# Seminar 3 - Calculation problems

**1)** 10.0 g of crystalline copper(II) sulphate (formula: $CuSO_4 \times 5\ H_2O$) is added to 200.0 g of $CuSO_4$ solution the mass percent composition of which is 10.0. What will be the mass percent composition of the final solution?

**2)** How many grams of crystalline copper(II) sulphate (formula: $CuSO_4 \times 5\ H_2O$) are needed for the preparation of 250.0 g of solution the mass percent composition of which is 7.00?

**3)** 2.50 g of crystalline sodium-sulphate ($Na_2SO_4 \times 10\ H_2O$) is dissolved in 247.5 g of water. The density of the solution in 1.01 g/cm$^3$. Calculate the molar concentration of the solution.

**4)** a) 3.20 g of potassium chloride can be dissolved in 100.0 g of water. What is the mass percent composition of the solution?
b) In the case of 8.00 m/m% solution how many grams of potassium chloride are dissolved in 100 g of water?

**5)** 500.0 g of saturated $KNO_3$ solution is cooled down from 60ºC to 20ºC. How many grams of $KNO_3$ will be precipitated?
Solubilities: at 60ºC 111.0 g salt/100 g $H_2O$ (it means that 111.0 g of $KNO_3$ dissolves in 100 g of water at 60 °C)
at 20ºC 31.2 g salt/100 g $H_2O$

**6)** 250.0 g of saturated $KNO_3$ solution is cooled down from 60ºC to 20ºC. How many grams of $KNO_3$ will be precipitated?
Solubilities: at 60ºC 111.0 g salt/100 g $H_2O$
at 20ºC 31.2 g salt/100 g $H_2O$

**7)** 200.0 g of $K_2SO_4$ is cooled down from 85 ºC to 15 ºC. How many grams of $K_2SO_4$ will be precipitated?
Solubilities: at 85ºC 22 g salt (without water)/100 g $H_2O$
at 15ºC 10 g salt (without water)/100 g $H_2O$

**8)** 250 g of saturated $MgSO_4$ solution is cooled down from 80 °C to 0 °C. What is the mass of $MgSO_4 \times 7\ H_2O$ precipitated? Saturated solution is of 38.6 m/m% at 80 °C and 29,0 m/m% at 0 °C.