

A level Chemistry A

H432/01 Periodic table, elements and physical chemistry

Question Set 12

1. (a) (i) This question is about acids and bases found in the home.

Ethanoic acid, CH_3COOH , is the acid present in vinegar.

A student carries out an experiment to determine the $\text{p}K_a$ value of CH_3COOH .

- The concentration of CH_3COOH in the vinegar is $0.870 \text{ mol dm}^{-3}$.
- The pH of the vinegar is 2.41.

Write the expression for the acid dissociation constant, K_a , of CH_3COOH . [1]

(ii) Calculate the $\text{p}K_a$ value of CH_3COOH .

Give your answer to **two** decimal places.

$\text{p}K_a =$ [3]

(iii) Determine the percentage dissociation of ethanoic acid in the vinegar.

Give your answer to **three** significant figures.

percentage dissociation = % [1]

(b) Many solid drain cleaners are based on sodium hydroxide, NaOH .

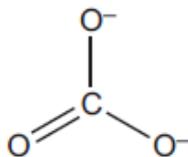
- A student dissolves 1.26g of a drain cleaner in water and makes up the solution to 100.0 cm^3 .
- The student measures the pH of this solution as 13.48.

Determine the percentage, by mass, of NaOH in the drain cleaner.

Give your answer to **three** significant figures.

percentage = % [4]

- (c) Sodium carbonate, Na_2CO_3 , is a base used in washing soda. Na_2CO_3 contains the carbonate ion, CO_3^{2-} , shown below.



Draw the 'dot-and-cross' diagram for the carbonate ion.

Show outer electrons only and use different symbols for electrons from C and O, and any 'extra' electrons.

[2]

Total Marks for Question Set 12: 11

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