

**Chemical Calculus – Exam
Batxilergoa 1**

Name:

Group:

1. From a solution of sodium chloride that has a concentration of 300 g/L we want to prepare 250 mL of a solution that is 2 M. Calculate the volume (in mL) we need to take from the initial solution to get the final one (by dilution)

Atomic weights: Cl=35.5; Na=23

2. A solution of sulfuric acid has a concentration of 64 % in mass proportion and the density is 1.54 g/mL. Calculate:

- a) the molarity of the solution
- b) the volume we need to take from that solution to get 50 g of solute
- c) the number of molecules of solute that are in 100 mL

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

Avogadro number: $N_A=6.02 \times 10^{23}$

3. The volume of a container is 5 L and in it we have propane (C_3H_8) in the following conditions: the pressure is 10 atm and the temperature is 17 °C.

If all that propane is burned (combustion reaction) calculate the volume of carbon dioxide we get in STP conditions.

Atomic weights: O=16; H=1; C=12

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

4. When aluminum reacts with hydrochloric acid the products formed are aluminum trichloride and hydrogen. If 9 g of aluminum and 200 mL of a solution of hydrochloric acid 3 M are added,

- a) write the adjusted chemical equation
- b) determine the limiting reactant
- c) determine the excess of the reactant (which one is and the mass in grams)

Atomic weights: Al=27; H=1; Cl=35.5