

## **MARK SCHEME for the May/June 2013 series**

### **8291 ENVIRONMENTAL MANAGEMENT**

**8291/13**

Paper 1, maximum raw mark 80

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 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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## General notes

Symbols used in Environmental Management mark schemes.

/	separates alternatives for a marking point – other valid ways of expressing the same idea are also credited
;	separates points for the award of a mark
[3]	indicates the number of marks available
<i>italic</i>	indicates that this is information about the marking points and is not required to gain credit italic text is also used for comments about alternatives that should be accepted, ignored or rejected
ora	or reverse argument – shows that an argument from an alternative viewpoint will be credited
AW	alternative wording, sometimes called ‘or words to that effect’ – AW is used when there are many different ways of expressing the same idea
( )	the word / phrase in brackets is not required to gain marks but sets the context of the response for credit e.g. (nuclear) waste – nuclear is not needed but if it was described as a domestic waste then no mark is awarded
<u>volcanic</u>	underlined words – the answer must contain exactly this word
ecf	error carried forward – if an incorrect answer is given to part of a question, and this answer is subsequently used by a candidate in later parts of the question, this indicates that the candidate’s incorrect answer will be used as a starting point for marking the later parts of the question

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### Section A

- 1 (a) (i) A – ocean trench, trench **not** plate boundaries  
 B – volcano, fold mountain(s)  
 C – subduction [3]
- (ii) 1 mark for each arrow [2]
- (iii) Convergent plates = (1); subduction (or equivalent) of denser plate (1); crustal dragging produces the trench = (1); melting and loss of density produces plutons (or rising magma = (1); causing volcanoes/volcanic mountains to form = (1). [5]

- (b) Local effects would include: ash clouds possibly affecting agriculture and more distant towns, disruption of local communications, atmospheric pollution and related health risks, some may mention the melting of the ice cap and resulting flooding. DO not credit lengthy answers on lava.

Distant: spread of ash cloud, disruption to airways therefore economic effects, ash deposition, economic effect on freight transport, therefore shop prices.

Mark in levels

- 7–10 shows a good understanding of nearby and distant physical, economic and social effects.
- 4–6 shows some understanding of nearby and distant physical, economic and social effects with some lack of balance.
- 1–3 answers barely move beyond the physical effects; very poor balance and detail. [10]

[Total: 20]

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- 2 (a) (i) 1 mark for the decrease in temperature in the troposphere; 1 mark for inverse tropopause; 1 mark for increase in temperature in the stratosphere; 1 mark for correct height and distance.
- (ii) Only one mark allowed – must get both correct. [1]
- (iii) *ozone depletion* stratosphere (1)
- global warming* troposphere (1) [2]
- (iv) Award 2 marks for each: To send back information on atmospheric pressure, temperature, humidity and wind speed by means of a small, expendable measuring device called a radiosonde. To obtain wind data; they can be tracked by radar, radio direction finding, or navigation systems (such as the satellite based Global Positioning System (GPS). [4]
- (b) (i) A zone of descending air (1); producing high pressure (1); descending air warms adiabatically (1); thereby reducing relative humidity (1); therefore clear skies with warm dry conditions (1)
- Award 1 mark for each valid point. Accept valid alternative phraseology. [5]
- (ii) Air rises at the polar front (1); it cools adiabatically (1) relative humidity increases (1) to the condensation level (1); producing cloud and precipitation (1).
- Award 1 mark for each valid point. Accept valid alternative phraseology. [4]

[Total: 20]

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### Section B

- 3 (a)** The variations in soil profile that occur down the slope are largely the result of change in slope, gradient and drainage.

Soil can be eroded easily from a steep slope, but will tend to accumulate on shallower gradients.

Soil water will drain freely on steep slopes, but will take much longer to drain from shallower ones and cause water logging.

Soil drainage is relatively important in the formation of the catena; although the limestone is permeable, the permeability is reduced by soil accumulation and the steep gradients encourage movement downslope rather than through the soil. This means that many nutrients are washed downslope, along with small particles. This produces a clay soil with a neutral pH.

Partial answers or no examples – max band 3 unless of exceptional quality (up to mid B2).

8–10 mark    answers should cover the whole slope with clear references to the interaction of slope, gradient and drainage.

