

A Level Chemistry B (Salters) H433/02 Scientific literacy in chemistry

Question Set 1

- Sodium ethanoate is used as an 'acidity regulator' in foods.
- (a) (i) Sodium ethanoate, CH_3COONa , can be made by reacting solutions of ethanoic acid, CH_3COOH , and sodium carbonate, Na_2CO_3 , in the laboratory.

Write an equation for this reaction.

(ii) Calculate the volume (in cm³) of $0.500 \text{ mol dm}^{-3} \text{ Na}_2\text{CO}_3$ that would react with 25.0 cm^3 of $0.450 \text{ mol dm}^{-3} \text{ CH}_3\text{COOH}$.

			volume of $Na_2CO_3 =$	cm ³	[2]
(b)		The ethanoate ion forms an alkaline sole Write an equation to show this.	ution in water.		[1]
(c)	(i)	Ethanoic acid is a weak acid. $K_a = 1.7$ write an equation for the reaction of ethat	< 10 ⁻⁵ mol dm ⁻³ . anoic acid in water.		[1]

(ii) Calculate the pH of a $0.030 \text{ mol dm}^{-3}$ solution of ethanoic acid.

pH =[2]

[2]

[3]

(d) When sodium ethanoate is acting as an acidity regulator in food, a buffer solution is set up. This buffer involves sodium ethanoate and ethanoic acid.

Explain, with the help of an appropriate equation, how this buffer solution works when acid is added.

(e) (i) Some students investigate buffers involving sodium ethanoate and ethanoic acid.

They make a solution containing equal amounts of ethanoic acid and sodium ethanoate.

Calculate the pH of this solution.

 $K_{\rm a}$ = 1.7 × 10⁻⁵ mol dm⁻³ for ethanoic acid.

pH = [1]

1

(ii) The students then set out to make a buffer solution of a known pH. They have 25.0 cm³ of a 0.100 mol dm⁻³ solution of ethanoic acid.

Calculate the mass of sodium ethanoate they need to add to the acid solution to make a solution of pH = 5.00.

mass of sodium ethanoate = g [4]

Total Marks for Question Set 1: 16

Resource Materials

Question Set No: 1

(0) 18 18 4.0	10 Ne 20.2 18 Ar 39.9	36 Kr krypen 83.8 54 54 Xe xenon	Rn radon	
17 (7)	9 F 19.0 17 C1 C1 35.5	35 Br bromine 79.9 53 1 I I 126.9	At assatra	71 Lu Iudebum 175.0 103 Lr Iawwenstum
(6) 16	8 00 16.0 16 32.1 32.1	34 Se satentum 79.0 52 Te betutum 127.6	Po Po pobrium 116 LV ivermonum	70 Yb ytbettum 173.0 102 No notestum
(5) 15	7 N 14.0 15 P phospharus 31.0	33 As arseric 74.9 51 Sb aritimory 121.8	Bi bismuth 209.0	69 Tm tavium 168.9 101 Md mendsevium
(4) 14	6 carbon 12:0 14 Si 28:1	32 Ge сетанит 72.6 50 Sn th th th th th th th th th th th th th	82 Pb ead 207.2 114 F1 ferovium	68 Er etèum 167.3 100 Fm ferrium
(3)	5 B boron 10.8 13 A1 akuminium 27.0	31 Ga patum 69.7 49 In In 14.8	81 11 thattum 204.4	67 Ho homium 164.9 99 Es eireonium
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	6	27 Co 58.9 45 Rh frodum frodum	Ir Ir 192.2 109 Mt methenum	63 Eu 152.0 95 Am areadum
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(1) 1 1 H H 1.0	3 11 8.9 8.9 8.9 8.9 8.9 8.0 23.0	19 K 39.1 37 Rb Rb Rb R5.5	55 Cs cassium 132.9 87 Fr francium	

The Periodic Table of the Elements



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