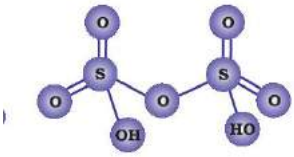
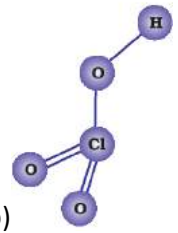
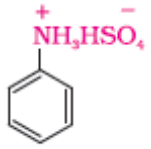
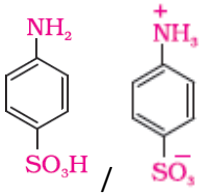
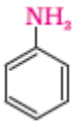
CBSE Class 12 Chemistry Question Paper Solution 2019

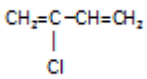
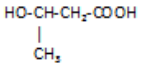
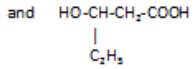
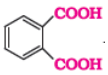
Marking Scheme – 2018-1

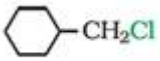
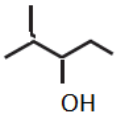
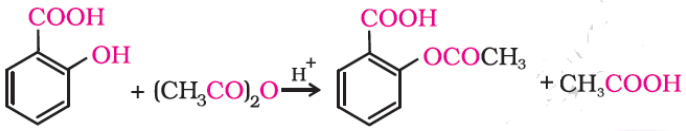
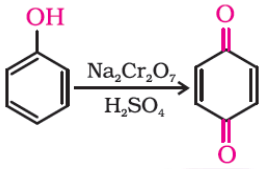
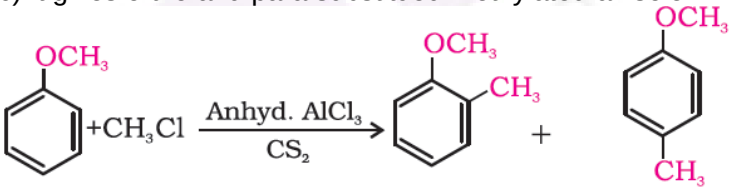
CHEMISTRY (043)/ CLASS XII

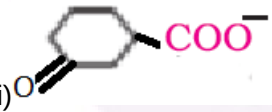
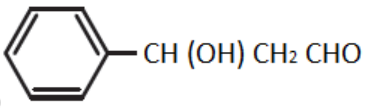
56/3/1

Q.No	Value Points	Marks
1	But-3-en-2-one	1
2	Cresol < Phenol < Benzoic Acid	1
3	Aquacyanidobis(ethylenediamine)Cobalt(III) ion	1
	OR	
3	$(NH_4)_2 [CoF_4]$	1
4	Glycosidic linkage is the linkage which joins two monosaccharrides through oxygen atom while peptide Linkage is the linkage which joins two amino acids through –CO-NH- bond	1
	OR	
4	Base linked with pentose sugar called as nucleoside while Nucleoside linked with phosphate group are called as nucleotide	1
5	Chloroform in the presence of light forms phosgene gas ($COCl_2$) which is poisonous in nature.	1
6	Cationic vacancies are produced ; Impurity defect.	1 + 1
	OR	
6	a) Schottky defect b) Metal excess defect (due to anionic vacancies)	1 1
7	a) 0.1 molal KCl ; Because KCl undergoes dissociation whereas glucose does not. b) I) Van't Hoff factor i > 1 ii) Van't Hoff factor i < 1	½ + ½ ½ ½
8	(a) $C + 2H_2SO_4 \rightarrow CO_2 + 2SO_2 + 2H_2O$ (b) $XeF_2 + PF_5 \rightarrow [XeF]^+ [PF_6]^-$	1 1
	OR	
8	a) $2F_2 + 2H_2O \longrightarrow 4HF + O_2$ b) $PH_3 + 3CuSO_4 \longrightarrow Cu_3P_2 + 3H_2SO_4$	1 1
9	a)  b) 	1, 1
10	Anode :. $Zn_{(s)} \dashrightarrow Zn^{2+} + 2e^-$ Cathode :. $MnO_2 + NH_4^+ + e^- \dashrightarrow MnO(OH) + NH_3$ Unlike mercury cell, Dry cell has shorter life (or) Cell potential in mercury cell remains constant but not in dry cell.	½ ½ 1

