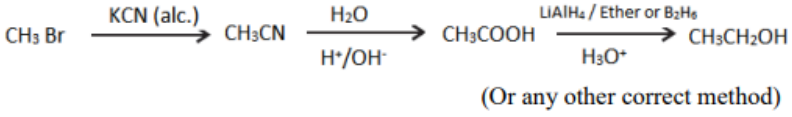
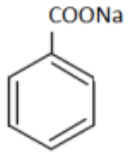
	SECTION A **The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.**	
1	(d) 2-methylpropanal and isopropyl magnesium iodide	1
2	(a) S_N1 mechanism	1
3	b) More negative Hydration enthalpy of Cu^{2+} ion	1
4	(c) Most probable kinetic energy increases at higher temperatures.	1
5	c) $G = K.a .l^{-1}$	1
6	(c) k[A][B]	1
7	(a) aniline	1
8	a) $CoCl_3.3NH_3$	1
9	(b) 2-Methylpropanal	1
10	(b). pKb value of ethylamine is higher than benzylamine.	1
11	(b) Iodoform test	1
12	(a) 2×10^{-4}	1
13	(b) solvate isomerism	1
14	(a) 2,2-Dimethylbutanoic acid	1
15	c) A is true but R is false.	1
16	b) Both A and R are true but R is not the correct explanation of A.	1
17	c) A is true but R is false.	1
18	b) Both A and R are true but R is not the correct explanation of A.	1

	SECTION B **This section contains 7 questions with internal choice in two questions. The following questions are very short answer type and carry 2 marks each.**	
19	a)  b) because the catalyst catalyses forward as well as backward reaction to the same extent	1 1
20	a) Amylopectin. b)   OR (a)Saccharic acid / $HOOC-(CHOH)_4-COOH$ (b)Due to the presence of carboxyl and amino group in the same molecule / due to formation of zwitter ion or dipolar ion.	1 ½ + ½ 1 1
21	Ans: I) $CH_3CH_2CH(Br)CH_3$ II) $CH_3CH_2CH_2CH_2Br$ III) $(CH_3)_3CBr$ and $(CH_3)_2CHCH_2Br$ OR (i) Due to the stability of benzyl carbocation/resonance/Diagram (ii) Due to – I effect of halogen.	4 × ½ 1 1
22	a) In $[NiCl4]^{2-}$, Cl^- is a weak field ligand due to which there are two unpaired electrons in 3d orbital whereas in $[Ni(CN)4]^{2-}$, CN^- is a strong field ligand due to which pairing leads to no unpaired electron in 3d- orbital/ or structural representation b) i) $t2g^3\ eg^2$ ii) $t2g^5\ eg^0$	½ + ½ ½ + ½
23	Ans.: $\Lambda m = \frac{K \times 1000}{M}$ $= \frac{0.0248 \times 1000}{0.20}$ = =124 Scm2 mol-1	½ ½ 1

24	$2NH_{3(g)} \rightleftharpoons N_{2(g)} + 3H_{2(g)}$ Here : $k = 2.5 \times 10^{-4}$ mol L^{-1} s^{-1} The order of reaction is 0 *i.e.*, Rate = k [Reactant]^0 Rate = $2.5 \times 10^{-4} \times 1 = 2.5 \times 10^{-4}$ mol L^{-1} s^{-1} Rate of reaction = $\frac{d[N_2]}{dt} = \frac{1}{3}\frac{d[H_2]}{dt}$ Again, $2.5 \times 10^{-4} = \frac{1}{3}\frac{d[H_2]}{dt}$ $\therefore \quad \frac{d[H_2]}{dt} = 7.5 \times 10^{-4}$ mol L^{-1} s^{-1} Therefore, rate of formation of H_2 $= 7.5 \times 10^{-4}$ mol L^{-1} s^{-1}	½ ½ ½ ½
25	a) A = CH3CHO B= CH3CH(OH)OCH3 b) A and B = CHI3 , C6H5COONa	½ + ½ ½ + ½
	SECTION C **This section contains 5 questions with internal choice in two questions. The following questions are short answer type and carry 3 marks each.**	
26	(i)  (ii)  (iii) 	1 1 1
27	a) $[Cr(Cl)6]^{3-} < [Cr(NH3)6]^{3+} < [Cr(CN)6]^{3-}$ b) Tetraamminedichloridochromium(III) ion  *cis* *trans*	1 1 ½ + ½

