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No text content! T182 Chemistry: Matter and change class name date date date chapter 9 study guide for the chapter 9 content mastery study guide for the domain of the Content Covalent Bonding Section 9.2 Nomenclature of Molecules In your book, read on how binary compounds and acids are named from their formulas. Section 9.1 The Covalent Title For each statement below, write true or false. In your book, read about the nature of covalent bonds. false 1. Binary molecular compounds are usually composed of a metal and a non-metallic one. Use each of the terms below only once to complete the passage. sigma bond exothemic pi bond false binding molecule 2. The second element in the formula of a binary compound is named using the -ite suffix. When electron sharing occurs, the resulting attachment between atoms is called false 3. The tetra prefix indicates three atoms. a(n) (1) covalent bond . When such attachment is formed, the dissociation of bonds is true 4. The hexa prefix indicates six atoms. energy is released, and the process is (2) exothermic. When two or more true 5. When naming the first element in a formula, the monoset is not used. atoms bind by sharing electrons, the resulting particle is called a(n) true 6. For binary acids, the hydrogen part of the compound is named using the prefix hydro-. (3) Molecule. If the shared electrons are centered between the two atoms, the accessory is called a sigma a(n) bond (4). If sharing involves overlay false 7. An oxymoside contains only two elements. parallel orbitals, the attachment is called a(n) (5) pi bond . false 8. If the name of an oxyanocin's anion ends in -comed, the acid name contains the suffix -ous. In your book, read about unique and multiple ties and bond strength. In your book, read about naming molecular and oxymoside compounds. Circle the letter of choice that best completes the statement or answer the question. For each item in Column A, type the corresponding item letter in Column B. 6. In what form do elements such as hydrogen, nitrogen and oxygen occur? Column A Column BStudy Guide for Content Mastery Answer Key a. as single atoms c. as molecules containing three atoms c 9. CO a. hydrobromic acid b. as molecules containing two atoms d. as molecules containing four atoms 7. How many electrons are shared in a double covalent bond? I 10. CO2 b. tetroxida dinitrogen g 11. H2CO3 c. carbon monoxide a. no b. a. c. two d. four and 12. NH3 d. nitrous acid b 13. N2O4 and. ammonia 8. The length of the bond is the distance between the nuclei of two connected atoms. d 14. HNO2 f. nitric acid a. two molecules of the same substance. d. the orbitals of two connected atoms. f 15. HNO3 g. carbonic acid b. os into two connected atoms. a 16. HBr h. bromic acid 9. Which of the following relationships related to the length of the link is generally correct? h 17. HBrO3 i. carbon carbon a. The smaller the bond, the stronger the bond b. the smaller the bond, the weaker the link c. the lower the bond, the less the electrons in it d. the smaller the bond, the lower the bond dissociation energy study guide for the chemistry content mastery: Matter and Change • Chapter 9 49 50 Chemistry: Matter and Change • Chapter 9 Study Guide for copyright content © Glencoe/McGraw-Hill, a division of McGraw-Hill Enterprises, Inc.Copyright © Glencoe/McGraw-Hill, a division of McGraw-Hill Companies, Inc.Study Guide for Content Mastery Answer Key Name Name Class Name Date Chapter 9 STUDY GUIDE FOR CONTENT MASTERY CHAPTER 9 STUDY GUIDE FOR CONTENT MASTERY Section 9.3 Molecular Structures Section 9.4 Molecular Form In your book , read about Lewis's structures. In your book, read about the VSEPR model. For each statement below, write true or false. Circle the letter of choice that best completes the declaration. truth 1. A structural formula shows the arrangement of atoms in a molecule. 1. The VSEPR model is mainly used to determine the molecular form. false 2. The central atom in a molecule is the one with the resonance structures of higher electrons b.c. determining ionic charge. Affinity. d. measure intermolecular distances. truth 3. In molecules, hydrogen is always a terminal atom. 2. The connecting angle is the angle between a. the sigma and pi bonds in a double bond. false 4. The number of binding pairs in a molecule is equal to the number of b. the nucleus and the binding electrons. c. two terminal atoms and the central atom. Electrons. d. the orbitals of a binding atom. false 5. To find the total number of electrons available for binding in a positive 3. The VSEPR model is based on the idea that ion, you should add the ion charge to the total number of valence electrons a. there is always an octet of electrons around an atom in a molecule. of the atoms present. b. Electrons are attracted to the nucleus. c. molecules repelling each other. false 6. Electrons in a coordinated covalent bond are given by the pairs of shared electrons and not shared if they repel as much as possible. bound atoms. true 7. Resonance occurs when more than one valid Lewis structure can be 4. The shape of a molecule whose central atom has four pairs of binding electrons is written to a molecule. a. tetrahedral. b. trigonal planar. c. trine trine. d. linear. true 8. Nitrate is an example of ion that forms resonance structures. 5. The shape of a molecule that has two unique covalent bonds and no solitary pair in true 9. The carbon dioxide molecule contains two double bonds. central atom is false 10. All electrons in an atom are available for bonding. a. tetrahedral. b. trigonal planar. c. trine trine. d. linear. 11. In sulfate ion (SO42X), 32 electrons are available for binding. 