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| UNIT TEST (2023-24) | | | | | |
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| Subject: Chemistry (Answer Key)  Grade: 12 | | Max. Marks:50Time: 2 ½ Hours | | | |
| Name: | | | Section: | Roll No: | |
| 1 | a | | | | 1 |
| 2 | b | | | | 1 |
| 3 | c | | | | 1 |
| 4 | d | | | | 1 |
| 5 | d | | | | 1 |
| 6 | a | | | | 1 |
| 7 | b | | | | 1 |
| 8 | b | | | | 1 |
| 9 | d | | | | 1 |
| 10 | b | | | | 1 |
| 11 | a)b) | | | |  |
| 12 |  | | | | 2 |
| 13 | This cell is a mercury cell  Anode  cathode | | | | 2 |
| 14 | Ecell = 0.277 – (0.0592/2) × log10(0.1) = 0.277 – (0.0296) (-1) =**0.3066 Volts** | | | | 2 |
| 15 |  | | | | 2 |
| 16. | a) Copper atom has completely filled d orbitals (3d10) in its ground state, yet it is regarded as a transition element due to incompletely filled d-orbital in its ionic states i.e., Cu2+ (3d9).  b) Due to comparable energies of 5f 6d and 7s orbitals of actinoids, these show a larger number of oxidation states than corresponding members of lanthanoids. | | | | 2 |
| 17. | a)  ncert-exemplar-problems-class-12-chemistry-chemical-kinetics-39  b) For a reaction rate generally depends on orientation factor and activation energy. In the reaction under observation, the orientation effect is not proper. Therefore, effective collisions are not much as expected. The reaction is, therefore, a slow reaction. | | | | 3 |
| 18 | a)  i)Hell Volhard Zelinsky Reaction  ii)Gabriel phthalimide synthesis  b) | | | | 3 |
| 19 | a)    b) 4-Methoxy benzoic acid < Benzoic acid < 4-Nitrobenzoic acid < 3, 4-Dinitrobenzoic acid.  c) | | | |  |
| 20 | 1. In aniline, the lone pair of electrons on the N-atom is delocalised over the benzene ring. As a result, the electron density on the nitrogen decreases. But in cyclohexylamine, the lone pair of electrons on N-atom is readily available. Hence aniline is weaker base than cyclohexylamine. 2. Due to presence of two H-atoms on N-atom of primary amines, they undergo extensive intermolecular H-bonding while tertiary amines due to the absence of a H-atom on the N-atom, do not undergo H- bonding. As a result, primary amines have higher boiling points than 3° amines. 3. Aniline being a Lewis base reacts with Lewis acid AlCl3 to form a salt. As a result, N of aniline acquires positive charge and hence it acts as a strong deactivating group for electrophilic substitution reaction. Consequently, aniline does not undergo Freidel Craft reaction. | | | |  |
| 21 | 1. The large positive E° value for Mn3+/Mn2+ shows that Mn2+ is much more stable than Mn+3 due to stable half filled configuration (3d5). Therefore the 3rd ionisation energy of Mn will be very high and Mn3+ is unstable and can be easily reduced to Mn2+. E° value for Cr3+ | Cr2+ is positive but small i.e. Cr3+ can also be reduced to Cr2+ but less easily. Thus Cr3+ is more stable than Mn3+. 2. The lanthanoid contraction arises due to imperfect shielding of one 4f electron by another present in the same subshell. | | | |  |
| 22 |  | | | | 2+1 |
| 23 | 1. Order: it is the sum of the powers to which the concentration terms are raised in the rate equation   Molecularity: it is the number of species(that must collide simultaneously in order to bring about a chemical reaction.    2. Zero order 3. Mol/L/s   OR  a)    b)    c) The reaction whose rate constant has same units as the rate of reaction, will have zero order of reaction. | | | | 2+2+1 |
| 24 | a)    b)     1. Cells that convert the energy of combustion of fuels like hydrogen, methanol, methane, etc directly into electrical energy are called fuel cell   **OR**   1. Anode: PbSO4 + 2H2O 🡪 PbO2 + 4H+ + SO4 -2 + 2ē   Cathode PbSO4 + 2 ē 🡪 Pb + SO4 -2  Overall : 2 PbSO4 + 2H2O 🡪 Pb + PbO2 + 2H2SO4 | | | | 2+3 |