|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A close-up of a sign  Description automatically generated** | | | | | |
|  | | | | | |
| **PRE-BOARD 1 (2023-24) - AK** | | | | | |
| **Subject: CHEMISTRY**  **Grade: XII** | | Max. Marks:70Time: 3 Hrs | | | |
| **Name:** | | | **Section:** | **Roll No:** | |
| A picture containing text, screenshot, font  Description automatically generated | | | | | |
|  | **SECTION A** | | | | |
| 1 | 1. the vapour will contain a higher percentage of benzene | | | | 1 |
| 2 | 1. order of the reaction | | | | 1 |
| 3 | 1. 3 AgCl, 2 AgCl, 1 AgCl | | | | 1 |
| 4 | 1. racemic mixture | | | | 1 |
| 5 | 1. 100 minutes | | | | 1 |
| 6 | c)Potassium cyanide, KCN | | | | 1 |
| 7 | 1. it is d2 sp 3 hybridised, octahedral | | | | 1 |
| 8 | d)Anomers | | | |  |
| 9 | b)phenol | | | | 1 |
| 10 | 1. ethanol< phenol< acetic acid< chloroacetic acid | | | | 1 |
| 11 | 1. Iodobenzene | | | | 1 |
| 12 | 1. Fehling’s solution test | | | | 1 |
| 13 | d)A is false but R is true. | | | |  |
| 14 | 1. Both A and R are true and R is the correct explanation of A | | | | 1 |
| 15 | c)A is true but R is false | | | | 1 |
| 16 | c)A is true but R is false | | | | 1 |
|  | **SECTION B** | | | |  |
| 17 | 1. When two liquids are mixed, there is a decrease in volume. The decrease in volume results in the negative deviation from Raoult’s law. This is because A- B interactions are stronger than A-Aand B-B interactions. 2. Egg in water will swell whereas in NaCl solution it will shrink. This is because due to osmosis, the net flow of the solvent is from less concentrated to more concentrated solution.   (OR) 1kg of solvent contains 1000/18=55.55 moles.Mole fraction of H2S is 0.195/0.195+55.55=0.195/55.475=0.0035Pressure of H2S  =0.987/0.0355=282bar | | | | 2 |
| 18 | In [NiCl4]2-,Ni is in+2 oxidation state with the configuration 3d8 4s0.Cl- ion being weak ligand, it cannot pair up the electrons in 3dorbitals.Hence,it is paramagnetic. In [Ni (CO)4],Ni is in zero oxidation with the configuration 3d8 4s2. In the presence of CO ligand, the 4s electrons shift to 3d to pair up 3d electrons.Thus,there is no unpaired electron present. Hence, it is paramagnetic | | | | 2 |
| 19 | 1. The methyl group due to its +I effect reduce the magnitude of positive charge on carbonyl carbon atom.  Moreover, it also hinders the approach of nucleophile CN−. Since, in acetaldehyde there is one methyl while in acetone there are two methyl groups attached to crbonyl group therefore acetaldehyde is more reactive than acetone towards nucleophilic addition with HCN. 2. Due to the presence of the lone pair of electrons on the oxygen atom in the hydroxyl group (OH - ), the electrophilic character of carbonyl carbon is decreased due to the possibility of resonance, which in turns helps it gain extra stability. | | | | 2 |
| 20 | Accomplish the following conversions: | | | | 2 |
| 21 |  | | | | 2 |
|  | **SECTION C** | | | |  |
| 22 | a) Rate = k[X]a [Y]b  1.2 x 10- 3 = k (0.1)a (0.1)b ------------- (1)  1.2 x 10- 3 = k (0.1)a (0.2)b-------------(2)  Dividing (2) by (1), we get  (2) b = 1 or b = 0  2.4 x 10- 3 = k(0.2)a (0.1)b ------------(3)  Dividing (3) by (1) we get  2 a = 2 or a= 1  Hence the rate equation is: Rate = k[X][Y]0 and the order of the reaction = 1  b)The value of rate constant for the reaction = min-1 | | | | 3 |
| 23 | 1. 1- methylcyclohex-1-e ne 2. 2- methylbut-2-ene 3. 2,2,3 - Trimethyl-pent-2-ene | | | | 3 |
| 24 | Predict the products of the following reactions:   1. CH3I + CH3CH2CH2OH 2. C6H5OH + C2H5Br 3. (CH3)3C-I + C2H5OH   (OR) | | | | 3 |
| 25 | 1. Uracil. 2. Vitamin D causes rickets. | | | | 3 |
| 26 | 1. 1 – Bromopentane , 2- Bromopentane , 2- Bromo- 2-methylbutane 2. 1- Bromo- 3- methylbutane, 2 – Bromo-3 – methylbutane , 2- Bromo- 2-methylbutane 3. 1- Bromobutane, 1- Bromo-3 -methyl butane , 1- Bromo -2- methylbutane, 1- Bromo- 2,2- dimethylpropane | | | | 3 |
| 27 | 1. Glucose does not give 2,4-DNP test, Schiff’s test 2. It does not form the hydrogensulphite addition product with NaHSO3 3. The pentaacetate of glucose does not react with hydroxylamine indicating the absence of free —CHO group. | | | | 3 |
