Ch 7 pretest

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) The 1s orbital is the smallest in _____ atoms.
   A) Cl
   B) I
   C) F
   D) Br
   E) The 1s orbitals in all of the above atoms are the same size.

2) Electrons in the 1s subshell are much closer to the nucleus in Ar than in He due to the larger _____ in Ar.
   A) paramagnetism
   B) Hund's rule
   C) nuclear charge
   D) azimuthal quantum number
   E) diamagnetism

3) Atomic radius generally increases as we move _____.
   A) down a group and from right to left across a period
   B) down a group; the period position has no effect
   C) down a group and from left to right across a period
   D) up a group and from right to left across a period
   E) up a group and from left to right across a period

4) Of the following, which gives the correct order for atomic radius for Mg, Na, P, Si and Ar?
   A) Ar > Si > P > Na > Mg
   B) Si > P > Ar > Na > Mg
   C) Na > Mg > Si > P > Ar
   D) Mg > Na > P > Si > Ar
   E) Ar > P > Si > Mg > Na

5) Screening by the valence electrons in atoms is _____.
   A) essentially identical to that by core electrons
   B) more efficient than that by core electrons
   C) responsible for a general increase in atomic radius going across a period
   D) less efficient than that by core electrons
   E) both more efficient than that by core electrons and responsible for a general increase in atomic radius going across a period

6) Which one of the following atoms has the largest radius?
   A) F B) O C) S D) Ne E) Cl

Consider the following electron configurations to answer the questions that follow:

(i) $[Kr]\ 5s^1$
(ii) $[Ne]\ 3s^2\ 3p^5$
(iii) $[Ar]\ 4s^2\ 3d^{10}\ 4p^4$
(iv) $[Ne]\ 3s^2\ 3p^6$
(v) $[Ar]\ 4s^1$

7) The electron configuration of the atom with the largest atomic radius is _____.
A) (i) B) (ii) C) (iii) D) (iv) E) (v)

8) The electron configuration of the atom that is expected to form a stable –2 ion is _____.
A) (i) B) (ii) C) (iii) D) (iv) E) (v)

9) The electron configurations of the two atoms that form isoelectronic ions are _____.
A) (i) and (iii) B) (ii) and (iii) C) (iii) and (iv) D) (ii) and (v) E) (i) and (v)

10) The electron configuration of the atom that is expected to have the lowest first ionization energy is _____.
A) (i) B) (ii) C) (iii) D) (iv) E) (v)

11) The electron configuration of the atom that is expected to have the highest first ionization energy is _____.
A) (i) B) (ii) C) (iii) D) (iv) E) (v)

12) Of the following atoms, which has the largest <u>first</u> ionization energy?
A) C B) I C) O D) Br E) P

13) _____ have the lowest <u>first</u> ionization energies of the groups listed.
A) Alkaline earth metals
B) Noble gases
C) Alkali metals
D) Halogens
E) Transition elements

14) Which of the following has the largest <u>second</u> ionization energy?
A) Al B) Na C) P D) Mg E) Si

15) Which equation correctly represents the <u>first</u> ionization of aluminum?
A) $Al^-(g) \rightarrow Al(g) + e^-$
B) $Al^+(g) + e^- \rightarrow Al(g)$
C) $Al(g) \rightarrow Al^+(g) + e^-$
D) $Al(g) \rightarrow Al^-(g) + e^-$
E) $Al(g) + e^- \rightarrow Al^-(g)$

16) The ion with the smallest diameter is _____.
A) Br^- B) Cl^- C) F^- D) O^{2-} E) I^-

17) The _____ have the most negative electron affinities.

A) alkali metals

B) halogens

C) transition metals

D) chalcogens

E) alkaline earth metals

18) In general, as you go across a period in the periodic table from left to right:

(1) the atomic radius _____;

(2) the electron affinity becomes _____ negative; and

(3) the first ionization energy _____.

