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**ENVIRONMENTAL MANAGEMENT**

**8291/12**

Paper 1

**October/November 2018**

MARK SCHEME

Maximum Mark: 80

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**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 International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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This document consists of **13** printed pages.

**PUBLISHED****Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(a)(i)	convergent / destructive;	<b>1</b>
1(a)(ii)	A steep slope / B gentle slope; B wider base / flatter; A higher than B; A is alternating lava and ash or more ash / B predominantly lava or less or no ash; more extensive volcanic cloud at A;	<b>max 2</b>
1(a)(iii)	<i>hazards:</i> hot ash clouds; debris flows (lahars); lava flows; volcanic bombs / falling ash; nuees ardente / pyroclastic flows;  <i>effects:</i> cut communications; damages crops / land; damages buildings / infrastructure; cause death; cause ill health / breathing problems; disrupt air travel;	<b>max 6</b>
1(b)(i)	linear pattern;  trending SW to NE;  parallel to the coast / following line of subduction zone;  some dimensions e.g. length / spacing;  eastern side of the Kamchatka peninsula;	<b>max 3</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
1(b)(ii)	Pacific Plate subducting; beneath the Okhotsk Plate; melting of leading edge of Pacific Plate; in the high temperatures in the mantle beneath; convection currents in magma; less dense magma rises; finding lines of weakness in the crust; erupting on the surface;	<b>max 4</b>
1(b)(iii)	historical records to identify patterns; seismic activity to suggest likely activity; tilt meters measure the change in the surface predicting eruption; (chemical) analysis of gases or ground water to seek evidence of increased activity; satellite monitoring to observe changes in shape and the ground;	<b>max 4</b>

Question	Answer	Marks
2(a)(i)	idea that energy is entering <u>and</u> leaving Earth's system; value of energy input equal to (or same as) value of energy output;	<b>2</b>
2(a)(ii)	49; 51(%)	<b>2</b>
2(a)(iii)	cloud droplets absorb incoming solar radiation; white surface of the clouds reflect / scatter incoming solar radiation; reducing the amount of energy reaching the surface;  transfer of latent heat / enthalpy of vaporisation; resulting from water vapour near the surface condensing water droplets in clouds; carrying energy from the water sources;	<b>max 4</b>
2(a)(iv)	greenhouse gas emissions; from industry, domestic and transport activity; relevant named greenhouse gas; (greenhouse gases) increase the atmosphere's ability to absorb and store heat; raise in global temperatures; land use changes alter the reflectiveness of Earth; correct reference to <u>albedo</u> ; relevant example of land use change;	<b>max 6</b>
2(b)(i)	<i>description:</i> N. Europe receives less total radiation; there is a greater seasonal variation in N. Europe;  <i>explanation:</i> angle of incidence of the sun much less in N. Europe; solar radiation less concentrated; angle of earth's tilt has a more pronounced seasonal effect in N. Europe; N. Europe more cloud cover / reflection by cloud;	<b>max 4</b>
2(b)(ii)	oceans have a higher specific heat capacity; solar radiation penetrates below surface in oceans; ocean currents responsible for dispersing heat;	<b>max 2</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
3(a)	<p>The break-up of Pangea supercontinent began around 250m years ago resulting in Gondwanaland and Laurasia, separated by a new ocean the Sea of Tethys. Further fragmentation resulted in 7 major land masses and the opening up of further new ocean.</p> <p>The migration of land masses/continental drift resulted in the severing of land bridges / connections. Evidence comes from the shape of the land masses, fossil remains and similar mineral deposits on previously attached land masses which are now separate such as Africa and South America.</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>please use level descriptors 1</b></p> </div>	<b>10</b>
3(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> <li>• <i>to demonstrate an understanding of the theory of Plate Tectonics</i></li> <li>• <i>to show, using examples, how it may be possible to prepare for earthquakes and volcanic eruptions</i></li> <li>• <i>to make a conclusion about the extent to which the theory of plate tectonics helps.</i></li> </ul> <p><b>Indicative content:</b></p> <p>Candidates are likely to conclude that an understanding allows predictions to be made based on past events and an understanding of the mechanisms of plate tectonics. The result is a fairly good understanding of the location of earthquake and volcanic hazards, however there are many shortcomings especially in relation to the timing of events.</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>please use level descriptors 2</b></p> </div>	<b>30</b>

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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
4(a)	<p><i>description:</i>            Land-ocean temperatures have regularly fluctuated but the long-term trend is an increase over past 150 years with a minor peak in 1940s.            Sea-levels have risen over the past 50 years with minor peak in 1980.            Credit data use and manipulation.</p> <p><i>links:</i>            Both correlations and anomalies should be observed. Candidates should show an awareness of the different time periods referred to by the different graphs.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p><b>please use level descriptors 1</b></p> </div>	<b>10</b>
4(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> <li>• <i>to demonstrate a knowledge of the likely impacts of climate change</i></li> <li>• <i>to demonstrate how and why they may affect different parts of the world differently</i></li> <li>• <i>to conclude as to the extent that the impacts will vary.</i></li> </ul> <p><b>Indicative content:</b></p> <p>Candidates will need to consider both positive and negative impacts to answer the question comprehensively. Some parts of the world will face more problems than others because of geography, politics, poverty and unequal resources. Technological skills are also likely to prove a factor in mitigation or adapting to climate change. The level of economic development of a country will determine the resources and technologies available.</p> <p>Different areas will experience better or worse growing conditions. Some coastal areas will be lost and increasing salinization will occur. Extreme weather events will increase and cause problems in e.g. hurricane prone areas.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p><b>please use level descriptors 2</b></p> </div>	<b>30</b>



