CBSE Class 12 Chemistry Question Paper Solution 2019

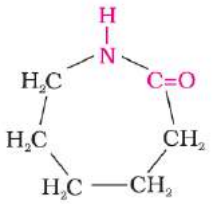
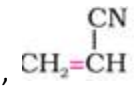
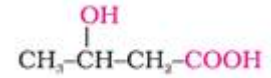
Marking scheme – 2019

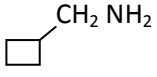
CHEMISTRY (043)/ CLASS XII

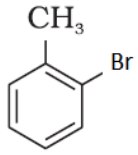
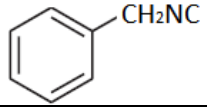
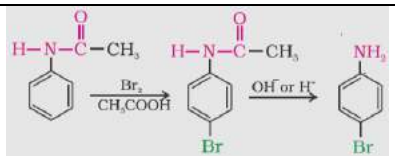
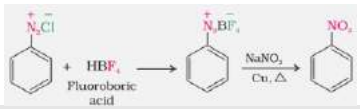
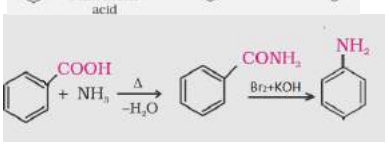
56/2/1

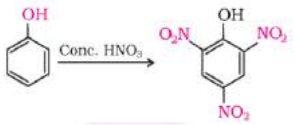
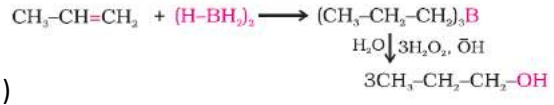
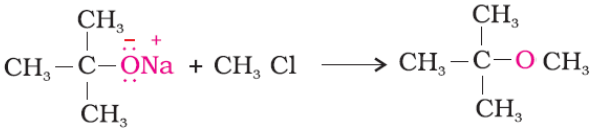
	SECTION - A	Marks
1	KCl , Due to comparable sizes of K^+ and Cl^-	½ + ½
	OR	
1	On heating, excess Zn^{2+} ions move to interstitial sites and the electrons to neighbouring interstitial sites/ because of metal excess defect due to presence of extra Zn^{2+} cations at interstitial sites	1
2	$(CH_3)_3N > C_2H_5NH_2 > C_6H_5NH_2$	1
3	Sol , Example- Paints (Or any other correct example)	½ + ½
4	Cyclohexyl chloride ; Because of partial double bond character of C-Cl bond in Chlorobenzene / Resonance effect / sp^3 hybridised carbon in cyclohexyl chloride whereas sp^2 carbon in chlorobenzene.	½ + ½
5	Starch is a polymer of α- glucose whereas cellulose is a polymer of β- glucose.	1
	OR	
5	2-deoxyribose + nitrogen containing heterocyclic base + phosphoric acid	1
	SECTION –B	
6	a) $2Ca(OH)_2 + 2Cl_2 \rightarrow CaCl_2 + Ca(OCl)_2 + 2H_2O$ b) $SO_2 + 2Fe^{3+} + 2H_2O \rightarrow 2Fe^{2+} + SO_4^{2-} + 4H^+$	1 1
	OR	
6	a) Mustard gas, tear gas, phosgene (Any two) b) Because it forms blue coloured complex $[Cu(NH_3)_4]^{+2}$ (aq) or Equation	½ + ½ 1
7	a) Due to increase of pressure in cooker, boiling point of water increases. b) RBC looses water in saline water and absorb water in distilled water due to osmosis.(Or any other correct reason)	1+1
8	It is defined as the sum of powers to which the concentration terms are raised in the rate law equation. a) First order b) zero order	1 ½ + ½
9	$A = Na_2CrO_4$; $B = Na_2Cr_2O_7$; $C = K_2Cr_2O_7$; $D = Na_2SO_4$	½ x4
10	Chloridobis(ethane-1,2-diamine)nitrito-N-cobalt(III) ion Linkage isomerism	1+1
	OR	
10	i) $[Cr(H_2O)_6]Cl_3$ ii) $Na_3[Fe(ox)_3]$	1+1
11	a) In $[NiCl_4]^{2-}$, 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) $t_{2g}^3 e_g^2$ ii) $t_{2g}^5 e_g^0$	½ + ½ ½ + ½
12	i) A = C_6H_5COCl B= C_6H_5CHO ii) A= CH_3COCH_3 B = $CH_3CH_2CH_3$	½ + ½ ½ + ½
	SECTION -C	

