INDIAN SCHOOL MUSCAT

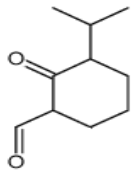
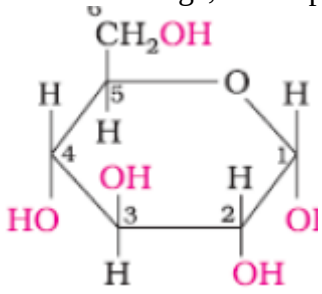
FINAL TERM EXAMINATION

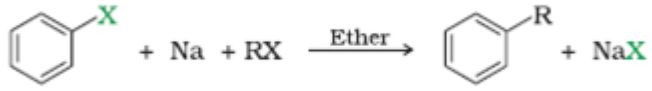
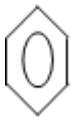
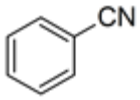
NOVEMBER 2018

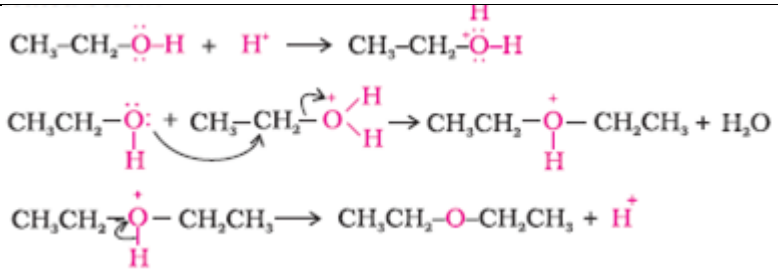
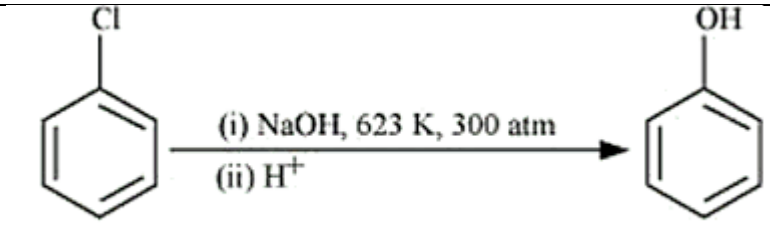
SET C

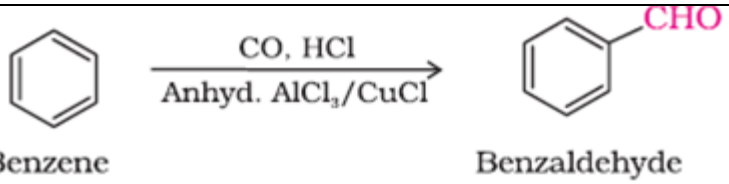
CLASS XII

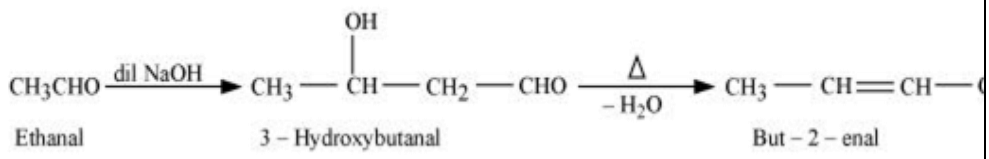
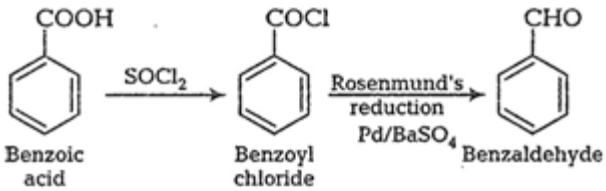
Marking Scheme – CHEMISTRY [THEORY]

Q.NO	Answers	Marks (with split up)
1.	2F OR Anode Cl_2,Cathode H_2	1
2.	Proteins that are crucial to communication system in the body are called receptors.	1
3.	Benzene sulphonyl chloride, to distinguish I^o,2^o and 3^oamines	½+½
4.	Due to increase in entropy which makes ΔG negative. OR Due to the formation of complex K2[HgI4], number of particles decreases	1
5.	CH_2=$CHCH_2Cl$ (stabilization of cation through conjugation)	1
6.	a) 1-PhenylPent-3-enol b) 	1 1
7.	a) When two molecules of amino acids combine, the amino group of one molecule reacts with –COOH group of another molecule by losing one water molecule to form a CO-NH linkage, called peptide linkage b) 	1 1
8.	a) (i) Molecularity 2 (ii)Pseudo first order b) 4 times	½+½ 1

