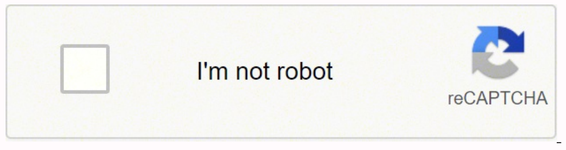

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Electron configuration worksheet with answers pdf free sample answer

Name _____ Class _____ Date _____

Chapter 4 Using Science Skills: Making comparisons

Isotopes or Different Elements?

write the shorthand notation

In each of the following statements, you are given a pair of elements and important information about each. Use this information to determine if the pair of elements are isotopes or different elements. Indicate your answer in the space provided.

1. Element D has 6 protons and 7 neutrons. ^{13}C ^{14}N different elements
   Element F has 7 protons and 7 neutrons.
2. Element J has 27 protons and 32 neutrons. ^{59}Co ^{60}Co different isotopes
   Element L has 27 protons and 33 neutrons.
3. Element X has 17 protons and 18 neutrons. ^{35}Cl ^{36}Ar diff elements
   Element Y has 18 protons and 17 neutrons.
4. Element Q has 56 protons and 81 neutrons. ^{137}Ba ^{138}Ba diff isotopes
   Element R has 56 protons and 82 neutrons.
5. Element T has an atomic number of 20 and an atomic mass of 40. ^{40}Ca ^{41}Ca diff isotopes
   Element Z has an atomic number of 20 and an atomic mass of 41.
6. Element W has 8 protons and 8 neutrons. ^{16}O ^{15}N diff elements
   Element V has 7 protons and 8 neutrons.
7. Element P has an atomic number of 92 and an atomic mass of 238. diff. isotopes
   Element S has 92 protons and 143 neutrons.

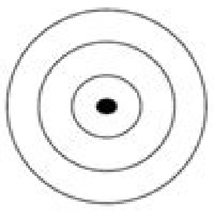
^{238}U ^{235}U

Name _____ Period_____

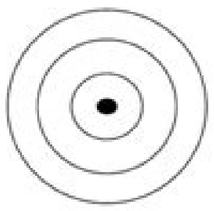
Date _____

BOHR MODEL WORKSHEET

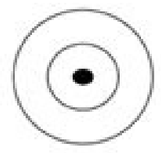
For each element draw the **inner electrons blue** & the **valence (outer) electrons red**.
The circles represent **possible** electron shells.



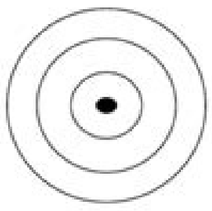
Sodium (Na) _____



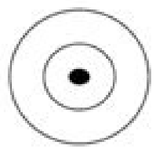
Aluminum (Al) _____



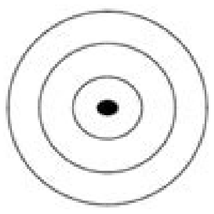
Carbon (C) _____



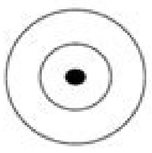
Silicon (Si) _____



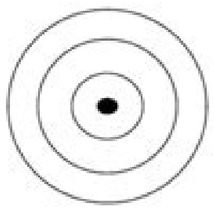
Oxygen (O) _____



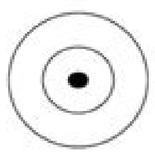
Chlorine (Cl) _____



Flourine (F) _____



Phosphorus (P) _____

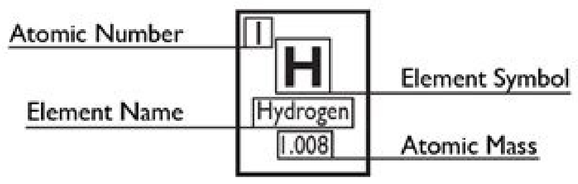


Lithium (Li) _____

Name: _____ Date:_____

Periodic Table Worksheet

The Periodic Table contains the following information for each element.



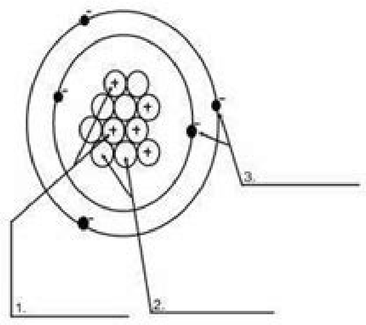
Complete the missing information for each of the following elements from a periodic table.

