UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2009 question paper

for the guidance of teachers

5070 CHEMISTRY

5070/03   Paper 3 (Practical Test), maximum raw mark 40

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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1 **(a)**

Test			Notes
Test **1**			
(a) White ppt		(1)	Ppt must be white
(b) Disappears		(1)	
Test **2**			
(a) White ppt		(1)	Ppt must be white
(b) Remains		(1)	

Formula of impurity in **P** is NaCl or Cl⁻   (Test 2 must be correct)   (1)   [5]

Formula of impurity in **P** is $NaCl$ or Cl^- (Test 2 must be correct)   (1)   [5]

(b) Titration

<u>Accuracy</u>

For each of the two best titres give:
- 4 marks for a value within 0.2 cm^3 of supervisor
- 2 marks for a value within 0.3 cm^3 of supervisor
- 1 mark for a value within 0.4 cm^3 of supervisor   (8)

<u>Concordance</u>

Give:
- 3 marks if all the ticked values are within 0.2 cm^3
- 2 marks if all the ticked values are within 0.3 cm^3
- 1 mark   if all the ticked values are within 0.4 cm^3 (3)

<u>Average</u>

Give 1 mark if the candidate calculates a correct average (error not greater than 0.05) of all his ticked values.

Assuming a 25 cm^3 pipette and a titre of 24.8 cm^3.   (1)   [12]

(c) moles of sodium carbonate in 1.00 dm^3 of **P**

$$= \frac{24.8 \times 0.1}{25 \times 2}$$ (1)

= 0.0496 (correct to 0.0001)   (1)   [2]

(d) mass of sodium carbonate in 1 dm^3 of solution **P**.

= 0.0496 × 106

= 5.26 g [1]

(e) percentage by mass of sodium carbonate in impure sample. [1]

$$= \frac{5.26 \times 100}{6.00}$$

= 87.7%

[Total: 21]

2   **R** is zinc sulfate   **S** is iron(II) sulfate   **T** is lead(II) nitrate

Test		Notes
General points For ppt allow solid, suspension, powder For gases Name of gas requires test to be at least partially correct. Effervesces = Bubbles = gas vigorously evolved (but not just gas evolved) Solutions Colourless not equivalent to clear, clear not equivalent to colourless		
Solution **R**		
Test **1** **(a)** White ppt	(1)	Ppt must be white
(b) Soluble in excess	(1)	
Colourless solution	(1)	
Test **2** **(a)** White ppt	(1)	Ppt must be white
(b) Soluble in excess	(1)	
Colourless solution	(1)	
(c) No reaction	(1)	
Test **3** No reaction/purple colour remains	(1)	Any indication of a reaction = 0

Solution S		
Test 1		
(a) Green ppt	(1)	
(b) Insoluble in excess	(1)	
Test 2		
(a) Green ppt	(1)	
(b) Insoluble in excess	(1)	
(c) Red-brown ppt	(1)	Accept brown but not orange
Effervescence	(1)	
Gas relights glowing splint	(1)	Test for gas here or in Test **2 (c)** for **T**
Oxygen	(1)	Partially correct test allow mark for oxygen
Test 3		
Decolourised	(1)	Colourless solution formed

Solution T		
Test 1		
(a) White ppt	(1)	
(b) Insoluble in excess	(1)	
Test 2		
(a) White ppt	(1)	
(b) Soluble in excess	(1)	
Colourless solution	(1)	
(c) Black/brown ppt	(1)	
Effervescence	(1)	
Oxygen	(1)	
Test 3		
White ppt	(1)	
No reaction/purple colour remains	(1)	

Conclusion

R is Zn^{2+} (White ppt must disappear in Tests 1 & 2)   (1)

S is Fe^{2+} (Green ppt in 1 or 2)   (1)

Any candidate obtaining 25 or more marks scores the maximum on question 2 i.e. 19. Thereafter scores are awarded according to the following table

Marks	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
Score	19	19	18	17	17	16	15	14	14	13	12	11	11	10	9	8	8	7	6	5	5

Marks	5	4	3	2	1
Score	4	3	2	2	1

[Total: max 19]