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| **HY/CHAK/1123/A 06-NOV-2023** | | | |
| **HALY YEARLYEXAMINATION - (2023-24)**  **Answer key** | | | |
| **Subject: CHEMISTRY**  **Grade: XI** | | Max. Marks:70Time:3hrs | |
|  | **SECTION A** | |  |
| 1 | (d) | | 1 |
| 2 | (a) | | 1 |
| 3 | (d) | | 1 |
| 4 | (a) And (d) | | 1 |
| 5 | (d) | | 1 |
| 6 | (d) | | 1 |
| 7 | (b) | | 1 |
| 8 | (b) | | 1 |
| 9 | (b) | | 1 |
| 10 | (c) | | 1 |
| 11 | (b) | | 1 |
| 12 | (d) | | 1 |
| 13 | (d) | | 1 |
| 14 | (c) | | 1 |
| 15 | (c) | | 1 |
| 16 | (a) | | 1 |
|  | **SECTION B** | |  |
| 17 |  | | 2 |
| 18 | Or | | 2 |
| 19 | 1. I molar as solvent quantity is less than (1000ml) as compared to solvent quantity in case of molality. 2. In molality all quantity is given in mass so mass not affect by temperature. | | 2 |
| 20 | *r* = 0.529 × 10–10 m. If uncertainty 2%  Δx = 0.529 × 10–10 × meter = 1.06 × 10–12 m.  Now, Δx . m . Δv ≥  Δv ≥ 5.47 × 107 m/sec. | | 2 |
| 21 | (a) 1s (b) 3p ( c) 4d (d) 4f | | 2 |
|  | **SECTION C** | |  |
| 22 | (i) Hund`s rule of maximum multiplicity: According to this rule electron pairing in p, d and f orbitals cannot occur until each orbital of a given subshell contains one electron each or is singly occupied.  (ii) Paul`s exclusion principle: no two electron can have the same spin in an orbital.   1. f orbitals | | 3 |
| 23 | 1. It will be closer to 575 kJ mol–1. The value for Al should be lower than that of Mg because of effective shielding of 3*p* electrons from the nucleus by 3*s*-electrons. 2. (i) Be has higher ∆iH than B:   due to high penetration power of s electron as compared to p- electrons.  (ii) O has lower ∆iH than N and F:  Nitrogen carry (2p3) stable 2p subshell and fluorine carry high nuclear charge as compared to oxygen. | | 3 |
| 24 | (a)(i) -3 , +5 (ii) +6 (1/2 mark each)  (b)(i) Tl2(I)SO4  (ii) Au(III)Cl3  (1mark each) | | 3 |
| 25 | (a) The Lattice Enthalpy of an ionic solid is defined as the energy required to completely separate one mole of a solid ionic compound into gaseous constituent ions. (b) See saw (ii) Trigonal bipyramidal | |  |
| 26 | Definition of Limiting reagent. | |  |
| 27 | 1. Orbitals of similar energy and shape 2. 3dz2, 3dxy, 3dx2-y2 3. Boundary surface diagram of dxz orbital | | 3 |
| 28 | (a)Definition of Law of multiple proportion  (b) | | 3 |
|  | **SECTION D** | |  |
| 29 | (a) (i) 2 to 1  (ii) 55  (b) n1 = 3 to n2 =5  (C) 656nm | |  |
| 30 | 1. (d) 2. (d)   (c) a difference in energy between resonance hybrid and most stable resonating structure.  (d)  Write the resonance structures of $ C{H_3}CO{O^ - } $ and show the movement  of electrons by curved arrows. | | 4 |
|  | **SECTION- E** | |  |
| 31 | (a) Calculate the mass percentage of nitrogen in  (i) urea [CO(NH2)2]  (ii) Ammonium carbonate. (NH4)2CO3  (b) How are 0.50 mol Na2CO3 and 0.50 M Na2CO3 different?  (c) You are given 2m CH3OH solution and density of solution is 0.981kg/litre. Calculate the number of moles of CH3OH in 5 litre vessels.  OR  (a) How many atoms are there in the following:  (i) 52u He  (ii) 52g He  (b) If the density of methanol is 0.793 kg L–1, what is its volume needed for making 2.5 L of its 0.25 M solution?  (c) What is the mole fraction of the solute in 2.5m aqueous solution? | | 5 |
| 32 | 1. (i) Magnetic quantum number   (ii) Principal quantum number  (b)    OR  (a)    (b) Completely filled and half filled orbitals have extra stability due to  (i) Symmetry  (ii) exchange of energy  In 3d104s1, d-orbital is completely filled and s is half filled. So, it is more stable configuration  (c) | |  |
| 33 | (a) MgO has higher lattice energy because each ion carries two-unit charge whereas in NaCl each ion carries one-unit charge.(1)  (b) Due to repulsion between axial and equatorial bond.  ©Lone pair occupies more space around central atom so minimize the repulsion lone pair present on equatorial position.   1. PCl5 has a shape of trigonal bipyramidal whereas IF5 has a shape of square pyramidal, it is due to- Presence of unshared electron pairs on I which is oriented so as to minimize repulsion while in PCl5 has no non-bonding pair. 2. Since the repulsions on the bond pairs in H2O molecule are greater due to presence of more number of lone pair than that in NH3, that’s why the bond angle in water is less than that of ammonia. 3. In BF3 there are three bond pairs which are shared in between two atoms resulting in the triangular planar structure while in case of NF3 there is sharing of three bond pairs plus one lone pair. Because of the lone pair sharing the structure get distorted and resulting structure is pyramidal | | 5 |

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