GOVERNMENT OF KARNATAKA

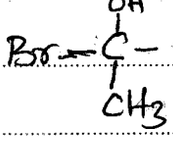
KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD

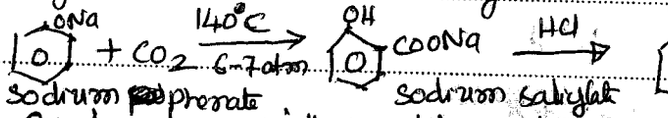
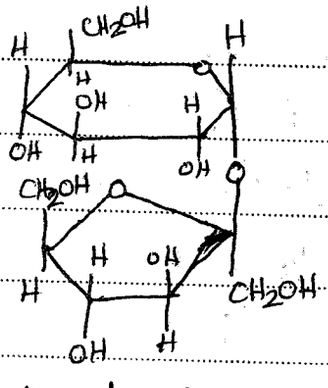
II YEAR PUC EXAMINATION – 2017 MARCH

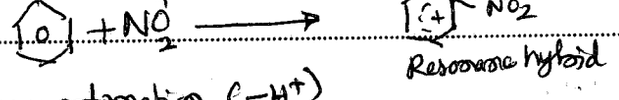
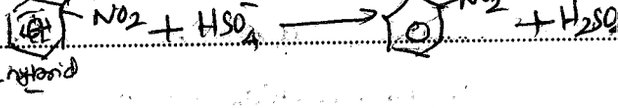
# SCHEME OF VALUATION

Subject Code : 34 Subject : CHEMISTRY

| Qn. No. | | Marks |
|---|---|---|
| 1 | Saturated Solution of Sodium chloride in water | 1 |
| 2 | 5 or Electronic config showing 5 unpaired electrons | 1 |
| 3 | EDTA or [Name] or any correct example | 1 |
| 4 | Number of solute particles | 1 |
| 5 | " The potential developed when a metal is in equilibrium with a one molar solution of its ions at 298K " or any other correct statement | 1 |
| 6 | Eight (8) | 1 |
| 7 | $-C_2H_5$ or ethyl group | 1 |
| 8 | $R-X + 2Na + R-X \longrightarrow R-R + 2NaX$ | 1 |
| 9 | Acetaldehyde or Ethanal | 1 |
| 10 | Insulin. | 1 |
| | Part – B. | |
| 11 | i) The energy difference betwn 3d & 4S is very less<br>ii) Have partially filled (n-1)d or 3d orbitals | 2 |
| 12 | Any two uses | 2 |
| 13 | BMO<br>i) Formed by the addition of atomic orbitals<br>ii) has less energy than the atomic orbitals | ABMO<br>i) Formed by substraction of atomic orbitals<br>ii) has more energy than the atomic orbitals. |

| Qn. No. | | Mar |
|---|---|---|
| | BMO ABMO | |
| | iii) It stabilises the molecule iii) It destabilises the molecule | |
| | and favours bond formation and ~~favours bond~~ doesn't favour bond formation | |
| | iv) Represented by $\sigma$ $\pi$ $\delta$ iv) Represented by $\sigma^*$ $\pi^*$ $\delta^*$ | |
| | OR any other correct two differences | 2 |
| 14 | Process which occurs by itself, without ~~help of any~~ any external help under given conditions or | |
| | any meaningful definition | 1 |
| | entropy increases | 1 |
| 15 | $K = \frac{0.693}{t_{1/2}}$ $30 \times 60 = 1800$ sec | 1 |
| | $K = \frac{0.693}{1800} = 3.85 \times 10^{-4}\ s^{-1}$ | 1 |
| 16 | For a weak ~~mono~~ basic acid $[H^+] = \sqrt{K_a \times C}$ | 1M |
| | $[H^+] = \sqrt{1.8 \times 10^{-4} \times 0.002}$ | |
| | $= \sqrt{3.6 \times 10^{-8}}$ | |
| | $= 6 \times 10^{-4}$ mol dm$^{-3}$ | 1 |
| | (Unit is not compulsory) | |
| 17 | Any two differences between Lyophilic - Lyophobic sols | 2 |
| 18 | "The property of solution of some ~~of~~ substances | |
| | which may rotate the path of plane polarised light | |
| | either to the right or left is called optical activity" | |
| | or any Meaningful correct statement | 1 |
| |  | 1 |

