

**Hurlstone Ag. H.S. Chemistry HSC Assessment Task #3 2005**

**Student Number:** \_\_\_\_\_

Time allowed: **45 minutes**

Total Marks: **30 marks**

Answer the questions in the space provided. The value of each question is given in brackets at the end of each question.

1. a) Discuss the problems associated with the use of CFC's. (5 marks)

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b) Outline the steps that have been taken to alleviate these problems. (2 marks)

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2. a) Draw the structural formula of 1,2-dichloro-1,1,2,2-tetrafluoroethane. (1 mark)

b) Draw the structural formula of an isomer of 1,2-dichloro-1,1,2,2-tetrafluoroethane and name it.  
(2 marks)

c) Write an equation to show what would happen when 1,2-dichloro-1,1,2,2-tetrafluoroethane is exposed to UV light.  
(1 mark)

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3. Describe how information regarding atmospheric concentrations of ozone are obtained.  
(2 marks)

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4. a) Identify a chemical reaction that needs monitoring and justify the need to monitor it.  
(5 marks)

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**5.** You were asked to present information from secondary sources to identify alternative chemical used to replace CFCs and evaluate the their use as a replacement for CFCs. Describe how you assessed the reliability of the data you collected regarding this point. (2 marks)

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**6.** The diagram below shows 4 different designs of microscopic membrane filters. Rank the 4 designs in order of effectiveness and justify your rankings. (5 marks)

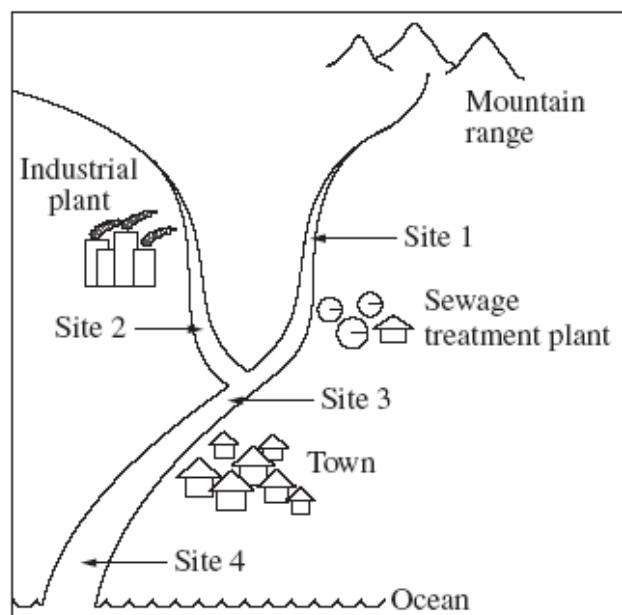




Addition of iron chloride

$\text{Cl}_2$

The map shows a catchment area. There is an industrial plant, a sewage treatment plant and a small town, all of which discharge water into the river. Water samples were collected at four sites.



The results of analysis of cadmium levels from these four sites are given in the table.

<i>Sample site</i>	<i>Absorbance</i>
Site 1	0.08
Site 2	0.15
Site 3	0.55
Site 4	0.40

(b) Justify your conclusion about the most likely source of cadmium pollution.

**Chemistry Assessment Task 3 Research task – 2005- Marking Criteria**

1. (a)

Criteria	Marks
Identifies the major issue as 'CFC's destroying ozone in the upper atmosphere' linking this to the subsequent increase in levels of harmful UV radiation reaching the Earth's surface AND Describes TWO or THREE disadvantages of these increased levels of UV radiation.	4 - 5 marks
Identifies the major issue as 'CFC's destroying ozone in the upper atmosphere' linking this to the subsequent increase in levels of harmful UV radiation reaching the Earth's surface AND/OR Describes ONE, TWO or THREE disadvantages of increased levels of UV radiation reaching the Earth's surface	1 - 3 marks

1.(b)

Criteria	Marks
Outlines the international agreement to phase out the use of CFC's (the Montreal protocol) AND EITHER Outlines at least one alternative available for use instead of CFC's OR Describes other ways to prevent the effects of exposure to harmful UV radiation	2 marks
One of the three points listed above	

2. (a)

Criteria	Marks
Draws the structural formula for 1,1,2,2-tetrachloro-1,2-difluoroethane.	1 mark

2.(b)

Criteria	Marks
Draws the structural formula for 1,1,1,2-tetrachloro-2,2-difluoroethane AND Names it.	1 mark

2.(c)

Criteria	Marks
Writes a correct equation, showing the formation of the chlorine free radical (an atom that has an unpaired electron). $\text{CCl}_2\text{FCCl}_2\text{F} \xrightarrow{\text{UV radiation}} \text{CCl}_2\text{FCCl} + \text{Cl}$	3 marks



3.

Criteria	Marks
Identify that a spectrophotometer is the device used to collect information (which may be land-based, attached to a helium balloon or located on a satellite) AND Describes how the spectrophotometer collects relevant information (reference to wavelength intensities, absorption by ozone, etc)	2 marks
One of the two points above	1 mark

4.

Criteria	Marks
Identifies a chemical reaction that needs to be monitored, using appropriate and relevant equations to outline the chemical reaction(s) AND thoroughly describes TWO or THREE specific reasons why it is of importance to monitor the reaction as justification	4 - 5 marks
Identifies a chemical reaction that needs to be monitored AND Uses appropriate and relevant equations to outline the chemical reaction(s) AND/OR Justifies the need for the reaction to be monitored by identifying ONE, TWO or THREE specific reasons why it is of importance to monitor the reaction (eg. production of pollutants, reduced energy output, reduced yield of desired product)	2 - 3 marks
Identifies a reaction that requires monitoring	1 mark

5.

Criteria	Marks
Identifies that reliability of information is ensured by collecting and analysing information from many sources (especially from highly reputable, unbiased sources such as government research bodies, eg. CSIRO) ensuring that only consistent information is used (this makes it reliable)	2 marks
Identifies that information should be collected from a number of sources to make it more reliable.	1 mark

6.

Criteria	Marks
Correct rank and appropriate justification for the relative position of all designs	5 marks
Correct rank and appropriate justification for the relative position of 3 designs	4 marks
Correct rank and appropriate justification for the relative position of 2 designs or appropriate justification for the relative position of 3 designs	3 marks
Correct rank and appropriate justification for the relative position of 1 design or appropriate justification for the relative position of 2 designs	2 marks
Correct rank or appropriate justification for the relative position of 1 designs	1 mark

7.

Criteria	Marks
Correctly identifies each process and outlines the role of each.	6 marks
½ marks were deducted for each process not correctly identified and 1 mark was deducted for each process whose purpose was not correctly outlined.	1- 5.5 marks