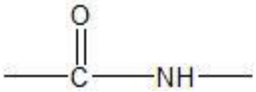
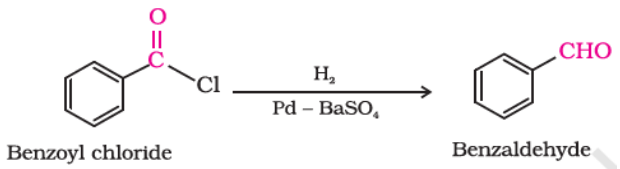
Marking scheme – 2020

CHEMISTRY (043)/ CLASS XII

56/2/2

Q.No	Expected Answer / Value Points	Marks
	SECTION A	
1	Acidic aminoacids- will have more number of carboxyl groups than amino groups. / Basic amino acids- will have more number of amino groups than carboxyl groups.	1
2	Those which are not synthesized in our body or must be supplied through diet.	1
3	They contain both acid (-COOH) and basic(NH_2) group / Zwitter ion form or structure / It can react both acids and bases.	1
4	Peptide linkage/amide linkage/ 	1
5	Simple organic compounds containing both carboxyl (—COOH) and amino (—NH_2) group. / Building blocks of protein. / Amino substituted carboxylic acid / structure	1
6	Vapour phase refining	1
7	Desorption	1
8	Zinc, Mercury or any other suitable metal	1
9	Linkage	1
10	Order =3	1
11	(C)	1
12	(D)	1
13	(A)	1
14	(D)	1
15	(A)	1
16	(i)	1
17	(iii)	1
18	(iii)	1
19	(i)	1
20	(iii)	1
	SECTION B	
21	(a) Due to lone pair -lone pair repulsion on oxygen. (b) Due to resonance in phenol and not in methanol / sp^2 hybridised carbon atom in phenol / sp^3 hybridised carbon atom in methanol.	1 1
22	a) Tranquilizers:used to treat mild to severe mental diseases. — Analgesics: Used to reduce pain b) Antiseptics- are applied to living tissues. — Disinfectants – are applied to inanimate objects or non living objects (or any other correct difference) **OR** Cationic detergent-are quartenary ammonium — Anionic detergent – are sodium salts	1 1 1

	salts of amines with acetates, chlorides or bromides as anions. e.g. cetyltrimethyl ammonium bromide. of sulphonated long chain alcohols or or hydrocarbons. e.g. Sodium lauryl sulphate / sodium dodecyl benzene sulphonate.	½ + ½
23	$8\ MnO_4^- + 3S_2O_3^{2-} + H_2O \rightarrow 8MnO_2 + 6SO_4^{2-} + 2OH^-$ $2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 8H_2O + 10CO_2$ (deduct 1/2 mark if not balanced)	1 1
24	Rate = k[A][B] Average rate - Rate of a reaction for a particular period or interval of time. Instantaneous rate - Rate of a reaction at a particular instant of time. (or any other suitable difference)	1 ½ ½
25	The curve obtained by plotting the amount of gas adsorbed by the adsorbent with pressure at constant temperature. $x/m = kp^{1/n}$	1 1
	OR	
25	The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. Shape selective catalysis / Catalytic dehydration.	1 1
26	Ni (s) | Ni^{2+} (aq) || Cu^{2+} (aq) | Cu (s) $E_{cell} = E^0_{cell} - 0.059/2 \log [Ni^{2+}] / [Cu^{2+}]$	1 1
27	a) Associated b) Dissociated	1 1
	SECTION C	
28	a) $CH_2 = C(Cl) – CH = CH_2$ b) $HOOC- (CH_2)_4 – COOH$ and $NH_2 – (CH_2)_6- NH_2$ c) $CH_2OH – CH_2OH$ and $HOOC – C_6H_4 –COOH$	1 x 3
	OR	
28	i) Amino caproic acid / Caprolactum / 6 -Aminohexanoic acid ii) Vinyl cyanide / Acrylonitrile iii) Melamine and formaldehyde.	1 1 1
29	(a) Potassiumhexacyanidomanganate(II) / Potassiumhexacyanomanganate(II) $t_{2g}^5\ eg^0$ (b) Increased stability of the complex due to presence of chelating or didentate or polydentate ligands. e.g.$[Cr(en)_3]^{3+}$ (or any other suitable example.)	1 1 ½ ½
	OR	
29	(i) d^2sp^3,diamagnetic (ii) sp^3d^2, paramagnetic (iii) sp^3, diamagnetic	½ +½ ½ +½ ½ +½
30	a) $C_6H_5CH_2Br < C_6H_5CH(Br)CH_3 < C_6H_5C(Br)(CH_3)_2$ due to increasing stability of carbocation b) $C_6H_5C(Br)(CH_3)_2 < C_6H_5CH(Br)CH_3 < C_6H_5CH_2Br$ due to decreasing steric hindrance.	1 ½ 1 ½
31	(a) The lone pair of nitrogen in aniline is in resonance or conjugation with the benzene ring. (b) Aniline forms salt with anhydrous $AlCl_3$. (c) As only alkyl halides undergo nucleophilic substitution.	1 1 1