28	$\Delta T_f = i.\ K_f\ m$ $= i\ K_f\ \frac{w_B \times 1000}{M_B \times w_A}$ $2K = \frac{2 \times 1.86K\ kg/mol \times w_B \times 1000}{58.5\ g/mol \times 37.2\ g}$ $w_B = 1.17g$	1 1 1
29	(i)Because of the combined factors of inductive effect and solvation or hydration effect (ii)Due to resonance stabilisation or structural representation / resonating structures. (iii)) Methyl amine being basic, gains a proton from water and releases hydroxyl ions which precipitate hydrated ferric oxide. (iv) Aniline is acetylated, before nitration reaction in order to avoid formation of tarry oxidation products and protecting the amino group, so that p -nitro derivative can be obtained as major product. (Any three)	1 1 1 1
30	i) $(CH_3)_3C\text{-}C(CH_3)=CHCH_3$ ii)  iii) A=  , B = C_6H_5MgBr OR i) $CH_3CH_2CH=CH_2 \xrightarrow{HBr\ /\ Peroxide} CH_3CH_2CH_2CH_2\text{-}Br \xrightarrow{NaI\ /\ dry\ acetone} CH_3CH_2CH_2CH_2\text{-}I$ ii) $C_6H_6 \xrightarrow[AlCl_{3(anhyd.}]{CH_3COCl,} C_6H_5COCH_3$ iii) $CH_3CH_2OH \xrightarrow{PCl_5} CH_3CH_2Cl \xrightarrow{KCN} CH_3CH_2CN$	1 1 ½ + ½ 1 1 1
	SECTION D **The following questions are case-based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.**	

31	a) Nine b) Glycine c) As a result of denaturation the globules get unfolded and the helixes get uncoiled. The secondary and tertiary structures get disrupted. The primary structure remains intact and the enzyme loses its activity. Eg. The coagulation of egg white on boiling and curdling of milk. OR c) Globular proteins:- highly branched or coiled structures ,soluble in water .eg. Hemoglobin Fibrous proteins:- elongated strand-like structures and are usually present in the form of rods or wires, insoluble in water. Eg. keratin	1 1 2
32	i. Solubility of gas in liquid increase with decrease in temperature. ii. (a) Nature of gas (b) Temperature iii. The decreased solubility of oxygen in natural waters subjected to thermal pollution can result in large-scale fish kills. OR $\Delta Tb = \frac{Kb \times w2 \times 1000}{M2 \times w1}$ $= \frac{0.52 \times 0.52}{180 \times 80.2} \times 1000$ $= 0.018\ K$ $\Delta Tb = Tb - T^0 b$ $Tb = 373.15 + 0.018 = 373.168K$	1 1 2
	SECTION E **The following questions are long answer type and carry 5 marks each. Two questions have an internal choice.**	
33	a) $E_{cell} = E^o_{cell} - \frac{0.059}{n} \log K_c$ $= E^o_{cell} - \frac{0.059}{2} \log \frac{10^{-3}}{10^{-2}}$ $= 2.71 + 0.0295$ $E_{cell} = 2.7395\ V$ i)Cu to Mg / Cathode to anode / Same direction ii)Mg to Cu / Anode to cathode / Opposite direction OR	½ 1 1 ½ 1 1

	(a) $m = z\,I\,t$ ½ $2.8\ g = \frac{56 \times 2 \times t}{2 \times 96500}$ ½ t= 4825 s ½ $\frac{m1}{m2} = \frac{E1}{E2}$ ½ $\frac{2.8}{mZn} = \frac{56}{2} X \frac{2}{65.3}$ m_{Zn} = 3.265 g 1 b) i)A- strong electrolyte , B-Weak electrolyte 1 ii)$\Lambda^{o}m$ for weak electrolytes cannot be obtained by extrapolation while $\Lambda^{o}m$ for strong electrolytes can be obtained as intercept. 1	
34	(a) (i)  1 (ii)  (Or any other correct method) 1 (b) A : 2-Methylbut-2-ene / $CH_3CH{=}C(CH_3)_2$ 1 B: Ethanal/ Acetaldehyde /CH_3CHO 1 C: Propanone/ Acetone /CH_3COCH_3 1 OR (a) (i)  1 (ii)  (Or any other correct method) 1 (b) (i) $CH_3CH_2CH_3$ 1 (ii) $(CH_3)_3C\ CH_2OH\ + (CH_3)_3C\ COONa$ 1 iii)  1	5
35	a) i) Variable or multiple oxidation states / ability to form complexes / they provide large surface area for adsorption. 1 ii) Similar size/similar properties 1 iii)No unpaired electron/weak metallic bonding/ completely or fully filled d orbitals 1 b) i) 2Na2CrO4 + 2 H+ → Na2Cr2O7 + 2 Na+ + H2O 1 ii) 2MnO2 + 4KOH + O2 → 2K2MnO4 + 2H2O 1	