11	(a) Because aryl halide does not undergo nucleophilic substitution reaction. (b) Because of the absence of acidic hydrogen attached to nitrogen (N-H) in the product of secondary amine.	1 1
12.	i) A=  ; B=  / ii) A=  ; B= 	½ + ½ ½ + ½
13	a) $E^o_{cell} = E^o_{(Ag+/Ag)} - E^o_{(Zn2+/Zn)}$ $= 0.80 - (-0.76)$ $= 1.56V$ $\Delta G^o = - nFE^o_{cell}$ $= - 2 \times 96500 \times 1.56$ $= - 301080$ joules/mol $= -301.080$ kJ/mol (Deduct half mark if unit is wrong or not written) b) Λ^0_m for strong electrolyte is obtained as intercept from plot of Λ_m verses $\sqrt{c}$ whereas Λ^0_m for weak electrolyte is obtained from Kohlrausch's law / $\Lambda^\circ_m = \nu_+ \lambda^\circ_+ + \nu_- \lambda^\circ_-$.	½ ½ 1 1
14	a)Coagulation : The settling of colloidal particles. Example-Delta formation. b)Multi molecular colloids: When large number of atoms or molecules aggregate to form species having size in the colloidal range. Such colloids are known as multimolecular colloids. Example- Gold sols . c)Gel : When liquid is dispersed in solid then it is called as gel.Example:Butter, cheese (Or any other correct example)	½,½ ½,½ ½,½
	OR	
14	a)Ferric hydroxide , Because it is lyophobic sol. b) Demulsification occurs. c) Promoters increase the efficiency of catalyst whereas poison decreases the efficiency of catalyst.	½ + ½ 1 ½ + ½
15	a) $d = \frac{zM}{a^3 N_A}$ $6.89 = 2x\ M / 6.022x10^{23} \times (3 \times 10^{-8})^3$ $M = 6.89 \times 6.022x10^{23} \times 27 \times 10^{-24} / 2$ $M = 56$ g/mol. b)	½ 1 ½

	i) p-type ii) n-type	½ ½
16	α= 0.95 α=(i-1)/ (n-1) 0.95 = (i-1) / (3-1) i=2.9 (Or any other method for calculation of i) Π = i CRT = 2.9 x 0.1 x 0.0821 x 300 = 7.143 atm. (Deduct half mark for no unit or wrong)	 ½ ½ 1 1
17	At 500 – 800 K , $3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$ $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$ $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$ Limestone decomposes to CaO and CO_2 . CaO combines with impurity (i.e.) SiO_2 to form slag which is then removed. / $CaO + SiO_2 \rightarrow CaSiO_3$ (Balancing may be ignored)	 ½ 1 ½ 1
	OR	
17	a)It forms complex $[Ag(CN)_2]^-$ (Or in equation form) b) FeS undergoes roasting to FeO , which combines with SiO_2 to form slag whereas Cu_2S on roasting gives Cu_2O which on reduction gives Cu. (Or in equation form) c) It selectively prevents the ZnS from coming to the froth / It acts as Depressant.	1 1 1
18	a)Due to presence of pπ-pπ bonding in oxygen but it is absent in sulphur / oxygen is diatomic but sulphur is polyatomic. b) Because NO reacts with O_3 to form NO_2 and O_2(g) or equation c) Interhalogens bonds are weaker than bonds in pure halogens / X –X′ bond is weaker than X-X bond.	1 1 1
19	a)  b)  and  c)HCHO and C_6H_5OH	1,1,1
	OR	
19	a)Nylon 6,6 > Bakelite >polythene> Buna-S b) Ethylene glycol and phthalic acid / $HO\text{-}CH_2\text{-}CH_2\text{-}OH$ and  c)HDP is linear chain whereas LDP is highly branched.	1 1 1
20	a)Metal hydroxides are insoluble and do not increase the pH above neutrality. b) Because it has anticlotting property. c) Because antihistamines and antacids act on different receptors.	1 1 1
	OR	
20	a)Chemical compounds used for the treatment of stress and mental diseases. Example- Equanil. b) Antibiotic: Chemical substances produced by micro-organisms that inhibit growth or even destroy micro-organisms. Example- Penicillin. c)Non-ionic detergents: The detergents which do not contain any ion in their constituition. Example- Dish washing liquids. (Or any other suitable example)	½ , ½ ½ , ½ ½ , ½

