

**MARK SCHEME for the May/June 2014 series**

**8291 ENVIRONMENTAL MANAGEMENT**

**8291/12**

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 2014 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
- italic* 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
- volcanic 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) soil creep/solifluction. [1]

(ii) earthflow/mudflow. [1]

(iii) unfavourable geology; unstable weak upper layer of clay prone to slide; downhill dip of the rock strata; encouraging sliding; buildings; increase weight loading; action of sea; undercutting slope foot/steepening slope; lack of trees; to stabilise soils with roots; gradient.

*Award one mark for identifying a factor to a max. of two marks for a list.  
Award additional marks for development of explanation.*

[4]

(iv) heavy precipitation; saturate the clay; increasing weight of clay layer; and increasing pore water pressure/lubricate; high/onshore winds; increase wave action on slope foot; frost/freeze thaw activity; alternate wet/dry periods.

*Credit other valid alternatives.*

*Max. two marks for list. Developed points for max. three marks.*

[3]

(b) (i) Afforestation:  
roots bind soil; promotes infiltration; interception reduces run-off.

Drainage:

reduces risk of saturation; lowers pore water pressure; reduces weight of overlying soil/rock.

Slope angle reduction:

creates stable angle of rest; reduces effect of gravity.

*Award one mark per simple statement, additional mark for development. Final mark for reference to Fig. 1.2 or a well-developed point.*

[7]

(ii) cost of stabilisation method;  
value of property protected (farmland, real estate, etc.);  
suitability/likely effectiveness of method;  
environmental issues (e.g. habitat conservation);  
safety issues;  
timescale.

*Award one mark for simple statement. Award additional mark for developed point.  
Two factors required.*

[4]

**[Total: 20]**

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2 (a) (i) 10 (degrees Celsius) [1]

(ii) coldest in the north and east; reference to pole; isotherm irregularity;  
warmest/mildest in the south and west; reference to the Equator; switches direction over Spain; SW corner milder than similar latitudes. [3]

(iii) land/sea differences (different specific heat capacities);  
variations in cloud cover;  
the effect of ocean currents;  
prevailing wind directions;  
distance from sea/ocean;  
differences in air pressure patterns.

*Award one mark for simple statement, additional mark for developed point.* [4]

(b) (i) both decrease with latitude; both dip at the equator;  
but incoming > outgoing in lower latitudes → surplus;  
outgoing > incoming in higher latitudes → deficit;  
exactly balanced at approx. 30 degrees north. [4]

(ii) low, thick clouds reflect solar radiation and cool the surface of the Earth.  
high, thin clouds; transmit incoming solar radiation; they trap some of the outgoing infrared radiation emitted by the Earth and radiate it back downward.

*Credit references to absence of clouds.*

depends on several factors, including the cloud's altitude, its size, and the make-up of the particles that form the cloud. [2]

(iii) Global circulation of winds shifts heat (advection);  
ocean currents move warm water towards the pole, cold water towards the Equator;  
weather systems, e.g. hurricanes, temperate frontal depressions, latent heat transfer;  
convective heat transfer (Ferrel cell/Hadley cell).

*Award one mark for simple statement. Award additional mark for developed point.* [6]

[Total: 20]

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### Section B

- 3 (a) Description of relationship; reference to Fig. 3.1; weakness of correlation / evidence; population density; MEDC versus LEDC; level of preparedness; time of day; location / physical factors, e.g. Tsunami.

**Please use level descriptors 1**

**[10]**

- (b) *The question requirements are:*
- *to select two natural tectonic disasters*
  - *to assess the success of a variety of strategies for limiting damage / loss of life*

Indicative content:

Natural disasters may arise from volcanic activity or earthquakes, and secondary consequences of these, e.g. tsunamis, landslides, lahars.

Relevant strategies will depend on examples chosen, e.g. for a volcanic eruption: monitoring, evacuation drills, diversion of lava flows, cooling lava flows with water; zoning.

Tsunamis: early warning broadcasts on media; evacuation routes; houses on stilts; boats for evacuation.

Earthquakes: protection drills; special constructed earthquake-proof buildings (Aseismic buildings).

**Please use level descriptors 2**

**[30]**

**[Total: 40]**

- 4 (a) All three display a similar rising trend (a positive correlation).  
However global surface temperatures fluctuate more.  
Fluctuations are independent so no pattern.  
Ocean heat content fluctuates over a longer cycle than surface temperatures.  
Carbon dioxide concentrations more uniform rise.

**[10]**

**Please use level descriptors 1**

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(b) *The question requirements are:*

- *to describe and explain the likely impact of global warming on the natural environment*
- *to refer to case studies*
- *to make an assessment of impact/likelihood*

Indicative content:

Rising sea levels (coastal erosion, coastal flooding, etc.).  
 Melting ice caps/melting permafrost.  
 More extreme weather, e.g. drought, rainfall variability, hurricane activity.  
 Indirect effect on mass movements, soil development, etc.  
 Credit loss/gain of habitat/migrations/extinctions/breeding behaviour.  
 Effect on distribution of plant species/staple crops/biomes.

**Please use level descriptors 2**

[30]

[Total: 40]

- 5 It might be possible to predict the likely track of a cyclone by using the historical data. Frequency data related to ocean temperature allows you to predict the likely number of storms in a season. Limited value of the data.  
 Climatic conditions data/weather forecasting/radar tracking/satellite imagery/air pressure monitoring/sending monitoring equipment into the storm/linking size to likely destructiveness.

**Please use level descriptors 1**

[10]

(b) *The question requirements are:*

- *to describe and explain coping strategies for countries affected by hurricanes*
- *to distinguish between the strategies adopted by LEDCs and MEDCs*
- *to make a judgement as to the extent that MEDCs might prove more able to cope*

Indicative content:

Strategies discussed might include: forecasting/predicting, planning and preparation, responses such as evacuation routes, emergency services support, early warning systems, storm shelters, etc.

Options for LEDCs may be limited by resources and technology. The extent may depend on other factors than level of development such as population density, magnitude of event, political decision making, position of settlement relative to coastline, ability to recover (finances, etc.).

**Please use level descriptors 2**

[30]

[Total: 40]

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**Section A and Section B, part (a) 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>Level descriptors 1</b>
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**6–8 marks / 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

**3–5 marks / 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

**1–2 marks / 1–4 marks**

The response:

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

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### Section B:

#### 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 poorly balanced of content
- may not contain evaluations
- make limited use of relevant vocabulary

#### **Level five, 1–5 marks**

- fulfil a few of the 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