Titration Exam Questions **ANSWERS**

# 2003 Q11

(a)(i) 0.00985 mol

(ii) 0.00590 mol

(iii) 0.00590 mol

(iv) 0.00395 mol

(v) 0.00395 mol

(vi) 0.0553 g

(vii) 6.18%

# 2004 Q10

(a) MnO4- + 8H+ + 5e- $→$ Mn2+ + 4H2O

(b) 2MnO4- + 5H2O2 $→$ 2Mn2+ + 8H2O + 5O2

(c) (i) 5.866×10-4 mol

(ii) 1.466×10-4 mol

(iii) 0.7332 mol/L

(iv) 2.494 %w/v

# 2005 Q11(a)

(i) 2.90×10-4 mol

(ii) 1.05×10-4 mol

(iii) 1.85×10-4 mol

(iv) 131 µg/mL

# 2006 Q10

(a) to increase surface area

(b) *There is no single correct answer but likely answers involve rinsing with distilled water and then with sulfuric acid (see p58 of textbook). Answer must relate to accuracy (see p72 of textbook).*

(c) yellow

(d) (i) 0.030 mol

(ii)(1) 0.012 mol

(ii)(2) 0.024 mol

(ii)(3) 0.0063 mol

(iii) 95%

# 2007 Q11(b)

(i) 0.0100 mol

(ii)(1) 0.00042 mol

(ii)(2) 0.00042 mol

(ii)(3) 0.0042 mol

(ii)(4) 0.0058 mol

(ii)(5) 14%

# 2008 Q11

(a)(i) d

(ii) 1.08 g

(iii)(1) 1.79×10-4 mol

(iii)(2) 5.36×10-4 mol

(iii)(3) 22.5 mg

(iii)(4) 4.50%

(iii)(5) It would be greater

(b) 4 tablets

# 2009 Q11(b)

(i) 

(ii)(1) 0.00300 mol

(ii)(2) The least precise input is 0.100 which is 3 s.f.

(iii) 0.00894 mol

(iv) 0.00179 mol

(v) 0.00121 mol

(vi) 0.00302 mol

(vii) 1.9 µg/L

# 2010 Q5(a)

(i) volumetric burette

(ii) 1.87×10-5 mol

(iii) 9.34×10-6 mol

(iv) 4.67×10-5 mol/L

(v) 2.40 ppm

# 2011 Q10(b-c)

(b) (i) (1) volumetric burette

(i) (2) HCl

(ii) The household ammonia is not stable so its concentration is decreasing over time therefore requiring less HCl to neutralise.

(c) (i) 0.005000 mol

(ii) 0.00100 mol

(iii) 0.00400 mol

(iv) 0.00400 mol

(v) 0.0500 mol

(vi) 3.40 %w/v

# 2012 Q12(b)(ii)

(1) 0.1427 g

(2)(A) volumetric pipette

(2)(B) 0.11 mol/L

# 2014 Q3(c)

(i) distilled water

(ii) 7.93 mL

(iii) 305 mg/L therefore SO2 concentration is not lower than the legal limit

# 2015 Q9

(a) bubbles no longer being produced

(b)(i) 0.01573 mol

(ii) 0.003368 mol

(iii)(1) 0.003368 mol

(iii)(2) 0.01236 mol

(iv) 0.006182 mol

(v) 52.4 %w/w
(c) The calculated percentage will be higher than it would be if the CaCO3 was not in the ore. This is because CaCO3 reacts with HNO3, decreasing the amount of excess acid remaining after Step 1.

# 2016 Q12

(a) ClO- + 2H+ +2e- $→$ Cl- + H2O

(b)(i) 12.62 g

(ii)(1) 0.006903 mol

(ii)(2) 0.003452 mol

(ii)(3) 7.104 %w/v

(ii)(4) The calculated concentration of ClO- would be lower. Less I2 would be produced in Step 3 therefore less sodium thiosulphate would be required in Step 4.

(iii) To make sure that concentration is at least the stated value even if some has reacted away or if there was some error during measurement.