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References This post is part of the series: Chemistry Lessons and ActivitiesAre you teaching a class about valence electrons? Chemical bonds? The periodic table? These chemistry lessons and activities will live up to your chemistry classroom. 0 ratings0% found this document useful (0 votes)3K viewsSaveView Valence Electrons Worksheet with Answer Key For Later09/06% found this document useful, undefinedValence electrons are negatively charged subatomic particles (electrons) present in the outermost shell of an atom. By this convention, valence electrons are ideally the electrons that get involved in chemical bond formation. Valence electrons lie farthest away from the atomic nucleus. Therefore, these electrons experience the least force of attraction from an atom's positively charged nuclear center. The valence electrons thus possess maximum energy and can easily break free from the nuclear hold in order to participate in different kinds of chemical reactions. How to find valence electrons?The Periodic Table is a tabular display of chemical elements, arranged in ascending order of atomic numbers. It consists of vertically arranged groups and horizontal rows called periods. There are a total of 18 groups and 7 periods in the Periodic Table. The elements situated in groups 1, 2, and 13-18 are called main-group elements. Groups 1 and 2 of the Periodic Table together make an s-block. On the other hand, the block comprised of groups 13-18 is called a p-block. For main-group elements, valence electrons can be determined from their position in the Periodic Table i.e., their group number and/or the electronic configuration of elements. However, valence electrons are not always the electrons present in the outermost shell. All the elements of Nitrogen, Z=7Step 2 Write the electronic configuration. Electronic configuration of N: 1s22s22p63s1Step 3 Identify the outermost shell of Nitrogen. Outermost shell = Shell number 2Step 4 Find the number of valence electrons by counting the total number of electrons present in the outermost shell. The outermost shell of nitrogen has (2s22p3). Therefore, the total valence electrons in nitrogen are (2 + 3) = 5 Lets take one more example to understand how to calculate the valence electrons with the help of electronic configuration. Calcium has atomic number Z=20Electronic configuration of Ca: 1s22s22p63s23p64s2 Outermost shell: shell number 4Step 5 Identify the outermost shell of Calcium. Outermost shell = shell number 4Step 6 Find the number of valence electrons in Ca. The outermost shell of calcium has (4s2). Therefore, the total valence electrons in calcium are (2 + 2) = 4Thus how you can easily find the number of valence electrons with the help of the atom's electronic configuration. How to find valence electrons from the orbital diagram?An orbital diagram is a diagrammatic representation of valence electrons occupying atomic orbitals. It can prove useful for determining the valence electrons present in an atom. Valence electrons are those valence electrons that achieve a stable electronic configuration. Lets see how it is done: The process of finding the valence electrons from the orbital diagram is the same as the electron configuration. The main difference between the orbital diagram and electron configuration is that an orbital diagram shows electrons in form of arrows whereas an electron configuration shows electrons in form of numbers. Two nitrogen atoms, each using three of their five valence electrons available can combine to form a nitrogen (N2) molecule. A triple covalent bond will form with three bond pairs. While 2 unshared electrons on each nitrogen will stay as a lone pair. In this way, each nitrogen atom will achieve an octet configuration. You can easily find the valence electrons for various atoms using an orbital diagram and electron configuration. Also Read: How to find valence electrons in compounds?In chemistry, a compound is a substance that results from a combination of two or more different chemical elements. Lets say we have to find a number of valence electrons in a CO2 compound.CO2 is a compound that is formed between two non-metal atoms (carbon and oxygen).Valence electrons in CO2 To find the total valence electron in CO2, look at the periodic group of carbon oxygen atoms. By looking at the periodic table, we come to know carbon belongs to the 4A group in the periodic table, and oxygen belongs to the 6A group in the periodic table. Hence, carbon has 4 valence electrons and oxygen has 6 valence electrons.Valence electron of Oxygen=6 [Periodic group of oxygen = 16 or 6A]Valence electron of Carbon=4 [1 Periodic group of carbon = 14 or 4A] Total valence electron available in CO2 compound = 4 + 2*6 = 16 valence electrons [CO2 molecule has one carbon and two oxygen atoms] Lets