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| **FT/CHAK/1119B 25/08/2019** | | | |
| **CLEARANCE EXAMINATION (2019-20)**  **(ANSWER KEY)** | | | |
| **Subject: CHEMISTRY**  **Grade: XI** | | Max. Marks: 70Time: 3 HRs | |
| 1. | 4s | | 1 |
| 2. | *s* > *p* > *d* > *f* | | 1 |
| 3. | 1.12 L | | 1 |
|  | OR  Mass of N Mass of O  N2O 28 16  NO (14 x 2) 32  Ratio of masses of O in the 3 compounds = 16:32 = 1:2 | | ½  ½ |
| 4. | N < O < Cl < F | | 1 |
| 5. | (ii) | | 1 |
| 6. | 16 atoms | | 1 |
| 7. | metallic character towards the bottom of the group  Largest size towards the bottom of the group | | ½+½ |
|  | OR  Small size, high electroegativity, absence of d orbitals | | 1 |
| 8. | 4s orbitals have lower energy according to (n+l) rule. | | 1 |
| 9. | Effective nuclear pull less in Cl- | | 1 |
| 10. | A<C<B<D | | 1 |
| 11. | 6 | | 1 |
| 12. | n2 = 9 | | 1 |
| 13. | Fully filled configuration is more stable than any other configuration. | | 1 |
| 14. | +2 | | 1 |
| 15. | CH4 + 2O2 ---------🡪 CO2 + 2H2O  16g 44g  64g x  X = 44 x 64/16 = 176g | | ½    ½ |
| 16. | 4s | | 1 |
|  | OR  1s2 2s22p6 3s2 3p6 4s2 3d5 | |  |
| 17. | Pairing of electrons in the orbitals belonging to the same subshell(p,d or f) does not take place until each orbital belonging to that subshell has got one electron each ie. it is singly filled. | | 1 |
| 18. | a) r = 52.9 x n2 /Z  =52.9/2 =26.45 pm | | ½  ½ |
| 19. | Statement-“Irrespective of the source, a given compound always contains same elements in same proportion” or (alternative statement) | | 1 |
| 20. | 4d < 5p < 6s < 4f < 5d | | 1 |
| 21. | No. of moles in 500 ml = 0.375/2  Mass = 0.375/2 \*82 = 15.375g | | 1  1 |
| 22. | (i) Carbon , because it has least size among these so maximum energy required to remove an electron .  (ii) Aluminium , because it has maximum size among these so it has highest electropositivity (least energy requires to remove an electron). | | 1  1 |
| 23. | Molar mass of ZnSO4 =145g  145 g of Zinc sulphate contains 65g of Zinc  100g will contain – 100x65/145  = 44.83% | | ½  ½  1 |
| 24. | a) ***Graph with proper labels***   1. b) The imaginary path in which the electrons move around the nucleus is   called orbit. Its two dimensional.  The region where there is maximum probability of finding the  electrons is called orbital. It’s three dimensional. ***Any one difference*** | | 1  1 |
| 24. | OR   1. 3dxy , 3dyz , 3dxz and 4dxy , 4dxz | | 1    1 |
| 25. | ns1-2  Electropositive, low ionization enthalpy (any 2) | | 1  1 |
| 26. | II  IV | | 1  1 |
| 27. | En= -RH/n2     with constant RH= 2.18 X 10-18 J  n2 = -RH/ En  n2 = (-2.18 X 10-18 J)/(-6.053 X 10-20 J)  n2= 35.999  n = 6 | | ½  1  ½ |
| 28. | In p-block, when we move from left to right in a period, the acidic character of the oxides increases due to increase in electronegativity.   1. An oxide that combines with water to give an acid is termed as an acidic oxide.   SO2+H2O→H2SO3  Cl2O7 + H2O 2 HClO 4 (any 1 example)   1. The oxide that gives a base in water is known as a basic oxide.   MgO+H2O→Mg(OH)2 (any 1 example) | | 1  1 |
| 29. | 10g of O2 = 10/32mol = 10/32 X 6.022 X 1023 = 1.88 X 1023 molecules  or = 2 x 1.88 X 1023 O atoms = 3.76 X 1023 O atoms  10g of O3 = 10/48mol = 10/48 X 6.022 X 1023 = 1.254 X 1023 molecules    or = 3 x 1.254 X 1023 O atoms = 3.76 X 1023 O atoms   1. Bulb A contains larger number of molecules. 2. Both bulbs contain the same number of O atoms. | | 1  1  ½  ½ |