6. The shape of a molecule molecule it has three unique covalent bonds and a solitary pair in the false central atom is 12. When carbon and oxygen bind, the molecule contains ten pairs of binding electrons. a. tetrahedral. b. trigonal planar. c. trine trine. d. linear. Chemistry: Matter and Change T183 In your book, read about resonance structures and exceptions to the octet rule. In your book, read about hybridization. Use each of the terms below only once to complete the passage. For each item in Column A, type the corresponding item letter in Column B. Column A Column B hybridization of carbon dioxide sp3 identical methane sp phosphorus trihydride c 13. Odd number of valence electrons a. O3 B 14. Less than 8 electrons around an atom b. BF3 The formation of new orbitals from a combination or rearrangement of valence electrons d 15. More than 8 electrons around the central atom c. NO is called (7) hybridization. The orbitals that are produced in this way are a 16. More than one valid Lewis d. SF6 (8) structure identical to each other. An example of an element that commonly undergoes such formation is (9) carbon. When this atom combines its orbitals of three p and its orbital one, the orbits that result are called (10) orbital sp3. An example of a molecule that has this type of orbital methane is (11) methane. Study Guide for Chemical Content Mastery: Matter and Change • Chapter 9 51 52 Chemistry: Matter and Change • Chapter 9 Study Guide for Mastery ContentT184 Chemistry: Matter and class name change Class Name Chapter 9 STUDY GUIDE FOR CONTENT SUBJECT CHAPTER 9 STUDY GUIDE FOR THE DOMAIN OF CONTENT Section 9.5 continuous Section 9.5 Electronics and Polarity In your book , read about the polarity of the title. In your book, read about electronegativity. Using the electronegativity table on the previous page, circle the letter of the choice that best completes the statement or answers the question. Use the electronegativity table below to answer the following questions. 1 Electronegativity of Some Elements 8. The unequal sharing of electrons between two bound atoms always indicates H a. a nonpolar covalent bond. c. a polar covalent bond. 2.20 3 4 Metal 567 89 b. an ionic bond. d. a polar molecule. Li Be Metalloid BCNOF 0.98 1.57 2.04 2.55 3.04 3.44 3.98 9. When the electronegativities of two bound atoms differ greatly, the bond is 11 12 Nonmetal 13 14 15 16 17 Na Mg 0.93 1.31 Al Si P S Cl a. polar covalent. b. coordinate covalent. c. polar covalent. d. ionic. 1.61 1.90 2.19 2.58 3.16 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 10. What is the difference in electronegativity that is usually the dividing line between the covalent K Ca Sc Ti V Cr Mn Fe Co Ni Zn Ga Ge As Se Br and ionic bonds? 0.82 1.00 1.36 1.54 1.63 1.66 1.55 1.83 1.88 1.91 1.90 1.65 1.81 2.8 2.18 2.55 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 a. 1.0 b. 1.7 c. 2.7 d. 4.0 Rb Rb Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I 0.82 0.95 1.22 1.33 1.6 2.16 2.10 2.2 2.28 2.20 1.93 1.69 1.78 1.96 2.05 2.1 2.66 55 56 57 72 73 74 75 77 77 78 79 80 81 82 83 85 11. Is the ¶ 2 placed next to which of the following? c. A positive ion Cs Ba La Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At a. the less electronegative atom in a polar covalent bond d. nucleus 0.79 0.89 1.1 1.1 1.3 1.5 1.7 1.9 1.9 2.2 2.2 2.2 2.4 1.9 1.9 1.8 1.9 1.9 2.2 b. the most electronegative atom in a polar covalent bond 87 88 89 Fr Ra Ac 0.7 0.9 1.11. What is the meaning of the term electronegativity? 12. A nonpolar covalent bond is that in which c. electrons are also shared. the tendency of an atom to attract electrons a. electrons are transferred. d. Both electrons are supplied by the same atom. b. Electrons are shared unevenly. 2. Which element has the highest electronegativity? What is the numeric value? What's the 13. Molecules that contain only polar covalent bonds c. are always ionic. name and group number of the chemical family that has the largest global electronegativity? a. they are always polar. d. are always non-polar. b. may or may not be polar. fluoride: 3.98; halogens; 7AStudy Guide for Content Mastery Answer Key 3. Which element has the lowest electronegativity? What is the numeric value? What's the 14. What factor besides electronegativity determines whether a molecule as a whole is the name and group number of the chemical family that has the lowest global electronegativity? polar or not? francium; 0.7; alkaline metals; group 1A a. temperature b. its geometry c. its physical state d. its mass 4. What general trend in electronegativity do you notice going down a group? For a period? 15. Which of the following correctly describes composite water, H2O? Electronegativity tends to decrease. Electronegativity tends to increase. a. global polar c. ionic, with non-polar covalent bonds b. non-polar, with polar covalent bonds d. polar global, with polar covalent bonds 5. How electronegativity values are used to determine the type of binding that exists 16. Which of the following correctly describes the compound carbon tetrachlorite, CCl4? between two atoms? a.c. ionic polar, with non-polar covalent bonds Values are subtracted. b. general non-polar, with polar covalent bonds d. polar global, with polar covalent loops In your textbook, read about the properties of covalent compounds. 17. An ammonia molecule, NH3, is a. nonpolar because it is linear. For each statement below, write true or false. b. polar because it is linear. c. non-polar because there is no difference in electronegativity. truth 6. Ionic compounds are usually soluble in polar substances. d. polar because there is a difference of electronegativity and the molecule is trigoine. 7. In a covalent molecular compound, the attraction between tends to be strong. 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