CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level

MARK SCHEME for the May/June 2013 series

8291 ENVIRONMENTAL MANAGEMENT

8291/23 Paper 2, 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.

CAMBRIDGE
International Examinations

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

<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

Section A

1 (a) (i) One mark for each, from top to bottom: interception, surface storage, infiltration, percolation. **[4]**

(ii) High (intensive) rainfall (1), no more interception (1), saturated ground (1), surface storage converted to runoff into the river (1).
Rain and saturated ground are needed plus two other linked and correct points. **[4]**

(iii) Credit any valid points relating to man-made changes with one mark for each. **[2]**

(b) (i) Large river (1), in a deep valley (1), valley narrows (1), steep downstream gradient for fast flow and HEP (1). Also accept: large storage capacity, no settlements. **[4]**

(ii) Award 3 marks for each issue: 1 mark for identification of an issue and 2 for its elaboration (1 for a brief statement and 2 for good detail). Issues could be physical or socio-economic and possibly derived from Fig. 1.2. **[6]**

[Total: 20]

2 (a) (i) This refers to spatial and temporal changes in plant communities as they move towards the climax (1), involving progressive soil development, dominant plant species replaced by increasing diversity of species. (1). **[2]**

(ii) This is closest to the shore; hence more wind- blown sand; it's also the earliest stage in the succession and dominated by one species (saline and aridity tolerant).

Credit two relevant points that link with the site. **[2]**

(iii) The number of species increases from 3 to 14 whilst the % marram grass decreases from 84.5 to 27; plant diversity decreases on the crests of the dunes and increases in the troughs and towards 175m.

The dunes are more mature inland; soil develops; dune crests and the shoreline are more exposed to wind; water accumulates in the troughs. A maximum of 4 marks for description/explanation only. **[6]**

(b)
- developing visitor centres: these can provide advice on the conservation area including information on access, vehicle parking etc.
- involving local stakeholders: include local conservation groups, farmers, landowners
- raising awareness: this involves education, advertising, involving people in conservation projects.

Although there are notionally 3 marks for two elements and 4 for the other, use the levels following to award the final mark.
8 to 10 mark answers will have good balance of all three elements with developed descriptions for each.

4 to 7 marks will describe all three have at least one element developed well with two adequately developed.

1 to 3 mark answers have poor coverage of the three elements or only develop one adequately.

[10]

[Total: 20]

Section B

3 (a) Agricultural land: chemical spills, fertilisers, livestock waste, storage facilities and land spreading pesticides.

Industrial area: air pollution, chemicals: storage and spills.
Oil storage tanks: fuels: storage and spills.

Urban area: air pollution, salt for de-icing streets, streets and parking lots,
Waste management: landfills.

Salt water intrusion: when sea water seeps inland above the water table.
The question is concerned with how groundwater becomes polluted and it is not necessary to expand upon composition of the pollutants.
8 to 10 mark answers will develop three ways with very good detail including the processes that occur in the diagram.

4 to 7 mark answers will develop at least one way, giving the remainder adequate treatment.

1 to 3 mark answers will be brief and although broadly relevant the content will be poor. **[10]**

(b) The question requirements are:

- to select an urban or agricultural area
- to understand the existing issues with supplying clean water
- assess the measures being used to achieve a clean water supply

Clean water supplies are achieved by a combination of: preventing pollution of water sources; having water purification measures in place and ensuring a supply to households, businesses industry etc.

For the area selected, each of these points should be developed.

Band 1 answers should contain very good references to each of the question requirements. These answers will display a clear understanding of the issues encountered in sustaining a clean water supply. There will include a wide range of methods for providing a clean water supply that are fully related to the selected area. 25–30)

Band 3 answers will be adequately developed with weak assessments. There may be some imbalance with either, the issues being better developed than measures or the reverse. There may be limited link to the selected area. (13–18)

Band 4 answers will have poor development. The detail of the answers will only be loosely tied to the selected area. (6–12)

[30]

[Total: 40]

4 (a) The size and shape of a delta depend on deposition of sediment by the river. Therefore the R. Mississippi experiences a massive reduction in sediment.
2011 shape is of an extensive 'birds foot' or lobate delta with sediment deposited both sides of the river channels. A smaller modern delta has formed at the end of the longest distributary. In 2100 the delta has withdrawn over 50 km and New Orleans is isolated.
Reasons include: upstream water extraction and river diversion along with rising sea levels associated with global warming.

8 to 10 marks answers will give a thorough description of the changes and provide detail of at least two reasons.

4 to 7 mark answers will have adequate description of the changes and may detail one or two reasons, possibly only mentioning sea level rise.

1 to 3 mark answers will be broadly relevant but lack detail on both changes and reasons.**[10]**

(b) The question requirements are to:

- use examples
- assess the effect of human activity on river water quantity,
- assess the effect of human activity on the effect on water quality

Quantity can reduce because of: dam and reservoir construction, deforestation reducing storage and causing aridity (desertification); loss of ground water and aquifer replenishment; long term loss of glacier melt water; population growth increasing the demand for water. The assessment should question whether it is just human activity or for e.g. climatic change.

Quality reduction involves increased pollution due to agricultural, industrial and domestic activity. In these cases human activity is almost entirely the sole contributor. Natural processes such as salinisation follow human activity.

