

**MARK SCHEME for the May/June 2012 question paper
for the guidance of teachers**

5070 CHEMISTRY

5070/31

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) Titration [12]

Accuracy 8 marks

For the two best titres give:

4 marks for a value within 0.2 cm³ of Supervisor

2 marks for a value within 0.3 cm³ of Supervisor

1 mark for a value within 0.4 cm³ of Supervisor

Concordance 3 marks

Give:

3 marks if all the ticked values are within 0.2 cm³

2 marks if all the ticked values are within 0.3 cm³

1 mark if all the ticked values are within 0.4 cm³

Average 1 mark

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

Assuming a 25 cm³ pipette and a titre of 24.8 cm³.

(b) concentration of ethanedioic acid in P [2]

$$= \frac{25.0 \times 0.15}{24.8 \times 2} \quad (1)$$

$$= 0.0756 \quad (1)$$

Answers should be correct to + or – 1 in the third significant figure.

(c) concentration of ethanedioic acid in P in g/dm³ [1]

$$= 0.0756 \times 90 \quad (1)$$

$$= 6.80$$

(d) mass of water in g [1]

$$= 9.45 - 6.80 \quad (1)$$

$$= 2.65$$

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(e) the value of **x** [2]

$$\text{mole H}_2\text{O} = \frac{2.65}{18}$$

$$= 0.147$$

$$\mathbf{x} = \frac{0.147}{0.0756}$$

$$= 1.94 \text{ or } 2$$

Shows the working to obtain value of **x** (1)

The value of **x**

i.e. the correct arithmetical answer or the nearest whole number (1)

[Total: 18]

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2 R is potassium iodide S is hydrogen peroxide

| Test | Notes |
|---|--------------------|
| <p>General points 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 gas evolved</p> <p>Solutions Colourless not equivalent to clear, clear not equivalent to colourless</p> | |
| Solution R | |
| <p>Test 1</p> <p>(a) yellow ppt (1)</p> <p>(b) insoluble in acid (1)</p> | accept pale yellow |
| <p>Test 2</p> <p>red/brown solution (1)</p> | |
| <p>Test 3</p> <p>(a) turns brown (1)</p> <p>solid formed (1)</p> <p>(b) turns green (1)</p> <p>solid disappears (1)</p> | accept black |

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|--|-------------------------------|
| Test 4 (a) yellow/red/brown solution (1) (b) black solid (1) | allow dark brown solid |
| Test 5 (a) yellow solution (1) (b) red-brown ppt (1) insoluble in excess (1) bubbles (1) gas relights a glowing splint (1) oxygen (1) | allow brown |
| Test 6 purple colour lost (1) bubbles (1) oxygen (1) | turns colourless/decolourised |
| Test 7 (a) no reaction (1) (b) bubbles (1) oxygen (1) liquid turns blue (1) | |

Conclusions

The anion in **R** is iodide or I^- (in Test 1 yellow ppt remains in acid) (1)

S is acting as an oxidising agent (in Test 5 yellow solution or red-brown ppt) (1)

S is acting as a reducing agent (in Test 6 indication purple colour lost) (1)

Note: 25 marking points, maximum 22.

[Total: 22]