Date ..... **Name** ..... **Group** .....

Lab report form for the practical lesson on biochemistry

Topic: **Volumetric analysis – selected tasks**

Task 1: Construction of titration curves

Principle (what are titration curves?):

Measured values of pH:

	20ml **HCl** *c*=0.1mol/l			20ml **CH_3COOH** *c*=0.1mol/l		
	NaOH *c*=0.1mol/l		pH	NaOH *c*=0.1mol/l		pH
	Addition in ml	Σ ml		Addition in ml	Σ ml	
1	0	0		0	0	
2	3	3		1	1	
3	3	6		2	3	
4	3	9		3	6	
5	3	12		4	10	
6	3	15		5	15	
7	3	18		3	18	
8	1	19		1	19	
9	1	20		1	20	
10	1	21		1	21	
11	1	22		1	22	
12	3	25		3	25	
13	5	30		5	30	
14	10	40		10	40	

Evaluation:

1. Graph of titration curves:

Plot the measured pH values against the volume (Σ ml) of NaOH added. Both curves should be drawn in the same graph to enable their comparison. Do it as accurately as possible with ruler and sharp pencil on the graph paper provided, sign your graph and attach to your report. Alternatively, you can make the graph in Excell, and send together with your report.

2. Calculate a theoretical value of pH for c(HCl) = 0.1 mol/l (activity coeff. f=0.796).

3. Calculate a theoretical value of pH for c(CH_3COOH) = 0.1 mol/l (K_a=1.75×10^{-5}).

4. Find and indicate in your graph the pK_a of acetic acid, and compare this value with the one provided above.

5. Determine pH of the equivalence point for both titration curves.

Task 2: Determination of molar and mass concentration of sulphuric acid solution by acid-base titration

Principle (equation):

Consumption of titration reagent: c = mol/l in ml per ..... ml of unknown sample

1) ……..

2) …….……

3) ……..…

Average:

Evaluation:

1. Write the equation in ionic form – the base of titration determination.

2. Give reasons for used indicator.

3. Calculate molar and mass concentration of sulphur acid in tested sample.

Task 3: Determination of molar and mass concentration of NaCl solution by argentometry

Principle (equation):

Consumption of titration reagent: c = mol/l in ml per .....ml volume of unknown sample

1) ……..

2) …….……

3) ……..…

Average:

Evaluation:

1. Write the ionic equation of titration determination and also the ionic equation of the reaction with indicator behind the point of equivalence.

2. Give reasons for the used indicator, and explain why AgCl precipitates first, despite the fact that its solubility product (K_s=1.6×10^{-10}) is greater than the solubility product of Ag_2CrO_4 (K_s=4×10^{-12}).

3. Calculate molar and mass concentration of chloride anion Cl^- in the tested sample of NaCl.

4. Calculate molar and mass concentration of the tested solution if the sample were $CaCl_2$ instead of NaCl, for the same volume and consumption of titration reagent.