Band 1 answers will be of very good quality. Both elements, quality and quantity, will have a balanced treatment with exemplar material well used. (25–30)

Band 3 answers will have adequate coverage with some bias towards either quantity or quality. Expect the linkage between human activity and natural causes to be loosely linked. (13–18)

Band 4 answers are likely to be poorly balanced with poor references to both/or either river water quality or quantity. (6–12)

[30]

[Total: 40]

5 (a) This the basic Malthusian model in which population rises slowly at first with resource provision exceeding demand; ultimately this state of well-being encourages rapid population growth. As resources have a linear increase there comes a point of crisis where the demands exceed supply.

Criticism: resources should also increase exponentially due:

- to improvements in food production, technology, resource extraction and industrial output
- population should eventually decline to a position below the resource line, only to rise again
- the model was developed in the late 18th century and cannot relate to conditions in the 21st century

Accept other valid reasons.

8 to 10 marks answers will give a description of the trends and outline the two criticisms.

4 to 7 mark answers will adequately describe the trends and outline one or two criticisms.

1 to 3 mark answers will be broadly relevant but lack detail on both trends and criticisms. **[10]**

(b) The question requirements are to:

- use examples from LEDCs and MEDCs
- show a clear understanding of overpopulation and underpopulation
- evaluate the policies that aim to reduce these issues

Indicative content:
Overpopulation is a situation where the populations demand for food, accommodation, health services, fuel and energy, land etc. cannot be met. As is appropriate to the LEDC or MEDC it is typified by: poverty, disease, lack of space, traffic and building congestion, demographic factors and high population density e.g. would be Mali, Hong Kong, Netherlands. This condition often needs a reduction or stabilisation in population.

Underpopulation is a situation where resources exceed the demand of the country. Although highly developed nations such as Canada and Australia are good examples it can also apply the some developing nations such as Brazil and Argentina. The prime factor being room for economic and population growth to better utilise resource; this furthers economic growth. This condition often needs an increase in population.

Issue reduction for:
Overpopulation: birth controls, family planning, increase resources, emigration.
Underpopulation: incentives to increase the birth rate, immigration and for some countries simply wait for natural increase.

Band 1 answers will develop the 3 requirements and display a very good understanding of each concept and how these issues may be reduced. There should be a tight linkage between the issues, their reduction and the stated examples. (25–30)

Band 3 answers will refer to the three requirements but the quality of the analysis and evaluations will be adequate. At the lower end of this band links with the examples may be tenuous. (13–18)

Band 4 answers will be of poor quality in terms of both analysis and evaluations. Expect some imbalance in the question requirements. Most answers will be brief and/or superficial. (6–12)

[30]

[Total: 40]

Generic Mark Scheme

This aims to provide a scheme for marking 30 mark answers in Section B. The marks are grouped into bands from which it should be possible to locate a mark. The assessment objectives outlined are developed out of the broad objectives for the examination and guideline for locating marks for essays.

Criterion A. demonstrates relevant knowledge and understanding applied to a range of issues and problems.
Criterion B. communicates clearly in a concise, logical and relevant way.
Criterion C. marshal evidence, draw conclusions and make evaluations.

Balance of marks for 30 mark questions; Criterion A = maximum of 15
Criterion B = maximum of 5
Criterion C = maximum of 10

Band	Level Descriptors	Marks
Band 1	**The candidate demonstrates the following abilities where appropriate to:**	**25–30**
A	• select and use a very good range of accurate and appropriate knowledge; • integrate knowledge from a wide range of areas; • show a good understanding of the concepts involved; • make good use of knowledge derived from personal experience and study;	
B	• select and use a form and style of writing appropriate to purpose and complex subject matter with facility; • communicate complex ideas clearly and accurately, in a concise, logical and relevant way;	
C	• analyse issues and problems well and evaluate them appropriately; • develop complex reasoned arguments and draw sound conclusions on the evidence;	
Band 2	**The candidate demonstrates the following abilities where appropriate to:**	**19–24**
A	• select and use a good range of accurate and appropriate knowledge; • integrate knowledge from a wide range of areas; • show an understanding of the concepts involved; • demonstrate a range of awareness of personally derived and studied knowledge;	
B	• select and use a form and style of writing appropriate to purpose and complex subject matter; • communicate complex ideas clearly and accurately, in a concise, logical and relevant way;	
C	• analyse issues and problems and evaluate them competently; • develop complex reasoned arguments and draw conclusions on the evidence	

Band 3	**The candidate demonstrates the following abilities where appropriate to:**	**13–18**
A	• select and use a limited range of accurate and relevant knowledge; • integrate knowledge from a limited range of areas; • show an adequate understanding of the concepts involved; • demonstrate a limited range of awareness of personally derived and studied knowledge;	
B	• select and use a form and style of writing appropriate to purpose and subject matter; • communicate the ideas clearly and in a logical way	
C	• undertake some analysis of issues and problems and make a superficial evaluation; • develop arguments and draw conclusions;	
Band 4	**The candidate demonstrates the following abilities where appropriate to:**	**6–12**
A	• select and use some accurate and relevant knowledge; • integrate knowledge from a very limited range of areas; • show a modest understanding of the concepts involved;	
B	• select and use a limited style of writing, appropriate to purpose and subject matter; • communicate ideas with limited clarity;	
C	• demonstrate limited analysis of issues and problems with limited evaluation; • develop limited arguments and draw limited conclusions;	
Band 5	**The candidate demonstrates the following abilities where appropriate to:**	**1–5**
A	• select and use some relevant knowledge; • integrate knowledge from a very limited area; • show a restricted understanding of the concepts involved;	
B	When producing written communication: • select and use a very limited style of writing appropriate to purpose and subject matter • communicate with limited clarity;	
C	• undertake a very limited analysis of issues, problems and evaluation; • recognise some arguments and conclusions	