9.	(i) Only those reactions, which have negative ΔG^o will occur spontaneously. (ii) Non-spontaneous reduction reactions can be made spontaneous by coupling them with reactions having very large negative ΔG^o.	1 1
10.	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 racemization OR  a) b) The chlorofluorocarbon compounds of methane and ethane are collectively known as freons eg:CCl_2F_2	1 1 1 ½+½
11.	a) Carbylamine reaction ($KCN+CHCl_3$), aniline forms phenyl isocyanide b) $C2H_5NH_2 > C_6H_5NHCH_3 > C_6H_5NH_2 > (C_2H_5)_2NH$ OR a)  b) 	1 1
12.	The polymer chains are held together by the weakest intermolecular forces (van der Waal's force).. 'cross links' formed in between the chains, which help the polymer to regain to its original position after the force is released eg buna-S, buna-N, Fibres are the thread forming solids which possess high tensile strength and high modulus. Here the different polymer chains are held together by strong intermolecular force eg;Nylon 6,6	½+½ ½+½
13.	Observed molar mass ,$M_B=\frac{Kf \times wB}{\Delta Tf \times wA}=\frac{5.13X0.2}{0.45X0.03}$=113.8g/mol Molar mass of CH_3COOH=60 g /mol Van't Hoff factor $=\frac{Normal\,molar\,mass}{Observed\,Molar\,mass}=\frac{60}{113.8}$=0.53 **OR** $p_{total}= p_A^o\chi_A+ p_B^o\chi_B$ $600=450 \times \chi_A +700(1-\chi_A)$	½ 1 ½ 1

	χ_A=0.4 χ_B=0.6 $P_A = p_A^o \chi_A$ =450X0.4=1800 $P_B = p_B^o \chi_B$ =700x0.6=420 $y_A = P_A/p$ =180/600=0.3 y_B=420/600=0.7	½ ½ ½+½ ½+½
14.	a) Ethyl alcohol and water (95.4% ethyl alcohol and 4.6% water) form constant boiling mixture (azeotrope) boiling at 351.1 °K. 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
15.	 **OR** a) -I effect & stabilization of anion formed. b) Decrease in surface area of contact and Vander Waals force with branching c) Elimination is favoured over substitution, and alkenes are formed	1 1 1 1 1 1
16.	 a) Chlorobenzene Phenol b) Allyl bromide is formed,CH_2Cl $CH=CH_2$ c) R-X + NaI→ R-I + NaX (Finkelstein reaction)	
17.	a) Zone refining- based on the principle that the impurities are more soluble in the melt than in the solid state of the metal b) Electrolytic refining -based on the differences in the electrode potential values of the metal and the impurities c) Vapour phase refining - is based on the difference in the chemical properties of metal and the impurities	1 1 1

18.	$\rho = \frac{Z\ X\ M}{a^3\ X N_a}$ $a^3 = \frac{4x207}{11.35x6.02x10^{23}}$ $= 4.949x10^{-8}$ cm=**494.9 cm** **r= a / 2√2** **=494.9 / 2√2 =174.95 pm**	½ ½ 1 ½+½
19.	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	1 1 1
20.	a)  b) $RCN + SnCl_2 + HCl \longrightarrow RCH = NH \xrightarrow{H_3O^+} RCHO$ $R\text{-}CH_2\text{-}COOH \xrightarrow[(ii)\ H_2O]{(i)\ X_2/\text{Red phosphorus}} R\text{-}\underset{\displaystyle X}{\underset{\vert}{CH}}\text{-}COOH$	
21.	a) Glucose &galactose b) Aminoacids which cannot be synthesised in the body and must be obtained through diet, are known as essential amino acids eg Valine c) Amylose is a linear polymer of α-D-glucose (C_1-C_4) and amylopectin is a branched chain polymer of α-D-glucose (C1-C4 & C_1-C_6)	½+½ ½+½ ½+½
22.	a) Glycine & aminocaproic acid, H2N-CH2-COOH &H2N-(CH2)5-COOH b) Acrylonitrile CH2=CHCN c) Chloroprene,CH2=CHCl-CH=CH2 OR a) On vulcanisation, sulphur forms cross links between the different poly isoprene units and thus the rubber gets stiffened. b) Speciality packaging, orthopaedic devices and in controlled release of drugs c) Condensation-Terylene, Bakelite Addition- PVC, Polythene	½+½ ½+½ ½+½ 1 ½+½ ½+½
23.	a) Narrow Spectrum – those which kill or inhibit a small range of gram positive or gram	½+½

