

---

**ENVIRONMENTAL MANAGEMENT**

**8291/12**

Paper 1

**May/June 2016**

MARK SCHEME

Maximum Mark: 80

---

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2016 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.

<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

**Section A**

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(a)(i)	X placed at Equator;	<b>1</b>
1(a)(ii)	(solar energy/solar radiation/eq.) strikes the Earth's surface at a higher angle near the Equator; (solar energy/solar radiation/eq.) is spread over a smaller area of the Earth's surface near the Equator; so the heating effect is more concentrated; (solar energy/solar radiation/eq.) has to pass through a shorter depth of atmosphere nearer the Equator; less scattering and absorption by particles of atmosphere;	<b>4</b>
1(a)(iii)	it is reflected; back to space by clouds or aerosols; it is absorbed or scattered; by aerosols/gases; such as ozone;	<b>4</b>
1(b)(i)	correct reference to the orbit of the Earth; correct reference to the angle of the axis; in June the northern hemisphere receives most solar radiation when the Sun is overhead at the Tropic of Cancer/in December the southern hemisphere receives most solar radiation when Sun is overhead at the Tropic of Capricorn; the poles experience either 24-hour daylight/24-hour darkness at the extremes of the year;	<b>3</b>

<b>Page 3</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(b)(ii)	<p>long nights;</p> <p>result in little incoming solar radiation;</p> <p>low angle of incidence of the Sun;</p> <p>lead to low insolation per unit area;</p> <p>high albedo;</p> <p>reflection by snow and ice;</p>	<b>4</b>
1(b)(iii)	<p>reduced economic activity, e.g. agricultural/industrial; development, e.g. vegetation/cultivation restricted; difficulties in resource utilisation; communication difficult; transport infrastructure affected;</p> <p>challenging conditions for human habitation; development, e.g. leads to low population density;</p> <p><i>(Credit development of examples. Credit alternative examples.)</i></p>	<b>4</b>

<b>Page 4</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(a)(i)	<p>upper section more steep; vertical; largely lacking vegetation;</p> <p>some large boulders / rocks;</p> <p>middle section less steep / more gentle slope; more vegetation; debris collecting <u>at foot / bottom of slope / eq.</u>;</p> <p>ref. to earth slumps;</p>	<b>2</b>
2(a)(ii)	<p>process name: rockfall / landslide / rotational landslide / landslip / slumping / solifluction / soil creep;</p> <p>description: e.g. for landslide: a landslide is the movement of rock, debris or earth; down a slope; they result from the failure of the materials which make up the hill slope; and are driven by the force of gravity;</p> <p><i>(Credit all valid descriptions. 1 mark for name. 3 marks for a valid description.)</i></p>	<b>4</b>
2(b)(i)	<p>discolouration;</p> <p>features worn;</p> <p>loss of detail;</p> <p>vegetation growing in joints;</p> <p>crumbling;</p>	<b>2</b>
2(b)(ii)	<p>frost action / pressure release / thermal expansion and contraction;</p> <p>description, e.g. water freezes in cracks; explanation, e.g. water expands, applying a force;</p> <p><i>(Allow any mechanical weathering choice.)</i></p>	<b>3</b>

<b>Page 5</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
2(b)(iii)	<p>people descending rock stairs;</p> <p>mechanically wearing away rock surface;</p> <p>crowd gathered at foot;</p> <p>loss of vegetation;</p> <p>taking pieces as souvenirs;</p> <p>human activity generating damaging pollution;</p>	<b>3</b>
2(c)(i)	<p>monument is close to an area with high acidity values;</p> <p>acid rain reacts with stone and rock / chemical weathering;</p>	<b>2</b>
2(c)(ii)	<p>physical protection of monument, e.g. coating / canopy;</p> <p>cleaning flue gases;</p> <p>to reduce sulfur dioxide;</p> <p>use of catalytic convertor;</p> <p>introduce legislation;</p> <p>to reduce nitrogen oxides;</p> <p>switch from coal-fired power generation to renewable energy sources or alternatives such as nuclear etc.;</p> <p><i>(Credit alternative strategies.)</i></p>	<b>4</b>

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge International AS Level – May/June 2016	8291	12

Section B

Question	Answer	Marks
3(a)	<p>Description of dominance of H.E.P.            Use of data from pie chart, table and/or map.            Varying contribution of other sources.            Lack of other resources.</p> <p>Arguments for reducing dependence on H.E.P., e.g. variability of rain and periods of prolonged drought result in fluctuating H.E.P. output, consideration that it is likely to be an increasing problem in the future.</p> <p><b>please use level descriptors 1</b></p>	10
3(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> <li>• <i>to consider a range of energy sources</i></li> <li>• <i>to show an understanding of energy sustainability</i></li> <li>• <i>to use examples to illustrate.</i></li> </ul> <p><b>Indicative content:</b></p> <p>Need to reduce dependence on fossil fuels.            Details of renewable technologies and their advantages.</p> <p>Disadvantages over hydrocarbons, e.g. sustainability, energy conservation, energy efficiency.</p> <p>A balance is needed between describing a range of energy sources and evaluating their sustainability.</p> <p>Use of examples.</p> <p><b>please use level descriptors 2</b></p>	30