5 **B** Boron 10.811	13 **Al** Aluminum 26.982	56 **Ba** Barium 137.328	11 **Na** Sodium 22.990	27 **Co** Cobalt 63.933
29 **Cu** Copper 63.546	53 **I** Iodine 126.904	50 **Sn** Tin 118.711	74 **W** Tungsten 183.84	32 **Ge** Germanium 72.631
93 **U** Uranium 238.029	16 **S** Sulfur 32.066	54 **Kr** Krypton 84.798	39 **Y** Yttrium 88.906	79 **Au** Gold 196.967
63 **Eu** Europium 151.964	26 **Fe** Iron 55.845	82 **Pb** Lead 207.2	19 **K** Potassium 39.098	47 **Ag** Silver 107.868

Name_____ Period_____

Atomic Structure Worksheet

Label the parts of an atom on the diagram below.



4. What type of charge does a proton have?

5. What type of charge does a neutron have?

6. What type of charge does an electron have?

7. Which two subatomic particles are located in the nucleus of an atom?

8. If an atom has 35 protons in the nucleus, how many electrons will it have orbiting the nucleus?

9. What is the atomic number of the atom in the diagram above?

10. What is the atomic mass/mass number of the atom in the diagram above?

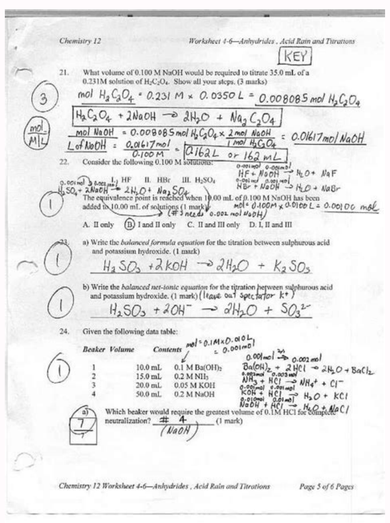
11. How many protons are in the nucleus of an atom with an atomic number of 15?

12. How many electrons are in the nucleus of an atom with an atomic number of 20?

13. How many neutrons are in the nucleus of an atom with an atomic number of 25? (use Periodic Table for mass)

14. What is the mass number of an atom with 3 protons, 4 neutrons, and 3 electrons?

15. How many neutrons are in the nucleus of an atom that has an atomic mass of 36 and an



Chemistry 12 Worksheet 4-6—Anhydrides , Acid Rain and Titrations KEY

21. What volume of 0.100 M NaOH would be required to titrate 35.0 mL of a 0.231M solution of $H_2C_2O_4$. Show all your steps. (3 marks)

$mol\ H_2C_2O_4 + 0.231\ M \times 0.0350\ L = 0.008085\ mol\ H_2C_2O_4$

$H_2C_2O_4 + 2NaOH \rightarrow 2H_2O + Na_2C_2O_4$

$mol\ NaOH = 0.008085\ mol\ H_2C_2O_4 \times \frac{2\ mol\ NaOH}{1\ mol\ H_2C_2O_4} = 0.01617\ mol\ NaOH$

$L\ of\ NaOH = \frac{0.01617\ mol}{0.100\ M} = 0.162\ L$ or $162\ mL$

22. Consider the following 0.100 M solutions:

I. HF II. HBr III. H_2SO_4

$H_2SO_4 + 2NaOH \rightarrow 2H_2O + Na_2SO_4$

The equivalence point is reached when 10.00 mL of a 100 M NaOH has been added to 10.00 mL of solutions (1 mark)

$HF + NaOH \rightarrow H_2O + NaF$

$HBr + NaOH \rightarrow H_2O + NaBr$

$mol\ NaOH = 0.100\ M \times 0.0100\ L = 0.00100\ mol$

A. II only (B) I and II only C. II and III only D. I, II and III

23. a) Write the *balanced formula equation* for the titration between sulphurous acid and potassium hydroxide. (1 mark)

$H_2SO_3 + 2KOH \rightarrow 2H_2O + K_2SO_3$

b) Write the *balanced net-ionic equation* for the titration between sulphurous acid and potassium hydroxide. (1 mark) (leave out spectator K^+)

$H_2SO_3 + 2OH^- \rightarrow 2H_2O + SO_3^{2-}$

24. Given the following data table:

Beaker	Volume	Contents
1	10.0 mL	0.1 M $Ba(OH)_2$
2	15.0 mL	0.2 M NH_3
3	20.0 mL	0.05 M KOH
4	50.0 mL	0.2 M NaOH

$mol = 0.1\ M \times 0.01\ L = 0.001\ mol$

$Ba(OH)_2 + 2HCl \rightarrow 2H_2O + BaCl_2$ (0.001 mol : 0.002 mol)

$NH_3 + HCl \rightarrow NH_4^+ + Cl^-$ (0.002 mol : 0.002 mol)

$KOH + HCl \rightarrow H_2O + KCl$ (0.001 mol : 0.001 mol)

$NaOH + HCl \rightarrow H_2O + NaCl$ (0.01 mol : 0.01 mol)

Which beaker would require the greatest volume of 0.1M HCl for complete neutralization? #4 (NaOH) (1 mark)