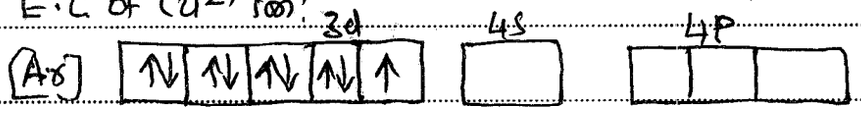
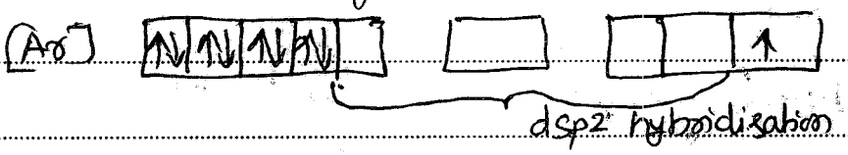
| Qn. No. | | Marks |
|---|---|---|
| 19 | $SN^1$ $SN^2$ | |
| i | It is unimolecular / It is bimolecular | |
| ii | It is a two step reaction / It is a single step reaction | |
| iii | order of reactivity of alkyl halides $3^\circ > 2^\circ > 1^\circ$ / order of reactivity of alkyl halide is $1^\circ > 2^\circ > 3^\circ$ | |
| iv | favoured by polar solvents / favoured by non-polar solvents | |
| v | occurs with weak bases / requires strong bases | |
| | OR any other 2 correct differences | 2 |
| 20 | | |
| a | Acid strength decreases with increase in the size of electron releasing alkyl group (−R) | 1 |
| b | Higher the number of electron withdrawing group (−Cl) greater the acidic strength | 1 |
| 21 |   Sodium phenolate Sodium salicylate | 2 |
| | OR Explanation with conditions | 1 |
| | Eq Reaction | |
| 22 |  | 2 |
| | Part–C –I | |
| 23 a) i) | Molten lead and molten Zn are immiscible, lighter Zn forms upper layer and heavier lead forms lower layer | 1 |
| ii) | Ag is about 300 times more soluble in molten Zn than in molten lead at 800°C (or 1073K) | 1 |

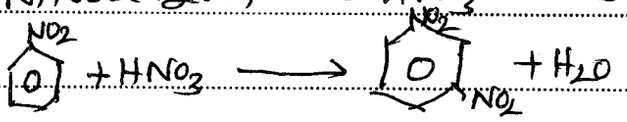
| Qn. No. | | M |
|---|---|---|
| 23 | iii) Zn-Ag alloy solidifies than lead, Zn distills leaving behind Ag at 960°C (or 1233K) | 1 |
| 23b | i) $C_{12}H_{22}O_{11} + \text{conc } H_2SO_4 \rightarrow 12C + H_2SO_4 \cdot 11H_2O$ | 1 |
| | ii) $K_2Cr_2O_7 + 6FeSO_4 + 7H_2SO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + 3Fe_2(SO_4)_3 + 7H_2O$ | 1 |
| 24 a) | $O_2 = \sigma 1s^2\ \sigma^* 1s^2\ \sigma 2s^2\ \sigma^* 2s^2\ \sigma 2p_z^2\ \pi 2p_x^2 = \pi 2p_y^2\ \pi^* 2p_x^1 = \pi^* 2p_y^1$ | 2 |
| @ | Due to presence of 2 un paired electrons oxygen molecule is paramagnetic | 1 |
| 24 b) | Potassium hexa cyano ferrate (II) – (IUPAC Name) | 1 |
| | 2 $CN^-$ ions | 1 |
| 25 a) | Neat labelled diagram | 1 |
| | Reduction zone reaction – compulsory. | 1 |
| | one Reaction in any other zone | 1 |
| 25 b) | EAN = Z − X + y | 1 |
| | = 29 − 2 + 8 | |
| | = 35 | 1 |
| | **PART-C – II** | |
| 26 a) | i. Formation of electrophile ($NO_2^+$ ion) | |
| | $HNO_3 + 2H_2SO_4 \rightarrow NO_2^+ + 2HSO_4^- + H_3O^+$ | 1 |
| | ii. Electrophilic attack on Benzene | |
| |  Resonance hybrid | 1 |
| | iii. Deprotonation ($-H^+$) | |
| |  Resonance hybrid | 1 |
| 26 b | Dipeptide is formed by the combination of two amino acid molecules OR any correct statement | 1 |
| | Tetrapeptide has 3 (three) peptide bonds | 1 |