32	$4\ Au + 8CN^- + 2H_2O + O_2 \rightarrow 4[Au(CN)_2]^- + 4OH^-$ $2\ [Au(CN)_2]^- + Zn \rightarrow [Zn(CN)_4]^{2-} + 2\ Au$ Zn acts as a reducing agent.	1 1 1
33	Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. Molar conductivity of $Sr(NO_3)_2$ $= \lambda^o_{Sr^{2+}} + 2\ \lambda^o_{NO_3^-}$ $= 119 + (2 \times 72)$ $= 263\ Scm^2/mol$ (deduct ½ mark if no or incorrect unit)	1 ½ ½ 1
34	$\Delta T_f = K_f\, m$ $= 1.86 \times 31 \times 1000 / 62 \times 600$ $= 1.55\ ^oC$ or K $\Delta T_f = T_f^o - T_f$ $T_f = -1.55^oC$ OR $T_f = 271.45K$ OR $271.6K$ (1/2 mark to be deducted if no or incorrect unit)	½ ½ 1 1
	Section D	
35	a) A= $CH_3CH_2COCH_2CH_3$ / pentan-3-one $CH_3CH_2COCH_2CH_3 \xrightarrow{\text{Zn-Hg, HCl(conc.)}} CH_3CH_2CH_2CH_2CH_3$ b) i) $CH_3CH_2COOH + Br_2 \xrightarrow{\text{Red P}} CH_3CHBrCOOH$ ii)  c) On heating with NaOH / I_2, acetaldehyde will give yellow ppt of CHI_3 , while benzaldehyde doesn't. (OR any other suitable chemical test) **OR**	1 1 1 1 1
35	a) i) A = $(CH_3)_2CH(OH)\ CH_2\ COCH_3$, B = $(CH_3)_2CH{=}CH\ COCH_3$, C and D = CHI_3 and $(CH_3)_2CH{=}CH\ COONa$ ii) 4-Hydroxy-4-methylpentan-2-one b) i) Propanone will give yellow coloured solution with 2,4-DNP but ethanol doesn't. (or any other suitable chemical test) ii) benzoic acid will give brisk effervescence with $NaHCO_3$ but phenol doesn't. (or any other suitable chemical test)	½ x 4 1 1 1

36	(a) (i) zero order (ii) slope = - k (iii) $molL^{-1}s^{-1}$ (b) k = *2.303/t* log $[A_0]/[A]$ = 2.303/25 log 100/75 = 2.303/25 log4/3 = 2.303/25(0.6021 – 0.4771) = 0.0115 min^{-1} $t_{1/2}$ = 0.693/k = 0.693/0.0115 = 60.26 min or 60.2 min (or by any other suitable method) (deduct half mark for no or incorrect unit)	1 1 1 ½ ½ 1
	OR	
36	(a) t = 2.303/k log $[A_0]/[A]$ = 2.303/ 60 log 1/1/16 = 0.046 s (or by any other suitable method) (deduct half mark for no or incorrect unit) (b) Concentration of reactants, Temperature, Pressure, surface area and catalyst (any two factors) (c) Proper orientation and energy should be equal to or greater than threshold energy.	1 1 1 1 1
37	(a) A= S_8 B= SO_2, C= SO_3, D= $H_2S_2O_7$, E= H_2SO_4, F=$CuSO_4$ (b) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$ (c) Dehydrating agent, oxidising agent, electrolyte in automobile batteries and catalyst (any two)	½ x 6 1 ½ x 2
	OR	
37	(a) (i) Readily accept one electron to attain noble gas configuration (ii) Due to weak dispersion forces / van der Waal forces. (iii) Due to smaller size of oxygen as compared to chlorine / due to higher electron density on O than on Cl / due to larger size of chlorine as compared to oxygen. (b) (i) $2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$ (cold, dil.) (ii) $2I^-_{(aq.)} + H_2O_{(l)} + O_{3(g)} \rightarrow I_{2(s)} + O_{2(g)} + 2OH^-_{(aq.)}$	1 1 1 1 1