<b>Page 7</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
4(a)	<p>Concentric pattern. Elongated mainly east to west (orientation of main runways perhaps). Noise in other areas due to urbanisation or industrialisation.</p> <p>Plus NW/SE pattern to form cross shape.</p> <p>Could be indicative of banking of planes after take-off. Likely increased volume of traffic servicing the airport. Overlap with western portion of London major urban area.</p> <p>Effects to include likely effects on health, well-being, property values etc.</p> <p><b>please use level descriptors 1</b></p>	<b>10</b>
4(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> <li>• <i>to explain a variety of strategies for achieving noise reduction</i></li> <li>• <i>to make an assessment of their success</i></li> <li>• <i>to make reference to examples.</i></li> </ul> <p><b>Indicative content:</b></p> <p>Strategies, e.g. building design, subsidies/grants for triple glazing, land-use zoning, access roads built underground or in cuttings, tree planting, controls and restrictions on night-time activities, e.g. flights, throttling back etc., transport design.</p> <p>Use of examples.</p> <p><b>please use level descriptors 2</b></p>	<b>30</b>

<b>Page 8</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
5(a)	<p>Problems may include examples of water/land/air/noise pollution. Detail, such as nuisance to local communities, transport difficulties, damage to habitats and wildlife.</p> <p>Regeneration needed afterwards.</p> <p>Candidates may refer to other examples as well as Fig. 5.1 to support their argument.</p> <p><b>please use level descriptors 1</b></p>	<b>10</b>
5(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> <li>• <i>to suggest a variety of management strategies</i></li> <li>• <i>to discuss strengths and weaknesses of the strategies</i></li> <li>• <i>to make reference to examples.</i></li> </ul> <p><b>Indicative content:</b></p> <p>Designation of conservation areas, national parks.</p> <p>Pollution controls and regulations.</p> <p>Control of access.</p> <p>Planning policies.</p> <p>Enforcement officials.</p> <p>Education strategies.</p> <p><b>please use level descriptors 2</b></p>	<b>30</b>



<b>Page 9</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

**Section B descriptor levels:**

<b>Descriptor</b>	<b>Award Mark</b>
Consistently meets the level criteria	Mark at top of level
Meets the criteria, but with some inconsistency	Middle, mark to just below top mark
Meets most of level criteria, but not all convincingly	Just below middle, mark to just above bottom mark
On the borderline of this level and the one below	Mark at bottom of level

<b>Page 10</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

**Section B descriptor levels:**

**level descriptors 1**

**Level one, 8–10 marks**

The response:

- contains few errors
- shows a very good understanding of the question
- shows a good use of data or the information provided, where appropriate
- provides a balanced answer

**Level two, 5–7 marks**

The response:

- may contain some errors
- shows an adequate understanding of the question
- shows some use of data or the information provided, where appropriate
- may lack balance

**Level three, 1–4 marks**

The response:

- may contain errors
- shows limited understanding of the question
- shows little or no use of data or the information, where appropriate
- lacks balance

Page 11	Mark Scheme	Syllabus	Paper
	Cambridge International AS Level – May/June 2016	8291	12

**Section B descriptor levels:**

**level descriptors 2**

Responses:

**Level one, 25–30 marks**

- fulfil all the requirements of the question
- contain a very good understanding of the content required
- contain a very good balance of content
- contain substantial critical and supportive evaluations
- make accurate use of relevant vocabulary

**Level two, 19–24 marks**

- fulfil most of the requirements of the question
- contain a good understanding of the content required
- contain a good balance of content
- contain some critical and supportive evaluations
- make good use of relevant vocabulary

**Level three, 13–18 marks**

- fulfil some requirements of the question
- contain some understanding of the content required
- may contain some limited balance of content
- may contain brief evaluations
- make some use of relevant vocabulary

**Level four, 6–12 marks**

- fulfil limited requirements of the question
- contain limited understanding of the content required
- may contain poor balanced of content
- may not contain evaluations
- make limited use of relevant vocabulary

<b>Page 12</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge International AS Level – May/June 2016</b>	<b>8291</b>	<b>12</b>

**Section B descriptor levels:**

**Level five, 1–5 marks**

- fulfil a few requirements of the question
- contain a very limited understanding of the content required
- are likely to be unbalanced and undeveloped
- evaluative statements are likely to be missing
- make no use of relevant vocabulary