

Date:..... Name:..... Study group:.....

Report form

Practical lesson – Buffers, buffering capacity

Task 1 – Measurement of the pH of aqueous solutions

Principle:

Table 1:

	Reaction (neutral/acidic/basic)	Estimated pH	Measured pH
Physiological solution			
HCl			
Na ₂ CO ₃			
NaHCO ₃			
NaH ₂ PO ₄			
Na ₂ HPO ₄			
(NH ₄) ₂ SO ₄			

Ionic equations for the hydrolysis of individual compounds:

Task 2 – Hydrogen carbonate (bicarbonate) buffer: principle and buffer capacity

Principle:

	A	B	C	D
ml HCl until colour change				

Evaluation of particular tasks:

1. Explain the difference in the volume of added HCl required to cause a colour change in the individual solutions.
2. Explain the principle and the reason for using the technique known as "breathing into a paper bag."

Task 3 – Titration curve of a weak acid, pH measurement, determination of pK_a

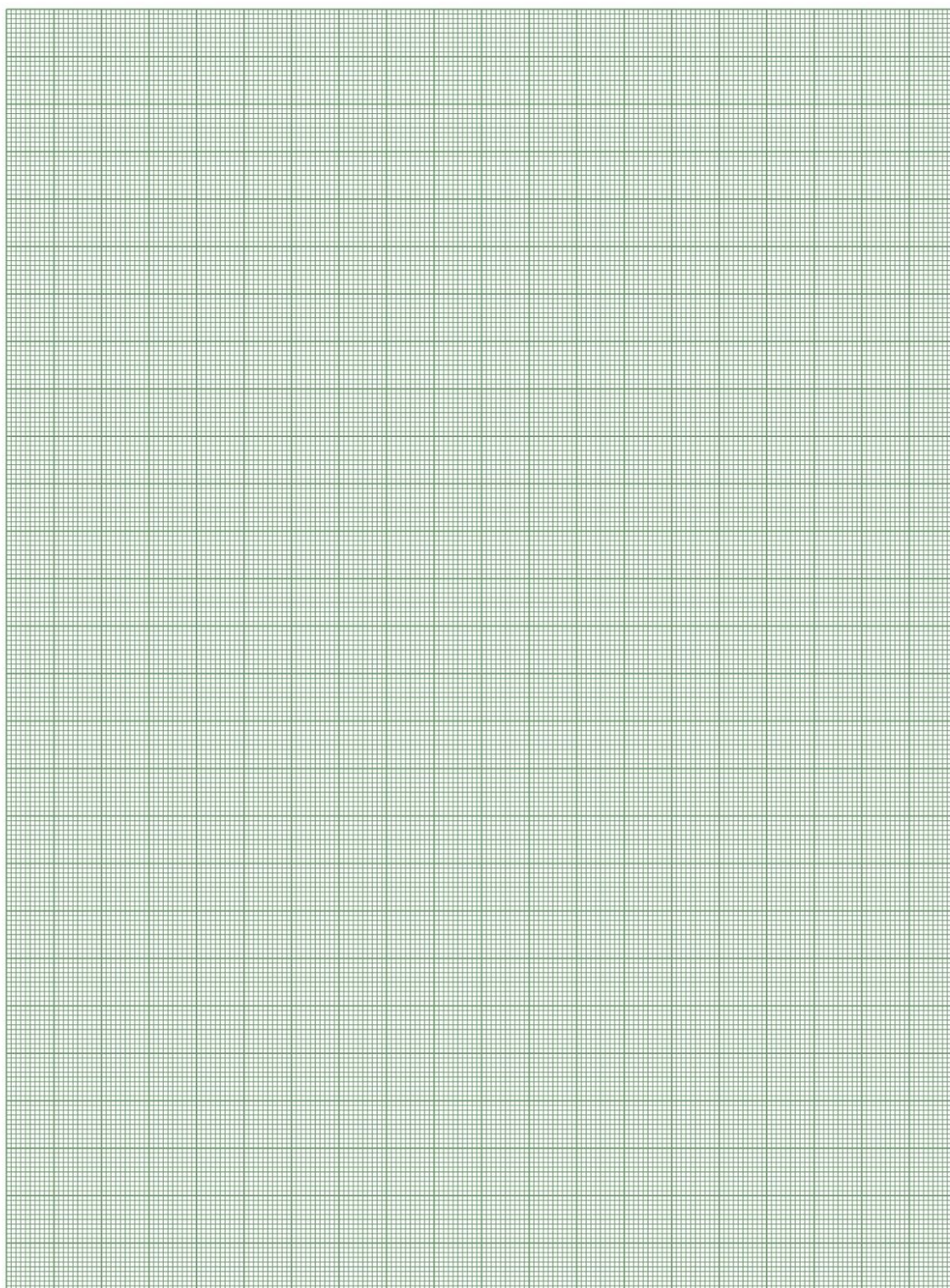
Principle:

Measured pH values:

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

Evaluation of particular tasks:

1. Write down the ionic equation of this titration analysis:
2. Use the grid below and construct a chart of the titration curve for a weak acid.
3. Calculate the theoretical pH for $c(\text{CH}_3\text{COOH}) = 0.1 \text{ mol/l}$ ($K_a = 1.75 \times 10^{-5}$).
4. Find and mark the pK_a of acetic acid on the chart and compare it with the tabulated value:
5. Determine the pH at the equivalence point for acetic acid.



Task 4 – Preparation of a buffer with defined properties

1. Buffer preparation procedure:
2. Measured pH of the prepared buffer: