NAME:_____ #:_____ Period:_____Date:_____

WORKSHEET ON ELEMENTS, ATOMS AND ISOTOPES

In view of the modern concept of atomic structure, fill in the following with the appropriate word:

1. The nucleus of an atom contains _____, which are positively charged.

2. Compared to the diameter of the atomic nucleus, the average distance of the electrons from the nucleus is relatively (small/large) _____.

3. An average atomic nucleus has a diameter of about _____ m.

4. The nucleus of an atom may also contain _____, which are uncharged.

5. The proton and the (electron/neutron)_____ have almost equal masses. The proton and the (electron/neutron)_____ have charges that are equal in magnitude but opposite in nature.

6. Although the nucleus of an atom is very important, it is the _____ of the atom that determine its chemical properties.

7. True or False? Atoms that have the same number of neutrons but different numbers of protons are called isotopes.

8. For an atom, the number of protons and electrons is (different/the same)_____.

9. How did Dalton's atomic theory have to be modified after the discovery that several isotopes of an element may exist?_____
_____
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10. Write the atomic symbol ($^{A}_{Z}X$) for each of the isotopes described below:
    a. Z = 8, number of neutrons = 9
    b. the isotope of chlorine in which A = 37
    c. Z = 27, A = 60
    d. number of protons = 26, number of neutrons = 31
    e. the isotope of Iodine with a mass number of 131
    f. Z = 3, number of neutrons = 4

11. How many protons and neutrons are contained in the nucleus of **each** of the following atoms? In an uncharged atom of each element, how many electrons are present?

    a. $^{24}_{12}Mg$ = ___p ___n ___e b. $^{19}_{8}O$ = ___p ___n ___e c. $^{45}_{21}Sc$ = ___p ___n ___e

    d. $^{52}_{24}Cr$ = ___p ___n ___e e. $^{53}_{24}Cr$ = ___p ___n ___e f. $^{54}_{24}Cr^{+3}$ = ___p ___n ___e

12. True or false? The mass number of a nucleus represents the number of protons in the nucleus?

13. The _____ number represents the sum of the number of protons and neutrons in a nucleus.

14. Are all atoms of the same element identical? If not, how can they differ?
_____
_____
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