

**N.B- THIS IS NOT AN ORIGINAL MARKSCHEME. BECAUSE THE JUNE 06 MARKSCHEME IS UNAVAILABLE, I HAVE CREATED MY OWN MARKSCHEME, WITH CONSULTATION FROM DR. RUSSEL FOR ANSWERS. AND THE EXAMINERS REPORT WHICH IS ALSO ATTACHED.**

**June 06 Unit 4**

1)

- a) Place whole apparatus on scale balance  
To measure loss in mass caused by **loss in CO<sub>2</sub> gas** (1)

OR

Titration with suitable alkali and indicator/pH meter  
pH goes up as HCl/H<sup>+</sup> ions are used up (1)

NOT Dilatometry/Conductivity

- b) CO<sub>2</sub> is slightly soluble in acidic solution (1)

OR

Gas escapes before bung is replaced/Not a closed system (1)

c)

- i) 88 cm<sup>3</sup> (1)

- ii) 16  
9  
4  
1 (1)

- iii) The concentration of HCl (1)

- iv) Correct Plotting of points (1)  
Smooth curve

- v) 36±2 (1)  
First order (1)  
Constant Half Lives (1)

- vi) Rate = k[HCl(aq)] (1)

- vii) s<sup>-1</sup> (1)

June 06 Unit 4

- d)  $\Delta S_{\text{system}}$ : Positive (1)  
Goes from more ordered states to more disordered states/(s)  
 $+(\text{aq}) \rightarrow (\text{aq}) + (\text{g}) + (\text{l})$  (1)

**NOT** More/less molecules on each side

- $\Delta S_{\text{total}}$ : Positive (1)  
Reaction is spontaneous (1)

2)

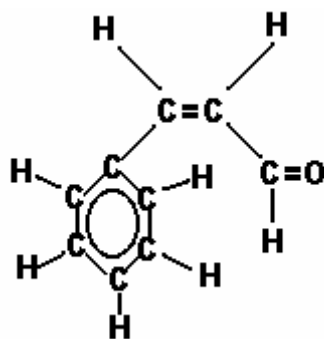
- a) Sodium Ethanoate (1)  
Neutralisation (1)
- b) 4-iodo-methoxybenzene (1)  
Electrophilic (1)
- c) Ethanamide (1)  
Nucleophilic (1)
- d) propan-1,2,3-triol (1)  
Decanoic Acid (1)
- Hydrolysis (1)

3)

a)

- i) Has an arene group (1)
- ii) Has a Carbonyl group/C=O bond (1)
- iii) Has an aldehyde group (1)
- iv) Has a C=C bond (1)
- v) Hydrogen are on same side of the alkene. (1)

vi)



All bonds shown (1)  
Cis isomer/H on same side(1)

June 06 Unit 4

b)

- i) Dissolve precipitate in **minimum** amount of **hot** solvent  
To make sure it has all dissolved, and that it recrystallises quickly after cooling (1)

Filter

Removes **insoluble** impurities (1)

Allow to cool

Evaporation and cooling recrystallise precipitate (1)

Filter/Use Buchner funnel

Removes **soluble** impurities (1)

Dry precipitate with dry filter paper (1)

- ii) Find melting point. Pure substances have a definite melting point.  
Compare to melting point in book of data. (1)

c)

- i)  $2\text{C}_6\text{H}_5\text{COOH (s)} + \text{Na}_2\text{CO}_3 \text{ (aq)} \rightarrow 2\text{C}_6\text{H}_5\text{COO}^-\text{Na}^+ \text{ (aq)} + \text{H}_2\text{O (l)} + \text{CO}_2 \text{ (g)}$

State symbols (1)

Balanced (1)

- ii)  $\text{C}_6\text{H}_5\text{COOH} \leftrightarrow \text{C}_6\text{H}_5\text{COO}^- + \text{H}^+$  (1)

$K_a = \frac{[\text{C}_6\text{H}_5\text{COO}^-][\text{H}^+]}{[\text{C}_6\text{H}_5\text{COOH}]}$  (1)

- iii)  $[\text{H}^+] = \sqrt{(6.3 \times 10^{-5} \times 0.001)} = 0.000250998$  (1) (1)

$\text{pH} = -\text{Log}(0.000250998) = 3.6$  1dp (1)

- d) Sodium Benzoate (1)

4)

- a) Pentyl dichloroethanoate  
Ester group (1)

June 06 Unit 4

b)

- i) Titrate (1)  
with an appropriate alkali and indicator (1)  
Compare number of moles in balanced equation (1)  
Find concentration from  $m=CV$  equation (1)



iii)

$2.3 - 0.6 = 1.7$	$1.7/300 = 5.66$
<b>0.6</b>	<b>2</b>

- iv)  $(2)/(1.33)(5.66)$   
 $= 0.117 \text{ dm}^3 \text{ mol}^{-1}$  (3)