

**Chem 110: Practice Test Questions Chapter 7**

- 1) \_\_\_\_\_ is credited with developing the concept of atomic numbers.
- A) Dmitri Mendeleev
  - B) Lothar Meyer
  - C) Henry Moseley
  - D) Ernest Rutherford
  - E) Michael Faraday
- 2) 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) increases, increasingly, decreases
  - C) increases, increasingly, increases
  - D) decreases, increasingly, increases
  - E) decreases, increasingly, decreases
- 3) Element M reacts with chlorine to form a compound with the formula  $MCl_2$ . Element M is more reactive than magnesium and has a smaller radius than barium. This element is \_\_\_\_\_.
- A) Sr
  - B) K
  - C) Na
  - D) Ra
  - E) Be
- 4) Metals can be \_\_\_\_\_ at room temperature.
- A) liquid only
  - B) solid only
  - C) solid or liquid
  - D) solid, liquid, or gas
  - E) liquid or gas
- 5) What is the coefficient of M when the following equation is completed and balanced if M is an alkali metal?
- $$M(s) + H_2O(l) \rightarrow \underline{\hspace{2cm}}$$
- A) 1
  - B) 2
  - C) 3
  - D) 4
  - E) 0

- 6) The reaction of potassium metal with elemental hydrogen produces \_\_\_\_\_.
- A) KH
  - B)  $\text{KH}_2$
  - C)  $\text{K}_2\text{H}$
  - D) None of the above; potassium will not react directly with hydrogen.
  - E) KOH
- 7) The element(s) \_\_\_\_\_ could be used to produce a red or crimson color in fireworks.
- A) Mg or Ba
  - B) Sr
  - C) Ca, Sr, or Li
  - D) Ba
  - E) Na or K
- 8) Oxides of the active metals combine with acid to form \_\_\_\_\_.
- A) hydrogen gas
  - B) metal hydrides
  - C) water and a salt
  - D) oxygen gas
  - E) metal hydroxides
- 9) Oxides of most nonmetals combine with base to form \_\_\_\_\_.
- A) hydrogen gas
  - B) an acid
  - C) a base
  - D) water
  - E) water and a salt
- 10) Element X reacts with chlorine to form a compound with the formula  $\text{XCl}_2$ . The oxide of element X is basic. Element X is \_\_\_\_\_.
- A) Rb
  - B) Ca
  - C) Al
  - D) P
  - E) H
- 11) The reaction of a metal with a nonmetal produces a(n) \_\_\_\_\_.
- A) base
  - B) salt
  - C) acid
  - D) oxide
  - E) hydroxide

12) The most common and stable allotrope of sulfur is \_\_\_\_\_.

- A) S
- B) S<sub>2</sub>
- C) S<sub>4</sub>
- D) S<sub>8</sub>

13) Of the hydrogen halides, only \_\_\_\_\_ is a weak acid.

- A) HCl (aq)
- B) HBr (aq)
- C) HF (aq)
- D) HI (aq)
- E) They are all weak acids.

14) The first noble gas to be incorporated into a compound was \_\_\_\_\_.

- A) Ar
- B) Kr
- C) He
- D) Ne
- E) Xe

15) Of the halogens, which are gases at room temperature and atmospheric pressure?

- A) fluorine, bromine, and iodine
- B) fluorine, chlorine, and bromine
- C) fluorine, chlorine, bromine, and iodine
- D) fluorine, chlorine, and iodine
- E) fluorine and chlorine

16)  $\text{Cl}_2 (\text{g}) + \text{H}_2\text{O} (\text{l}) \rightarrow$  \_\_\_\_\_

- A)  $\text{HCl} (\text{aq}) + \text{HOCl} (\text{aq})$
- B)  $2 \text{Cl}^- (\text{aq}) + \text{H}_2\text{O} (\text{l})$
- C)  $2 \text{HCl} (\text{aq}) + \text{O}_2 (\text{g})$
- D)  $2 \text{HCl} (\text{aq}) + \text{O}_2^- (\text{g})$
- E)  $\text{Cl}_2 (\text{aq}) + \text{H}_2\text{O} (\text{l})$

17) In which set of elements would all members be expected to have very similar chemical properties?

- A) O, S, Se
- B) N, O, F
- C) Na, Mg, K
- D) S, Se, Si
- E) Ne, Na, Mg

18) Electrons in the 1s subshell are much closer to the nucleus in Ar than in He due to the larger \_\_\_\_\_ in Ar.

- A) nuclear charge
- B) paramagnetism
- C) diamagnetism
- D) Hund's rule
- E) azimuthal quantum number

19) Of the following, which gives the correct order for atomic radius for Mg, Na, P, Si and Ar?

- A)  $\text{Mg} > \text{Na} > \text{P} > \text{Si} > \text{Ar}$
- B)  $\text{Ar} > \text{Si} > \text{P} > \text{Na} > \text{Mg}$
- C)  $\text{Si} > \text{P} > \text{Ar} > \text{Na} > \text{Mg}$
- D)  $\text{Na} > \text{Mg} > \text{Si} > \text{P} > \text{Ar}$
- E)  $\text{Ar} > \text{P} > \text{Si} > \text{Mg} > \text{Na}$

20) The atomic radius of main-group elements generally increases down a group because \_\_\_\_\_.

- A) effective nuclear charge increases down a group
- B) effective nuclear charge decreases down a group
- C) effective nuclear charge zigzags down a group
- D) the principal quantum number of the valence orbitals increases
- E) both effective nuclear charge increases down a group and the principal quantum number of the valence orbitals increases

21) Of the choices below, which gives the order for first ionization energies?

- A)  $\text{Cl} > \text{S} > \text{Al} > \text{Ar} > \text{Si}$
- B)  $\text{Ar} > \text{Cl} > \text{S} > \text{Si} > \text{Al}$
- C)  $\text{Al} > \text{Si} > \text{S} > \text{Cl} > \text{Ar}$
- D)  $\text{Cl} > \text{S} > \text{Al} > \text{Si} > \text{Ar}$
- E)  $\text{S} > \text{Si} > \text{Cl} > \text{Al} > \text{Ar}$

22) Which equation correctly represents the first ionization of aluminum?

- A)  $\text{Al}^- (\text{g}) \rightarrow \text{Al} (\text{g}) + \text{e}^-$
- B)  $\text{Al} (\text{g}) \rightarrow \text{Al}^- (\text{g}) + \text{e}^-$
- C)  $\text{Al} (\text{g}) + \text{e}^- \rightarrow \text{Al}^- (\text{g})$
- D)  $\text{Al} (\text{g}) \rightarrow \text{Al}^+ (\text{g}) + \text{e}^-$
- E)  $\text{Al}^+ (\text{g}) + \text{e}^- \rightarrow \text{Al} (\text{g})$

23) Which of the following correctly represents the second ionization of phosphorus?

- A)  $\text{P}^+ (\text{g}) + \text{e}^- \rightarrow \text{P}^{2+} (\text{g})$
- B)  $\text{P} (\text{g}) \rightarrow \text{P}^+ (\text{g}) + \text{e}^-$
- C)  $\text{P}^- (\text{g}) + \text{e}^- \rightarrow \text{P}^{2-} (\text{g})$
- D)  $\text{P}^+ (\text{g}) \rightarrow \text{P}^{2+} (\text{g}) + \text{e}^-$
- E)  $\text{P}^+ (\text{g}) + \text{e}^- \rightarrow \text{P} (\text{g})$

