

Exam: CHEMICAL CALCULUS

1. Batxilergoa

Name:

Group:

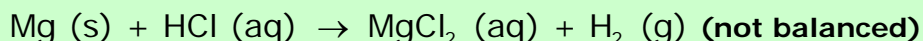
- 1 Concentrated sulfuric acid (18.3 M) has a density of 1.84 g/mL
- how many moles of sulfuric acid are present per milliliter of solution?
 - how many molecules of sulfuric acid are per milliliter?
 - what is the mass % of sulfuric in the solution?

Atomic weights: S=32; O=16; H=1

- 2 Calculate the volume of 18 M sulfuric acid that must be added to water to prepare 2 L of a 0.309 M solution

Atomic weights: S=32; O=16; H=1

- 3 A sample of impure magnesium was analyzed by allowing it to react with excess HCl solution:



After 1.32 g of the impure metal was treated with 0.1 L of 0.75 M HCl, 0.0125 mol HCl remained. Assuming the impurities do not react with the acid, what is the mass % Mg (purity) in the sample?

Atomic weights: Mg=24.3; H=1; Cl=35.5

- 4 Hydrazine (N₂H₄) and dinitrogen tetroxide (N₂O₄) react on contact to form nitrogen gas and water vapor.

- How many grams of nitrogen gas form when 100 g N₂H₄ and 200 g N₂O₄ are mixed?
- Which is the volume of that gas at P=2.2 atm and T=23 °C?

Atomic weights: N=14; O=16; H=1

$$R = 0.082 \frac{\text{atm}\cdot\text{L}}{\text{K}\cdot\text{mol}}$$