| Qn. No. | | Marks |
|---|---|---|
| 27a | When oils exposed to moist air for a long time develops bad or unpleasant smell, called rancidity of oils | 1 |
| | $CH_2-OCO-C_{17}H_{35}$ (Tristearin) + $3NaOH \longrightarrow$ $CH_2-OH$ (Glycerol) + $3C_{17}H_{35}COONa$ (Soap / Sodium stearate) | |
| | or any other general equation or example | 2 |
| 27b | A - Chlorine in presence of Sunlight | |
| | B - Aqueous KOH | |
| | C - Acidified $K_2Cr_2O_7$ or other correct oxidising agent | 2 |
| | D - Soda lime OR [NaOH + CaO] | |
| 28a | i) Separation of middle oil fraction between 170°C to 230°C | 1 |
| | ii) Cooling & removal of Naphthalene, Washing with dil acid to remove basic impurities (pyridine) | 1 |
| | iii) Treatment of base (NaOH) to form Sodium Phenate & acidification OR reaction | 1 |
| 28b | $R-CONH_2 + Br_2 + KOH \xrightarrow{heat} RNH_2 + 2KBr + K_2CO_3 + 2H_2O$ (Acidamide, Bromine, Primary amine) | 2 |
| | or any Specific example Explanation – 1M reaction – 1M | |
| 29 a) | $2R-CHO + KOH$ (conc. or NaOH) $\longrightarrow R-CH_2OH + R-COOK$ (Aldehyde, Alcohol, or R COONa) | |
| | or Benzaldehyde / Formaldehyde reactant as Example | 1M |
| | Explanation: (Point to be emphasised) aldehydes not having α-hydrogen | 1M |
| 29 b) | i. 2-Butene | 1 |
| | ii. Ethyl carbylamine or Ethyl isocyanide | 1 |
| 29c | Chair form – most stable form of cyclohexane | 1 |
| | PTO | |

| Qn. No. | Part – C – III | M |
|---|---|---|
| 30 a | Any three important postulates – | 3 |
| b | $\Delta G = -2.303RT \log K_p$ | |
| | $\Delta G = -2.303 \times 8.314 \times 300 \times \log 8 \times 10^{-3}$ | |
| | $= 12044.89$ Joules (Unit is not compulsory) | 1 |
| 31 a | i. $pK_a = -\log K_a$ | |
| | $= -\log 1.8 \times 10^{-5}$ | |
| | $= 4.7447$ | 1 |
| | ii $PH = pK_a + \log \frac{[salt]}{[acid]}$ | 1 |
| | $= 4.7447 + \log \frac{[0.12]}{[0.08]}$ | |
| | $PH = 4.9208$ | 1 |
| 31 b | Lewis bases : $CaO$, $OH^-$ | 1 |
| | Lewis acids : $FeCl_3$ $SiF_4$ | 1 |
| 32 a) | " The coagulating power of an electrolyte is directly proportional to the valency of the active ion" | |
| | OR any correct Statement | 1 |
| | ~~Any two uses of colloids~~ Formation of delta | |
| | clarification of drinking water | |
| | Electrical precipitation of smoke OR | |
| | any two applications of colloids | 1 |
| 32 b | Barrier protection : Coating of metal with paints, enamels or thin film of oil or grease or with other metals like Zn, Sn etc | |
| | cathodic protection or any other methods (two methods) | 2 |
| 33 a) | Consider the I order reaction | |
| | $A \longrightarrow$ Products | |

