Exam Ready: Review of SCH3U

1- Write the formula:

- aluminum chloride
- iron (III) carbonate
- potassium dichromate
- silver acetate

2- Write the IUPAC name for each of the following:

- SF_6
- $Ca(HCO_3)_{2(S)}$
- $CuSO_4.5H_2O$
- Pentaphosphorus decaoxide

3- Draw a Lewis structures and structural diagram for each of the following:

- O_2
- NH_3
- CO_2
- CH_4
- C_2H_4
- C_2H_2

4- What is the amount (in moles) of each type of atom in each of the following samples:

- 2.0 mol of iron (III) nitrate
- 5.0 mol of ammonium sulfate

5- Calculate the percentage composition of each of the following:

- $H_2SO_{4(l)}$
- 2.50 g of $AgNO_{3(s)}$

6- An oxide of nitrogen was found to contain 36.8% nitrogen by mass:

(a) find the empirical formula for this compound

(b) the molar mass of this compound was found to be 76.02 g/mol. What is the molecular formula of this compound?

7- Balance the following equations:

(a) $C_{12}H_{22}O_{11(s)} + O_{2(g)} \rightarrow$

(b) $KClO_{3(s)} \rightarrow KCl +$

8- Methanol, $CH_3OH(l)$, burns in excess oxygen to produce carbon dioxide and water, according to the following equation:

$2CH_3OH_{(l)} + 3O_{2(g)} \rightarrow 2CO_{2(g)} + 4H_2O_{(g)}$

(a)- What amount of oxygen is required to completely burn 5 mol of methanol?

(b)- How many grams of carbon dioxide are produced when 12.5 mol methanol is completely burned?

9- Silicon tetrafluoride is produced from the reaction of silicon dioxide and hydrofluoric acid, with water as the other product.

(a)- What mass of silicon tetrafluoride can be produced from 15.00 g of silicon dioxide in excess hydrofluoric acid?

(b)- If the actual yield of silicon tetrafluoride is 17.92 g, what is the percentage yield?

10- What volume of a 0.36 mol/L solution of KCl(aq) contains 0.09 mol of the solute?

11- What mass of copper (II) sulfate pentahydrate is needed to prepare 150.0 mL of a 0.125 mol/L solution?

12- Calculate the concentration of hydrogen ions in a solution with the pH of 2.1.

13- A sample of a mixture of gases contains 80.0% nitrogen gas and 20.0 % oxygen gas by volume. Calculate the mass of 1.00 L of this mixture at STP.

14- Calculate the pressure exerted by 6.60 g of carbon dioxide gas at 25°C in a 2.00 L container.

15-Assume that 13.1 g of potassium are reacted with 18.0 g of oxygen to produce potassium oxide, K_2O. Determine which reactant is in excess and by what amount in moles, and calculate the number of gram of products formed.

16-Calculate the volume of 1.50 M NaOH solution to neutralize 100.0 mL of 0.75 M H_2SO_4 solution.

17-A 100 L helium balloon at a temperature of 22°C and a pressure of 150 kPa is let go and rises to an altitude of 10 km where the air pressure is 29.3 KPa and the temperature is –43°C. Assuming the surface containing the balloon does not exert any pressure itself, what would be the new volume of the balloon at this altitude?

18-Isopropyl alcohol, C_3H_7OH, makes an excellent fuel for cars.

a) Write a chemical equation representing complete combustion of isopropyl alcohol.

b) What volume of oxygen at 100.0 KPa and 23 ◦ C is needed to burn 4.3 Kg of isopropyl alcohol?

19- use the data below to calculate the relative mass of thalium bromide, $TlBr_3$, to two decimal places.

Isotope	Percentage Abundance
^{203}Tl	29.52
^{205}Tl	70.48
^{79}Br	50.69
^{81}Br	49.31

20- The reaction below represents the reduction of iron ore to produce iron.

$$2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$$

A mixture of 30 kg of Fe_2O_3 and 5.0 kg of C was heated until no further reaction occurred. Calculate the maximum mass of iron that can be obtained from these masses or reactants.