Chemistry 12 Worksheet 4-6—Anhydrides , Acid Rain and Titrations Page 5 of 6 Pages

How many valence electrons are there?20. 7) If necessary, you can transform the lone pair of electrons into bond pair of electrons to fulfil octet rule. Hence, we cannot predict the number of valence electrons of a transition metal with certain number. In this way, abbreviated electron configuration is much more useful for elements that has higher atmic numbers. And learn about periodic table terminology like rows, columns, periods and groups. 5) Then, allot the lone pair of electrons to every single atom of a molecule. What atom matches this electron configuration? These values range start from 1 to n…, while n denotes the value of the outermost shell occupied with electron. Core Electrons The electrons which do not participate in any type of chemical bonding and do not refer to valence electrons are core electrons. 2) As a second step, you need to check for the noble gas element present at the right side of preceding horizontal row. Let us study in detail about this example: Noble gas elements have completely filled subshells and hence the elements with completely filled subshells can replace them. This is a 150 slide PowerPoint Review Game and 1-25 template sheet about atomic theory, electron orbitals, molecules, and electron configuration that concludes part III of the my atoms and periodic table unit that I offer on TpT. How many orbitals are in the 4s sublevel?21. How many electrons does Si contain?9. Solving Electron Dot Formula of CO2 The carbon atom is the central atom of the molecule.The oxygen atom consists of 6 valence electrons and 2 lone pairs. They possess electrons with unstable arrangement and hence the electrons excite to jump from excited to ground state often. It holds the atomic number 54 and symbol ‘Xe’. Answers are provided at the end so students can self assess. What is the highest occupied energy level?18. 3) Trace out the number of electrons present in the outer most shell. You can grab the link in my IGTV channel(@CoScineCreative) here to share with students. The electron configuration of an atom is 1s22s22p6. Whereas orbital diagram is an illustrative representation of location and spin of the electrons within the orbitals in the form of arrows. After filling 6s, electrons would fill26. For ex: The electronic configuration of Neon is 1s2 2s2 2p6 and for Aluminium it is 1s2 2s2 2p6 3s2 3p1 To make it easy and convenience to write, we can write the electronic configuration of Aluminium using noble gas notation as [Ne] 3s2 3p1. So, the principal quantum number of Iodine is 5. These four atomic orbitals are present around the nucleus of an atom and represent different energy states. 3) In case of cation, subtract the electrons around the element from the total number of valence electrons while drawing the dot diagram. In this diagrammatical representation, arrows represent electrons and its point of direction represent the spin of the electron. Let us learn what Quantum Numbers and Spin values of an electron are! Download The Denotation of Quantum Numbers In quantum physics and chemistry, quantum numbers play a major role in denoting the locality and energy values of an electron in its atomic orbital. Based on this information, let us learn about ground and excited state levels and also about the differences between these two states of energy levels. That’s it! The electronic configuration of zinc atom is [Ar] 4s2 3d10 Unabbreviated Electron Configuration Download The unabbreviated form of electron configuration is the configuration that does not utilise noble gas notation while writing the electron configuration of elements. What is the highest occupied energy level?19. Principal Quantum Number ValueNumber of possible sublevelsPossible Angular Momentum Quantum Numbers ValueElectronic Configuration from ‘n’ values and Sublevels n = 11l = 0 1sn = 22l = 02sl = 12pn = 33l = 03sl = 13pl = 23dn = 44l = 04sl = 14pl = 24dl = 34f Since the orbital quantum number values is less than the principal quantum numbers, there is no existence of 1p, 2d and 3f atomic orbitals. According to the rules of electronic configuration, two electrons can locate in the same orbital but with opposite spin directions. Excited State: The highest possible energy levels among all the atomic orbitals around the nucleusrefers to excited state. These electrons are usually found in inner energy levels and fully occupied and hence referred to chemically inert electrons. Well, using the periodic table, anyone can easily write the electronic configuration of any element. And hence the electronic configuration of bromine atom is 1s22s22p63s23p64s23d104p5, satisfying Aufbau principle. Two electrons out of 7 valence electrons occupy 4s orbital first and the rest occupy 4p orbital. 2) In case of anion molecule, add the extra electrons around the element while drawing dot diagram. 