UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Level

MARK SCHEME for the November 2005 question paper

9701 CHEMISTRY

9701/05 **Paper 5 (Practical Test), maximum raw mark 30**

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

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N.B. Boxes references within the mark scheme relate to the accompanying booklet of Standing Instructions.

1 Check and correct, if necessary, all subtractions in Tables 1.1 and 1.2.

(b) Accuracy Marks

Calculate the average of the Supervisor's titres in Table 1.1. This value will be used as the standard for the second set of accuracy marks and should be recorded on the Supervisor's script and against Table 1.1 on each candidate script.

Candidate consistency

Calculate the difference between the two closest titres in Table 1.1.

Award consistency marks as follows:

Mark	Difference/cm^3
3	Up to 0.10
2	0.10+ to 0.20
1	0.20+ to 0.50
0	Greater than 0.50

[3]

Comparison to Supervisor

Calculate the difference between the 'Supervisor Standard' and the closest of the Candidate values.

Award accuracy marks as follows:

Mark	Difference/cm^3
3	Up to 0.10
2	0.10+ to 0.20
1	0.20+ to 0.50
0	Greater than 0.50

[3]

(c) Give **one mark** if all final burette readings in Tables 1.1 and 1.2 are to 2 decimal places and in the correct place in the table. Do **not** give this mark if any burette reading (initial or final) is 'absurd' e.g. 9.67 cm^3. **[1]**

Accuracy marks

Calculate the difference between the two closest titres in Table 1.2.

Award consistency marks as follows:

Mark	Difference/cm^3
2	Up to 0.20
1	0.20+ to 0.50
0	Greater than 0.50

[2]

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(d) Give **one mark** for $\frac{50}{1000}$ **x 0.20** **[1]**

(e) Give **one mark** for $\frac{\text{titre}}{1000}$ **x 0.1 x 5** for each flask **[1]**

(f) Give **one mark** for **(answer (d) - answer (e))** for each flask **[1]**

(g) Give **one mark** for **answer to (e) x** $\frac{1000}{50}$ for each flask **[1]**

(h) Give **one mark** for **answer to (f) x** $\frac{1000}{20}$ for Flask **A**

and

Give **one mark** for **answer to (f) x** $\frac{1000}{40}$ for Flask **B** **[2]**

(i) Give **one mark** for evaluating $K_c = \frac{[C_2H_5COOH(\text{organic layer})]}{[C_2H_5COOH(\text{aqueous layer})]}$

and

$$K_c = \frac{\sqrt{[C_2H_5COOH(\text{organic layer})]}}{[C_2H_5COOH(\text{aqueous layer})]}$$

Give **one mark** for an appropriate conclusion, from results, as to correct equilibrium expression. **[2]**

(j) Give **one mark each** for suitable reasons as to why the equilibrium expression is not constant
e.g. Not shaken for sufficient time to reach equilibrium.
Variation in temperature between the two flasks. **[2]**

(k) Give **one mark** for transfer of acid from the organic layer/to the aqueous layer. **[1]**

[Total for Question 1: 20 marks]

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2 Assessment of planning skills

(a) Outline Plan

Give **one mark** for mixing two pairs of solutions.
Do **not** give this mark if all three pairs have been mixed. **[1]**

Give **one mark** for stating that an acid/alkali pair will have a (large) temperature rise but an acid/acid pair will have no (or minimal) temperature change. **[1]**

Results

Give **one mark** for a suitable tabulation of results including units. **[1]**
Give **one mark** if one (or two) pair(s) show a significant temperature rise and one pair has virtually no temperature change
and
FB 5 is identified as the solution containing sodium hydroxide. **[1]**

(b) Give **one mark** for using twice the volume of sodium hydroxide compared to sulphuric acid. **[1]**

Give **one mark** for predicting that the temperature rise will be twice as great when 1.0 mol dm^{-3} sulphuric acid is used. **[1]**

Results

Give **one mark** for suitable tabulation of results.
Do **not** penalise absence of units if already penalised in **(a)**.
Give **one mark** if initial temperatures are recorded for each solution.
Give **one mark** if one pair has approximately twice the temperature rise of the other pair. **[3]**

Identity

Give **one mark** if the solutions are correctly identified.
FB 3 is 0.05 mol dm^{-3} H_2SO^4
FB 4 is 1.00 mol dm^{-3} H_2SO^4
FB 5 is 1.00 mol dm^{-3} NaOH

[Total for Question 2: 10 marks]

[Total for Paper: 30 marks]

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