INDIAN SCHOOL MUSCAT

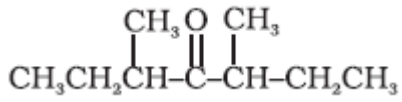
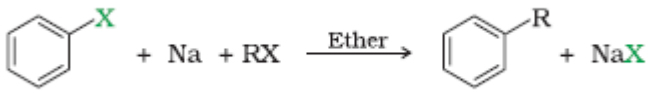
FINAL TERM EXAMINATION

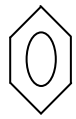
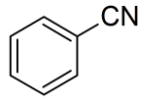
SET A

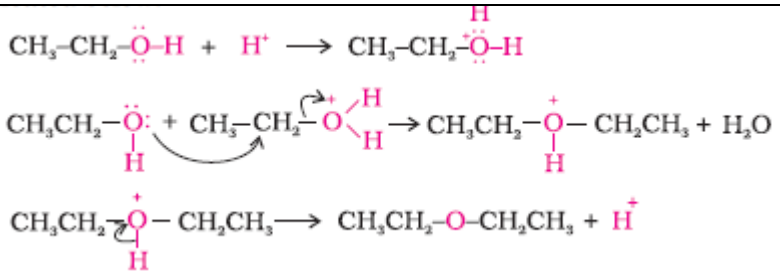
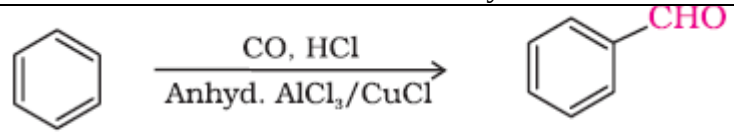
NOVEMBER 2018

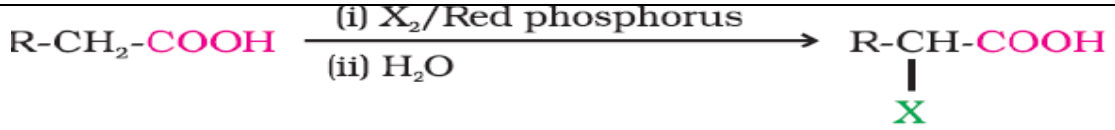
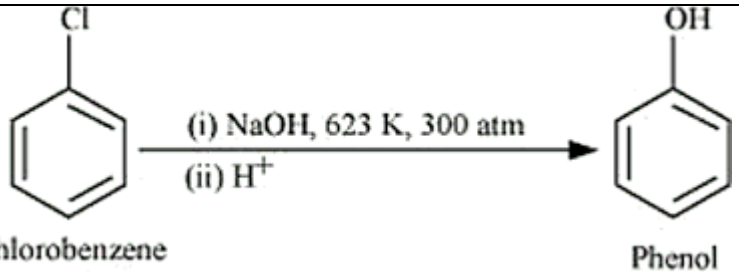
CLASS XII

Marking Scheme – CHEMISTRY [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	Due to increase in entropy which makes ΔG negative. OR Due to the formation of complex $K_2[HgI_4]$, number of particles decreases.	1
2.	Vinyl chloride does not respond to NaOH and silver nitrate test because of partial double bond character due to resonance	1
3.	3 F OR to overvoltage/ overpotential Cl^- is oxidised in preference to water.	1
4.	Antagonists are drugs that bind to the receptor site and inhibit its natural function	1
5.	Benzene sulphonyl chloride, to distinguish I^o,2^o and 3^oamines	½+½
6.	a) DNA is double stranded while RNA is single stranded b) They differ in the position of -OH group on anomeric carbon (C-1)	1 1
7.	a) 4-(4-Methoxyphenyl)butan-2-ol b) 	1 1
8.	a) In dehydrohalogenation reactions, the preferred product is that alkene which has the greater number of alkyl groups attached to the doubly bonded carbon atoms b) process of conversion of enantiomer into a racemic mixture is known as **racemisation.** **OR** a)  b) The chlorofluorocarbon compounds of methane and ethane are collectively known as freons .eg CCl_2F_2	1 1 1 ½+½

