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43rd INTERNATIONAL CHEMISTRY OLYMPIAD

UK Round One - 2011

MARKING SCHEME

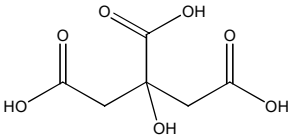
Notes:

Chemical equations may be given as sensible multiples of those given here.

Formulae can be given by any conventional method (i.e. structural or molecular) unless a particular format is specified by the question.

State symbols do not need to be included in chemical equations to obtain the mark(s).

Answers should be given to an appropriate number of significant figures although the marker should only penalise this once (on the whole paper).

Total marks for paper = 55			
Question 1			
		Answer	**Marks**
a)		Heat energy transferred to the water for 2.0 g snack = 500 x 4.18 x 20.9 J = **43681 J** (or **43.7 kJ**) Whole bag of snack = (43681* x 22/2.0)/1000 = 480 kJ = **115 dietary calories**. *Allow 2 or 3 sf. Correct answer scores 2 marks without reference to working. *Allow ecf from first marking point.*	1 1
b)	**(i)**	$AgNO_3$	1
	(ii)	K_2CrO_4	1
c)		$Ag^+ + Cl^- \rightarrow AgCl$ [*Allow equation with spectator ions*] Moles silver (nitrate) = (8.20/1000) x 0.100 = 8.20 x 10^{-4} *Allow ecf from equation.* Moles (sodium) chloride from small bag of snack = 8.20 x 10^{-4} x 10 Mass sodium chloride in small bag snack = (8.20 x 10^{-4} x 10) x 58.44 = **0.479 g** (*3sf*) *Correct answer scores 2 marks without reference to working.* *Allow 1 mark if correct answer but given to 2 or 4 sf.*	1 2
d)		 *Allow any clear representation of the correct structure for 1 mark if not skeletal.*	2
e)		None	1

10 marks

Note: Tests are to be taken under controlled conditions. Students must not have access to the information contained in this marking scheme prior to, or during, the test.