Teacher's Tools® Chemistry
Atomic Structure: Electronic Structure: Worksheet 1

Given the following list of atomic and ionic species, find the appropriate match for questions 1-3.

(A) Fe^{2+} (B) Cl (C) K^{+} (D) Cs (E) Hg^{+}

1. Has the electron configuration: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6$.

2. Has a noble gas electron configuration.

3. Has electrons in f orbitals.

4. The electron configuration that is impossible is

   (A) $1s^2 2s^2 2p^6$ (B) $1s^2 2s^2 2p^3$ (C) $1s^2 2s^2 2p^6 3s^1$

   (D) $1s^2 2s^2 2p^6 3s^2$ (E) $1s^2 2s^2 2p^6 2d^2$

5. Which species is paramagnetic in the gaseous state?

   (A) K (B) Ca (C) Zn (D) Kr

6. How many unpaired electrons are found in the most stable electronic state (ground state) of a sulfur atom?

   (A) 0 (B) 2 (C) 4 (D) 6

7. Which set contains three isoelectronic species?

   (A) Zn, Cd, Hg

   (B) Br^{+}, Kr, Rb^{-}

   (C) P^{3-}, Se^{2-}, I^{-}

   (D) F^{-}, Na^{+}, Mg^{2+}

8. Which of the following refers to the ground-state electron configuration of an atom?

   (A) $1s^1 2s^1$

   (B) $[Kr]5p^1$

   (C) $[Ne]3s^1 3p^2$

   (D) $[Ar]4s^2 3d^6$

9. Which species is diamagnetic in the ground state?

   (A) N (B) Zn^{2+} (C) Cu^{2+} (D) O^{-}

10. What is the maximum number of electrons that can occupy the 5f sublevel?

    (A) 10 (B) 14 (C) 7 (D) 2

11. What is the atomic number of the first element in the periodic table to have a filled d-orbital?

(A) 30 (B) 2 (C) 2 (D) 29

12. How many unpaired electrons are there in the Ti^{3+} ion?

(A) 0 (B) 2 (C) 1 (D) 4

13. The sublevel that can be occupied by a maximum of 10 electrons is identified by the letter

(A) d (B) f (C) p (D) s

14. An orbital may never be occupied by

(A) 1 electron.

(B) 2 electrons.

(C) 3 electrons.

(D) 0 electrons.

15. The number of orbitals in the 2nd shell of an atom is

(A) 1 (B) 9 (C) 16 (D) 4

16. The first element in the periodic table having the first completed p-orbital is

(A) He (B) Be (C) O (D) Ne

17. All of the following attempts to write a ground-state electronic configuration are incorrect except for one. The correct one is

(A) $[Ne]3s^2 3p^6 3d^{10}$

(B) $[He]2s^2 2p^3$

(C) $[Ne]3p^3$

(D) $[Ne]3s^2 3p^8$

18. The ion that has the ground-state electronic configuration of $[Ne]3s^2 3p^3$ is

(A) Si^{+1}

(B) Al^{+3}

(C) S^{+1}

(D) Cl^{-1}