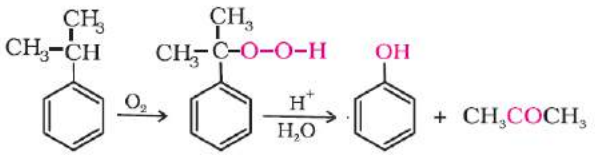
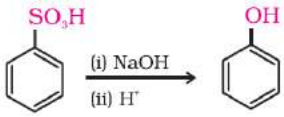
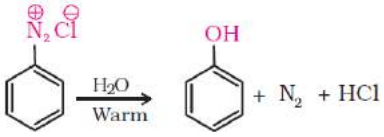
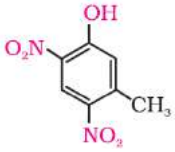
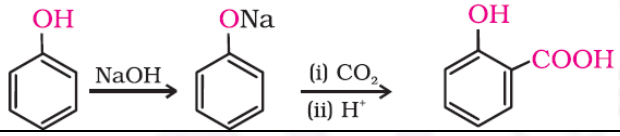
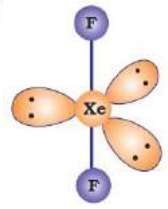
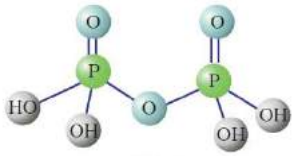
13	Rate = $k[A]^p[B]^q$ On solving a) Order with respect to A=2 , B=1 b) Rate = $k[A]^2[B]^1$; overall order = 3 c) Experiment 1 : $4.2 \times 10^{-2} = k\,(0.2)^2\,(0.3)$; k=3.5 Experment 2 : $6.0 \times 10^{-3} = k\,(0.1)^2\,(0.1)$; k=6 (Full marks may be awarded for any one correct answer)	 ½ + ½ ½ , ½ 1
14	i) Dispersed phase = solid ; Dispersion medium = gas ii) Due to weak van der Waal's forces in physisorption whereas strong chemical forces in chemisorption. iii) Positively charged , AgI/Ag^+	1 1 ½ + ½
15	$d=\frac{zM}{N_A \times a^3}$ $Z = \frac{d \times N_A \times a^3}{M}$ $= \frac{10.2 \times 6.022 \times 10^{23} \times 2.7 \times 10^{-23}}{81}$ = 2 Hence lattice is bcc.	½ 1 1 ½
16	π_1 (urea) = π_2 (KCl) $C_1RT = i\,C_2RT$ $\frac{n_1}{V1} = i\,\frac{n_2}{V2}$ (V1 = V2) $\frac{3}{60} = i \times \frac{1.9}{74.5}$ i= 1 .96 $\propto = \frac{i-1}{n-1}$ $= \frac{1.96-1}{2-1}$ = 0.96 or 96%	½ 1 ½ 1
17	a) Distillation/ Electrolytic refining: The impure metal is evaporated to obtain the pure metal as distillate/ The more basic metal remains in the solution and the less basic ones go to the anode mud. b) Zone refining : Impurities are more soluble in the melt than in the solid state of the metal. c) van Arkel method : The metal should form a volatile compound which decomposes at higher temperature to pure metal.	½ + ½ ½ + ½ ½ + ½

18	i) Due to small size , high ionic charge and availabilty of d-orbital. ii) Due to stable $3d^{10}$ configuration in Zn^{2+} and $3d^5$ configuration in Mn^{2+}. iii) Due to comparable energies of 5f ,6d and 7s orbitals / levels.	1 1 1
19	a)  b) HOH_2C-CH_2OH ,  c) $CH_2=CH-CH=CH_2$, 	1,1,1
	OR	
19	a) Homopolymer ; As the same monomer is repeated. b)  ,  / 3-Hydroxybutanoic acid , 3-Hydroxypentanoic acid c) It acts as an initiator.	½ , ½ 1 1
20	i) Bithional ii) Non-ionic detergents iii) Because it is unstable at cooking temperature.	1,1,1
	OR	
20	a) These are chemical substances produced by micro-organisms which kill or inhibit the growth of microorganisms. Ex. Penicillin b) These are chemical substances which kill or prevent the growth of microorganisms when applied on living tissues. Ex. Dettol c) These are sodium salts of sulphonated long chain alcohols or hydrocarbons. / Anionic part of the molecule is involved in cleansing action.Example- sodium lauryl sulphate. (Or any other one correct example)	½ + ½ ½ + ½ ½ + ½
21	I) $CH_3CH_2CH(Br)CH_3$ II) $CH_3CH_2CH_2CH_2Br$ III) $(CH_3)_3CBr$ and $(CH_3)_2CHCH_2Br$	1 1 ½ + ½