A) decreases, decreasingly, increases

B) decreases, decreasingly, decreases

C) decreases, increasingly, increases

D) increases, increasingly, decreases

E) increases, increasingly, increases

Consider the following electron configurations to answer the questions that follow:

(i) $1s^2\ 2s^2\ 2p^6\ 3s^1$

(ii) $1s^2\ 2s^2\ 2p^6\ 3s^2$

(iii) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$

(iv) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$

(v) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

19) The electron configuration of the atom forming the smallest cation is _____.

A) (i) B) (ii) C) (iii) D) (iv) E) (v)

20) The electron configuration belonging to the atom with the highest second ionization energy is _____.

A) (i) B) (ii) C) (iii) D) (iv) E) (v)

21) The electron configuration of the atom with the most negative electron affinity is _____.

A) (i) B) (ii) C) (iii) D) (iv) E) (v)

22) The electron configuration of the atom that is expected to have a positive electron affinity is _____.

A) (i) B) (ii) C) (iii) D) (iv) E) (v)

23) The list that correctly indicates the order of metallic character is _____.

A) Na > K > Rb

B) F > Cl > S

C) P > S > Se

D) B > N > C

E) P > N > O

24) The oxide of which element below can react with hydrochloric acid?

A) sodium B) sulfur C) carbon D) selenium E) nitrogen

25) Oxides of the active metals combine with water to form _____.

A) metal hydroxides

B) metal hydrides

C) oxygen gas

D) water and a salt

E) hydrogen gas

26) The reaction of a metal with a nonmetal produces a(n) _____.

A) acid B) hydroxide C) salt D) oxide E) base

27) Alkali metals tend to be more reactive than alkaline earth metals because _____.

A) alkali metals have greater electron affinities

B) alkali metals have lower melting points

C) alkali metals have lower densities

D) alkali metals have lower ionization energies

E) alkali metals are not more reactive than alkaline earth metals

28) Oxides of most nonmetals combine with water to form _____.

A) a base

B) water

C) hydrogen gas

D) an acid

E) water and a salt

29) Which of the following generalizations cannot be made with regard to reactions of alkali metals? (The symbol M represents any one of the alkali metals.)

A) $2M\,(s) + Cl_2\,(g) \rightarrow 2MCl\,(s)$

B) $2M\,(s) + 2H_2O\,(l) \rightarrow 2MOH\,(aq) + H_2\,(g)$

C) $2M\,(s) + S\,(s) \rightarrow M_2S\,(s)$

D) $M\,(s) + O_2\,(g) \rightarrow MO_2\,(s)$

E) $2M\,(s) + H_2\,(g) \rightarrow 2MH\,(s)$

30) Alkaline earth metals _____.

A) form halides with the formula MX

B) have the smallest atomic radius in a given period

C) exist as triatomic molecules

D) form monoanions

E) form basic oxides

31) The reaction of potassium metal with elemental hydrogen produces _____.

A) K_2H

B) KH

C) KH_2

D) None of the above; potassium will not react directly with hydrogen.

E) KOH

32) Of the hydrogen halides, only _____ is a weak acid.

A) HBr (aq)

B) HCl (aq)

C) HF (aq)

D) HI (aq)

E) They are all weak acids.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

33) Write the balanced reaction between zinc oxide and sulfuric acid.

34) Write the balanced equation for the reaction of elemental chlorine with liquid water.

35) Write the balanced equation for the reaction of elemental fluorine with liquid water.

Answer Key
Testname: UNTITLED1.TST

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) B
2) C
3) A
4) C
5) D
6) C
7) A
8) C
9) D
10) A
11) D
12) C
13) C
14) B
15) C
16) C
17) B
18) C
19) C
20) A
21) E
22) B
23) E
24) A
25) A
26) C
27) D
28) D
29) D
30) E
31) B
32) C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

33) $ZnO + H_2SO_4 \rightarrow ZnSO_4 + H_2O$

34) $Cl_2\,(g) + H_2O\,(l) \rightarrow HCl\,(aq) + HOCl\,(aq)$

35) $2H_2O\,(l) + 2F_2\,(g) \rightarrow 4HF\,(aq) + O_2\,(g)$