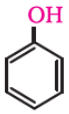
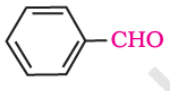
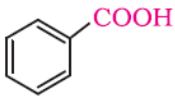
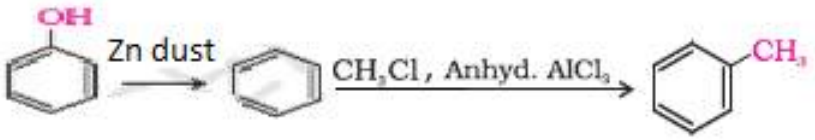
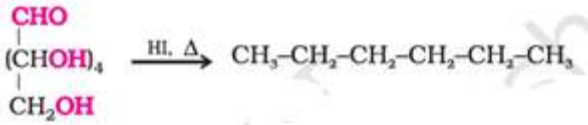
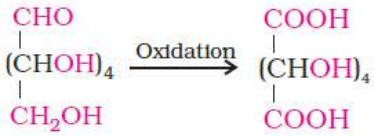
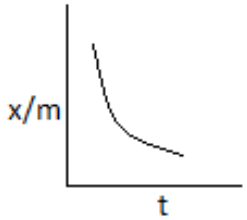
MARKING SCHEME- 2019

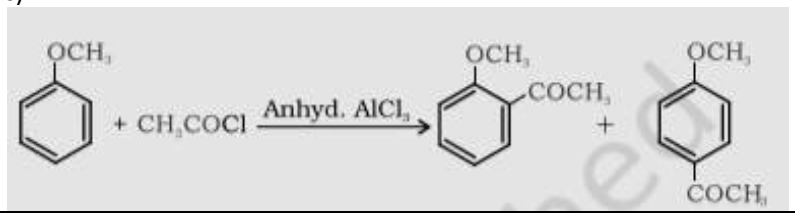
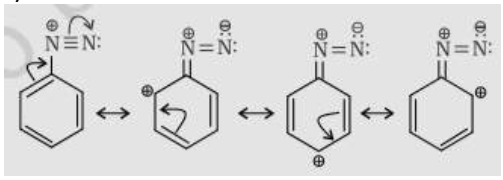
CHEMISTRY (043) CLASS XII

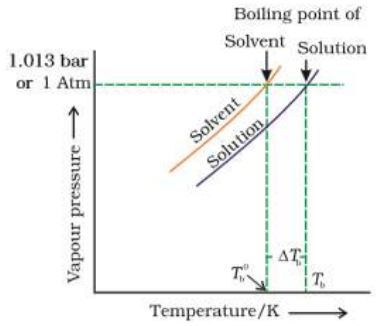
56/5/1

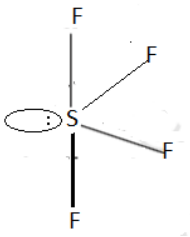
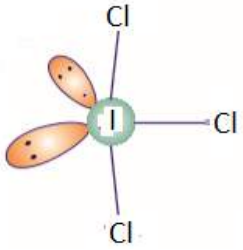
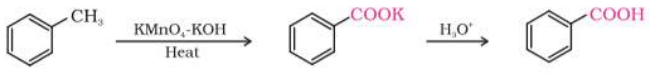
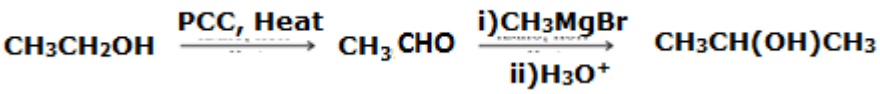
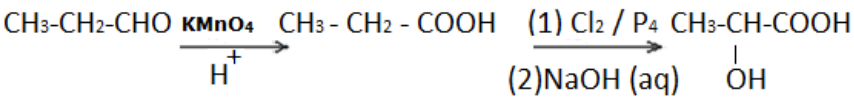
Q.No.	Expected answers/ Value points	Marks
	SECTION A	
1	A_3B_2	1
2	$As_2O_3 + 3H_2S \rightarrow As_2S_3(sol) + 3H_2O$ / By Double decomposition of Arsenic oxide with Hydrogen sulphide.	1
	OR	
2	$N_2(g) + 3H_2(g) \xrightarrow{Fe(s)} 2NH_3(g)$ or any other suitable example.	1
3	Steric reason / Electronic reason/ Inductive effect	1
4	Mixture of amines including quaternary ammonium salts / RNH_2, R_2NH , R_3N , $R_4N^+X^-$	1
5	Ionization isomerism	1
	OR	
5	$[Cr(Cl)_6]^{3-} < [Cr(NH_3)_6]^{3+} < [Cr(CN)_6]^{3-}$	1
	SECTION B	
6	At cathode- $H_2(g)$ is produced due to greater E^o value of H^+ ion At anode- Cl_2 (g) is produced due to over voltage /over potential of oxygen	1 1
7	$t=(2.303/k)\log[R]_o/[R]$ Let $[R]_o=100$ For 99% completion reaction- $t_{99\%}=(2.303/k)\log(100/1)$ $k=(2.303 \times 2)/t_{99\%}$ For 90% completion $t_{90\%}=(2.303/k)\log(100/10)$ Putting the value of k $t_{90\%}=(2.303 \times t_{99\%} \times \log10)/2.303 \times 2$ $2xt_{90\%}=t_{99\%}$ (Or any other suitable method)	½ ½ ½ ½
8	$H_2S < H_2Se < H_2Te < H_2O$ From H_2S to H_2Te boiling point increases as magnitude of van der Waal force increases.The boiling point of water is maximum due to H-bonding H_2O / water	1 ½ ½

