

### Atomic Multiple Choice Practice Standard #2

#### Multiple Choice

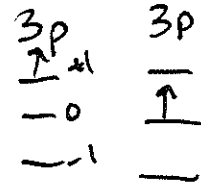
Identify the letter of the choice that best completes the statement or answers the question.

1. (#2-2) Consider the following quantum numbers for two different electrons in a ground state atom of phosphorus. Which is a correct comparison of these electrons?

3,1,1,-1/2

3,1,0,-1/2

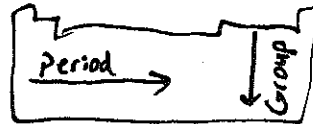
Sub orbital



- a. These electrons have the same energy and occupy different orbitals
- b.** These electrons have the same energy and occupy the same orbital - P
- c. These electrons have ~~different~~ energies and occupy different orbitals
- d. These electrons have ~~different~~ energies and occupy different energy sublevels
- e. These electrons have ~~different~~ energies and occupy the same energy sublevels

2. (#2-3) Which is the correct statement of a trend within a group of elements on the periodic table as atomic number increases?

- I. The number of valence electrons increases ~~N~~
- II. The radius of the most common ion increases ~~Y~~
- III. The ionization energy increases. ~~N~~



- a. I only
- b.** II only
- c. III only
- d. I and II
- e. I, II, and III

3. (#2-2) An atom with the electron configuration  $1s^2 2s^2 2p^6 3s^2 3p^4 4s^2$  has an occupied but incomplete

- a. 2s sublevel
- b. 3s sublevel
- c. 4s sublevel
- d. 2nd principal energy level
- e.** 3rd principal energy level

3d

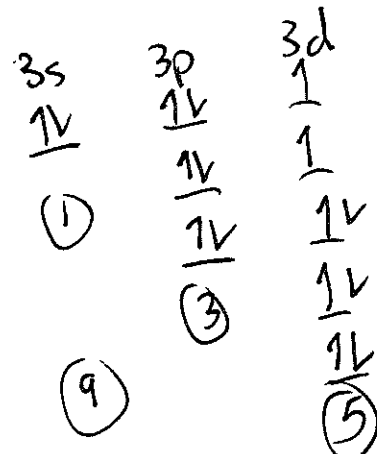
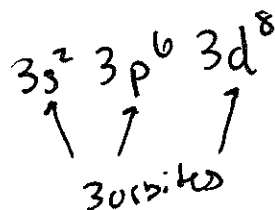
4. (#2-3) Which is a correct comparison of the  $Cl^0$  atom to the  $Cl^-$  ion?

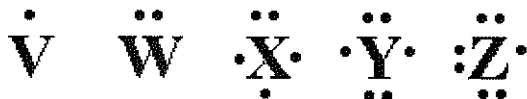
- I. The radius of the  $Cl^0$  atom is greater than the radius of the  $Cl^-$  ion? ~~N~~
- II. The mass of the  $Cl^0$  atom is about 1 amu greater than the mass of the  $Cl^-$  ion ~~N~~
- III. The  $Cl^0$  atom contains fewer electrons than the  $Cl^-$  ion. ~~Y~~

- a. I only
- b.** III only
- c. I and II only
- d. II and III only
- e. I, II, and III

5. (#2-2) What are the number of occupied orbitals in the third principal energy level of a nickel atom in the ground state?

- a. 3
- b. 4
- c. 5
- d. 8
- e.** 9





6.

(#2-2) Which of the above is most likely to be the atom with the electron configuration of  $1s^2 2s^2 2p^3$ ?

a. V

b. W

c. X

d. Y

e. Z



5 valence

7.

(#2-1) The term "weighted average atomic mass" refers to a calculated atomic mass that takes into account

a. ionization energy

b. number of positive valences

c. charge on the monatomic ion

d. mass defect

e. naturally occurring distribution of isotopes

8.

(#2-3) Which of the following would justify which has the higher 1st ionization energy? Atomic Oxygen or Oxide ion

a. Oxide, due to being isoelectric to a noble gas.

b. Oxide, due to having more protons

c. Oxygen, due to having the same number of protons

d. Oxygen, due to a slightly smaller atomic radius.

Element	First Ionization Energy (kJ/mol)	Atomic Radius (pm)
B	801	85
C	1086	77
N	1400	75
O	1314	73
F	1680	72
Ne	2080	70

9.

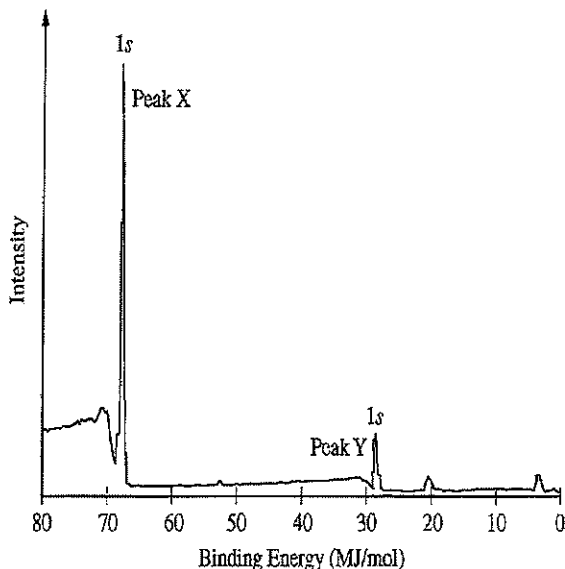
(#2-3) Which of the following would best describe why Ne has a higher 1st ionization energy than F.

a. F has more protons

b. Ne has more electrons.

c. F has a higher electronegativity

d. Ne has a higher effective nuclear charge.



10. (#2-2d) How many electrons are in each of the substances S orbital
- |           | X | Y |
|-----------|---|---|
| a.        | 1 | 1 |
| <b>b.</b> | 1 | 2 |
| c.        | 2 | 1 |
| d.        | 2 | 2 |
- height of peak*
11. (#2-3) X has a higher ionization energy than Y due to
- Larger radius
  - Larger electronegativity
  - Larger amount of shielding
  - d.** Larger number of protons
12. (#2-2d) Which of the following substances could be an example of substance Y?
- Mg
  - Al
  - He
  - d.** K
13. (2-1) Carbon-13 is a radio active isotope used to determine the age of old living fossils. Which of the following is true relative to isotope Carbon 13.
- The majority of carbon atoms on earth are Carbon-13  $\checkmark$
  - On average, most carbon-13 atoms contain 6 protons and 7 neutrons.  $\checkmark$
  - Carbon-12 is more abundant on earth than carbon-13  $\checkmark$
- I only
  - I and II only
  - c.** III only
  - d. I, II and III
14. (2-1) The aluminum atom can oxidize to form an ion. Which of the following is true regarding this process.
- The oxidation is  $\text{Al} \Rightarrow \text{Al}^{3+} + 3e^-$   $\checkmark$
  - Al is an isotope of  $\text{Al}^{3+}$   $\checkmark$
  - Energy will be released as the negative electron is pulled away from the atom.  $\checkmark$
- a.** I only
  - I and II only
  - c. I and III only
  - d. I, II and III