

# UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

## MARK SCHEME for the November 2004 question paper

### 0680 ENVIRONMENTAL MANAGEMENT

0680/02

Paper 2, maximum mark 80

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the November 2004 question papers for most IGCSE and GCE Advanced Level syllabuses.



**Grade thresholds** taken for Syllabus 0680 (Environmental Management) in the November 2004 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 2	80	54	40	29	24

The threshold (minimum mark) for B is set halfway between those for Grades A and C.

The threshold (minimum mark) for D is set halfway between those for Grades C and E.

The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.

Grade A\* does not exist at the level of an individual component.



November 2004

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0680/02

ENVIRONMENTAL MANAGEMENT  
Paper 2



Page 1	Mark Scheme	Syllabus	Paper
	ENVIRONMENTAL MANAGEMENT – NOVEMBER 2004	0680	2

- 1 (a) (i) Provides the energy used by plants in photosynthesis, details about the process of photosynthesis, plants are the primary producers which support all animal life, provides warmth/heat that plants/animals need, supports the water cycle.
- (ii) Allows transfer of nutrients from the roots, nutrients in solution enable plants to grow, compensates for losses by transpiration, needed by crops/animals for food output.
- In general 2 + 2, but allow 3 + 1 where justified. [4]
- (b) (i) Igneous - basalt or granite  
Sedimentary - limestone or sandstone  
Metamorphic - marble or slate.
- 3 @ 1 mark.
- If the candidate attempts to give two examples for one type, both must be correct for the mark to be awarded. [3]
- (ii) Most can be used as building stone. Candidates may choose an example with many different uses e.g. limestone for making cement, as a fertiliser, as a (flux) cleaner in industrial processes (e.g. steel making) and power stations.
- One use stated can be sufficient for both marks provided that the candidate describes more fully how or where it is used, for example by naming an example of a building made from it. [2]
- (iii) It results from changes that have altered the properties of either sedimentary or igneous rocks, heat and pressure on pre-existing rocks was responsible, whereas igneous rocks are formed from new materials from inside the Earth/by volcanic eruptions.
- Two points made along these lines so that the difference is clearly established. [2]
- (iv) Loose at the surface and made up of smaller particle sizes than rock, composed of minerals, organic material, air and water, has a vertical structure to it.
- One statement about soil which could not apply to rock. [1]

Page 2	Mark Scheme	Syllabus	Paper
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(c) (i) Area of shallow water next to the land areas - or similar. [1]

(ii) Fish and minerals are the two most obvious answers.  
Others are possible such as salt and sea weed.

2 @ 1 provided that the candidate attempts to make them different (e.g. stating two types of fish caught, or naming oil and gas are not enough for both marks). [2]

(iii) All resources are more difficult to discover than on land because they are less likely to be visible and discovery is both more difficult and expensive. Some are moving resources e.g. shoals of fish and movements are difficult to predict and discover.

All resources are more difficult and expensive to obtain at or from under the sea; they have to be transported back to land to be used; weather conditions are more of a problem e.g. average wind speeds are higher at sea. Some resources are at depths beyond what current technology allows.

Some idea = 1 mark  
Fuller response = 2 marks  
Well answered question = 3 marks [3]

(d) (i) Two from

fuels/direct sources of energy,  
fossil fuels,  
non-renewable,  
formed from the decomposition of organic materials.

2 @ 1 mark [2]

(ii) Scale around frame completed with the unit = 1 mark  
Accurate plot of the three components = 2 marks  
(1 accurately plotted = 1 mark)  
Key completed for the shading used = 1 mark [4]

(iii) Possible approaches to 'All three have increased'.

- Reasons for growth in world energy consumption such as increased population, economic development, advent of the car, electricity in homes etc.
- Cheapness and ease of use of these fossil fuels in relation to other energy sources.

Why some more than others?

For the most successful answer, it will be helpful if candidate has noticed the relative growth of oil and natural gas compared with coal. Burning coal causes more air pollution and it is more expensive to mine and transport and less easy to use than oil and gas. These are the types of points that can be elaborated upon.

Credit points similar to/along the lines of those made above.

Reserve 2 marks for each part. [5]

Page 3	Mark Scheme	Syllabus	Paper
	ENVIRONMENTAL MANAGEMENT – NOVEMBER 2004	0680	2

- (e) (i) Opencast mining =1 mark  
Methods;  
excavate a surface pit,  
loosen the mineral by using dynamite,  
use diggers to put mineral in the trucks,  
take mineral loads out of the mine in trucks.

2 valid points = 2 @ 1 mark

Should the methods of mining be fully described in a logical order without opencast being named, allow the 3 marks to be reached. **[3]**

- (ii) Shows clear understanding of sustainable development = 1 mark answer.

Applied to the copper mining shown e.g. taking out a resource that is not able to be replaced naturally, causing damage to the environment by the size of the mining pit created, polluted water in the bottom of the pit. Answer making points along these lines = 2 marks. **[2]**

- (f) (i) Possible strategies listed in the syllabus;  
increased efficiency in use,  
insulation in buildings,  
recycling,  
new technology leading to alternative/more renewable sources.

The question only asks for these to be named - maximum of 2 marks for this part.