22	a) 	1x3=3

	b)  c)  	
	OR	
22	a)  b)  c)  (or any other suitable method)	1x3
23	a) i) Due to greater electronegativity of sp^2 hybridised carbon to which carboxyl carbon is attached / Due to greater resonance stabilization of carboxylate ion with the benzene ring. ii) Because carbonyl carbon of methanal is more electrophilic than that of ethanol / due to +I effect of methyl group in ethanal, reactivity decreases. b) On heating with Tollens'reagent / $[Ag(NH_3)_2]^+$, propanal forms silver mirror whereas propanone does not. (or any other suitable chemical test)	*1+1* *1*
24	a) Glucose + Glucose b) Hydrogen bonding c) Vitamin $-B_{12}$	1+1+1
	OR	
24	i) Hydrolysis of sucrose brings a change of sign of rotation from dextro(+) to laevo(-) and the product is named as invert sugar. ii) Protein found in biological system with unique three dimensional structure and biological activity is called native protein. iii) A unit formed by the combination of nitrogenous base , pentose sugar and phosphate .	1,1,1
	SECTION -D	

25	$\Lambda_m = \frac{\kappa}{c} = \frac{4.95\times10^{-5}\ \text{S cm}^{-1}}{0.001\ \text{mol L}^{-1}} \times \frac{1000\ \text{cm}^3}{\text{L}} = 49.5\ \text{S cm}^2\ \text{mol}^{-1}$ $\alpha = \frac{\Lambda_m}{\Lambda_m^\circ} = \frac{49.5\ \text{S cm}^2\text{mol}^{-1}}{390.5\ \text{S cm}^2\ \text{mol}^{-1}} = 0.126$ a) $K = \frac{c\alpha^2}{(1-\alpha)} = \frac{0.001\ \text{mol L}^{-1} \times (0.126)^2}{1-0.126} = 1.8\times10^{-5}\ \text{mol L}^{-1}$ (If K= cα^2, then K= 1.6 × 10^{-5} mol L^{-1} b) $E_{(cell)} = E^\ominus_{(cell)} - \frac{0.059}{6}\log\frac{[Al^{3+}]^2}{[Cu^{2+}]^3}$ c) Batteries which are rechargeable Example- Lead storage, Ni-Cd batteries (Or any other one example)	1 1 1 1 ½ , ½
	OR	
25	a) Al(s) | Al^{3+}(0.01M) || Ni^{2+} (0.1 M) | Ni(s) $E_{(cell)} = E^\ominus_{(cell)} - \frac{0.059}{6}\log\frac{[Al^{3+}]^2}{[Ni^{2+}]^3}$ $E_{(cell)} = 1.41V - \frac{0.059}{6}\log\frac{[0.01]^2}{[0.1]^3}$ $E_{(cell)} = 1.4198V$ or E_{cell} =1.42V b) Λ_m decreases with increase in concentration for both strong & weak electrolyte Λ_m^0 can be obtained for weak electrolyte by applying Kohlrausch law / $\Lambda_m^\circ = \nu_+\lambda_+^\circ + \nu_-\lambda_-^\circ$	1 ½ 1 ½ 1+1
26	a) (i)  (ii)  (iii)  	1 1 1

	b) On heating with NaOH / I_2 , Butan - 2 - ol forms yellow ppt of iodoform (CHI_3) whereas butan -1-ol does not. (Or any other correct chemical test) c) Ethanol < water < Phenol	1 1
	OR	
26	a) (i)  (ii)  (iii)  b)  c) 	1 1 1 1 1
27	a) i) Due to increase in size and metallic character. ii) Due to decrease in bond dissociation enthalpy . iii)Due to lower bond dissociation enthalpy of F-F bond than Cl-F bond whereas Cl-Cl bond has higher bond dissociation enthalpy than Cl-F bond. b) (i)  (ii) 	1,1,1,1,1
	OR	
27	i) $2F_2(g) + 2H_2O(l) \rightarrow 4H^+(aq) + 4F^-(aq) + O_2(g)$ ii) White phosphorus is discrete tetrahedral whereas red phosphorus is polymeric / or structures drawn iii) It forms $Na^+ [XeF_7]^-$ / $XeF_6 + NaF \rightarrow Na^+ [XeF_7]^-$ iv) Due to lower bond dissociation enthalpy of H-S bond than H-O bond. v) HF < HCl < HBr< HI	1x5