

Sumeya primary No.2 School

2012 A.Y 2nd Semester Chemistry Workshee II Correction - for Grade 7

I. Answer the following depending on each instruction (Use legible /clear handwriting)

1. Define atomic number and mass number?

Ans. The sum of the number of protons plus the number of neutrons in an atom is called the mass number. And the number of protons in a particular atom is given a special name, the atomic number. Chemists commonly use the symbolization in Figure-1 to represent these amounts for a particular element.

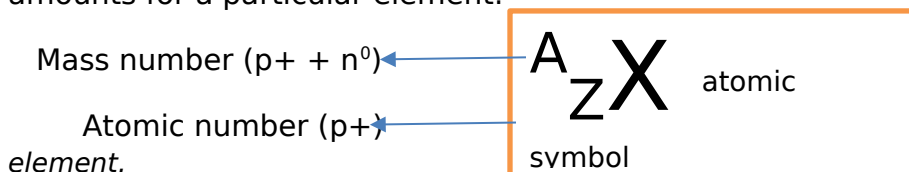


Fig.1: Representing a specific element.

2. Define **isotopes** and Give or show three examples of elements that have isotopes.

Ans. The atoms of a particular element can have an identical number of protons and electrons but varying numbers of neutrons. If they have different numbers of neutrons, then the atoms are called isotopes.

E.g. $^{12}_6\text{C}$, $^{13}_6\text{C}$ & $^{14}_6\text{C}$, ^1_1H , ^2_1H , & ^3_1H , $^{35}_{17}\text{Cl}$ & $^{37}_{17}\text{Cl}$

NB. **Isotopes: Varying neutrons**

3. Define **atomic mass**, Are mass number & atomic mass the same ? If they are the same how could the atomic mass of chlorine be 35.5?

Ans. The **atomic mass of an element** is the average mass of its isotopes.

NB. Since mass no. is the sum of protons and neutrons, it could not be fractional like 35.5 which is the atomic mass of chlorine. This is because no half a proton and half a neutron in the nucleus of an atom. Hence **mass number is not same as atomic number**.

4. Define **energy levels** (atomic shells)? Represent energy level (shells) by letters & numbers?

Ans. **Energy level** is the path that an electron takes around the nucleus of an atom. Chemists use both energy levels and electron configurations to represent which energy level, subshell, and orbital are occupied by electrons in any particular atom.

5. Describe the *maximum* number of electrons each *main* energy level (atomic shell) and *sub*-shells

can accommodate?

Ans.

Atomic shell	Max no. of Electrons	Sub shell	Max electrons
First shell (K -shell)	2	s -sub shell	2

Second shell (L -shell)	8	s, p -sub shell	6
Third shell (M -shell)	18	s,p, d -sub shell	10
Fourth shell (N -shell)	32	s,p,d, f -sub shell	14

6. Define **electronic configuration**? Then write the electronic configuration of the **first 5 elements in the** main energy levels?

Ans. Electronic configuration is the arrangement of electrons in atomic energy levels. See your text book page #98.

7. Describe what **valence shell & valence electrons** are and explain how to determine the number of valence electrons?

Ans. The electrons in the outermost energy level are commonly called valence electrons. Knowing the number of electrons that are an atom's outermost energy level gives you a big clue about how that atom will react.

NB. **Valence electrons: Clues about chemical reaction**

8. Define **ion**, describe how they are formed & list some examples of positive ions (**cations**) and negative ions (**anion**)?

Ans. Atoms (or groups of atoms) in which there are unequal numbers of protons and electrons are called ions. Atoms become ions by gaining or losing electrons. And ions that have a positive charge are called cations. The progression goes like this: The Na^+ ion is formed from the loss of one electron. Because it lost an electron, it has more protons than electrons, or more positive charges than negative charges, which means it's now called the Na^+ cation. **See more ... on my t.me channel @beauty of chemistry.**

NB. **Ions: Varying electrons**

9. List the seven **diatomic** elements & the common **monoatomic** molecular elements (**noble gases**)?

Ans. Diatomic molecules = H_2 , N_2 , O_2 , Cl_2 , Br_2 , I_2 , & F_2 , and

He, Ne, Ar, Kr, Xe and Rn are monoatomic molecules (noble gases).

10. Choose only one; (a) $_{31}\text{Ga}$ or (b) $_{38}\text{Sr}^+$, then write all the following information:

Solution for (b): no. of e^- = $Z - \text{charge} = 38 - (+1) = 37$

- ⇒ Full sub-shell electron configuration: $_{38}\text{Sr}^+ = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1$
- ⇒ Valence shell configuration: $5s^1$, Valence electrons: 1
- ⇒ No. of inner electrons = $Z - \text{Valence electrons} = 37 - 1 = 36$

All the best!!

Parent's Name _____ Signature _____ Date _____

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