9	1. When pyrolusite is fused with KOH in presence of air or oxidizing agent , potassium manganate is produced . $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$ 2. Potassium manganate upon further oxidation or disproportionation in a neutral or acidic medium gives potassium permanganate. $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$ / $MnO_4^{2-} \xrightarrow{\text{Electrolytic oxidation in alkaline solution}} MnO_4^-$ (Award full marks if only correct reactions are given)	1 1
10	A=  B=  C=  D=  (Full marks may be awarded if only correct names are given)	½ ×4
	OR	
10	a)  b) $CH_3CH_2OH \xrightarrow[\Delta]{PCC} CH_3CHO$ (Or any other suitable method)	1 1
11	a) n-hexane is formed  b) Saccharic acid is formed  (Award full marks if correct reactions are given)	1 1
	OR	
11	<table><tr><td>Fibrous</td><td>Globular</td></tr><tr><td>i)The polypeptide chains run parallel and are held together by hydrogen and disulphide bonds.</td><td>The polypeptide chains coil around to give a spherical shape.</td></tr><tr><td>ii)Insoluble in water</td><td>Soluble in water</td></tr></table>(Or any other correct difference)	1+1
12	<table><tr><td>DNA</td><td>RNA</td></tr><tr><td>i)Deoxyribose sugar</td><td>Ribose sugar</td></tr><tr><td>ii)contain bases ATGC</td><td>Contain bases AUGC</td></tr></table>	1+1

	(Or any other correct difference)	
	SECTION C	
13	a)Ferromagnetism b) let the number of O^{2-} ions be 100 then total number of $Ni2^{+}$ = 98 Let the number of Ni^{2+}=x Then number of Ni^{3+}=0.98-x Total chrge of cation = Total charge of anion 2 x +3(0.98-x)=2 x = 0.94 Fraction of Ni^{2+} = 0.94/0.98= 0.96 Fraction of Ni^{3+}=1 - 0.96 = 0.04	1 1 ½ ½
14	n=6 $E^{o} = E^{o}_{cathode} - E^{o}_{anode}$ = (-0.25) - (-1.66) = 1.41 V $E_{cell} = E^{o}_{cell} - (0.059/n) \log [Al^{+3}]^2/[Ni^{+2}]^3$ $E_{cell}=1.41-(0.059/6)\log(10^{-3})^2/(0.1)^3$ E_{cell}=1.4395 V	½ ½ ½ 1 ½
15	For experiment II [A] =0.2 mol^{-1} For Experiment III Rate = 0.08 mol $L^{-1}min^{-1}$ For Experiment IV [A] = 0.1 mol L^{-1}	1 1 1
16	a) Negative sol is formed Due to adsorption of I^{-} from dispersion medium b)  As extent of adsorption decreases with increase in temperature c) 'A'; With higher critical temperature, it will liquify more easily	½ + ½ ½ + ½ ½ + ½
17	a) The ore particles are wetted with oil, while gangue particles are wetted by water / Preferential wettability b) The impurities are more soluble in the melt than in the solid state of metal c) The metal forms a volatile compound with a suitable reagent. The volatile compound is easily decomposed on heating.	1 1 1
	OR	
17	a) Cast iron contain 3% carbon while pig iron contain 4% carbon b) Hydraulic washing is the method of concentration of an ore while liquation is the method of refining of metal (or any other suitable diffrence) c) Leaching is the method of concentration of an ore while roasting is the method used to convert a sulphide ore to oxide	1 1 1