21.	(a)  Because it is a primary halide. (b)  It is more reactive due to the presence of electron withdrawing -NO_2 group. (iii)  It is optically active due to chiral carbon.	½ + ½ ½ + ½ ½ + ½
22.	a) Salicylic acid is treated with acetic anhydride in the presence of H^+ to give aspirin.  b) Phenol in the presence of acidified sodium dichromate gives benzoquinone.  c) It gives ortho and para substitued methylated anisole.  (Full marks may be awarded if child writes correct equations only)	1 1 1
23.	a) On addition of silver nitrate, $[Co(NH_3)_5(SO_4)]Cl$ will form white precipitate of AgCl while other does not.(Or any other correct chemical test). b)In $[Ni(CO)_4]$, Ni is in zero oxidation state whereas $[NiCl_4]^{2-}$,it is in +2 oxidation state. In the presence of CO ligand the unpaired d electrons of nickel pair up but Cl^- being a weak ligand is unable to pair up the unpaired electrons. c)i) Strong field ligand --- $t_2g^5\ eg^0$ ii) Weak field ligand ---- $t_2g^3\ eg^2$	1 1 ½ ½
24.	a)Anomers: These are the hemi-acetal forms of glucose which differ in the configuration at C1 of hydroxyl group. Ex- α -glucose and β-glucose. b)The amino acid which do not get synthesised by our body are called essential amino acid. Ex-Valine. c)Denaturation of proteins:. When native protein is subjected to change in temperature and pH, then it loses its biological activity.Ex- Curdling of milk. (Or any other correct example.)	½ + ½ ½ + ½ ½ + ½

	SECTION D	
25	a)Order of a reaction:. It is the sum of the power to which the concentration terms are raised in the rate law equation. Order of reaction is applicable for complex reaction but molecularity has no meaning for the complex reaction. ii) k= 2.303/t log $[R]_o/[R]$ = (2.303 /25) log (100/50) = 0.0277 min^{-1} $t_{80\%}$=(2.303/0.0277) log 100/20 = 58.11 min	1 1 ½ 1 ½ 1
	OR	
25	a) $$\log\frac{k_2}{k_1} = \frac{E_a}{2.303R}\left[\frac{1}{T_1} - \frac{1}{T_2}\right]$$ $$\log\frac{7.5x10^4}{2.5x10^4} = \frac{19.147\ x\ 10^3}{2.303x8.314}\left[\frac{1}{300} - \frac{1}{T_2}\right]$$ $$\log 3 = 1000\left[\frac{T_2-300}{300\ T_2}\right]$$ $$\frac{0.4771 \text{ x } 300 \text{ x } T_2}{1000} = T_2 - 300$$ $$T_2 = \frac{300}{0.856} = 350K$$ b)When one of the reactants is in excess. CH_3COOCH_3 + H_2O (excess) -------→ CH_3COOH + CH_3OH (Or any other suitable example)	1 1 1 1 1
26.	a) (i)  (ii) $CH_3\ CH(OH)\ COOCH_3$ (iii)  b) On adding NaOH / I_2 and heat, acetophenone forms yellow ppt. of iodoform(CHI_3) whereas benzophenone does not. c) Due to resonance stabilisation of conjugate base of carbonyl compound.	1 1 1 1 1
	OR	
26	a) i) $CH_3CH_2CH\ (OCH_3)_2$	1

	ii) $CH_3CH_2CH(OH)CH(CH_3)CHO$ iii) $CH_3CH_2CH_3$ b) i) $CH_3COOH < HCOOH < FCH_2COOH < O_2N\text{-}CH_2COOH$ ii) Acetophenone < Benzaldehyde < acetone < acetaldehyde	1 1 1 1
27	a) i)Due to the presence of maximum no. of unpaired electrons . ii) because Cr is more stable in +3 oxidation state due to stable t^3_{2g} configuration whereas Mn is more stable +2 oxidation state due to half filled $3d^5$ configuration. iii) Due to the presence of one unpaired electron in V^{4+} whereas there is no unpaired electron in Ti^{4+} . b) $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$ $3MnO_4^{2-} + 4H^+ \rightarrow 2\ MnO_4^- + MnO_2 + 2H_2O$ Due to the formation of Mn^{2+} ion from MnO_4^- / or reaction	1 1 1 ½ ½ 1
	OR	
27	a) Transition elements show variable oxidation states that differ by 1 unit whereas p-block elements it differs by 2 units / Heavier transition elements are stable in higher oxidation state whereas p-block elements are stable in lower oxidation state. b) Because of strong interatomic interactions / Strong metallic bonding between atoms. c) Cerium / Terbium ; Oxidising agent. d) Steady decrease in atomic radii with increase in atomic number due to poor shielding effect of 4f orbital electrons. Consequence : 5d series have almost same size as 4d series (Or any other correct consequence) e) $Cr_2O_7^{2-} + 14\ H^+ + 6\ Fe^{2+} \rightarrow 2\ Cr^{3+} + 6\ Fe^{3+} + 7\ H_2O$	1 1 ½ , ½ ½ ½ 1