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| **PB1/CHAK/1222/A 24-NOV-2022** | | | |
| **PRE-BOARD EXAMINATION - I (2022-23)** | | | |
| **Subject: CHEMISTRY (ANSWER KEY)**  **Grade: XII** | | Max. Marks:70Time: 3Hrs | |
|  | **SECTION A** | | |
| 1 | c | | 1 |
| 2 | a | | 1 |
| 3 | b | | 1 |
| 4 | d | | 1 |
| 5 | b | | 1 |
| 6 | b | | 1 |
| 7 | b | | 1 |
| 8 | b | | 1 |
| 9 | d | | 1 |
| 10 | a | | 1 |
| 11 | **b** | | 1 |
| 12 | d | | 1 |
| 13 | b | | 1 |
| 14 | b | | 1 |
| 15 | C | | 1 |
| 16 | C | | 1 |
| 17 | b | | 1 |
| 18 | a | | 1 |
|  | **SECTION B** | |  |
| 19 | a. Tert butyl alcohol or 2-methyl propan-2-ol using Lucas reagent , mixture of concHCl and ZnCl2 the reaction will follow the SN 1 pathway.  b.Chloromethane is having higher dipole moment . Due to smaller size of fluorine the dipole moment of flouromethane is comparatively lesser. | | 2 |
| 20 | 1. Both the compounds are non-electrolytes, non-volatile with same molality. So, it is same as ΔTα m.   b) At higher temperature, solubility of oxygen decreases or amount of CO2 dissolved is greater at lower temperature rather than the hot cold drink. | | 2 |
| 21 | a) Cr2+ is a stronger reducing agent than Fe2+. E°Cr3+/Cr2+ is negative (–0.41 V) whereas E°Fe3+/Fe2+ is positive (+ 0.77 V). Thus Cr2+ is easily oxidized to Cr3+ but Fe2+ cannot be easily oxidized to Fe3+. Hence, Cr2+ is stronger reducing agent than Fe2+.  (b) More positive is the value of E°, reaction will be more feasible. As E°Co3+/Co2+ is maximum, thus Co2+ ion is most stable | | 2 |
| 22 | 1. Denticity : The number of coordinating groups present in a ligand is called the denticity of ligand. For example, bidentate ligand ethane-1, 2-diamine has two donor nitrogen atoms which can link to central metal atom. 2. Double salts dissociate into ions completely when dissolved in water. On the other hand, in complexes, the complex ion does not dissociate.   **OR**   1. . In [Mn(CN)6] 3–, Mn is in +3 state so, it has configuration of 3d 4 . Since CN– is a strong field ligand hence pairing of electrons in 3d-orbital takes place. So, [Mn(CN)6] 3– has two unpaired electrons. But in [MnCl6] 3–, Cl– is a weak field ligand, so no pairing takes place and it has 4 unpaired electrons 2. Anhydrous CuSO4 has no ligand. So, crystal field splitting does not occur so, it does not show any colour but in hydrated form it is linked with H2O ligand so, it shows colour due to d-d transition | | 2 |
| 23 | 2. o-hydroxybezaldehyde will be formed ( Equation required) | | 2 |
| 24 |  | | 2 |
| 25 | 1. Nitrous acid test 2. Coupling reaction (equation) | | 2 |
|  | **SECTION C** | |  |
| 26 | 1. Aniline is acetylated, before nitration reaction in order to avoid formation of tarry oxidation products and protecting the amino group, so that p -nitro derivative can be obtained as major product. 2. Due to the presence of acidic hydrogen in the N-alkylbenzenesulphonamide formed by the treatment of primary amines. 3. . Aniline does not react with methylchloride in the presence of AlCl3 catalyst , because aniline is a base and AlCl3 is Lewis acid which lead to formation of salt. | | 3 |
| 27 | 1. . The major product formed when 2-cyclohexylchloroethane undergoes dehydrohalogenation reaction is 1- cyclohexylethene. (Equation)   The reagent which is used to carry out the reaction is ethanolic KOH.   1. Allyl chloride shows high reactivity as the carbocation formed in the first step is stabilised by resonance while no such stabilization of carbocation exists in the case of n-propyl chloride. | | 3 |
| 28 | **OR**  Since the molecular formula of D is CH2O2, thus, D is HCOOH (formic acid). D is obtained by the acidification of C, so, C is sodium formate (HCOONa). Thus, A must be formaldehyde (as it undergoes Cannizzaro reaction with a strong base) | |  |
| 29 |  | | 3 |
| 29 |  | | 3 |
|  | **SECTION D** | |  |
| 30 | i)Mn3+ and Co3+ are the strongest oxidizing agents from the data given  ii) | | 4 |
| 31 | 1. Reverse osmosis  1. Fresh water container 2. Cellulose acetate | | 4 |
|  | **SECTION E** | |  |
| 33 | (a) (a) The difference of energy between two splitted levels of d-orbitals is called crystal field splitting energy    (c) n [CoF6] 3–, Co is in +3 state and has 3d 6 configuration    OR   1. (i) Linkage isomerism   (ii) Ionization isomerism  b)    c)  [Ni (CN)4] 2- dsp2 hybridisation, Ni in +2 state all electrons are paired, so diamagnetic. [Ni(CO)4] sp3 hybridisation, Ni in 0 state all electrons are paired so diamagnetic. | | 5 |
| 34 | a)     1. It is used for the inflow and outflow of electrons. 2. HCl will have greater value of molar conductivity because H+ ions are smaller than Na+ ions and hence H+ ions have greater ionic mobility than Na+ ions.   OR  a)      b)The reaction at anode with lower value of E° is preferred i.e., O2 gas should be liberated but on account of over potential of oxygen reaction at anode, preferred reaction is    i.e., Cl2 gas is liberated at anode in the electrolysis of aq. NaCl.  c) Molar conductivity increases with decrease in concentration. This is because the total volume, V, of solution containing one mole of electrolyte also increases. It has been found that decrease in K on dilution of a solution is more than compensated by increase in its volume. | | 5 |
| 35 | A is an alkene B is an aldehyde with –CH3 group C is a methyl ketone      **OR** | | 5 |

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