	negative organisms. &Broad Spectrum – those which kill a wide range of gram negative and gram positive organisms b) Saccharin ,Aspartame, Sucrolose, Alitame c) prevent the interaction of histamine with receptors..so less amount of acid is released OR a) They are class of compounds used stress relief, mild and severe mental diseases b) Drugs compete with the substrates for binding on the enzyme site – c) They compete with histamine for the binding sites of receptors ans act as antiallergics	½+½ 1 1x3
24.	a) aryl amines, the $-NH_2$ group is attached directly to the benzene ring. So the lone pair electrons present in the nitrogen atom enter into the benzene ring and in alkyl amines electron density is more due to +I effect of alkyl gp. b) The lp on N will involve in resonance with CO gp which reduces electron density on N c) anilinium ion is meta directing.	1 1 1
25.	a)  (i)  (ii) a) (i) (A) $CH_3–CH_2–CH_2–CHO$ (B) $CH_3–\overset{\overset{O}{\|}}{C}–CH_2–CH_3$ (C) $CH_3–\overset{\overset{O}{\|}}{\underset{\underset{CH_3}{|}}{CH}}–C–H$ (D) $CH_3–CH_2–CH_2–CH_3$ (ii) Since B is a ketone it will be less reactive due to +I effect and steric hindrance	1 1 4x ½ ½+½ ½ +½ 1 1

	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	1 1
26.	a) cells cannot be recharged and used again. Eg: dry cell a) $2PbSO_4 + 2H_2O \rightarrow Pb + PbO_2 + 2H_2SO_4$ $\lambda_m = \frac{1000 \times K}{c}$ $= \frac{1000x5.25x10-5}{2.5x10-4} = 210\ scm^2mol^{-1}$ $\lambda^o_{HCOOH} = 394.5 + 50.5 = 400\ scm^2mol^{-1}$ $\alpha = \frac{\lambda m}{\lambda 0 m} = 210/400 = 0.525 = 52.5\%$ **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 b) Electrode potential/Concentration of ions /Overvoltage /Nature of electrode c) Thus, number of electrons involved = n = 2 $\Delta G^0 = - nFE^0$ $= -2 \times 96500 \times 0.236$ $= 45548\ J\ mol^{-1}$ $= 45.548\ kJ\ mol^{-1}$ $\Delta G^0 = - nFE^0$ $= -2.303\ RT \log K_{eq}$ $\log K_{eq} = \frac{nFE^\circ}{2.303\ RT}$ $= \frac{45548}{2.303 \times 8.3143 \times 298}$ $\log K_{eq} = 7.9824$ K_{eq} = Antilog of 7.9824 $= 9.60282 \times 10^7$	1 1 ½ 1 ½ 1 1 ½+½ ½ 1 ½ 1
27.	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) $t_{½} = \frac{0.693}{K} = 0.693/2.2\times10^{-5} = 3.15\times10^{4}$ s	½
	$K = \frac{2.303}{t} \log \frac{[A]o}{[A]}$	½
	$\log \frac{[A]o}{[A]} = \frac{2.2\times10^{-5}\times90\times60}{2.303} = 0.05158$	½+½
	$\frac{[A]o}{[A]}$ =antilog 0.05158=1.126	
	$[A] = \frac{[A_0]}{1.126} = 0.888 = 88.80\%$ 11.2% of SO_2Cl_2 would decompose on heating for 90 mnts	
	OR	
	a) Reactions which appears to be of higher order but becomes reactions of 1st order under certain conditions are called pseudo order reactions.	1
	b) It is the no: of reacting species involved in simultaneous collision during a reaction	1
	$\text{Log}\ \frac{k2}{k1} = \frac{Ea}{2.303\,R}\left(\frac{1}{T1} - \frac{1}{T2}\right)$	½
	$\log \frac{k2}{7.87\text{x}10-7} = \frac{103x1000}{2.303x8.314}\left(\frac{1}{273} - \frac{1}{293}\right)$ $= \log \frac{k2}{7.87\text{x}10-7} = 1.345$	1
	$\frac{k2}{7.87\text{x}10-7}$ =antilog 1.345=22.13	1
	$k=22.13\text{x}7.87\text{x}10^{-7}=\mathbf{1.74x10^{-5}\ s^{-1}}$	

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