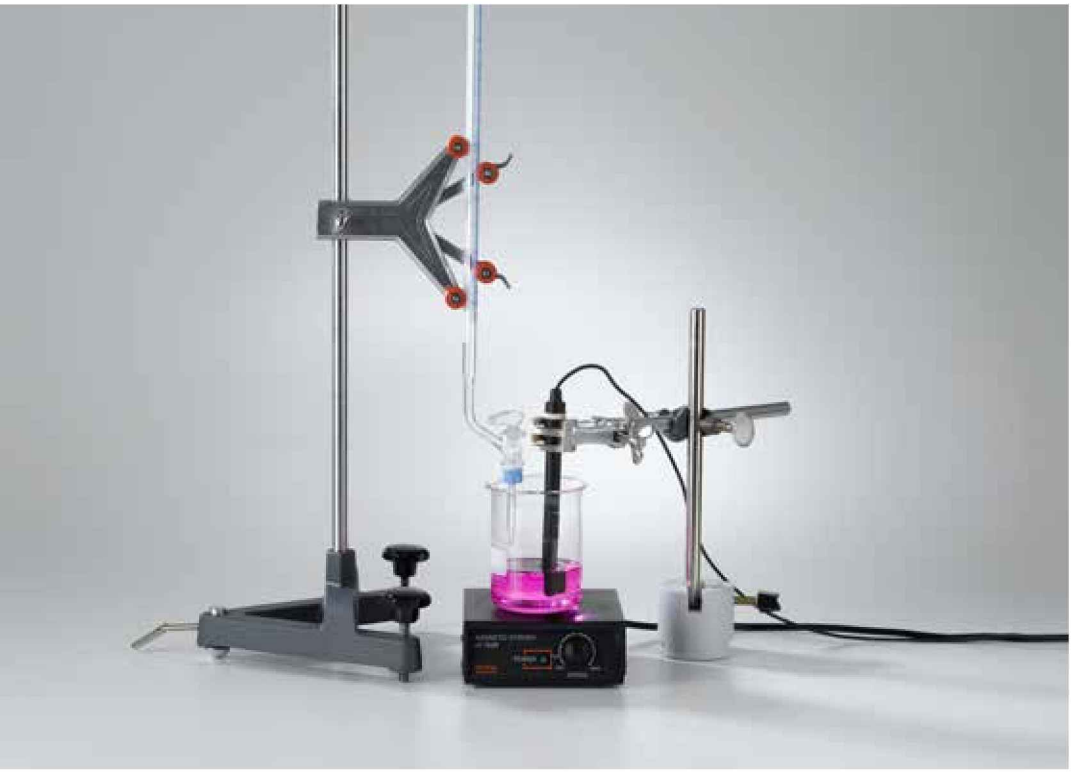

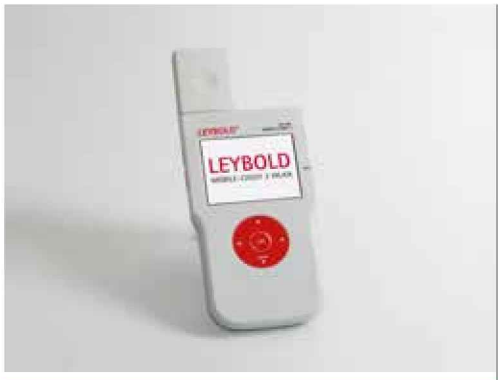

C1.7.2
ACID STRENGTHS AND pH VALUES

C1.7.2.1
Determination of acidity (pKa value) by titration

Determination of acidity (pKa value) by titration (C1.7.2.1)

Cat. No.	Description	C1.7.2.1
524 005W	Mobile-CASSY 2 WiFi	1
524 220	CASSY Lab 2	1
524 0672	pH adapter S	1
667 4172	pH sensor with plastic shaft, BNC	1
607 105	Magnetic stirrer mini	1
666 851	Stirring magnet 25 mm x 6 mm Ø, circular	1
665 845	Burette, clear glass, 25 ml	1
666 559	Burette clamp for 1 burette, roller clamp	1
665 816	Burette filling funnel plastic, 35 mm Ø	1
300 02	Stand base, V-shaped, small	1
300 43	Stand rod, 75 cm, 12 mm diam.	1
301 26	Stand rod 25 cm, 10 mm Ø	1
300 11	Saddle base	1
301 09	Bosshead S	1
666 555	Universal clamp 0...80 mm	1
665 997	Graduated pipette 10 ml	1
666 003	Pipetting ball (Peleus ball)	1
664 130	Beaker, Boro 3.3, 250 ml, squat	1
661 243	Wash bottle PE 500 ml	1
661 082	Stopcock grease, 60 g	1
671 9560	Acetic acid, 0.1 mol/l, 500ml	1
673 8410	Sodium hydroxide solution, 0.1 mol/l, 500ml	1
674 2500	Phenolphthaleine solution, 100 ml	1
674 4640	Buffer solution pH 4.00, 250 ml	1
674 4670	Buffer solution pH 7.00, 250 ml	1

Cat. No.	Description	C1.7.2.1
675 3400	Water, pure, 1 l	1
	additionally required: PC with Windows 7 or higher with WIFI or USB connection	1

In experiment C1.7.2.1, the acidity (pK_a value) of acetic acid is determined. Between an acid HA and its base A^- the following equilibrium reaction takes place in an aqueous solution :

$$HA + H_2O \rightleftharpoons H_3O^+ + A^-$$

According to the law of mass action, the equilibrium position is described by the equilibrium constant K_a:

$$K = \frac{[H_3O^+] \cdot [A^-]}{[HA] \cdot [H_2O]}; K_a = K \cdot [H_2O] = \frac{[H_3O^+] \cdot [A^-]}{[HA]}$$

By analogy to the pH value, the pK_a value is given as the negative base 10 logarithm of the numerical value of K_a

$$pK_a = -\lg \frac{[H_3O^+] \times [A^-]}{[HA]}$$

The lower the value of pK_a, the higher the acidity. The pK_a value is numerically equal to the pH value of a solution when the protonated and non-protonated forms are present in equal concentration.