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| **FT/CH/1119B 16/06/2019** | | | | | |
| **FIRST TERM EXAMINATION (2019-20)** | | | | | |
| **Subject: CHEMISTRY**  **Grade: XI** | | Max. Marks: 70Time: 3 Hrs | | | |
| **Name:** | | | **Section:** | **Roll No:** | |
| ***General Instructions:***   * *This question paper consists of 4 printed pages.* * *All questions are compulsory.*   *(i) Question numbers 1 to 20 are very short-answer questions and carry 1 mark each.*  *(ii) Question numbers 21 to 27 are short-answer questions and carry 2 marks each.*  *(iii) Question numbers 28 to 34 are also short-answer questions and carry 3 marks each.*  *(iv) Question numbers 35 to 37 are long-answer questions and carry 5 marks each.*   * *The marks for each question are indicated against it.* | | | | | |
| 1. | Out of 4s and 4d, which will experience more effective nuclear charge from the nucleus? | | | | 1 |
| 2. | Give the order of screening effect of electrons of *s*, *p*, *d* and *f* orbitals of a given shell of an atom on its outer shell electrons | | | | 1 |
| 3. | Calculate the volume occupied by 1.4g of nitrogen gas. | | | | 1 |
|  | OR  Show that the given two oxides of Nitrogen: N2O and NO follow the law of multiple proportion. | | | |  |
| 4. | Arrange these elements in the increasing order of oxidizing property  N,O,Cl,F | | | | 1 |
| 5. | The pair of ions having same electronic configuration is \_\_\_\_\_\_\_\_\_\_.  (i) Cr3+, Fe3+  (ii) Fe3+, Mn2+  (iii) Fe3+, Co3+  (iv) Sc3+, Cr3+ | | | | 1 |
| 6. | a) How many atoms are present in 64 u of He? | | | | 1 |
| 7. | In which part of group would you expect the elements to have  i) the most metallic character ii) the largest size? | | | | 1 |
|  | OR  Why does the first member of each group of representative elements shows anomalous behavior? | | | |  |
| 8. | Why are the 4s orbitals filled before the 3d orbitals? | | | | 1 |
| 9. | Why is Cl smaller in size than Cl-? | | | | 1 |
| 10. | Electronic configurations of four elements A, B, C and D are given below :  (A) 1*s*2 2*s*2 2*p*6 (B) 1*s*2 2*s*2 2*p*4  (C) 1*s*2 2*s*2 2*p*6 3*s*1 (D) 1*s*2 2*s*2 2*p* 5  Arrange them in the correct order of increasing tendency to gain electron | | | | 1 |
| 11. | An atom having atomic mass number 13 has 7 neutrons. What is the atomic number of the atom? | | | | 1 |
| 12. | What is the total number of orbitals associated with the principal quantum number n=3? | | | | 1 |
| 13. | The electronic configuration of valence shell of Cu is 3*d*104*s*1 and not 3*d*94*s*2. How is this configuration explained? | | | | 1 |
| 14. | What is the oxidation number of oxygen in OF2? | | | | 1 |
| 15. | Calculate the mass of carbon dioxide that will be produced on complete combustion of 64g of methane. | | | | 1 |
| 16. | Iron atom can lose two electrons to form Fe2+ ion. The atomic number of Iron is 26. From which orbital will Iron lose two electrons? | | | | 1 |
|  | OR  Give the electronic configuration of Fe+3 | | | |  |
| 17. | State Hund’s rule of maximum multiplicity. | | | | 1 |
| 18. | Calculate the radius of 1st orbit of He+. | | | | 1 |
| 19. | State the law of definite (constant) proportions. | | | | 1 |
| 20. | Arrange the following orbitals in the increasing order of energy.  5p, 4d, 5d, 4f, 6s | | | | 1 |
| 21. | Calculate the mass of sodium acetate required to make 500ml of 0.375 molar aqueous solution. | | | | 2 |
| 22. | Among the elements B, Al, C and Si,   1. which element has the highest first ionisation enthalpy? 2. which element has the most metallic character?   Justify your answer in each case. | | | | 2 |
| 23. | How much Zinc can be obtained from 100g of ZnSO4? | | | | 2 |
| 24. | a) Draw a plot of Ψ2  vs r for a 2s orbital.  b) Give one point of difference between orbit and orbital. | | | | 2 |
|  | OR   1. Draw the shape of the **dxy**orbital 2. Which of the following orbitals are degenerate?   3dxy, 4dxy, 4dxz, 3dxz, 3dyz | | | |  |
| 25. | Give the general electronic configuration of s -block elements. Write any two characteristic properties of s-block elements. | | | | 2 |
