

Name KEY - A

Quiz #6-A

Date 10/29/14

Each question is worth 10 points.

Circle the correct answer:

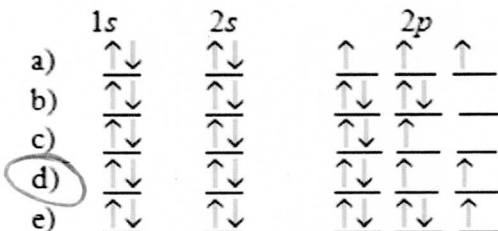
1. In the periodic table atoms are arranged in order of

- A) atomic mass.
- ☒ B) atomic numbers.
- C) physical properties.
- D) periodicity.
- E) chemical reactivities.

2. How does atomic radius increase or decrease horizontally or vertically across the periodic table?

- ☒ A) Atomic radius decreases moving from left to right across a period and increases from top to bottom.
- B) Atomic radius increases moving left to right across a period and decreases from top to bottom.
- C) Atomic radius is sporadic unless moving you are moving across a period.
- D) Atomic radius increases diagonally across the periodic table.
- E) None of the answers is correct.

3. The orbital diagram for a ground-state oxygen atom is



4. Which two electron configurations represent elements that would have similar chemical properties?

(1)  $1s^2 2s^2 2p^4$     (2)  $1s^2 2s^2 2p^5$     (3)  $[\text{Ar}]4s^2 3d^{10} 4p^3$     (4)  $[\text{Ar}]4s^2 3d^{10} 4p^4$

A) (1) and (2)

B) (1) and (3)

☒ C) (1) and (4)

D) (2) and (4)

E) (2) and (3)

5. Which of these elements has the highest first ionization energy?

A) Cs

B) Ga

C) K

D) Bi

☒ E) As

*In general, IE increases left to right on the periodic TABLE. IE decreases from top to bottom.*

6. The electron configuration of a ground-state vanadium atom is

A)  $[\text{Ar}]4s^2 4d^3$ .

B)  $[\text{Ar}]4s^2 4p^3$ .

☒ C)  $[\text{Ar}]4s^2 3d^3$ .

D)  $[\text{Ar}]3d^5$ .

E)  $[\text{Ar}]4s^2 3d^7$ .

7. Select the correct electron configuration for Cu ( $Z = 29$ ).

A)  $[\text{Ar}]4s^23d^9$

B)  $[\text{Ar}]4s^13d^{10}$

C)  $[\text{Ar}]4s^24p^63d^3$

D)  $[\text{Ar}]4s^24d^9$

E)  $[\text{Ar}]5s^24d^9$

8. Which of the following is a correct set of quantum numbers for an electron in a  $3d$  orbital?

A)  $n = 3, l = 0, m_l = -1$

B)  $n = 3, l = 1, m_l = +3$

C)  $n = 3, l = 2, m_l = 3$

D)  $n = 3, l = 3, m_l = +2$

E)  $n = 3, l = 2, m_l = -2$

9. Atomic orbitals developed using quantum mechanics

- ☒ A) describe regions of space in which one is most likely to find an electron.
- B) describe exact paths for electron motion.
- C) give a description of the atomic structure which is essentially the same as the Bohr model.
- D) allow scientists to calculate an exact volume for the hydrogen atom.
- E) are in conflict with the Heisenberg Uncertainty Principle.

10. Which of these species make an isoelectronic pair:  $\text{Cl}^-$ ,  $\text{O}^{2-}$ , F,  $\text{Ca}^{2+}$ ,  $\text{Fe}^{3+}$ ?

- A)  $\text{Ca}^{2+}$  and  $\text{Fe}^{3+}$
- B)  $\text{O}^{2-}$  and F
- C) F and  $\text{Cl}^{6-}$
- ☒ D)  $\text{Cl}^-$  and  $\text{Ca}^{2+}$
- E) none of the above