

MARK SCHEME for the May/June 2014 series

8291 ENVIRONMENTAL MANAGEMENT

8291/11

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

Answer **all** questions in this section

- 1 (a) (i) Accept between 70–80 °C. [1]
- (ii) Incoming solar radiation/short wave radiation/insolation/from the Sun; warms the Earth's surface/energy is absorbed; radiated energy warms the atmosphere close to the surface *NOT reflects*. [2]
- (iii) Upward movement inhibited by tropopause (large scale temperature inversion); stratosphere begins to warm up so can't rise because they are cooler. [2]
- (iv) Temperature or pressure decrease with height/temperature ranges from 20 to –60; with some elaboration; Ranges up to 10km; Contains the heavier gases; e.g. oxygen, nitrogen and water vapour;
Contains almost all of the Earth's weather; e.g. moisture, clouds, winds.

One mark for simple statement, second mark for development. [2]
- (b) (i) The ozone layer absorbs incoming solar radiation / from the Sun;
Notably UV radiation; UVB;
Protecting against human health problems; e.g. Skin cancers/cataracts;
Damage to plants; Damage to plankton; Other valid alternatives.

*Ignore references to global warming.
Max. two marks for the role of the stratospheric ozone layer. Max. two marks for what is protected.* [3]
- (ii) Human activity is responsible for the production of man-made chlorines;
CFCs/HCFCs/freons/halons;
Used in air conditioning/cooling machinery/refrigeration/aerosol spray propellants/
solvents/foam blowing agents (*max. two marks for list*);
UV on CFCs releases chlorine atoms;
Which break down stratospheric ozone;
Chain reaction.

Two marks for simple description of relevant activities and up to four marks for detailed explanation. [4]

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- (iii) *Support view*
 Hole grew rapidly 79–89, more slowly/stable thereafter;
 Thus the rate of ozone depletion has been reduced;
 The size of the ozone hole has reduced and stabilised/description of shape.

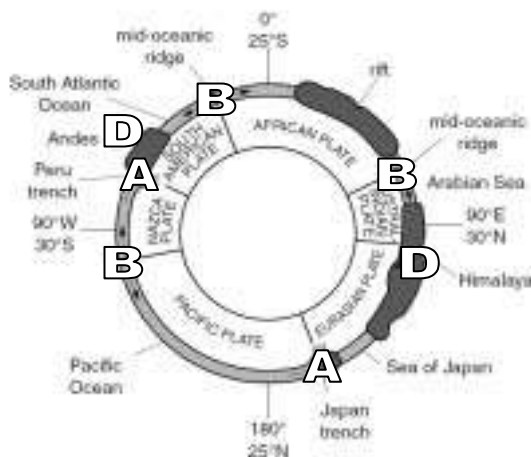
Against view
 Anomalous years 2002, 2010;
 No obvious increase in ozone as yet.

Most likely conclusion
 Appears that international agreements may have had only an initial effect and comments on extent.

Credit answers which argue either for, or against, or a balanced argument on basis of using evidence effectively from both Fig.1.2 and Fig.1.3. Max. four marks for description only. [6]

[Total: 20]

2 (a)



C

Place C anywhere within the circle where the plate names are – but not the centre.

- | | | |
|-----|-----------------------|---|
| (i) | Subduction | A |
| | Ocean floor spreading | B |
| | Convection current | C |
| | Young fold mountains | D |

One mark per correct answer. Reject if the same letter is placed more than once and shows an incorrect response. [4]

- (ii) Circulating convection (currents); in the mantle; *NOT magma alone*
 Driven by the heat; from the Earth's core;
 Resulting from radioactive decay;
 Frictional drag between mantle movement and crust;
 Rising currents → diverging (and vice versa);
 Ocean/sea floor spreading.

For four marks, there should be explicit reference to plate movement in the diagram provided. [4]

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(b) (i) Converging plates/movement by convection currents;
Subduction (of denser/thicker North American plate);
Leading edge of Caribbean plate dragged down/AW. [2]

(ii) Explosive/high pressure; intermittent; involving viscous lava; acidic/ andesitic;
High silica content; High gas content; Ash clouds; Pyroclastic flows.

