Chapter 2 – Prior Quiz and Exam Questions

Nomenclature

1. The correct formula for sodium sulfide is NaS
   a) correct b) incorrect c) more information is needed

2. The name of HIO₃ is hydroiodic acid
   a) correct b) incorrect c) more information is needed

3. The name of MnO₂ is manganese dioxide
   a) correct b) incorrect c) more information is needed

4. The correct formula for calcium hydroxide is Ca(OH)₂
   a) correct b) incorrect c) more information is needed

5. The name of aqueous HCN is cyanic acid
   a) correct b) incorrect c) more information is needed

6. The name of Ag₂O is silver (I) oxide
   a) correct b) incorrect c) more information is needed

7. According to the naming rules discussed in lecture, what is the correct name for HClO₂?
   a) Hydrochlorous acid
   b) Hypochlorous acid
   c) Chlorous acid
   d) Chlorite acid
   e) Chloric acid

8. What is the correct formula for chromium (III) carbonated?
   a) Cr₃CO₃
   b) CrCO₃
   c) Cr₂CO₃
   d) Cr₃(CO₃)₂
   e) Cr₂(CO₃)₃

9. According to the naming rules discussed in lecture, what is the correct name for Fe₃N₂?
   a) Iron nitride
   b) Triiron dinitride
   c) Iron (III) nitride
   d) Iron (II) nitride
   e) Iron (III) dinitride

10. What is the correct formula for sodium peroxide?
    a) NaO₂
    b) NaO
    c) Na₂O
    d) Na₂O₂
    e) Na(O₂)₂
11. Based on the naming rules discussed in the textbook and in lecture, how many of the following compounds are named incorrectly?
   
   a) 0  HBrO₃  hydrobromic acid
   b) 1  N₂S₄  nitrogen tetrasulfide
   c) 2  Sn(CrO₄)₂  tin chromate
   d) 3  Ca(HCO₃)₂  calcium hydrogen carbonate
   e) 4

12. Element X reacts with the nitrate ion to produce the compound X(NO₃)₃. What will be the formula of the compound formed when element X reacts with the carbonate ion? Assume element X has a fixed ion charge.
   
   a) X(CO₃)₂
   b) XCO₃
   c) X₂(CO₃)₃
   d) X(CO₃)₃
   e) X₂CO₃

13. What is the correct formula for chloric acid?
   
   a) HClO₂
   b) HCl
   c) HClO₃
   d) HClO
   e) HClO₄

14. Which is not the correct chemical formula for the compound named?
   
   a) Calcium carbonate – CaCO₃
   b) Lithium nitrate – LiNO₃
   c) Iron (II) oxide – FeO
   d) Potassium phosphate – K₃PO₄
   e) Sodium sulfide – NaS

15. What is the correct formula for cobalt (III) carbonate?
   
   a) Co₂(CO₃)₃
   b) CoCO₃
   c) Co₃(CO₃)₂
   d) Co(CO₃)₃
   e) Co₃CO₃

16. What is the correct formula for copper (I) sulfide?
   
   a) CuS
   b) Cu₂S
   c) CuS₂
   d) Cu₂S₂
   e) Cu₂S₃
17. Which is not the correct chemical formula for the compound named?
   a) I only
   b) II only
   c) III only
   d) II and III
   e) I, II and III

   [Chemical formulas]
   I. MgCl₂ – magnesium chloride
   II. ZnO – zinc (II) oxide
   III. CoS₂ – cobalt (III) sulfide

18.NH₄Cl is an ionic compound
   a) True
   b) False
   c) More information required

19. Which is not the correct chemical formula for the compound named?
   a) Lithium oxide – Li₂O
   b) Iron (III) phosphate – FePO₄
   c) Hydrogen fluoride – HF
   d) Nitrogen dioxide – N₂O
   e) Magnesium nitride – Mg₃N₂

20. _____ form ions with a 2⁻ charge when they react with metals
   a) Alkaline earth metals
   b) Chalcogens
   c) Noble gases
   d) Halogens
   e) None of these