9.	a) 5/2 b) 9 times	1 1
10.	Depressants are used to separate two sulphide ores. For example NaCN is used as a depressant in the separation of ZnS from PbS ore. NaCN prevents ZnS from coming to the froth but does not prevent PbS from the formation of the froth.	1 1
11.	a) Carbylamine reaction ($KCN+CHCl_3$), aniline forms phenyl isocyanide b) $C_2H_5NH_2 > C_6H_5NHCH_3 > C_6H_5NH_2 > (C_2H_5)_2NH$ OR a)  b) 	1 1 1 1
12.	Thermoplastics-Plastics which become soft on heating and can be remoulded eg: Polythene, PVC Thermosetting plastics-which do not become soft on heating and cannot be remoulded eg: bakelite, melamine formaldehyde	½+½ ½+½
13.	a) Alkali metal ions have larger size which cannot fit into interstitial sites. b) Due to resistance offered to the flow of electrons due to vibration of kernels. c) Due to electron hole /additional electron which results in p-type / n-type semiconductor.	1x3
14.	$\rho = \frac{Z\ X\ M}{a^3\ X N_a}$ $a^3 = \frac{4x207}{11.35x6.02x10^{23}}$ $= 4.949x10^{-8}$ cm=**494.9 cm** **r= a / 2√2** **=494.9 / 2√2 =174.95 pm**	½ ½ 1 ½+½
15.	a) Constant boiling mixtures distills with constant composition. b) Shows positive deviation from Raoults law Due to weakening of molecular interactions between ethanol molecules by acetone c) B since it is less soluble	1 ½ ½ ½+½
16.	Observed molar mass ,$M_B = \frac{Kf\ x\ wB}{\Delta Tf\ x\ wA} = \frac{5.13X0.2}{0.45X0.03}$=113.8g/mol	½

	Molar mass of CH_3COOH=60 g /mol	1
	Van't Hoff factor $=\frac{Normal\ molar\ mass}{Observed\ Molar\ mass}=\frac{60}{113.8}$=0.53	½
	OR	1
	$p_{total}= p_A^o\chi_A+ p_B^o\chi_B$ 600=450 x χ_A +700(1-χ_A) χ_A=0.4 χ_B=0.6	½ ½
	$P_A= p_A^o\chi_A$ =450X0.4=1800 $P_B= p_B^o\chi_B$ =700x0.6=420	½+½
	y_A =P_A/p =180/600=0.3 y_B=420/600=0.7	½+½
17.	a) $4Au + 8CN^- + 2H_2O + O_2 \rightarrow 4[Au(CN)_2]^- + 4OH^-$ $2[Au(CN)_2]^- + Zn \rightarrow [Zn(CN)_4]^{2-} + 2Au$ b) To lower the melting point and to increase the conductivity.	½+½ ½+½ ½+½
18.		1 1 1
	OR	
	a) -I effect &stabilization of anion formed.	1
	b) Less surface area of contact and Vander Waals forces decreases	1
	c) Eliminination is favoured over substitution,and alkenes are formed	1
19.	a) As primary amines form inter molecular H – bond, but tertiary amines don't form H – bonds. b) Aniline forms salt with Lewis acid $AlCl_3$. c) This is because of the combined effect of hydration and inductive effect	
20.	 a) Benzene Benzaldehyde	1
	b) $RCN + SnCl_2 + HCl \longrightarrow RCH = NH \xrightarrow{H_3O^+} RCHO$	1

	c) 	1
21.	a) α helix-Intramolecular H bonding. β pleated-Intermolecular H bonding. b) Glucose &galactose	½+½ ½+½ ½+½
22.	 a) Chlorobenzene Phenol b) Allyl bromide is formed,$CH_2Cl\ CH=CH_2$ c) R-X + NaI→ R-I + NaX (Finkelstein reaction)	1 1 1
23.	a) 3 Hydroxy butanoic acid & 3-hydroxy pentanoic acid $CH_3CHCH(OH)CH_2COOH$& $CH_3CH_2CH(OH)CH_2COOH$ b) Hexa methylene diamine & adipic acid, $H_2N(CH_2)_6NH_2$ & $HOOC(CH_2)_4COOH$, c) Vinyl chloride,$CH_2=CHCl$ OR a) synthetic rubber is Buna-S b) greater resistance to abrasion, wear and water. c) Buna-S<Polythene< Nylon-6	½+½ ½+½ ½+½ 1 1 1
24.	a) Penicillin-bactericidal others are broad spectrum antibiotics b) (i)Equanil- a tranquiliser (ii)Sucralose-artificial sweetner OR a) They are neurologically active drugs that abolish pain eg.Aspirin,Morphine, codeine, b) Medicines used to treat acidity ,eg.Ranitidine/ $Al(OH)_3$, $Mg(OH)_2$ c) They are quaternary ammonium salts of amines with acetates, chlorides or bromides as the anions eg.Cetyltrimethylammonium bromide	½+½ 1+1 ½+½ ½+½ ½+½