4–7 mark    answers should refer to the whole slope but will lack development of processes

1–3 mark    answers will be unclear about slope processes and changes to soils. **[10]**

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(b) The requirements of the question are:

- To select an area
- Assess soil degradation; natural causes and/or human activity
- Evaluate one method that sustains soil quality.

#### Indicative Content

Candidates are at liberty to select their own area, thus the indicative content is generic. In most cases soil degradation is caused by human activity triggering natural processes.

Human activity = over-farming; construction; deforestation, mining/quarrying.

Natural processes = increased surface runoff, soil erosion, increased leaching; loss of fertility; increased aridity.

One method of sustaining soils is needed and for high marks this should be well developed; and can include improved farming methods, replanting, slope management etc.

Band 1 answers will develop each requirement. The analysis and assessments should be of a very high quality and be related directly to the example. (25–30)

Band 3 answers will contain adequate analysis and assessment, perhaps loosely linked to the example. Expect some imbalance in the development of the question requirements (13–18)

Band 4 answers will be relevant but contain poor analysis and very little assessment. The analysis may not be linked to an example. (6–12)

**[30]**

**[Total: 40]**

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- 4 (a) The route through this question is to recognise that most LEDCs lack the capital in the form of personal income, education and technology to keep pollution to a minimum. Pollution is high because of the poor quality of waste disposal (hazardous/solid/domestic), lack of traffic management and polluting vehicles.

Noticeably the use of energy is seen as a minor problem either because of personal necessity or the development of alternatives to fossil fuels. Noise might simply be disregarded as an issue.

8–10 marks answers should make good use of the data and point out the reasons for percentages over 64, the lower percentages of 48 and 38, and the gradual increase in the minor problem category.

4–7 marks answers will give the table partial reference, with descriptive answers lacking in data.

1–3 marks answers will be brief and make very generalised references to the lack of development in LEDCs. **[10]**

(b) The question requirements are:

- to select suitable examples
- display an understanding of the relevant levels and types of pollution
- relate and assess the policies that aim to keep atmospheric pollution to a minimum.

Indicative content

Most candidates will select urban areas either from MEDCs or LEDCs.

Answers should relate to both sources and types of atmospheric pollution in order to assess measures. If no examples are given, max Band 3.

Measures should recognise that most effective strategies require some form of legislation at both local and regional scales.

Band 1 answers will satisfy the three requirements of the question and contain analyses and assessments of a very good quality. (25–30)

Band 3 answers will be of adequate quality. Answers may lack detail on one of the key elements or each will have superficial coverage. (13–18)

Band 4 answers will be of poor quality by being either very superficial or poorly balanced, with the better part being barely adequate. (6–12)

**[30]**

**[Total: 40]**

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- 5 (a) Short term weather forecasts rely on the construction of weather maps containing systems, pressures and wind direction. This is enabled by recordings from weather stations at sea/land/air (balloons), satellite and direct observation of: wind speed and direction, cloud cover, temperature, pressure, precipitation and humidity to be recorded. Weather maps are supported by satellite observations that assist the short term prediction.

8–10 marks answers should refer to the use of weather maps and satellite photographs to plot the changing weather conditions. There will be very good reference to the elements that need to be recorded.

4–7 marks answers may refer to weather maps but lack clarity on what is being recorded. There might be limited reference to temperature and precipitation as these are in Fig. 5.1.

1–3 marks answers will display a poor understanding of how forecasts are made and either omit the items that need to be recorded or provide very brief and superficial answers. **[10]**

(b) The question requirements are to:

- describe and explain two ways
- understand the effects human activity has had
- assess the success of two counter measures

Indicative content

Candidates can refer to: greenhouse gases, ozone, other pollutants, urban heat, deforestation etc. The prime requirement is to describe the effects on weather and climate which could include: climatic change, increased aridity or increases in precipitation, urban heat islands, pollution domes, hurricanes etc. The prime requirement is the link between the human activity and the changes to weather.

Counter measures should relate to the selected adverse effects and might include: alternative energy, policies to clean urban air, international legislation, and sustainable forestry.