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<b>Question</b>	<b>Answer</b>	<b>Marks</b>
5(a)	<p>Economic development generally leads to increased demand for food and other agricultural products from a diminishing area of land.</p> <p>Urbanisation and industrialisation can result in pollution and large areas of productive land being damaged. The processes connecting the ideas in the diagram should be discussed.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p><b>please use level descriptors 1</b></p> </div>	<b>10</b>
5(b)	<p><i>The question requirements are:</i></p> <ul style="list-style-type: none"> <li>• <i>to demonstrate an understanding of soil management strategies</i></li> <li>• <i>to show how these are often related to level of development</i></li> <li>• <i>to conclude the extent to which the view is true.</i></li> </ul> <p><b>Indicative content:</b></p> <p>Candidates will use examples they have studied to draw the contrast between LEDCs and MEDCs. They may conclude that the threats to soils are different and the most appropriate strategies therefore are different. An alternate argument would be that there are other factors than level of economic development which are more important such as climate, relief, and population density.</p> <p>The level of development will determine the types of agricultural methods used and each have their specific impacts on the soil e.g. mechanised versus subsistence farming</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p><b>please use level descriptors 2</b></p> </div>	<b>30</b>

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Question	Answer	Marks										
<b>Section B descriptor levels:</b>												
<table border="1"> <thead> <tr> <th>Descriptor</th> <th>Award Mark</th> </tr> </thead> <tbody> <tr> <td>Consistently meets the level criteria</td> <td>Mark at top of level</td> </tr> <tr> <td>Meets the criteria, but with some inconsistency</td> <td>Middle, mark to just below top mark</td> </tr> <tr> <td>Meets most of level criteria, but not all convincingly</td> <td>Just below middle, mark to just above bottom mark</td> </tr> <tr> <td>On the borderline of this level and the one below</td> <td>Mark at bottom of level</td> </tr> </tbody> </table>			Descriptor	Award Mark	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
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Question	Answer	Marks
<p><b>Section B (part (a)):</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><b>Level descriptors 1</b></div> <p><b>8–10 marks</b> The response:</p> <ul style="list-style-type: none"><li>• contains few errors</li><li>• shows a very good understanding of the question</li><li>• shows a good use of data or the information provided, where appropriate</li><li>• provides a balanced answer</li></ul> <p><b>5–7 marks</b> The response:</p> <ul style="list-style-type: none"><li>• may contain some errors</li><li>• shows an adequate understanding of the question</li><li>• shows some use of data or the information provided, where appropriate</li><li>• may lack balance</li></ul> <p><b>1–4 marks</b> The response:</p> <ul style="list-style-type: none"><li>• contains errors</li><li>• shows limited understanding of the question</li><li>• shows little or no use of data or the information, where appropriate</li><li>• lacks balance</li></ul>		

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Question	Answer	Marks
<p><b>Section B (part (b)):</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p><b>Level descriptors 2</b></p> </div> <p>Responses:</p> <p><b>Level one, 25–30 marks</b></p> <ul style="list-style-type: none"> <li>• fulfil all the requirements of the question</li> <li>• contain a very good understanding of the content required</li> <li>• contain a very good balance of content</li> <li>• contain substantial critical and supportive evaluations</li> <li>• make accurate use of relevant vocabulary</li> </ul> <p><b>Level two, 19–24 marks</b></p> <ul style="list-style-type: none"> <li>• fulfil most of the requirements of the question</li> <li>• contain a good understanding of the content required</li> <li>• contain a good balance of content</li> <li>• contain some critical and supportive evaluations</li> <li>• make good use of relevant vocabulary</li> </ul> <p><b>Level three, 13–18 marks</b></p> <ul style="list-style-type: none"> <li>• fulfil some requirements of the question</li> <li>• contain some understanding of the content required</li> <li>• may contain some limited balance of content</li> <li>• may contain brief evaluations</li> <li>• make some use of relevant vocabulary</li> </ul> <p><b>Level four, 6–12 marks</b></p> <ul style="list-style-type: none"> <li>• fulfil limited requirements of the question</li> <li>• contain limited understanding of the content required</li> <li>• may contain poorly balanced content</li> <li>• may not contain evaluations</li> <li>• make limited use of relevant vocabulary</li> </ul>		

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Question	Answer	Marks
<p><b>Level five, 1–5 marks</b></p> <ul style="list-style-type: none"><li>• fulfil a few of the requirements of the question</li><li>• contain a very limited understanding of the content required</li><li>• are likely to be unbalanced and undeveloped</li><li>• evaluative statements are likely to be missing</li><li>• make no use of relevant vocabulary</li></ul>		