

**MARK SCHEME for the October/November 2009 question paper  
for the guidance of teachers**

<b>5070 CHEMISTRY</b>
<b>5070/03</b> 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  $\text{NaCl}$  or  $\text{Cl}^-$  (Test 2 must be correct) (1) [5]

(b) Titration

Accuracy

For each of the two best titres give:

4 marks for a value within  $0.2 \text{ cm}^3$  of supervisor

2 marks for a value within  $0.3 \text{ cm}^3$  of supervisor

1 mark for a value within  $0.4 \text{ cm}^3$  of supervisor (8)

Concordance

Give:

3 marks if all the ticked values are within  $0.2 \text{ cm}^3$

2 marks if all the ticked values are within  $0.3 \text{ cm}^3$

1 mark if all the ticked values are within  $0.4 \text{ cm}^3$  (3)

Average

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

Assuming a  $25 \text{ cm}^3$  pipette and a titre of  $24.8 \text{ cm}^3$ . (1) [12]

(c) moles of sodium carbonate in  $1.00 \text{ dm}^3$  of **P**

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

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

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(d) mass of sodium carbonate in 1 dm<sup>3</sup> of solution P.

$$= 0.0496 \times 106$$

$$= 5.26 \text{ g}$$

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

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<b>Solution S</b>		
<b>Test 1</b>		
<b>(a)</b> Green ppt	(1)	
<b>(b)</b> Insoluble in excess	(1)	
<b>Test 2</b>		
<b>(a)</b> Green ppt	(1)	
<b>(b)</b> Insoluble in excess	(1)	
<b>(c)</b> 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
<b>Test 3</b>		
Decolourised	(1)	Colourless solution formed

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

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**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]**