



Cambridge Chemistry Challenge Lower 6th

June 2016

Student Answer Booklet

Student name _____

male female

Date of exam _____

Email _____

School _____

School year (eg year 12) _____

Subjects taken for AS _____

	p2	p3	p4	p5	p6	p7	Total
mark	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

1(a) oxidation states of titanium in ilmenite (FeTiO_3):

1(b)

(i) reaction between rutile (TiO_2), chlorine and carbon:

(ii) reaction between ilmenite (FeTiO_3), chlorine and carbon:

1(c) type of structure and bonding:

ionic giant covalent simple molecular (simple covalent)

1(d) average bond strength TiCl_4 :

1(e)

(i) dot and cross diagram for NO₂

(ii) bond angle in NO₂:

90° 105° 109° 115° 120° 135° 180°

1(f)

(i) reaction between NO₂ and HO•:

the product is named:

(ii) reaction between superoxide and NO:

(iii) net reaction with species being reduced underlined:

1(g) the reaction for the formation of titanium(III) chloride is:

1(h)

(i) what happens to the titanium:

oxidation reduction disproportionation nothing

1(h)

(ii) the standard entropy change is:

(iii) the position of equilibrium would:

1(j) the standard enthalpy and entropy changes are:

1(k)

ionic

giant covalent

simple molecular (simple covalent)

leave
blank

2(a) molecular formula of Pyrethrin I:

leave
blank

2(b)

(i) moles of bromine reacting with 500 mg Pyrethrin I:

(ii) volume of bromine water reacting:

2(c)

(i) concentration of Cypermethrin in the sample:

(ii) mass of Cypermethrin in the sample:

(iii) number of blueberries consumed without exceeding the MRL:

2(d) ways of forming Br₂:

2(e) Spectrum matching that of Br₂:

Spectrum A Spectrum B Spectrum C Spectrum D

2(f)

(i) m/z values of Cl₂:

(ii) intensities of peaks corresponding to Cl₂:

2(g) m/z values for molecular ions and their corresponding ratios.

Cypermethrin	Deltamethrin	Tralomethrin
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2(h)

(i) volume of Deltamethrin solution:

2(j) products of ester hydrolysis:

(i)	(ii)
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(iii)

2(k) Four possible products:

leave
blank

(Product 1)

(Product 2)

(Product 3)

(Product 4)

2(l)

(i) Circle the correct structure in your answer above

(ii) The reagent is:

2(m) Structures:

(Anion W⁻)

(Compound X)

(Compound Y)

(By-Product Z)