Period Law: Practice Test

Select the best answer.

1) The ionization energies for removing successive electrons from sodium are 496 kJ/mol, 4562 kJ/mol, 6912 kJ/mol, and 9544 kJ/mol. The great jump in ionization energy after the first electron is removed indicates that

a) sodium has four or five electrons.
b) the atomic radius has increased.
c) a *d*-electron has been removed.
d) the noble gas configuration has been reached.

2) Valence electrons are those

a) closest to the nucleus.
b) in the lowest energy level.
c) in the highest energy level.
d) combined with protons.

3) In developing his periodic table, Mendeleev listed on cards each element's name, atomic mass, and

a) atomic number.
b) electron configuration.
c) isotopes.
d) properties.

4) The element that has the greatest electronegativity is

a) oxygen.
b) sodium.
c) chlorine.
d) fluorine.

5) Among the alkali metals below, which has the lowest melting point?

a) sodium (atomic number 11)
b) potassium (atomic number 19)
c) rubidium (atomic number 37)
d) cesium (atomic number 55)

6) A measure of the ability of an atom in a chemical compound to attract electrons is called

a) electron affinity.
b) electron configuration.
c) electronegativity.
d) ionization potential.

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7) The electron configuration of cesium, atomic number 55, is [Xe] $6s^1$. In what period is cesium?

a) Period 1
b) Period 6
c) Period 8
d) Period 55

8) Which represents a neutral atom acquiring an electron in an exothermic process?

a) $A + e^- + \text{energy} \rightarrow A^-$
b) $A + e^- \rightarrow A^- - \text{energy}$
c) $A + e^- \rightarrow A^- + \text{energy}$
d) $A^- + \text{energy} \rightarrow A + e^-$

9) The number of valence electrons in Group 17 elements is

a) 7.
b) 8.
c) 17.
d) equal to the period number.

10) Compared to the alkali metals, the alkaline-earth metals

a) are less reactive.
b) have lower melting points.
c) are less dense.
d) combine more readily with nonmetals.

11) Evidence gathered since Mendeleev's time indicates that a better arrangement than atomic mass for elements in the periodic table is an arrangement by

a) mass number.
b) atomic number.
c) group number.
d) series number.

12) The energy required to remove an electron from an atom is the atom's

a) electron affinity.
b) electron energy.
c) electronegativity.
d) ionization energy.

13) The idea of arranging the elements in the periodic table according to their chemical and physical properties is attributed to

a) Mendeleev.
b) Moseley.
c) Bohr.
d) Ramsay.

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14) In a row in the periodic table, as the atomic number increases, the atomic radius generally

a) decreases. b) remains constant.

c) increases. d) becomes unmeasurable.

15) Neutral atoms with an s^2p^6 electron configuration in the highest energy level are best classified as

a) metalloids. b) metals.

c) nonmetals. d) gases.

16) The periodic table

a) permits the properties of an element to be predicted before the element is discovered.

b) will be completed with element 118.

c) has been of little use to chemists since the early 1900s.

d) was completed with the discovery of the noble gases.

17) In Period 3 there are 8 elements. What sublevel(s) is (are) being filled?

a) *s* b) *s* and *d*

c) s and *p* d) *d* and *f*

18) How many elements are in a period in which only the *s* and *p* sublevels are filled?

a) 2 b) 8

c) 18 d) 32

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ANSWER KEY

1) d

2) c

3) d

4) d

5) d

6) c

7) b

8) c

9) a

10) a

11) b

12) d

13) a

14) a

15) d

16) a

17) c

18) b