The Periodic Table: End-of-Chapter Assessment

Multiple Choice:

1. Which one of the following elements will not conduct an electric current?
a) zinc **b)** copper **c)** iodine **d)** aluminum

2. Which metal will not react readily with hydrochloric acid?
a) magnesium **b)** zinc **c)** copper **d)** aluminum

3. Copper metal will conduct an electric current. This is an example of a (an)
a) physical property. **b)** chemical property.
c) chemical reaction. **d)** oxidation-reduction reaction.

4. Every time carbon and oxygen gas combine to produce carbon dioxide, the mass of the carbon dioxide is the same. This is an example of
a) the Law of Definite Proportions. **b)** the Law of Double Displacement.
c) the Law of Oxidation and Reduction. **d)** the Law of Isomers.

5. The cathode rays that are produced in an electric discharge tube are
a) protons **b)** electrons **c)** neutrons **d)** alpha particles

6. Rutherford's experiments on the nucleus of the atom led him to believe that the nucleus carried a
a) negative charge **b)** neutral charge
c) positive charge **d)** gravity charge

7. Which light has the lowest radiation energy?
a) purple **b)** green **c)** violet **d)** red

8. When an electron from a hydrogen atom has been excited to a higher energy level and then allowed to fall to the lowest energy level (E_1), the radiation will be
a) visible light **b)** infrared light **c)** ultraviolet light **d)** x-rays

9. The line spectrums produced by helium and neon gas are:
a) Identical to the line spectrum of hydrogen.
b) Exactly the same for both of them.
c) Not the same, but helium and hydrogen will be the same since they belong to the same period.
d) Not identical with any other element's line spectrum.

10. Which one of the following has the highest ionization energy?
a) Na^0 **b)** Ne^0 **c)** Na^+ **d)** F^0

11. Which family of elements should have the lowest first ionization energies?
a) The alkaline metals **b)** The noble gases
c) The halides **d)** The alkali metals

12. The correct ground state electron configuration for calcium (Ca) is
a) $1s^2 2s^4 2p^6 3s^2 3p^2$ **b)** $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2$ **d)** $1s^2 2s^2 2p^6 2d^{10}$

13. The last electron to be put into the halides electron configuration will be placed in the
a) *s* orbital **b)** *p* orbital **c)** *d* orbital **d)** *f* orbital

14. Which element contains 6 valence electrons?
a) silicon **b)** iodine **c)** phosphorus **d)** sulfur

15. Which group of elements should all have similar chemical behavior?
a) Magnesium, strontium and sodium.
b) Sulfur, phosphorus and silicon.
c) Hydrogen, oxygen and nitrogen.
d) Argon, helium and neon.

16. How many valence electrons do the transition elements contain?
a) 1 **b)** 2 **c)** 3 **d)** 4

17. What is the correct formula for aluminum oxide?
a) Al_3O_2 **b)** Al_2O **c)** AlO_2 **d)** Al_2O_3

18. What type of bond is contained between carbon and oxygen atoms of carbon dioxide?
a) Ionic bond **b)** Covalent bond
c) Hydrogen bond **d)** Electronic bond

19. The three common isotopes of magnesium have masses of 25, 26 and 27 grams. The differences in mass are attributed to:
a) The different number of protons each isotope contains.
b) The different number of electrons each isotope contains.
c) The different number of neutrons each isotope contains.
d) The different number of alpha particles each isotope contains.

20. Any element that has more than 83 protons is said to have an unstable nuclei. These elements are said to be
a) monotomic **b)** radioactive **c)** prototomic **d)** electroactive

21. The chemical properties of an atom depend primarily on:
a) The number of protons contained in the atom.
b) The number of neutrons contained in the atom.
c) The mass of the atom.
d) The number of valence electrons contained in the atom.

22. A metal element, M, combines with oxygen to form a compound with the formula of MO. What would be the correct formula when the metal combines with bromine?
a) MBr **b)** MBr_2 **c)** M_2Br **d)** MBr_3

23. Which element in the second period has 6 valence electrons?
a) Boron **b)** Carbon **c)** Nitrogen **d)** Oxygen

24. Which group or family has the highest 1st ionization energies?
a) Alkali metals **b)** Alkaline earth metals
c) Halides **d)** Noble gases

25. Which element loses an electron most readily?
a) Sodium **b)** Neon **c)** Fluorine **d)** Oxygen

26. Given the electron arrangements for neutral atoms A and B.
A. $1s^2 2s^2 2p^6 3s^1$
B. $1s^2 2s^2 2p^6 5s^1$

Which statement is false?

a) A is the electron configuration of sodium.
b) Energy is required to change A to B.
c) Less energy is required to remove one electron from B than from A.
d) A and B represent different elements.

27. When deuterium and tritium combine, the reaction is called
a) fission **b)** fusion **c)** neutrenoism **d)** ionization

Written Expression:

1. Write the electron configuration for zinc (Zn). How many valence electrons does zinc have? Write the correct formula for zinc chloride and zinc oxide.

2. The first ionization energy of magnesium is greater than the first ionization energy of sodium. Why is the second ionization energy of sodium greater than the second ionization energy of magnesium?

3. Magnesium has three stable isotopes as follows:

mass number	isotopic mass	% abundance
24	23.98504	78.99
25	24.98594	10.00
26	25.98259	11.01

Calculate the average atomic mass for magnesium. Show work to support your answer.

4. Illustrate how visible, ultraviolet, and infrared light are produced when the hydrogen atom is excited to different energy levels.

Answer Key

Multiple Choice:

1) c	2) c	3) a	4) a	5) b
6) c	7) d	8) c	9) d	10) c
11) d	12) b	13) b	14) d	15) d
16) b	17) d	18) b	19) c	20) b
21) d	22) b	23) d	24) d	25) a
26) d	27) b			

Written Expression:

1. $1s^2 2s^2 2p^6 3s^2 3d^{10}$. Zinc contains 2 valence electrons. $ZnCl_2$ and ZnO

2. The second ionization energy of sodium is the energy needed to remove the electron from the noble gas configuration. We know that noble gas configurations are the most stable. Whereas, the second ionization energy of magnesium is the removal of an electron from its s^1 configuration. This electron is not a noble gas configuration.

3.

24	23.98504	× .7899	=	18.95
25	24.98594	× .1000	=	2.499
26	25.98259	× .1101	=	2.861
			1.0 =	24.31