| 26. | The 1st and 2nd ionization enthalpies and electron gain enthalpy (kJ/mol) of a few elements designated by Roman numerals are shown below:   |  |  |  |  | | --- | --- | --- | --- | | Element | IE1 | IE2 | ∆egH | | I | 2372 | 5251 | +48 | | II | 520 | 7300 | -60 | | III | 1008 | 1846 | -295 | | IV | 1681 | 3374 | -328 |   Name a) a metal which forms a halide of the formula MX  b) the most reactive non-metal | | | | 2 |
| 27. | What is a likely energy level for a hydrogen atom with En= -6.053 X 10-20 J? | | | | 2 |
| 28. | *p*-Block elements form acidic and basic oxides. Explain each property by giving two examples and also write the reactions of these oxides with water. | | | | 2 |
| 29. | Identify, giving reason, which of the following sets of quantum numbers are incorrect?   |  |  |  |  | | --- | --- | --- | --- | |  | ***n*** | ***l*** | ***ml*** | | (i) | 1 | 1 | +2 | | (ii) | 2 | 1 | +1 | | (iii) | 3 | 2 | -2 | | (iv) | 3 | 4 | -2 | | | | | 3 |
| 30. | Two bulbs A & B of equal capacity contain 10g of Oxygen(O2) and ozone(O3) respectively. Which bulb will have   1. Larger number of molecules? 2. Larger number of oxygen atoms? | | | | 3 |
| 31. | A compound contains 4% hydrogen, 24% carbon and 71.65% chlorine. Its molar mass is 98.9g, what are its empirical and molecular formulae? | | | | 3 |
| 32. | Among the elements of the second period Li to Ne pick out the element:   1. with the highest first ionization energy 2. with the highest electronegativity.   Give the reason for your choice. | | | | 3 |
| 32. | OR  a) How would you explain the fact that first ionization enthalpy of sodium is lower than that of magnesium?  b) Identify the group and period of an element with At.no. 120. Also predict the outermost electronic configuration and the general formula of its oxide. | | | | 3 |
| 33. | a) Define molality.  b) Calculate the molality of K2CO3 solution which is formed by dissolving 2.5 g of it in one litre of the solution. Density of the solition is 0.85 gml-1. | | | | 3 |
| 34. | a) How would you justify the presence of 18 elements in the 5th period of the Periodic Table?  b) Predict the formulas of compounds which might be formed by the following pairs of elements; (a) silicon and bromine (b) aluminium and sulphur. | | | | 3 |
| 35. | a) What is a limiting reagent?  b) 80g of H2 are reacted with 80g of oxygen to form water. Find out the mass of water obtained. Which substance is the limiting reagent?  c) Calculate the mass % of nitrogen in one mole of ammonium hydroxide. | | | | 5 |
|  | OR   1. The density of 3M solution of NaCl is 1.25g/ml. Calculate molality of the solution. 2. What mass of solid AgCl is obtained when 25mL of 0.068M AgNO3 reacts with excess of aqueous HCl according to the given reaction? (At mass of Ag=108u) | | | | 5 |
| 36. | Answer the following.  a) Calculate the uncertainty in the velocity of wagon of mass 2000 kg whose position is known to an accuracy of 10m  b) Write the electronic configuration of Mn+2  c) How many unpaired electrons are present in Ag(Z=47)  d) Calculate the momentum of a particle which has a de Broglie wavelength of 0.1nm | | | |  |
| 36. | OR  What are the quantum numbers for?  a) 2p electrons in Nitrogen  b) 19th electron of chromium  c) highest energy electron in sodium atom  d)unpaired electron in copper.  e) Which of the two is paramagnetic, V(IV) or V(V) and why? | | | |  |
| 37. | Explain the following :  a) There are ten elements in each transition series.  b) Nitrogen is located in p-block.  c) Lanthanides and actinides are placed in separate rows at the bottom of periodic table  d) Elements in a group show similar chemical characteristics.  e) Give the electronic configuration of the fourth element of the first transition series. | | | |  |
|  | OR  Account for the following:  a) The first ionization enthalpies for two isotopes of the same element are same.  b)Boron has a smaller ionization enthalpy than beryllium even though the former has a higher nuclear charge.  c) Among isoelectronic species, Al3+ has the smallest size and N3- the largest.  d) The second electron gain enthalpy of Oxygen is positive.  e) Cations are smaller in radii than their parent atoms. | | | |  |

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