25.	a) cells cannot be recharged and used again. Eg: dry cell	1
	a) $2PbSO_4 + 2H_2O \rightarrow Pb + PbO_2 + 2H_2SO_4$	1
	$\lambda_m = \frac{1000 \times K}{C}$	½
	$= \frac{1000x5.25x10-5}{2.5x10-4} = 210\ scm^2mol^{-1}$	1
	$\lambda^o_{HCOOH} = 394.5 + 50.5 = 400\ scm^2mol^{-1}$	½
	$\alpha = \frac{\lambda m}{\lambda 0 m} = 210/400 = 0.525 = 52.5\%$	1
	OR	
	a) The amount of substance deposited or liberate at an electrode is directly proportional to the quantity of electricity passed through the electrolytic solution	1
	b) Electrode potential/Concentration of ions /Overvoltage /Nature of electrode	½+½
	c) Thus, number of electrons involved = n = 2 $\Delta G^0 = - nFE^0$ $= -2 \times 96500 \times 0.236$ $= 45548\ J\ mol^{-1}$	½
	$= 45.548\ kJ\ mol^{-1}$ $\Delta G^0 = - nFE^0$ $= -2.303\ RT \log K_{eq}$	1
	$\log K_{eq} = \frac{nFE^\circ}{2.303\ RT}$	½
	$= \frac{45548}{2.303 \times 8.3143 \times 298}$ $\log K_{eq} = 7.9824$ K_{eq} = Antilog of 7.9824 $= 9.60282 \times 10^7$	1
26.	a) No of collisions/sec/unit volume of the reaction mixture.	1
	b) Rate of a reaction when centration of reactants is unity.	1
	a) $t_{1/2} = \frac{0.693}{K} = 0.693/2.2x10^{-5} = 3.15x10^4$ s	½
	$K = \frac{2.303}{t} \log \frac{[A]o}{[A]}$	½
	$\log \frac{[A]o}{[A]} = \frac{2.2x10^{-5}x90x60}{2.303} = 0.05158$	
	$\frac{[A]o}{[A]}$ = antilog 0.05158 = 1.126	

[A] =$\frac{[A_0]}{1.126}$ = 0.888=88.80% — 1

11.2% of SO_2Cl_2 would decompose on heating for 90 mnts

OR — ½+½

a) Reactions which appears to be of higher order but becomes reactions of 1st order under certain conditions are called pseudo order reactions.

b) It is the no: of reacting species involved in simultaneous collision during a reaction — 1

$$\text{Log}\frac{k2}{k1} = \frac{Ea}{2.303\,R}\left(\frac{1}{T1} - \frac{1}{T2}\right)$$ — 1

$$\log\frac{k2}{7.87x10-7} = \frac{103x1000}{2.303x8.314}\left(\frac{1}{273} - \frac{1}{293}\right)$$ — ½

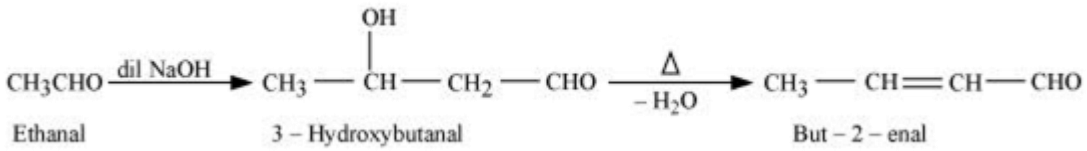
$$= \log\frac{k2}{7.87x10-7} = 1.345$$ — 1

$$\frac{k2}{7.87x10-7} = \text{antilog } 1.345 = 22.13$$ — 1

$k=22.13x7.87x10^{-7}=\mathbf{1.74x10^{-5}\ s^{-1}}$ — ½

27.

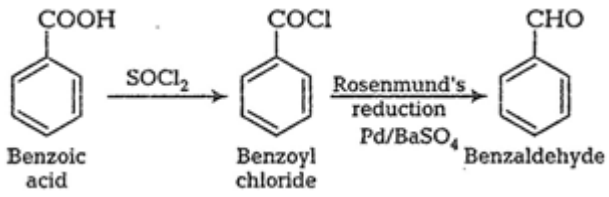
a)



1

1

b)



(i)

(A) $CH_3–CH_2–CH_2–CHO$

(B) $CH_3–\overset{\overset{O}{\|}}{C}–CH_2–CH_3$

(C) $CH_3–\underset{\underset{CH_3}{|}}{CH}–\overset{\overset{O}{\|}}{C}–H$

(D) $CH_3–CH_2–CH_2–CH_3$

4x ½

(ii) Since B is a ketone it will be less reactive due to +I effect and steric hindrance — ½+½

	OR	
	a) $(CH_3)_3CCHO$, absence of α Hydrogen b) (i) $CHI_3+C_6H_5COONa$ (ii) $CH_3CH(OH)CH_2COOC_2H_5$ c) (i) EWG stabilizes the carboxylate ions &acidic character increases (ii) Aldehydes and Ketones form addition compounds with $NaHSO_3$ whereas impurities do not. On hydrolysis we get pure aldehydes and ketones back	½ +½ 1 1 1 1

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