Credit valid alternatives. [5]

(iii) *Prediction:* monitoring; tilt meters; gas analysis; satellites.
Preparation and planning: hazard mapping; warning systems; evacuation drills; public education; any valid response.

Up to three marks for simple descriptions/lists of strategies.
Four to five marks for clear and detailed link to impact reduction. [5]

[Total: 20]

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Section B

- 3 (a) Some concentricity: CBD at centre, poor housing around the periphery.
 ‘Spoke’ like shape of city boundaries.
 Informal markets and formal CBD in proximity to each other.
 Wealthy suburbs clustered to the south with own small CBDs.
 2 commercial zones and industrial zones – linear pattern often beside roads/rivers.
 Commuter settlements to the south and east.

Please use level descriptors 1

[10]

(b) *The question requirements are:*

- *to describe and explain a variety of effects of urban growth on a city and its surrounding area*
- *to make reference to a range of relevant examples*
- *to make an assessment*

Indicative content:

Demand for resources, e.g. energy for transport, cooking fuel etc.
 Building materials for housing.
 Loss of natural vegetation and soils to be replaced by concrete and tarmac/deforestation
 Pollution of the atmosphere from traffic congestion/airport.
 Pollution of the soil, e.g. landfill/pollution of rivers.
 Accelerated mass movements on surrounding slopes/slope destabilisation
 Marine pollution from port and the polluted rivers.

Requires some evaluation of the extent of the effects and may include an awareness of both positive and negative effects, local and regional, direct and indirect, short term and long term. No specific example/reference to the diagram would typically limit to level 3.

Please use level descriptors 2

[30]

[Total:40]

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- 4 (a) *Describe the trend*
 Uneven; upward trend from 1988 to 2004; particularly steep increase 2001 to 2004; peak in 2004; smaller spike in 1997; decline 2004 to 2009.

Outline two likely sources

industry

traffic

fossil fuel power generation

cooking and burning

construction activity

Suspended particulates form mainly as a result of human activities such as vehicular traffic/combustion; construction industry; fossil fuel power generation; cooking and burning of vegetation; photochemical reactions.

Please use level descriptors 1

[10]

- (b) *The question requirements are:*
- *to understand how air pollution can be reduced*
 - *to evaluate the relative success of a variety of policies*
 - *to illustrate answer with examples*

Lists will limit to level 3.

Indicative content:

A range of policies aimed to reduce atmospheric pollution, e.g. clean air legislation, vehicle emission controls, traffic reduction policies / car sharing / 2+lanes / alternate days.

Industrial air pollution controls, advanced emission capture technologies.

Controls on domestic cooking / solid fuel use.

Controls on deforestation / agricultural burning / rubbish tips and landfills.

Any relevant.

Please use level descriptors 2

[30]

[Total 40]

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- 5 (a) Maritime versus continental climate.
 Different thermal properties of land/ sea (sea has a higher specific heat capacity).
 Insolation penetrates deep below water surface, shallow depth on land.
 Mixing of ocean waters moderates winter temperatures.
 Presence of warm current in North Atlantic/ gulf stream.
 The role of different air masses.
 Cloud cover over ocean a moderating influence on winter temperatures.

Please use level descriptors 1

[10]

- (b) *The question requirements are:*
- *to select one area whose climate they have studied*
 - *to describe and explain the consequences of global warming*
 - *to describe and explain the difficulties of managing the issues on a global scale*

Indicative content:

Impacts likely to include rising sea levels, coastal flooding.
 More extreme weather events – wind damage, river flooding, drought.
 Impacts on crop yields (positive and negative)/ may have to change traditional crops.
 Difficulties might include the problems of achieving international agreement, because of different country's contrasting interests and priorities, e.g. emerging economies/ conflict zones/ mistrust of the science.

Please use level descriptors 2

[30]

[Total 40]

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Section A and Section B, part (a) descriptor levels:

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

Level descriptors 1

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