| 28 | Phenol is more acidic than alcohols due to stabilisation of phenoxide ion through resonance. The alkoxide ion is destabilised due to + I effect of alkyl group  1. This is because with increase in branching, van der Waals forces of attraction decreases with decrease in surface area, hence boiling point decreases. 2. This is due to the electron-donating effect of the hydroxyl group in phenol, electron density increases at the ortho and para position of the aromatic ring. So, phenol undergoes electrophilic substitution more easily than benzene. | | | |  |
|  | **SECTION D: Each question has an internal choice and carries 4 (1+1+2) marks** | | | |  |
| 29 | 1. Identify the reaction order from each of the following rate constants.   (i) 2nd order (ii) 1st order   1. Overall order of a reaction = ½ + 3/2 = 2 2. Rate= k[X]2 --- (1)   On increasing the concentration of X to 3 times Rate = k[3X]2 = 9k[X]2 ------ (2)  Therefore, the rate increases by 9 times  (OR)  A reaction is first order in A and second order in B.   1. Rate = - d[R]/dt = k [A][B]2 2. Rate = k[2A][2B]2 = 8k[A][B]2 Hence rate increases by 8 times | | | | 4 |
| 30 | 1. Trimethylamine 2. Benzyl isocyanide 3. Give a chemical test to distinguish between the following pairs: 4. aniline and benzyl amine: HNO2 test 5. dimethyl amine and trimethyl amine: Hinsberg’s test   (OR) | | | | 4 |
|  | **SECTION E** | | | |  |
| 31 | **Answer any 5 among the 7 questions**   1. The amount of dissolved oxygen in water decreases with rise in the water's temperature, as Kh value increases. Cold water has more dissolved oxygen per unit area than warm water. This the reason why aquatic animals are more comfortable in cold water than warm water. 2. Methyl alcohol is more volatile than water. But NaCl is non-volatile solute. On addition of NaCl in water , vapour pressure is lowered and as a result boiling point of water increased. But on addition of methyl alcohol ,vapour pressure is more than that of water. Hence boiling point decreases. 3. When salt is spread over snow covered roads, snow starts melting from the surface because of the depression in freezing point of water and it helps in clearing the roads. 4. KCl can dissociate in water and is an electrolyte. So, 1 molecule of KCL gives 2 ions. Hence, its van't Hoff factor is 2. So, the elevation of boiling point of 1M KCl solution will be nearly double than that of 1M sugar solution. | | | | 5 |
| 32 | 1. BaCl2 test      1. Potassium trioxalatoferrate(III) 2. Water acts as a ligand which splits the d-orbitals, but in the absence of ligand, crystal field splitting does not occur , there is no d-d transition and hence the substance is colourless. 3. This is due to the presence of (en) which is a strong field ligand, the splitting is increased. Due to the change in  t2g - eg splitting the colouration of the compound changes from green to blue. 4. T2g4   (OR)  Draw the geometrical isomers of complex [Pt(NH2)2Cl2]   1. Hexaamminechromium(III) hexacyanidocobaltate(III) 2. Arrange the following complexes in the increasing order of conductivity of their solution: [Co(NH3)3Cl3], [Co(NH3)4Cl2]Cl, [Co(NH3)5Cl]Cl2, [Co(NH3)6]Cl3 3. [ F e ( C N ) 6 ] 3 − involves d 2 s p 3 hybridization with one unpaired electron and [ F e ( H 2 O ) 6 ] 3 + involves s p 3 d 2 hybridization with five unpaired electrons. This difference is due to the presence of strong ligand and weak ligand H 2 O in these complexes. | | | | 5 |
| 33 | 1. CH 3 CH 2 CH 3 , CH 3O CH 3, CH 3 CHO, CH 3 CH 2 OH 2. Draw structures of the following derivatives:Cyclopropanone oxim 4. A = ( CH3)2CHCH2COOH   B = (CH3)2CH- CH(Cl) – COOH  C = (CH3)2C = CH- COOH  D = (CH3)2C = CH2  (OR)     1. Iodoform test : description & equation 2. This is because carboxylate ion forms equivalent resonance structures whereas phenoxide ion forms non equivalent resonance structures. Moreover in phenoxide ion the negative charge is on a less electronegative carbon atom whereas in carboxylate ion the negative charge is on a more electronegative oxygen atom. This means that a carboxylate ion is more stabilised by resonance making it more acidic. 3. Complete each synthesis by giving missing starting material, reagent or products:   A chemical formula with text  Description automatically generated  A chemical formula with black text  Description automatically generated A chemical formula with black text  Description automatically generated  COO -  Benzoyl Chloride 98-88-4 | Tokyo Chemical Industry (India) Pvt. Ltd.  A black line drawing of a hexagon  Description automatically generated | | | |  |