Band 1 answers should cover the three requirements with very good analysis and assessment. The adverse effects and ameliorating measures must at this level be directly related. (25–30)

Band 3 answers will refer to the three requirements but there may be some imbalance. The analysis and assessments will be of an adequate quality. (13–18)

Band 4 answers will be poor in analysis and assessments. Expect some answers to be superficial or very brief and lacking detail. (6–12)

**[30]**

**[Total: 40]**



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Band	Level Descriptors	
<b>Band 1</b>	<b>The candidate demonstrates the following abilities where appropriate to:</b>	<b>25–30</b>
<b>A</b>	<ul style="list-style-type: none"> <li>select and use a very good range of accurate and appropriate knowledge;</li> <li>integrate knowledge from a wide range of areas;</li> <li>show a good understanding of the concepts involved;</li> <li>make good use of knowledge derived from personal experience and study;</li> </ul>	
<b>B</b>	<ul style="list-style-type: none"> <li>select and use a form and style of writing appropriate to purpose and complex subject matter with facility;</li> <li>communicate complex ideas clearly and accurately, in a concise, logical and relevant way;</li> </ul>	
<b>C</b>	<ul style="list-style-type: none"> <li>analyse issues and problems well and evaluate them appropriately;</li> <li>develop complex reasoned arguments and draw sound conclusions on the evidence;</li> </ul>	
<b>Band 2</b>	<b>The candidate demonstrates the following abilities where appropriate to:</b>	<b>19–24</b>
<b>A</b>	<ul style="list-style-type: none"> <li>select and use a good range of accurate and appropriate knowledge;</li> <li>integrate knowledge from a wide range of areas;</li> <li>show an understanding of the concepts involved;</li> <li>demonstrate a range of awareness of personally derived and studied knowledge;</li> </ul>	
<b>B</b>	<ul style="list-style-type: none"> <li>select and use a form and style of writing appropriate to purpose and complex subject matter;</li> <li>communicate complex ideas clearly and accurately, in a concise, logical and relevant way;</li> </ul>	
<b>C</b>	<ul style="list-style-type: none"> <li>analyse issues and problems and evaluate them competently;</li> <li>develop complex reasoned arguments and draw conclusions on the evidence</li> </ul>	
<b>Band 3</b>	<b>The candidate demonstrates the following abilities where appropriate to:</b>	<b>13–18</b>
<b>A</b>	<ul style="list-style-type: none"> <li>select and use a limited range of accurate and relevant knowledge;</li> <li>integrate knowledge from a limited range of areas;</li> <li>show an adequate understanding of the concepts involved;</li> <li>demonstrate a limited range of awareness of personally derived and studied knowledge;</li> </ul>	
<b>B</b>	<ul style="list-style-type: none"> <li>select and use a form and style of writing appropriate to purpose and subject matter;</li> <li>communicate the ideas clearly and in a logical way</li> </ul>	
<b>C</b>	<ul style="list-style-type: none"> <li>undertake some analysis of issues and problems and make a superficial evaluation;</li> <li>develop arguments and draw conclusions;</li> </ul>	

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<b>Band 4</b>	<b>The candidate demonstrates the following abilities where appropriate to:</b>	
<b>A</b>	<ul style="list-style-type: none"> <li>select and use some accurate and relevant knowledge;</li> <li>integrate knowledge from a very limited range of areas;</li> <li>show a modest understanding of the concepts involved;</li> </ul>	
<b>B</b>	<ul style="list-style-type: none"> <li>select and use a limited style of writing, appropriate to purpose and subject matter;</li> <li>communicate ideas with limited clarity;</li> </ul>	
<b>C</b>	<ul style="list-style-type: none"> <li>demonstrate limited analysis of issues and problems with limited evaluation;</li> <li>develop limited arguments and draw limited conclusions;</li> </ul>	
<b>Band 5</b>	<b>The candidate demonstrates the following abilities where appropriate to:</b>	<b>1–5</b>
<b>A</b>	<ul style="list-style-type: none"> <li>select and use some relevant knowledge;</li> <li>integrate knowledge from a very limited area;</li> <li>show a restricted understanding of the concepts involved;</li> </ul>	
<b>B</b>	When producing written communication: <ul style="list-style-type: none"> <li>select and use a very limited style of writing appropriate to purpose and subject matter</li> <li>communicate with limited clarity;</li> </ul>	
<b>C</b>	<ul style="list-style-type: none"> <li>undertake a very limited analysis of issues, problems and evaluation;</li> <li>recognise some arguments and conclusions</li> </ul>	