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| **HALF YEARLY EXAM (2023-24)**  **ANSWER KEY** | | | | |
| **Subject: CHEMISTRY**  **Grade: XI** | | **Max. Marks:70**  **Time: 3Hrs** | | |
| **Name:** | | | **Section:** | **Roll No:** |
|  | **SECTION A** | | | |
| 1 | c) | | | | 1 |
| 2 | b) | | | | 1 |
| 3 | c) | | | | 1 |
| 4 | c) | | | | 1 |
| 5 | b) | | | | 1 |
| 6 | a) | | | | 1 |
| 7 | b) | | | | 1 |
| 8 | b) | | | | 1 |
| 9 | c) | | | | 1 |
| 10 | d) | | | | 1 |
| 11 | c) | | | | 1 |
| 12 | b) | | | | 1 |
| 13 | a) | | | | 1 |
| 14 | a) | | | | 1 |
| 15 | (i) Assertion and Reason both are correct statements, and Reason is correct explanation of Assertion. | | | | 1 |
| 16 | (iii) Assertion is correct statement, but Reason is wrong statement. | | | | 1 |
|  | **SECTION B** | | | |  |
| 17 | BaCO3​→BaO+CO2​ When 197 grams of BaCO3​ is decomposed it forms 22.4 liters of CO2​ If 9.85 grams of BaCO3​ is decomposed it forms X liters of CO2​. X=1979.85×22.4​=1.12. Hence volume is 1.12 liters | | | | 2 |
| 18 | 1. 4 electrons (1s2 2s2 2p6 3s2 3p6 3d4) 2. 21 (Scandium) | | | | 2 |
| 19 |  | | | | 2 |
| 20 | 1. Due to less inter electronic repulsion in Cl than F as F is smaller in size than Cl. 2. Due to similar charge/radius ratio i.e. similar polarizing power. | | | | 2 |
| 21 | 1. Oxygen is oxidized from –2 to zero, and fluorine is reduced from 0 to –1; since fluorine is the strongest oxidizing agent. 2. Because Cl is already present in its highest oxidation state of +7 | | | | 2 |
|  | SECTION C | | | |  |
| 22 | (b) Molarity is temperature dependant as volume changes with temperature | | | | 3 |
| 23 | Basic medium: 10 Cl- + 8 H2O + 2MnO4- → 2Mn2+ + 5Cl2 + 16OH- | | | | 3 |
| 24 |  | | | | 2 |
| 25 | 1. The reactant that is completely used up in a reaction, and thus determines when the reaction stops. | | | | 3 |
| 26 |  | | | | 3 |
| 27 | a) B  b) D  c) A | | | | 3 |
| 28 | 1. In case of water molecule, the oxygen atom, in addition to forming bonds with the hydrogen atoms, also carries two pairs of unshared electrons. All of the electron pairs—shared and unshared—repel each other. CO2 is linear as there are no lone pairs present on C atom which would be responsible for decreasing in bond angle.   ii)     1. If the lone pair of electrons is in equatorial position, then it forms an angle of approximately 120o with equatorial bond pair of electrons. But if the lone pair of electrons is in axial position, then it forms an angle of approximately 90o with equatorial bond pair of electrons.  Greater the bond angle, lesser is the repulsion between lone pair and bond pair of electrons. | | | | 3 |
|  | **SECTION D** | | | |  |
| 29 | 1. Paschen series 2. Heisenberg’s uncertainty principle 3. The wavelength associated with moving object, or an electron is inversely proportional to the momentum of the particle **(λ = h/mv)** 4. No two electrons in an atom can have the same four quantum numbers. | | | | 4 |
| 30 | 1. (a) 2. (a) 3. (b) 4. (c) | | | | 4 |
|  | **SECTION E** | | | |  |
| 31 | a)    b. 4 Fe + 3 O2      →      2 Fe2O3  4 moles of Fe reacts with 3 moles of O2 to give 2 moles of Fe2O3  4 moles Fe produces 2 moles of Fe2O3  i.e. 4 x 56g Fe produces 2 x 160g Fe2O3  So 2g Fe produces 2 x 160 x 2 / 4 x 56 = 2.857g Fe2O3  **OR** A is more concentrated than B because 1 molar have more concentration than 1 molal (b)  c) | | | | 5 |
| 32 | **OR**  a) It is impossible to determine simultaneously, the exact position and exact momentum (or velocity) of an electron.  b) As uncertainty in velocities is same, the one with more mass will have less uncertainty in position. i.e. more accuracy in position. So, neutron has more accuracy in position.  c) | | | | 5 |
| 33 | (i) Because the charge separation is larger in CH3​Cl compared to CH3​F. This is due to greater C−Cl bond length than C−F bond length.  (ii) The smaller cation and larger anion shows greater covalent character due to greater extent of polarization. The size of Li+ ion is smaller than Na+ ion and hence the polarizing power of Li+ ion is more.  (iii) Due to resonance.  (iv)Carbonate ion (CO3−2​) has greater resonance stabilization than carbonic acid.Carbonic acid does not have resonance structures.   1. CO2​ has the structure as O=C=O in which there is bond dipole moment (C-O bond). The dipole moment of one bond is cancelled by other. So, CO2​ has zero dipole moment because it is a linear molecule. 2. Dipoles are equal and opposite 3. Lp-lp repulsion>lp-bp repulsion>bp-bp repulsion | | | | 5 |