| 30. | |  |  |  |  | | --- | --- | --- | --- | | Element | Hydrogen | Carbon | Chlorine | | % | 4 | 24 | 71.65 | | Mole ratio | 4/1 =4 | 24/12 = 2 | 71.65/35.5 =2 | | Simplest ratio | 4/2 = 2 | 2/2 =1 | 2/2 =1 |   Empirical formula = CH2Cl  Empirical formula mass = 49.5  Molar mass/ efm = 98.9/ 49.5 = 2  Molecular formula = ( CH2Cl)2 = C2H4Cl2 | | 1  ½  ½  ½  ½ |
| 31. | (i) Neon.  (ii) Fluorine.  To remove an electron from stable noble gases requires highest amount of energy.  The electro negativity is electron- accepting tendency. This increases on going from left to right across a period. | | ½  ½  1  1 |
| 32. | a) The 1st ionization enthalpy of magnesium is higher than that of Na due to higher nuclear charge and slightly smaller atomic radius of Mg than Na.  b) the element with At.no.120 is the 2nd member of  8th period  group 2  outer electronic configuration 8s2 and valency 2.  The formula of is oxide is MO. | | ½+½  ½  ½  ½  ½ |
| 33. | a) Definition  b) Formula  Mass of the solution = DxV = 1000 x 0.85 = 850g  Mass of the solvent = 850-2.5 = 847.5g = 0.8475kg  Molality = 2.5/138 = 0.21m  0.8475 | | 1  ½  ½  ½  1/2 |
| 34. | a) The maximum number of electrons that can be accommodated in 9 orbitals(5s,4d,5p) is 18; and therefore 18 elements are there in the 5th period  b) SiBr4 and Al2S3 | | 1  1+1 |
| 35. | a) the reagent which gets consumed first and thus limits the amount of product formed.  b) ***2H2 + O2 -----🡪 2H2O***  ***4g 32g 36g***  ***Given 80g 80g***  ***80g of oxygen requires only (4 x 32/80)g of hydrogen***  ***So, oxygen is the limiting reagent.***  ***32g of oxygen produce 36g of water***  ***Amount of water produced by 80g of oxygen = 36x80/32= 90g***   1. ***Total mass of ammonium hydroxide = 14+4+16+1= 35***   ***Mass % of N = 14/35 x 100 = 40%*** | | 1  1  1  1  1 |
|  | OR   1. Molarity = 3M   Mass of NaCl solution= 3 x 58.5 = 175.5g  Mass of 1L solution= 1000 x 1.25 = 1250g  Mass of water in solution = 1250 – 175.5 = 1074.5g  Molality = no. of moles of solute/ mass of solvent in kg = 3 mol/1.0745kg = 2.79m   1. AgNO3 + HCl → AgCl +HNO3   Formula  Molar mass of AgCl=143.5g/mol  No of moles of AgNO3=0.068x25/1000=0.0017 mol  Amount of AgCl=0.244g | | 1  1  1  1  1 |
| 36.a) | b)[Ar] 3d5  c) 1  d) Formula  6.63x10-24 Kg m/s | | ½  1  ½  1  1  ½  ½ |
|  | OR  a) 2p electrons in Nitrogen = n=2, l=1, ml= -1 to +1, ms= +1/2  b) 19th electron of chromium = According to aufbau’s principle,19th electron is present in 4s orbibtal, so, quantum no.’s are n=4, l=0, ml= 0 and ms =+1/2  c) highest energy electron in sodium atom is 4s1,so, quantum no.’s are n=4, l=0, ml= 0 and ms =+1/2  d) unpaired electron in copper is 4s1  e) V(IV) as it has 1 unpaired electron. | | 1  1  1  1  1 |
| 37. | a) The maximum number of electrons that can be accommodated in five d orbitals is 10; and therefore 10 elements are there in each transition series.  b) In the case of Nitrogen, the last electron enters the p subshell and hence it is a p-block element.  c) ***For convenience and systematic study based on similar properties***  d)they have the same electronic configuration and same number of valence electrons.  e) [Ar] 4s1 3d5 | | 1  1  1  1  1 |
|  | OR  a) they have the same electronic configuration and same number of valence electrons.  b) ***Be*** - ***1s2 2s2 B - 1s2 2s22p1***  ***Easy to remove electron from B than stable Be***  c) Al3+ has the smallest size and N3- the largest as ***effective nuclear pull less in the case of*** N3- as it has only 7 protons and 10 electrons.  d) Electron repulsion outweighs the stability gained by achieving noble gas configuration.  e) ***Effective nuclear pull less in the parent atom than in the cation.*** | | 1  1  1  1  1 |
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