**Isotope Composition and Atomic Structure**

1. Which of the following is true?
   a) \(^{18}_8O\) and \(^{19}_9F\) have the same number of neutrons
   b) \(^{14}_6C\) and \(^{14}_7N\) are isotopes of each other
   c) \(^{18}_8O²⁻\) has the same number of electrons as \(^{20}_10Ne\)
   d) \(^{32}_{16}S\) and \(^{32}_{6}S²⁻\) are isotopes of each other
   e) Both a and c are true

2. Which pair of symbols corresponds to species with the same number of electrons?
   a) \(^{32}_{16}S\) and \(^{27}_{13}Al\)
   b) \(^{7}_{3}Li\) and \(^{23}_{11}Na\)
   c) \(^{40}_{20}Ca²⁺\) and \(^{51}_{23}V²⁺\)
   d) \(^{56}_{23}Fe³⁺\) and \(^{52}_{24}Cr⁴⁺\)
   e) More than one of these are correct

3. How many electrons and neutrons are there in \(^{126}_{50}Sn²⁺\)?
   a) 52 electrons, 76 neutrons
b) 48 electrons, 126 neutrons  
c) 50 electrons, 74 neutrons  
d) 48 electrons, 76 neutrons  
e) None of these  

4. Which of the following has the fewest neutrons?  
   a) $^{126}_{50}Sn^{2+}$  
   b) $^{127}_{53}I^-$  
   c) $^{123}_{48}Cd^{2+}$  
   d) $^{130}_{52}Te$  
   e) More than one of these  

5. How many electrons are in $^{186}_{74}W^{3+}$?  
   a) 74  
   b) 186  
   c) 77  
   d) 71  
   e) 183  

6. An element’s most stable ion forms an ionic compound with chlorine having the formula $XCl_2$. If the mass number of the ion is 40 and it has 18 electrons, what is the element and how many neutrons does it have?  
   a. Ar – 22 neutrons  
   b. Ar – 24 neutrons  
   c. Ca – 20 neutrons  
   d. Ca – 24 neutrons  
   e. S – 24 neutrons  

7. Which of the following represents a pair of isotopes?  
   a) $^{14}_7N$ and $^{15}_8O$  
   b) $^{31}_15P$ and $^{31}_15P^{3-}$  
   c) O$_2$ and O$_3$  
   d) $^{12}_6C$ and $^{13}_6C$  
   e) $^{14}_6C$ and $^{14}_7N$  

8. Which of the experiments listed below did not provide the information stated about the nature of the atom?  
   a) The Rutherford experiment determined the charge on the nucleus  
   b) Millikan’s oil-drop experiment showed that the charge on any particle was a simple multiple of the charge on the electron  
   c) The cathode-ray tube proved that electrons have a negative charge  
   d) The Rutherford experiment proved that the Thomson “plum pudding” model of the atom was essentially correct
9. A sulfide ion has ____ electrons.
   a) 15
   b) 14
   c) 16
   d) 18
   e) 17

10. Which three elements are likely to have similar chemical and physical properties?
   a) Sodium, magnesium and aluminum
   b) Boron, silicon and germanium
   c) Carbon, nitrogen and oxygen
   d) Magnesium, calcium and strontium

11. $^{35}\text{Cl}^-$, $^{40}\text{Ar}$ and $^{39}\text{K}^+$ all have the same number of neutrons
    a) True
    b) False
    c) More information is required

12. $^{35}\text{Cl}^-$, $^{40}\text{Ar}$ and $^{39}\text{K}^+$ all have the same number of electrons
    a) True
    b) False
    c) More information is required

13. $^{35}\text{Cl}^-$, $^{40}\text{Ar}$ and $^{39}\text{K}^+$ all have the same number of protons
    a) True
    b) False
    c) More information is required

14. ____ form ions with a 1- charge with they react with metals
    a) Alkali metals
    b) Halogens
    c) Chalcogens
    d) Alkaline earth metals
    e) None of these