take one more example to understand, how to determine the valence electrons in the compound. For example Find valence electrons in the PBr3 molecule. An easy way to find the valence electron of atoms in the PBr3 molecule is, just to look at the periodic group of phosphorus and bromine atoms.As the phosphorus atom belongs to the 5A group in the periodic table and bromine is situated in the 7A group in the periodic table, hence the valence electron for the phosphorus is 5, and for the bromine atom, it is 7. Total number of valence electrons in Phosphorus= 5 Total number of the valence electrons in bromine = 7 Total number of valence electrons available in PBr3= 5 + 7*3 = 26 valence electrons [PBr3 molecule has one phosphorus and three bromine atoms] PBr3 molecule has one phosphorus and three bromine atoms. The Bohr model/Bohr model describes the visual representation of orbiting electrons around the small nucleus. It used different colored buttons to represent those in the outermost shell of an atom.Lets say you have the Bohr model of a Nitrogen atom. By looking at it, you can easily find the valence electrons for the nitrogen atom. Nitrogen Bohr modelFrom the Bohr diagram of an atom, we can easily find the number of valence electrons in an atom by looking at its outermost shell. So, we have to find a valence electron in the Nitrogen atom. For this, look at its Bohr diagram.Bohr diagram of Nitrogen has only two electron shells (K and L). The inner shell is the K-shell and the outermost shell is L-shell. Hence, the electrons found in the L-shell of the Oxygen atom are its valence electrons because it is the outermost shell also called the valence shell. The L-shell or outer shell of the Oxygen Bohr model contains 6 electrons. Therefore, the number of valence electrons in the Oxygen atom is 6. Therefore, by using the above explanation, you can easily determine the valence of electrons by looking at the Bohr model of the atom Also Read: How to draw the Bohr model for any atom?Name of element/Number of electrons/Electronic configuration based on shell/Outermost electron/Valence shell electrons/Hydrogen (H) [1] Helium (He) [2] Lithium (Li) [3] Beryllium (Be) [4] Boron (B) [5] Carbon (C) [6] Nitrogen (N) [7] Oxygen (O) [8] Fluorine (F) [9] Neon (Ne) [10] Sodium (Na) [11] Magnesium (Mg) [12] Aluminum (Al) [13] Silicon (Si) [14] Phosphorus (P) [15] Sulfur (S) [16] Chlorine (Cl) [17] Argon (Ar) [18] Potassium (K) [19] Calcium (Ca) [20] Scandium (Sc) [21] Titanium (Ti) [22] Vanadium (V) [23] Chromium (Cr) [24] Manganese (Mn) [25] Iron (Fe) [26] Cobalt (Co) [27] Nickel (Ni) [28] Copper (Cu) [29] Zinc (Zn) [30] Gallium (Ga) [31] Germanium (Ge) [32] Arsenic (As) [33] Selenium (Se) [34] Bromine (Br) [35] Krypton (Kr) [36] Rubidium (Rb) [37] Strontium (Sr) [38] Yttrium (Y) [39] Zirconium (Zr) [40] Niobium (Nb) [41] Molybdenum (Mo) [42] Technetium (Tc) [43] Ruthenium (Ru) [44] Rhodium (Rh) [45] Palladium (Pd) [46] Silver (Ag) [47] Cadmium (Cd) [48] Indium (In) [49] Tin (Sn) [50] Antimony (Sb) [51] Tellurium (Te) [52] Iodine (I) [53] Xenon (Xe) [54] Barium (Ba) [55] Lanthanum (La) [56] Cerium (Ce) [57] Praseodymium (Pr) [58] Neodymium (Nd) [59] Promethium (Pm) [60] Samarium (Sm) [61] Europium (Eu) [62] Gadolinium (Gd) [63] Terbium (Tb) [64] Dysprosium (Dy) [65] Holmium (Ho) [66] Erbium (Er) [67] Thulium (Tm) [68] Ytterbium (Yb) [69] Lutetium (Lu) [70] Hafnium (Hf) [71] Tantalum (Ta) [72] Tungsten (W) [73] Rhenium (Re) [74] Osmium (Os) [75] Iridium (Ir) [76] Platinum (Pt) [77] Gold (Au) [78] Mercury (Hg) [79] Thallium (Tl) [80] Lead (Pb) [81] Bismuth (Bi) [82] Polonium (Po) [83] Astatine (At) [84] Francium (Fr) [85] Radium (Ra) [86] Actinium (Ac) [87] Thorium (Th) [88] Protactinium (Pa) [89] Uranium (U) [90] Neptunium (Np) [91] Plutonium (Pu) [92] Americium (Am) [93] Curium (Cm) [94] Berkelium (Bk) [95] Californium (Cf) [96] Einsteinium (Es) [97] Fermium (Fm) [98] Mendelevium (Md) [99] Nobelium (No) [100] Lawrencium (Lr) [101] Rutherfordium (Rf) [102] Dubnium (Db) [103] Seaborgium (Sg) [104] Bohrium (Bh) [105] Hassium (Hs) [106] Meitnerium (Mt) [107] Darmstadtium (Ds) [108] Roentgenium (Rg) [109] Copernicium (Cn) [110] Flerovium (Fl) [111] Livermorium (Lv) [112] Tennessine (Ts) [113] Oganesson (Og) [114] Unbinilium (Ubn) [115] Untrium (Uut) [116] Unquadrium (Uuq) [117] Unpentium (Uup) [118] Unsextium (Uus) [119] Unseptium (Uus) [120] Unoctium (Uuo) [121] Unnonium (Uun) [122] Undecium (Uud) [123] Unduellium (Udu) [124] Untrium (Uut) [125] Unquadrium (Uuq) [126] Unpentium (Uup) [127] Unsextium (Uus) [128] Unseptium (Uus) [129] Unoctium (Uuo) [130] Unnonium (Uun) [131] Undecium (Uud) [132] Unduellium (Udu) [133] Untrium (Uut) [134] Unquadrium (Uuq) [135] Unpentium (Uup) [136] Unsextium (Uus) [137] Unseptium (Uus) [138] Unoctium (Uuo) [139] Unnonium 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