Series N° 1

Exercise 1:

187.6 g of chromium (III) sulfate $Cr_2(SO_4)_3$ are dissolved in water and the solution is adjusted to 1 liter, the density of this solution is 1.172. Determine:

a. The molarity of the solution.

b. The molality of the solution.

c. The molar fraction of each constituent.

d. The percentage of salt.

e. The normality of this solution.

f. How many milliliters of this solution must be taken to prepare 5 liters of a solution of normality equal to 0.1 eq.g/I.

Data : M_{Cr}= 52 g/mol, M_S= 32 g/mol, M_O = 16g/mol.

Exercise 2:

A sample of concentrated nitric acid has a density of 1.41 g/ml and contains 70% HNO_3 by mass.

(a) What mass of HNO_3 is present per liter of solution?

(b) What is the molarity?

(c) What is the volume of this concentrated solution which contains one mole of acid?

Data : M_H= 1 g/mol, M_N= 14 g/mol, M_O = 16g/mol.

Exercise 3:

We have a solution of sucrose $C_{12}H_{22}O_{11}$ with a molality of 4.03 mol/kg and percent by mass is 58%.

- Calculate the molarity, the mole fraction of solute and the density of this solution. (There is basically no significant change to the overall volume when the solute is added).

What is the concentration of this CH_3COOH solution? (p= 99%, M = 60g/mol and d = 1,06).

The density of an aqueous solution of potassium chromate is 1,129 g/mL.

- Calculate the molality, mass percent and mole fraction of a 0,872 M aqueous potassium chromate solution (K_2CrO_4, M=194.1896 g/mol). (There is no significant change to the overall volume when the solute is added).

200 mL of water is mixed with 50 mL of 5M NaOH.

- Calculate the molarity of the final solution.
- What is the dilution factor?

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