CHM1025 Exam 2 Review Summer 2020 Answer Key 08/02/2020
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1. Silver Chloride is often a chemical used in silver plating. The compound itself only contains 75.27% of silver, Ag. Calculate the mass of silver chloride required to plate 200. mg of pure silver.

(1) 0.201 g
(2) 0.504 g
(3) 0.433 g
(4) 0.266 g
(5) 0.101 g

2. Find the percent mass composition of oxygen of sodium bicarbonate (baking soda).

(1) 19.05%
(2) 20.20%
(3) 57.14%
(4) 75.32%
(5) 2.31%

3. You have a 68.42g sample of an unknown organic compound. After combustion analysis of your sample, you collect 196.26g of CO_2 and 26.76g of H_2O from the complete combustion of your sample. You know the molar mass of the compound is 416.43g/mol. Determine the molecular formula for the compound. How many carbons are in the molecular formula?

(1) 4
(2) 6
(3) 8
(4) 10
(5) 12

4. One fun science experiment is to blow up balloons with hydrogen gas. Hydrogen gas can be made from mixing aluminum, sodium hydroxide, and water in the reaction below:

$$\mathbf{2Al(s) + 2NaOH(aq) + 6H_2O(l) \rightarrow 2NaAl(OH)_4(aq) + 3H_2(g)}$$

After combining 5.2g of aluminum with 6.1g of sodium hydroxide, about 0.35g of H_2 gas was collected. What is the percent yield of H_2 gas? (Water is in excess)

(1) 76.6%
(2) 33.4%
(3) 20.3%
(4) 94.3%
(5) 55.2%

5. How many oxygen atoms are in a 40.3g sample of chlorous acid?

(1) 2.54×10^{23}
(2) 6.55×10^{23}
(3) 7.09×10^{23}
(4) 6.55×10^{24}
(5) 7.09×10^{24}

6. Which of these reactions is labeled incorrectly?

(1) $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$ **combination and redox reaction**
(2) $C_2H_6O(g) + 3O_2(g) \rightarrow 2CO_2(g) + H_2O(g)$ **combustion and redox reaction**
(3) $Mg(s) + Cl_2(g) \rightarrow MgCl_2(s)$ **combination and precipitation reaction**
(4) $NH_3(aq) + HCl(aq) \rightarrow Cl^-(aq) + NH_4^+(aq)$ **Bronsted-Lowry Acid-base reaction**
(5) $Ca(s) + SO_4^{2-}(aq) \rightarrow CaSO_4(s)$ **combination and precipitation reaction**

7. Which of these labeled names is correct?

(1) $Ni(OH)_2$	**Nickel (II) Dihydroxide**
(2) $CaCO_3$	**Calcium (II) Carbonate**
(3) CO	**Monocarbon monoxide**
(4) $HClO_4$	**Perchlorous Acid**
(5) PbS_2	**Lead (IV) Sulfide**

8. Write out the balanced net ionic equation for iron (II) hydroxide reacting with potassium phosphate:

$3Fe^{2+}(aq) + 2PO_4^{3-}(aq) \rightarrow Fe_3(PO_4)_2(s)$

9. What is the electron configuration of copper(I)?

[Ar] $3d^{10}$

10. What neutral atom and singly-charged cation and anion all share the electron configuration $1s^2 2s^2 2p^6 3s^2 3p^6$?

Neutral atom: Ar

Cation: Na^+

Anion: Cl^-

11. Which answer has the element with the lower ionization energy listed first?

(1) S vs. Te
(2) F vs. Cl
(3) O vs. N
(4) Pb vs. Au
(5) S vs. Se

12. A recipe calls for a 47% m/m solution of isopropanol in acetone. You know your lab mates prefer to work with molarity so convert it for them.

(1) 5.40 M
(2) 6.33 M
(3) 6.16 M
(4) 5.30 M
(5) 4.00 M

13. Predict the products and label which products are the conjugate acid and the conjugate base:

$H_2O(l)$ + ammonium ion (aq) → **H_3O^+(conj. acid) + NH_3(conj. base)**

14. Calculate the number of molecules of Lactic Acid ($CH_3CHOHCOOH$) is in a 42.0g sample?

(1) 4.03×10^{23}
(2) 6.90×10^{23}
(3) 9.01×10^{23}
(4) 1.21×10^{23}
(5) 2.81×10^{23}

15. Balance the combustion of propane below:

$$C_3H_8 + O_2 \rightarrow H_2O + CO_2$$

You run the reaction with 27g of propane with 1.3 moles of O_2 and get yield 14.2 g of water. What is the percent yield of water?

(1) 65.32%
(2) 75.85%
(3) 20.1%
(4) 20.99%
(5) 67.43%

16. You perform a serial dilution with a solution of H_2SO_4. In the first step, you dilute 30 mL of a 5.0 M H_2SO_4 solution by a certain volume to obtain a 0.150 M H_2SO_4 solution. In the second round you 10 mL of the 0.150 M H_2SO_4 solution and dilute it to a volume of 100 mL. What volume after the first dilution and what is the final concentration of the solution after the second dilution?

First volume: 1000mL or 1 L
Final concentration: 0.015 M