AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.10.1.3

Waste water treatment

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**2**
Available paper years	**2020–2022**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

5.10.1.3 Waste water treatment

Answer 01 · Mark scheme November 2020 | 8464/C/2H | Original Q3

03.1	microbes chemicals	allow bacteria / pathogens	1 1	AO1 5.10.1.3
03.2	anaerobic digestion		1	AO1 5.10.1.3
03.3	(decrease =) 6.7 (billion) (% decrease =) $\frac{6.7}{8.0}$ × 100 = 84 (%) **alternative approach:** (% now used =) $\frac{1.3}{8.0}$ × 100 (1) = 16.25 (1) (% decrease =) 84 (%) (1)	 allow correct use of an incorrect value for decrease in plastic bag use allow 83.75 / 83.8 (%) allow 83.75 / 83.8 (%)	1 1 1	AO2 5.10.2.2

5.10.1.3 Waste water treatment

Answer 01 · Mark scheme

03.4	respiratory problems **or** acid rain	allow named respiratory conditions eg asthma allow breathing problems allow consequences of acid rain eg kills aquatic life **or** damages limestone buildings allow smog	1	AO1 5.9.3.2

03.5	(increased) more traffic (decreased) improved efficiency of car engines	allow more cars allow use of catalytic converters allow more electric / hybrid cars allow lower temperature of car engines allow more use of public transport allow more people walk / cycle ignore better designed engines	1 1	AO3 5.9.3.1

Total			**9**

5.10.1.3 Waste water treatment

Answer 01 · Mark scheme

November 2020 | 8464/C/2H | Original Q3

Question	Answers	Extra information	Mark	AO / Spec. Ref.

5.10.1.3 Waste water treatment

Answer 02 · Mark scheme

Question 2

<table>
<tr><th>Question</th><th>Answers</th><th>Mark</th><th>AO / Spec. Ref.</th></tr>
<tr><td rowspan="3">02.1</td><td>Level 2: Scientifically relevant features are identified, the way(s) in which they are similar / different is made clear and (where appropriate) the magnitude of the similarity / difference is noted.</td><td>4–6</td><td rowspan="3">AO1
5.10.1.3</td></tr>
<tr><td>Level 1: Relevant features are identified and differences noted.</td><td>1–3</td></tr>
<tr><td>No relevant content</td><td>0</td></tr>
<tr><td></td><td>
Indicative content
<table>
<tr><th>ground water</th><th>waste water</th></tr>
<tr><td>easier to obtain</td><td>more difficult to obtain</td></tr>
<tr><td>fewer processes</td><td>more processes</td></tr>
<tr><td>takes less time</td><td>takes more time</td></tr>
<tr><td>filtered through filter beds

to remove insoluble particles</td><td>screening and grit removal

to remove large particles</td></tr>
<tr><td></td><td>sedimentation

to produce sewage sludge and effluent</td></tr>
<tr><td></td><td>aerobic biological treatment of effluent

to reduce solid waste</td></tr>
<tr><td>sterilised

using chlorine, ozone or uv light

to kill bacteria</td><td>and then sterilised

using chlorine, ozone or uv light

to kill bacteria</td></tr>
<tr><td></td><td>sludge is anaerobically digested

by specific bacteria

to remove organic matter</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

5.10.1.3 Waste water treatment

Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	distillation		1	AO1 5.10.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	(conversion) $(\frac{150}{1000} =) 0.15 (dm^3)$ (concentration =) $\frac{2.40}{0.15}$ $= 16 (g/dm^3)$ **OR** (conversion) $\frac{1000}{150}$ (1) = 6.67 (1) (6.67 × 2.4) $= 16 (g/dm^3)$ (1) **OR** (concentration =) $\frac{2.4}{150}$ (1) = 0.016 (1) (conversion) (0.016 × 1000) $= 16 (g/dm^3)$ (1)	allow correct use of incorrect / no conversion	1 1 1	AO2 5.3.2.5

Total Question 2		10

5.10.1.3 Waste water treatment

Answer 02 · Examiner comments

June 2022 | 8464/C/2H | Original Q2

Question 2

The topic of water purification was generally not well known.

02.1 Over 50% of students were able to score at least 3 marks comparing the methods of treatment of ground and wastewater to make potable water. This was for simple statements that both waters need to be filtered and/or sterilised, and that ground water is easier to treat than wastewater. The idea that both waters need to be distilled was very commonly seen, mistaking this with sea water.

02.2 About 70% of students were able to identify distillation to desalinate sea water. The most common incorrect response was filtration.

02.3 Over half of students were able to score two marks on this item, with the conversion of cm^3 to dm^3 being the most likely mark missed. 1 in 5 students gained 3 marks here.