	(or any other suitable difference)	
18	a) At + 3, Stable d^O is obtained b) Absence of unpaired electron / no d-d transition occurs c) MnO has Mn in +2 Oxidation State Mn_2O_7 has Mn in +7 Oxidation State . Higher the Oxidation State , Higher is the acidic character.	1 1 1
	OR	
18	a) $4f^{1-14}\ 5d^{0-1}\ 6s^2$ b) +3and +4 c) 5f 6d 7s orbitals/levels are of comparable energies	1 1 1
19	a) d^2sp^3, diamagnetic b) sp^3, diamagnetic	1 + ½ 1 + ½
20	a) The stereoisomers related to each other as non superimposable mirror images are called enantiomers. b) Equimolar mixture of d- and l- form is known as racemic mixture c) Resonance effect / difference in hybridisation of carbon atom in C – X bond / instability of phenyl cation /partial double bond character	1 1 1
21	a) Add neutral $FeCl_3$ to both the compounds. Phenol gives violet colouration while, 1 – propanol does not. b) Add I_2 / NaOH(aq) to both the compounds, Ethanol gives yellow precipitate while ether does not c) Add HCl and $ZnCl_2$ to both the compounds, 2-methyl-2-propanol gives turbidity immediately while 1-propanol does not (Or any other suitable chemical test)	1 1 1
	OR	
21	a) CH_3-CH_2OH + CH_3I b)  c)  	1 1 1
22	a) Due to resonance stabilisation of arene diazonium ion /  b) Methyl amine being basic, gains a proton from water and releases hydroxyl ions which precipitate hydrated ferric oxide.	1 + ½ 1 + ½

	$CH_3NH_2 \xrightarrow{H_2O} CH_3NH_3^+ + OH^-$ $FeCl_3 \xrightarrow{3OH^-} Fe(OH)_3\downarrow + 3Cl^-$	
	OR	
22	a) p-nitroaniline > aniline > p-toluidine pK_b decreases, basicity increases / due to inductive effect / EWG $-NO_2$ and EDG $-CH_3$ group b) $C_2H_5NH_2 > (C_2H_5)_2NH > (C_2H_5)_3N$ Due to increase in number of ethyl groups, inductive effect increases	1 ½ 1 ½
23	a) Homopolymer as it is formed only from one monomer. b) Addition polymer as it is formed by addition of monomeric units. c) Bakelite is a thermosetting plastic due to extensive crosslinking.	½ + ½ ½ + ½ ½ + ½
24	a) 2-3% solution of iodine in alcohol – water mixture It is an antiseptic / is applied on wounds b) Chloroxylenol and terpineol c) $CH_3(CH_2)_6$ - Hydrophobic ; $-COO(CH_2CH_2O)_nCH_2CH_2OH$ - Hydrophilic	½ ½ 1 ½ + ½
	SECTION D	
25	a)  When a solute is added to a solvent, the vapour pressure of the solvent decreases and it becomes equal to atmospheric pressure at a higher temperature. b) i = 3 π= i CRT π = 3 x 0.025 x 0.0821 x 298/174x2 π = 5.27 x 10^{-3} atm. (Deduct half mark if unit is not given or wrong)	1+1 ½ ½ 1 1
	OR	
25	a) Solution does not obey Raoult's law over the entire range of concentration, $\Delta H_{mix} \neq 0$ (or any two suitable characteristics) b) n = 2 (dimer) ΔT_f = i K_fm i=1.62 x 122 x 25/4.9 x 2 x 1000 i= 0.504 α= 2(1-i) α = 2(1 - 0.504)	1 + 1 ½ ½ ½ ½ ½

	= 0.992 = 99.2% (Or any other suitable method)	 ½
26	a) Due to the presence of an unpaired / unbonded / odd electron on nitrogen atom b) Bleaching effect of chlorine is due to oxidation / oxidation is caused by nascent oxygen released by reaction of Cl_2 and H_2O / $Cl_2 + H_2O \rightarrow 2HCl + [O]$ Coloured substance + [O] →colourless substance c) Due to small size of oxygen, the added electron suffers inter electronic repulsion. d) Unavailability of d-orbital in Fluorine / Due to high electronegativity and small size. e) Due to weak dispersion forces.	1 1 1 1 1
	OR	
26	  a) i) See – saw ii) Bent T b) i) It forms chloride and chlorate. $6\ NaOH + 3\ Cl_2 \rightarrow 5\ NaCl + NaClO_3 + 3H_2O$ ii) On complete hydrolysis XeO_3 is formed. $XeF_6 + 3\ H_2O \rightarrow XeO_3 + 6\ HF$ iii) Charring of cane sugar takes place. $C_{12}H_{22}O_{11} + H_2SO_4 \rightarrow 12\ C + 11H_2O$ (Balancing may be ignored)	½ + ½ ½ + ½ ½ + ½ ½ + ½ ½ + ½
27	a) But-2-enal b) To both the compounds add Tollen's reagent, ethanal gives silver mirror while ethanol does not (Or any other correct chemical test) c) i)  ii)  iii) 	1 1 1 1 1
	OR	
27	a) 2-Hydroxy benzoic acid	1

	b) Due to Inductive effect of Cl^- / presence of EWG(Cl^-) c) i) $(CH_3)_3C\text{-}CH_3$ ii) $(CH_3)_3C\text{-}CH_2OH$ and $(CH_3)_3C\text{-}COONa$ iii) $(CH_3)_3C\text{-}CH{=}NNHCONH_2$	1 1 1 1