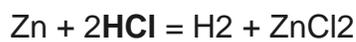


5. Which of the following is an example of a physical property?
- Polymerization of DNA creates a double helix shape
 - Proteins are synthesized by ribosomes in plants and transport macromolecules.
 - Water corrodes an iron tank and changes color to orange
 - Lithium battery explodes when punctured
 - Heated water turns into steam at 100C, but condenses again at high pressure
6. Zinc metal reacts with hydrochloric acid to produce zinc chloride and hydrogen gas. How many grams of hydrogen gas would be produced if 0.25 L of 1.0 M HCl solution were allowed to react with enough zinc such that all of the HCl reacted? If this amount of H₂ gas were at 0 °C and 1 atm, what would the volume be?



- 0.50 g, 2.8 L
 - 0.25 g, 284 L
 - 0.36 g, 0.36 L
 - 0.25 g, 2.8 L
 - 0.50 g, 5.6 L
7. A 20.0 mL sample of an element with a density of 3.0 g/mL contains 4×10^{23} atoms. What is the atomic weight (in g/mol) of this element?
- 300
 - 40
 - 60
 - 90
 - None of the above
8. After balancing the combustion reaction shown, what is the coefficient for O₂?



- 42
- 21
- 11
- 10

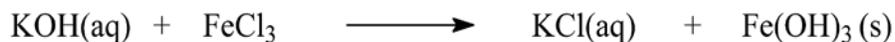
9. Which set of elements below contains, respectively, an alkali metal, a halogen, a noble gas and a transition metal?
- Rb, Br, He, Ag
 - H, F, Kr, V
 - Li, S, La, Fe
 - Ca, Kr, Tc, Mn
10. What is the correct chemical name of CoCl_3 ?
- cobaltous chloride
 - cobalt trichloride
 - cobalt(III) chloride
 - cobalt(III) trichloride
11. How many protons and electrons are present in a Ca^{2+} ion?
- 20 protons and 18 electrons
 - 18 protons and 20 electrons
 - 20 protons and 21 electrons
 - 20 protons and 19 electrons
 - 22 protons and 20 electrons
12. What binary compound would be formed from barium ions and fluoride ion?
- Ba_2F_3
 - BaF
 - Ba_2F
 - BaF_2
 - BaF_3
13. A 9.4-g sample of titanium was added to a graduated cylinder originally containing 6.8 mL of water. After addition of the titanium, the water level in the graduated cylinder was 8.9 mL. What is the density of titanium?
- 1.4 g/cm^3
 - 4.5 g/cm^3
 - 1.1 g/cm^3
 - 0.22 g/cm^3

14. Write out the correct net ionic equation for the reaction that occurs when solutions of $\text{Pb}(\text{ClO}_3)_2$ and Na_2SO_4 are mixed.

15. Which of the following compounds is most likely to dissolve in water?

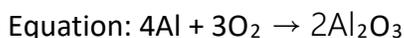
- a. BaSO_4
- b. AgBr
- c. CaCO_3
- d. Na_2S
- e. None of the above.

16. What kind of reaction is the following? (FeCl_3 is also aqueous)



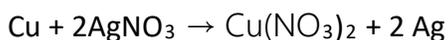
- a. Neutralization, because K is being neutralized by Cl
- b. Acid-base, because KOH is a strong base and Cl is the conjugate base to a strong acid
- c. Precipitation, because $\text{Fe}(\text{OH})_3$ was precipitated
- d. Combustion, because OH ions can combine with H to form water

17. How many moles of oxygen gas will react with 12.4 mol aluminum?



- a. 0.24 mol
- b. 0.42 mol
- c. 4.8 mol
- d. 9.3 mol
- e. 16.8 mol

18. What mass of copper (II) nitrate would be produced from the complete reaction of 45.6 g of copper, according to the chemical reaction shown below?



19. The correct Stock system name for $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ is
- cuprous sulfate pentahydrate
 - copper (II) sulfate pentahydrate
 - copper (II) sulfate hydrate
 - copper (I) sulfate pentahydrate
 - copper sulfate pentahydrate
20. $\text{C}_{\text{graphite}}$ and $\text{C}_{\text{diamond}}$ are examples of:
- isotopes of carbon because of the differences in atomic level
 - allotropes of carbon because of the differences in physical structure
 - the law of definite proportions because each will have the same fixed ratio
 - different carbon ions because carbon is able to form different bond based on physical structure
 - Tautomers because carbon can form double and triple bonds
21. Solid sulfur and oxygen gas react to produce sulfur trioxide as shown below. In a particular experiment, 5.0 g of O_2 are reacted with 6.0 g of S_8
- $$\text{S}_8 (\text{s}) + \text{O}_2 (\text{g}) \rightarrow \text{SO}_3 (\text{g})$$
- Determine the limiting reagent and the mass of the product in grams
 - What is the % yield of SO_3 if 7.9g SO_3 are isolated?
22. Which of the following is an example of a metal displacement reaction?
- $2 \text{P}(\text{s}) + 3 \text{Cl}_2(\text{g}) \rightarrow 2 \text{PCl}_3(\text{g})$
 - $\text{CaBr}_2(\text{aq}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{CaSO}_4(\text{s}) + 2 \text{HBr}(\text{aq})$
 - $2 \text{Na}(\text{s}) + 2 \text{H}_2\text{O}(\text{l}) \rightarrow 2 \text{NaOH}(\text{aq}) + \text{H}_2(\text{g})$
 - $\text{C}_3\text{H}_8(\text{g}) + 5 \text{O}_2(\text{g}) \rightarrow 3 \text{CO}_2(\text{g}) + 4 \text{H}_2\text{O}(\text{g})$
 - $\text{Fe}_2\text{O}_3(\text{s}) + 2 \text{Al}(\text{s}) \rightarrow 2 \text{Fe}(\text{s}) + \text{Al}_2\text{O}_3(\text{s})$
23. **Show work:** In an experiment, 0.200 moles of $\text{Ba}(\text{OH})_2$ are treated with 0.500 moles of HClO_3 according to the chemical reaction shown below:
- $$\text{Ba}(\text{OH})_2 + \text{HClO}_3 \rightarrow \text{Ba}(\text{ClO}_3)_2 + \text{H}_2\text{O}$$
- Balance the chemical reaction.
 - Determine which species is the limiting reagent.
 - Calculate the grams of H_2O formed.
 - Determine which species is in excess and by how much (in grams).