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| **HY/CHAK/1222/C 15-SEP-2022** | | | |
| **HALF YEARLY EXAMINATION (2022-23)** | | | |
| **Subject: CHEMISTRY (ANSWER KEY)**  **Grade: XII** | | Max. Marks:70Time: 3 Hrs | |
|  | **SECTION A** | | |
| 1 | a | | 1 |
| 2 | b | | 1 |
| 3 | d | | 1 |
| 4 | b | | 1 |
| 5 | c | | 1 |
| 6 | c | | 1 |
| 7 | b | | 1 |
| 8 | b | | 1 |
| 9 | d | | 1 |
| 10 | b | | 1 |
|  | **SECTION B** | |  |
| 11 | On taking large amounts of common salt, Na+ and Cl− ions enter into the body fluid thereby raising the concentration of the solutes. As a result, osmotic pressure increases which may rupture the blood cells. | | 1 |
| 12 | When sugar is added to the water the vapor pressure of the water decreases because non-volatile solute makes the solvent to not evaporate at a lesser temperature when compared to normal solvent. | | 1 |
| 13 | When temperature increases, the vibration of metal ions increases. This results in increase in resistance of metal and hence, decrease in conductivity. In electrolytic conductors, the ions are charge carriers and with increase in temperature, ionization increases and hence, conductivity increases. | | 1 |
| 14 | For weak electrolytes such as acetic acid, molar conductivity increases rapidly with dilution. (C = concentration of electrolyte) is not linear. Therefore the value of Λ°m for weak electrolytes cannot be obtained by extraploting the graph. | | 1 |
| 15 | Platinum foil used in the construction of hydrogen electrode serves as an inert electrode through which electrons flow into and out of the electrode. | | 1 |
| 16 | **[Co** (NH3)5ONO] Cl2.- Pentaaminenitrito-O- cobalt (III) chloride. | | 1 |
| 17 |  | | 1 |
| 18 | It is because Cu2+ has one unpaired electron and undergoes d-d transition by absorbing light from visible region and radiate blue colour, whereas Zn2+ is colourless due to absence of unpaired electrons | | 1 |
| 19 | It is due to larger size, absence of unpaired electron and weak inter atomic attraction and weaker metallic bond. | | 1 |
| 20 | It is because Cr3+(t2g3 ) half-filled orbitals are more stable than Cr2+(3d4 ). | | 1 |
|  | **SECTION C** | |  |
| 21 |  | | 2 |
| 22 |  | | 2 |
| 23 | The chromates and dichromates are interconvertible in aqueous solution depending upon pH of the solution. The oxidation state of chromium in chromate and dichromate is the same. | | 2 |
| 24 | 1. In d block elements, oxidation states differ from each other by unity, e.g., VII, VIII, VIV, VV . This is in contrast with the variability of oxidation states of non transition elements where oxidation states normally differ by a unit of two. 2. This catalytic activity is dueto their ability to adopt multiple oxidation states and to form complexes. | | 2 |
| 25 |  | | 2 |
| 26 | 1. Transition metals have vacant d-orbitals which accept lone pair from ligands to form a bond and give pair of electron to molecular orbital of ligand forming d π -p π -bond. 2. Ni2+ has unpaired electrons, therefore, forms high spin complex as pairing of electrons does not take place because after pairing only one d-orbital will be left which cannot be used in octahedral complex | | 2 |
| 27 | 1. When  Eexternal​>1.1V Any further increase in the external potential again starts the reaction but in the opposite direction. It now functions as an electrolytic cell, a device for using electrical energy to carry non-spontaneous chemical reactions. 2. Salt bridge permits the flow of current by completing the circuit. No current will flow and **the voltage will drop to zero** if the salt bridge is removed. | | 2 |
|  | **SECTION D** | |  |
| 28 | **`**  **OR** | | 3 |
| 29 |  | | 3 |
| 30 | ZnCl2 combines with the ammonia produced to form the complex salt [Zn(NH3)2Cl2] otherwise the pressure developed due to ammonia would crack the seal of the cell. | | 3 |
| 31 | a)H2O is weak field ligand , which causes small splitting , leading to the d-d transition corresponding green colour, however due to the presence of ( en ) which ia 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. b) [Co(en)3​]2​(SO4​)3​., hybridisation of the compound is : d2sp3 | |  |
| 31 | 1. . It is due to presence of unpaired electrons and there is more frequent metal-metal bonding in 5d series than 3d and 4d series.  1. Zinc has lowest enthalpy of atomization due to weak metallic bond which is due to absence of unpaired electrons. 2. Density goes on increasing from Sc to Cu because atomic mass increases more than atomic volume | | 3 |
| 33 | b)Spectrochemical series-definition. | |  |
| 34 | Lanthanoid contraction – The cumulative effect of the regular decrease in size or radii of Lanthanoid with increase in atomic number is called Lanthanoid contraction.  Causes – The shape of f orbitals is diffused. They have poor shielding effect due to which the effective nuclear charge increases with increase in atomic number. This causes a decrease in atomic radii  Consequences – Due to Lanthanoid contraction  i) Radii of the members of the third transition series is similar to those of second transition series. ii) It becomes difficult to separate Lanthanoids. | |  |
|  | . **SECTION D** | |  |
| 35 | OR   1. In a solution, the vapour pressure of a component at a given temperature is equal to the mole fraction of that component in the solution multiplied by the vapour pressure of that component in the pure state.   Any one difference. | | 5 |
| 36 | iii)Optical isomerism  b)    c)    OR | | 5 |
| 37 | a)    b)        **ii)** Oxidation state Apart from +3 oxidation state, lanthanoids show +2 and +4 oxidation states due to large energy gap between 4f and 5d subshells. Whereas actinoids show large number of oxidation states due to small energy gap between 5f and 6d subshells. OR  a)    Na2Cr2O7 + 2 KCl → K2Cr2O7 + 2 NaCl  b)  c) Alloys-definition  Mischmetal which consists of a lanthanoid metal (~ 95%) and iron (~ 5%) and traces of S, C, Ca and Al.  mischmetal is used in Mg-based alloy to produce bullets, shell and lighter flint. | | 5 |

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