

3. Outline TWO methods of collecting information regarding atmospheric concentrations of ozone. 2M

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4. Why is it important to use information from more than one source when doing research? 2M

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5. Relate the structure of microscopic membrane filters to their function. 3M

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6. (a) Identify the catchment area studied. 1M

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(b) Water from the catchment area is chemically treated before being delivered to consumers. Identify TWO chemicals that are added to the water and justify their use. 2M

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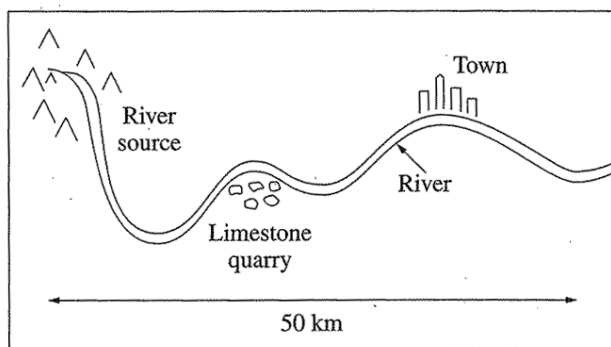
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7. Water quality analyses were performed on a number of samples of water collected at different locations along the river, shown on the map to the right.

Limestone is composed primarily of calcium carbonate

The table shows the results of the tests performed on the different samples of water.



Sample number	Results of tests performed		
	B.O.D. (ppm)	Turbidity (NTU)	Acidity (pH)
1	12	730	7.6
2	145	350	5.8
3	0	1	6.5
4	1	2	7.1

Which sample has most likely been collected downstream of the above-ground limestone quarry? Justify your response. 3M

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Research/Processing Information Task

8. CFCs have been used by humans for many years as refrigerants, foaming agents, solvents and aerosol propellants. In recent years, it has been discovered that they cause damage to the ozone layer in the stratosphere.

(a) Identify, by name, a CFC that could cause damage to the ozone layer. 1M

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(c) Outline how the CFC, identified in (a), damages the ozone layer, using appropriate chemical equations. 3M

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(c) Identify ONE specific chemical that has been used to replace CFCs by drawing its structural formula. 1M

There is another question overleaf.

9. *“Society often drives developments in science that results in new technologies.”*

Analyse this statement with reference to synthetic detergents.

5M

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Marking Guidelines Task 3 - 2011

Year 12 CHEMISTRY

1.

<i>Marking criteria</i>	<i>Marks</i>
Identifies in words (i) chlorine gas (ii) sodium/mercury amalgam	2
Identifies one of the above	1

2.

<i>Marking criteria</i>	<i>Marks</i>
1 provides a reason why the purification of brine is important (eg. purifying brine increases the yield of sodium hydroxide)	5
2 Identifies 3 examples of impurities [2(a),2(b), 2(c)] that need to be removed from brine (e.g. Ca^{2+} , Mg^{2+} , SO_4^{2-})	
3 provides 3 correct equations [3(a), 3(b), 3(c)] showing how the impurities identified as 2(a), 2(b), 2(c) can be removed from brine	
4 makes the judgement that the purification of brine is essential	
Provides points 1, 2(a), 2(b), 2(c) and 3(a), 3(b), 3(c) as outlined above OR Provides points 2(a), 2(b), 2(c), 3(a), 3(b), 3(c) and (4) as outlined above	4
Provides point 4 as outlined above AND provides two correct equations showing how two different impurities can be removed from brine OR Provides a reason why the purification of brine is important AND identifies two impurities that can contaminate brine	3
Covers 1 or 2 of the following 3 points: • Provides a reason why the purification of brine is important • Identifies an impurity that can contaminate brine • Identifies another impurity that can contaminate brine	1 - 2

3.

<i>Marking criteria</i>	<i>Marks</i>
Outlines TWO methods of collecting information regarding atmospheric concentrations of ozone (e.g. UV spectrometer and TOMS)	2
Outlines ONE method of collecting information	1

4.

<i>Marking criteria</i>	<i>Marks</i>
Outlines TWO reasons for why it is important to use more than one source of information when doing research, such as - Reliability of information (ensuring it is valid/consistent/accurate) - Provides more evidence to support your	2

research (able to draw relationships between data and phenomena) - Ensures information is up-to-date - Provides a full picture of the area (by getting different perspectives/avoids bias)	
Outlines ONE reason for why it is important to use more than one source of information when doing research	1

5.

<i>Marking criteria</i>	<i>Marks</i>
Relates the structure of microscopic membrane filters to their function	3
Outlines structure AND function (no link)	2
Outlines structure OR function	1

6a.

<i>Marking criteria</i>	<i>Marks</i>
Identifies Warragamba dam as the catchment area – NB – the catchment is Hawkesbury Nepean!!!	1

6b.

<i>Marking criteria</i>	<i>Marks</i>
Identifies TWO chemicals (eg. chlorine) and for each chemical provides a reason for its addition to water	2
Identifies ONE chemical added to water (eg. alum) and provides a reason for its use OR Identifies TWO chemicals added to water <i>N.B. Fluoride ions are added, not fluorine</i>	1

7.

<i>Marking criteria</i>	<i>Marks</i>
Identifies the sample collected at site 1 as most likely to have been collected downstream AND provides TWO reasons to support this judgement → The water is basic (pH= 7.6) which is consistent with limestone (CaCO_3) being washed into the river → The water has a high level of turbidity, consistent with mining activity that destroys soil structure, allowing loose soil to wash into the waterway	3
Identifies the sample collected at site 1 as most likely and provides ONE reason	2
Identifies the sample collected at site 1 as most likely OR Identifies the sample collected at site 4 as the most likely and provides a reason for this (the water is more basic than the water delivered from the river's source) <i>N.B. Be careful when referring to an increase of pH as an increase in acidity.....</i>	1

8a.

<i>Marking criteria</i>	<i>Marks</i>
Names a CFC that is capable of destroying the ozone layer – e.g. trifluoromethane	1

8b.

<i>Marking criteria</i>	<i>Marks</i>
<ul style="list-style-type: none">• Uses the CFC named in (a)• Outlines the impact of the CFC on the ozone layer by writing the THREE key equations that show the processes of (i) formation of a chlorine free-radical (ii) destruction of ozone (iii) regeneration of a chlorine free-radical• Identifies that UV radiation is required for the destruction of the CFC• Uses the correct symbol to represent all of the free-radicals that are involved	3
Outlines the impact of the named CFC on the ozone layer by writing TWO of the three key equations that show the processes involved	2
Outlines the impact of the named CFC on the ozone layer by writing ONE of the three key equations that show the processes involved	1

8c.

<i>Marking criteria</i>	<i>Marks</i>
Draws the structural formula for a HFC that is used to replace CFCs.	1

9.

<i>Marking criteria</i>	<i>Marks</i>
Outlines THREE societal demands/needs related to synthetic detergents and identifies, for each, the new synthetic detergent technology that results AND strongly draws out the relationship between these	5
Outlines TWO societal demands/needs related to synthetic detergents and identifies, for each, the new synthetic detergent technology that has resulted AND strongly draws out the relationship between these	4
Outlines ONE societal demand/need related to synthetic detergents and identifies, for each, the new synthetic detergent technology that has resulted AND strongly draws out the relationship between these OR Weakly draws out TWO different relationships between societal needs/demands and a synthetic detergent technology	3
Weakly draws out ONE relationship between societal needs/demands and a synthetic detergent technology	2
Identifies a societal demand relating to detergents OR identifies a new technology relating to detergents	1