6) Check out for every atom whether it possess octet configuration. And the electrons can locate in this three dimensional space of a nucleus. In atomic theory, the angular quantum number plays an important role since it signifies the magnitude of the shape of atomic orbitals and its impact on chemical bonding of electrons. Unabbreviated Electron Configuration: 1s2 2s2 2p6 3s2 3p6 4s2 3d10 4p6 5s2 4d2 Abbreviated Electron Configuration: [Kr] 4d² 5s² Complete Electron Configuration for Barium Barium is a highly reactive alkaline earth metal with atomic number 56 and bears the symbol ‘Ba’. I.e. s, p, d, and f atomic orbitals. Atomic Theory, Atomic Symbols, #s, Valence Electrons, Octet Rule, SPONCH Atoms, Molecules, Hydrocarbons (Structure), Alcohols (Structure), Proteins (Structure) Also iPage 2Use this free video about quantum numbers to easily teach your students about spdf, spin, n, l, ml, ms, and super easy method of finding quantum numbers. Electrons fill up these orbitals in an order and here is the cheat sheet that helps you better understand the order of orbital diagrams. By studying these atomic orbitals, scientists calculate and write the location and energy state of an electron plus its interaction in the atom to create chemical bonding. To put it simply, every individual electron encompasses of four quantum numbers and two electrons must exhibit opposite spins when located in the same orbital. However, Hund’s rule strictly follows the theory of atomic spectra. The formula that derives the value of magnetic quantum number is ml = (2ℓ + 1)! Where ℓ = angular quantum number. You don't need an account to see We thoroughly check each answer to a question to provide you with the most correct answers. It has 35 electrons and among which 7 electrons are valence electrons. How many unshared pairs of electrons are in this orbital diagram?27. For example: let us learn the abbreviated and unabbreviated form of Gold metal in the periodic table. For Ex: Calcium—Electron Dot Configuration of Calcium is: .Ca. Steps to determine the electron dot diagram 1) Analyse the total number of valence electrons of every atom in a molecule. This notation also helps in understanding the bonding capacity of electrons in an atom through magnetic and other chemical features. After filling 5s, electrons would fill…25. Unabbreviated Electron Configuration: 1s2 2s2 2p6 3s2 3p6 3d10 4s2 4p6 4d10 5s2 5p6 Abbreviated Electron Configuration: [Kr] 4d¹⁰ 5s² 5p⁶ Conclusion The overall benefits of writing electron configurations for elements include: Helps in describing the valence of a particular elementUseful for defining the chemical properties of elements that fall under same group in the periodic table.To find out elements that show similar chemical and physical properties.For understanding the complete picture of atomic spectra of elements in the periodic table.To differentiate the elements into different blocks and groups such as s-block, p-block, d-block and f-block elements. Differences between Ground State and Excited State Ground StateExcited StateDefinitionElectrons locate in lowest possible energy levelsElectrons locate in highest possible energy levelsStabilityHighly StableHighly UnstableLifetimeVery Long LifetimeVery Short LifetimeEnergyVery Less Energy or sometimes with Zero EnergyHigh EnergyElectron LocationElectron Location is always intact to lowest possible energy levelsElectron Location is always intact to highest possible energy levelsDistance From Atomic NucleusDistance between atomic nucleus and ground state electron is very lessDistance between atomic nucleus and excited state electron is comparatively high Electron Dot Configuration To understand better about electron dot configuration, we need to learn a couple of terminology related to electron configurations. Let us see one example of orbital diagram: Electron Configuration of Nitrogen: 1s2 2s2 2p3 Orbital Diagram for Nitrogen: Source:differencebetween.com S, P, D and F are the four different atomic orbitals located around the nucleus of an atom with different energy levels. It consists of 40 electrons in total in the shells. The number of electrons in the atom is13. Let us know about it through the REPORT button at the bottom of the page.n atomic physics and quantum chemistry, the electron configuration is the distribution of electrons of an atom or molecule (or other physical structure) in atomic or molecular orbitals. You might have observed the standardized notation while writing electron configuration. The unabbreviated electron configuration of Gold is: 1s2 2s2 2p6 3s2 3p6 3d10 4s2 4p6 4d10 5s2 5p6 4f14 5d10 6s1 while the abbreviated electron configuration of Gold is [Xe] 4f145d106s1 You might have observed that the unabbreviated electron configuration of Gold is long, tedious and takes time to write it completely. 3) In the third step, scroll down and back to far left side of periodic table! Then, write the outer electron configuration of your desired element by succeeding the elements from left to right associated with every column. Unabbreviated Electron Configuration: 1s2 2s²2p⁶ 3s² 3p⁶ 3d¹⁰ 4s² 4p⁶ 4d¹⁰ 5s² 5p⁶ 6s2 Abbreviated Electron Configuration: [Xe] 6s2 Complete Electron Configuration for Xenon Xenon is a noble gas element that is available in very less amounts on the Earth’s crust. Writing electronic configurations for the elements present in the initial periods and groups of the periodic table is easy and simple. 1s22s22p63s23p64s23d10ZincCopperNickelGermanium3. What is the electron configuration for a Sulfur atom?1s22s22p63p61s22s22p63s23p61s22s22p63s23p43p44. That is the reason, we observe four different atomic orbitals around the nucleus of an atom. That means, they occupy the lowest energy state in the beginning and continue to the next highest energy level and go on… Have a look at the order of electron occupying energy states in its atomic orbitals: 1s

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