| Qn. No. | | Marks |
|---|---|---|
| | Rate $\frac{dx}{dt} = K[A]$ | |
| | Velocity of reaction after time 't' | |
| | $\therefore \frac{dx}{dt} = K[a-x]$ | |
| | $\frac{dx}{(a-x)} = K \cdot dt$ ——— | 1 |
| | $\int \frac{dx}{(a-x)} = \int K \cdot dt$ | |
| | $-\ln(a-x) = Kt + C$ | |
| | When $t=0$, $x=0$ then $C = -\ln a$ | 1 |
| | $\therefore -\ln(a-x) = Kt - \ln a$ | |
| | $Kt = \ln a - \ln(a-x)$ | |
| | $\therefore K = \frac{2.303}{t} \log \frac{a}{(a-x)}$ | 1 |
| 33b) | Definition | 1 |
| | Example with explanation | 1 |
| 34a) | Extra pressure applied on the solution to stop the flow of solvent molecules into the solution through a semipermeable membrane is called osmotic pressure OR Pressure to stop osmosis or any correct meaningful statement | 1 |
| | Any two differences between Ideal and Non ideal solutions | 2 |
| 34b | Number of particles = $\frac{1}{8} \times 8$ corners $+ \frac{1}{2} \times 6$ faces | 1 |
| | $\therefore$ Number particles $= 1 + 3 = 4$ | 1 |
| 35a (i) | $SO_3 + H_2SO_4 \longrightarrow H_2S_2O_7$ (oleum) or fuming sulphuric acid | 1 |
| | $H_2S_2O_7 + H_2O \xrightarrow{\text{calculated amount of water}} 2H_2SO_4$ (98%) | 1 |
| (ii) | a) Valence electrons move freely in metallic structure like gas | 1 |
| | b) Positively metal consits definite arrangement of positively | |

| Qn. No. | |
|---|---|
| | charged Kernel immersed in a sea of mobile electrons |
| 35 b) | i) cyclopropane has maximum angle strain |
| | ii) cyclopentane has minimum angle strain |
| 35 c) | Glucose on oxidation with $Br_2$ water gives gluconic acid |
| | This indicates presence of aldehydic group |
| 35 d) | Neat labelled diagram of SHE |
| | $H^+ + \bar{e} \rightleftharpoons \frac{1}{2} H_2$ |
| | $Pt\ H_2(1\ atm) \mid H^+(1M HCl)$ |
| | or Explanation covering all the above points |
| 36 a) | E.C of $Cu^{2+}$ ion:   |
| | In presence of ligand $NH_3$   |
| | Square planar structure |
| | Paramagnetic |
| 36 b) | i) $C_6H_5-\underset{H}{\overset{O}{\overset{\|}{C}}} + NaHSO_3 \longrightarrow C_6H_5-\underset{OH}{\overset{H}{\overset{\|}{C}}}-SO_3Na$ |
| | ii) $CH_3COOH + NH_3 \xrightarrow{heat} CH_3CONH_2 + H_2O$ |
| | iii) $CH_3NH_2 + HNO_2 \longrightarrow CH_3OH + N_2\uparrow + H_2O$ |
| 36 c | $\log \frac{K_2}{K_1} = \frac{Ea}{2.303R}\left[\frac{T_2 - T_1}{T_1 T_2}\right]$ |
| | $\log 2 = \frac{Ea}{2.303 \times 8.314}\left[\frac{310-300}{300 \times 310}\right]$ |
| | $Ea = \frac{2.303 \times 8.314 \times 300 \times 310 \times \log 2}{10}$ |
| | $Ea = 53.6\ KJ$ |

| Qn. No. | | Marks |
|---|---|---|
| Qno: 37 a | Nitrobenzene, Conc $HNO_3$ and Conc $H_2SO_4$ | 1 |
| |  | 1 |
| | Yellow colour | 1 |
| b) | Soln of the compd + 5% α-Naphthol | |
| | in alcohol and conc $H_2SO_4$ added along the sides of test tube | 1 |
| | Observation : Deep Violet ring at the junction of layers | 1. |
| | | |
| 38 | principle | 1 |
| | Procedure | 2 |
| | observation, calculation including tab column | 1 |
| | conclusion | 1 |
| | | |
| 39 | $2KMnO_4 + 10FeSO_4 + 8H_2SO_4 \longrightarrow K_2SO_4 + 2MnSO_4 + 5Fe_2(SO_4)_3 + 8H_2O$ | 2 |
| | 31.6 (Eq. mass of $KMnO_4$) | 1 |
| | Self indicator ie $KMnO_4$ | 1 |
| | colourless to pale pink | 1. |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |