

MARK SCHEME for the May/June 2015 series

5070 CHEMISTRY

5070/41

Paper 4 (Alternative to Practical), maximum raw mark 60

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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- 1 (a) (i) Silver/grey solid (1) [1]
- (ii) $2\text{Zn} + \text{O}_2 = 2\text{ZnO}$ (1) [1]
- (iii) Nitric acid/ HNO_3 (1) [1]
- (b) (i) Toxic/poisonous gas evolved (1) [1]
- (ii) $3.78/189 = 0.02$ (1) [1]
- (iii) $0.02 \times 24000 \times 2 = 960 \text{ cm}^3$ (1)
 $0.02 \times 24000 \times 0.5 = 240 \text{ cm}^3$ (1) [2]
- [Total: 7]
- 2 (a) $88 - 45 = 43$ (1)
 $n = 3$ (1)
- butanoic acid/butyric acid (1) [3]
- (b) hydrogen (1)
pops in flame / burning splint pops / lighted splint pops (1) [2]
- (c) (i) esters (1) [1]
- (ii) $\text{CH}_3\text{COOC}_2\text{H}_5$ / $\text{CH}_3\text{CO}_2\text{C}_2\text{H}_5$ (1) [1]
- (iii) ethanol (1) ethanoic acid (1) [2]
- (iv) $\text{C}_2\text{H}_5\text{COOCH}_3$ (1)/methyl propanoate (1)
OR HCOOC_3H_7 (1)/propyl methanoate (1) [2]
- [Total: 11]
- 3 (d) [Total: 1]
- 4 (b) [Total: 1]
- 5 (b) [Total: 1]
- 6 (b) [Total: 1]
- 7 (b) [Total: 1]

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- 8 (a) Gas no longer turns litmus blue (1) [1]
- (b) Pink to colourless (1) [1]
- (c) $\begin{array}{ccc} 29.5 & 28.8 & 39.9 \\ \underline{8.9} & \underline{7.9} & \underline{19.5} \\ \underline{20.6} & \underline{20.9} & \underline{20.4} \end{array}$ 1 mark for each correct row or column to the benefit of the candidate (3)
- Mean value 20.5 cm^3 (1) [4]
- (d) 0.00205 moles (1) [1]
- (e) (i) 0.00205 (1) [1]
- (ii) 0.0205 (1) [1]
- (f) 0.1 (1) [1]
- (g) 0.0795 (1) [1]
- (h) (i) 1.352 g (1) [1]
- (ii) 54.06 g (1) [1]
- (i) One mole of $(\text{NH}_4)_2\text{SO}_4$ produces $34 \text{ g}/2 \text{ moles}$ of ammonia (1)
Concentration = $54.06/34 = 1.59 \text{ mol/dm}^3$ (1) [2]

[Total: 15]

- 9 (a) colourless solution (1)
- (b) (i) white ppt (1)
- (ii) soluble in excess (1)
- (c) (i) white ppt (1)
- (ii) insoluble in excess (1)
- (d) M1 (aq) NaOH/sodium hydroxide/ (1)
M2 Al/aluminium (foil)/Devarda's alloy (1)
M3 warm/heat/boil (1)
M4 ammonia/ NH_3 **OR gas** turns litmus blue (1)

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ALLOW

Brown ring test: conc. (1) sulfuric acid / H_2SO_4 (1) iron(II) sulfate / FeSO_4 (1) brown ring (1)

[Total: 9]

10 (a) 10, 36, 54, 68

All correct for two marks; three correct for one mark

[2]

(b) Temperature at which solid appears is below room temperature (1)

Cooling the tube by some method e.g. ice (1)

[2]

(c) all points plotted correctly (1)

two smooth curves through the points (1 mark for each)

[3]

(d) (i) NH_4Cl – 2.8 (1)

[1]

(ii) KNO_3 – 1.7 (1)

[1]

(e) (i) 23 (1)

[1]

(ii) $3.4 \text{ g} / 10 \text{ g} = 34 \text{ g} / 100 \text{ g water}$ (1)

[1]

(f) NH_4Cl – solution + undissolved solid (1)

KNO_3 – solution (no solid) (1)

[2]

[Total: 13]