- (ii) Problems of putting them into practice;  
cost of development and application of new technology,  
new technology is often more expensive in the long term,  
cost of replacement of old machinery and conversion of old buildings,  
recycling may be difficult to organise and has energy and other costs,  
human attitude tends to be to do nothing while something else is easier and cheaper.

Further explanation is most likely to focus upon some of the problems of replacing fossil fuels with renewable energy sources.

Maximum of 5 marks for this part. **[6]**

**Total: 40 marks**

Page 4	Mark Scheme	Syllabus	Paper
	ENVIRONMENTAL MANAGEMENT – NOVEMBER 2004	0680	2

- 2 (a) (i) Plot of values - all 12 correct = 2 marks  
at least 4 correct = 1 mark  
Valves evenly spaced for the months = 1 mark  
Line drawn through the points = 1 mark [4]
- (ii) Lowest temperatures in the middle of the year - or similar to show that the question is understood. [1]
- (iii) April to October [1]
- (iv) Savanna or one of its recognised alternative names.  
(Also allow (tropical) monsoon; although not in the syllabus for climate, monsoon forest included under biosphere). [1]
- (v) Between November and March in the wet season, this is a time of high rainfall between 84 and 208mm of rain per month, crops can be planted, tended while growing and harvested. 2 points along these lines. 2@1 mark  
Mark dry season answers on their merits. [2]
- (b) (i) Highest 1120; lowest 350 = 1 mark (allow + / .Total 20) [1]
- (ii) 770 mm is the difference = 1 mark, but allow a correct answer based on values given in the first part, provided that they were reasonable. [1]
- (iii) Four years with more than 1000mm of rain is one approach to answering, but the realisation that rainfall totals were well above average in a number of years may be conveyed in other ways. Understood ( however expressed) = 1 mark [1]
- (iv)
  - Health - insect pests breed in wet times when stagnant water is present, outbreaks of malaria and other diseases are more likely, poor health reduces the farmer's ability to work and earn income.
  - Income - fields of crops may be destroyed by being flooded with water, ground too wet to allow crop growing to continue, access to fields/farm may become impossible, farm animals may be drowned.
Any 3, reserving 1 mark for health and 1 for income [3]
- (v) Dispersion graph;  
there were more years when it is drier than average than wetter than average,  
in 12 years (out of 20) rainfall was less than average,  
in the driest years under half of average rainfall occurred,  
Should the climate graph be used instead;  
virtually no rain at all/only 10mm of rain falls between April and October, for half the year no crops can be grown without irrigation.  
Points made along these lines = 1 mark  
Supported by quoting of values from graph or their use = 2nd mark. [2]

Page 5	Mark Scheme	Syllabus	Paper
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- (vi) Naming of area = 1 mark  
 Details about water collection and use - up to 3 marks depending upon amount of information. The third mark is only allowable if there is something which ties content to the area named.  
 General answers about irrigation (absence of named area or of identifiable references to one) = max. of 2 marks. **[4]**
- (vii) References to environmental damage may include;
- environmental problems from building large dams such as drowning valleys and habitat loss
  - shortage of water in streams that remain leading to more erosion / silting up of water courses
  - salination from indiscriminate water use drawing up salts to the surface as water evaporates
  - intensive farming that can lead to over-cultivation, soil exhaustion, soil erosion and land degradation.
  - The answer can be concentrated upon either one or a variety of references to environmental damage; credit mention and use of examples. **[3]**
- Any route to 3 marks based upon amount of relevant content included.
- (viii) The water is delivered only where needed around the plant, so that less water needs to be stored/used for the same output, less of the water remains unused so that salination is less likely.  
  
 Some relevant explanation of the method = 1 mark  
 Used in relation to the theme of the question = 2nd mark **[2]**
- (c) (i) Seeds are made by scientists/by genetic modification (or words to that effect),  
  
 whereas other seeds were developed from wild/natural plants.  
 1 mark for selecting from the information given  
 2nd mark for candidate showing some knowledge and understanding **[2]**
- (ii) Approximately correct division between USA and Argentina = 1 mark,  
 accurate designation of the four countries (irrespective of whether the first task was completed successfully) = 2nd mark. **[2]**
- (iii) 1% (allow up to 1.6% if shown to be measured from graph) **[1]**
- (iv) USA **[1]**



<b>Page 6</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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**(d) (i)** Scientist supporting use - examples of views which can be taken from the information given in the question.

- Advantages for food output and nutrition.
- Less need for new farm land to be cleared.
- Less pollution from chemical pesticides.

A summary might be that GM crops allow more people to be fed on less land with less damage to the environment.

Environmentalists opposing their use –

- Using plants which are not naturally created.
- This is dangerous because bio-diversity is likely to be reduced.
- Some of the claims made by those in favour such as less environmental damage and more food output have not been met.

A summary might be that GM crops are dangerous because farmers are going into unchartered areas with unproven results.

Heavy reliance on use of information as provided = 1 or 2 marks.  
Based on the information but explained more fully by stronger arrangement and understanding = 3 or 4 marks.

**[4]**

**(ii)** There is no mark for particular view expressed; all the marks are for explanation by supporting one and/or rejecting the other.

Views are expressed, but are explained by sticking close to information provided = 1 or 2 marks.

The views expressed are supported by well ordered arguments = 3 or 4 marks.

**[4]**

**Total 40 marks**