MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

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 must be read in conjunction with the question papers and the report on the examination.

UNIVERSITY *of* 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
[max 3]	the number shows the maximum number of marks available for the question where there are more marking points than total marks available
[max 3]	when part of the marks of a question must come from part of the mark scheme, this is indicated by non-bold marks showing the internal maxima for different parts of the question
	these non-bold marks are also used to show marks for bands where banded mark schemes are used
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)** credit 1 mark for each simple definition and 1 mark for an elaboration e.g. an example or process

chemical weathering: the decay or decomposition of rock in situ or a brief description of a process (1) e.g. carbonation, hydrolysis or an acid (1) **[2]**

mechanical weathering: the physical breakdown of a rock into smaller fragments usually by changes in temperature (1) e.g. freeze-thaw (1) **[2]**

(b) **(i)** credit for rocks and weathering: the rocks at the top have joints (1) that provide planes of weakness (1) allowing water to penetrate (1) and physical weathering to occur (1) detail of weathering process (1) **[max 3]**

(ii) large boulders resting on the first terrace and shoreline, larger material has the momentum to faller further and accumulate on the shoreline (1) **[2]**

(iii) credit one linked point with two marks
basal (high to low tide) erosion undercuts the slope (1), this has a knock-on effect of progressive slumping towards to the top of the slope and cliff (1) **[2]**

(c) **(i)** there are 6 marks; award 3 for description and 3 for explanation

description
credit 1 mark for each reference point i.e. vegetation linked to losses (1), slope angle shows little variation (1) and the extent of cover (1)
explanation
credit 1 mark for each linked point
the extent of vegetation cover is the critical factor (1 if stated); as vegetation prevents surface runoff (1) and the roots binds the soil particles together (1), steep slopes have low soil loss (1), therefore bare ground has the highest loss (18.0) **[max 6]**
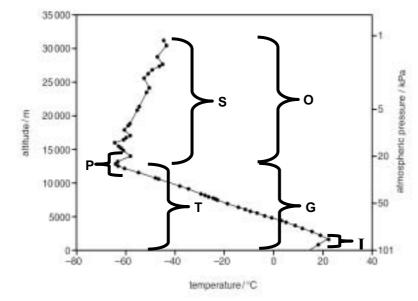
(ii) minimal and selective cutting retains the root system (1) which reduces the effects of mass wasting (1), whilst extensive clearance creates a bare slope with maximum losses (1) **[3]**

[Total: 20]

2 (a) (i)

one mark for each letter within regions shown **[6]**

(ii) credit 1 mark for a simple statement and 2 for a developed point

distance (1) from the warming (1) or radiating effect from the Earth Surface (1) and adiabatic cooling (1), if the latter is well developed award the maximum **[3]**

(iii) air pressure decreases from 1013 mb at sea level to 70 mb at 70 km (1) the atmospheric gases are particle that have mass and are affected by gravity (1) the vertical pressure gradient is balanced by the force of gravity (1) **[3]**

(b) Table 2.1

gases	global warming	ozone depletion	
carbon dioxide	yes	no	
methane	yes	no	(1)
nitrogen oxides	yes	yes	(1)
CFC's	yes	yes	(1)
water vapour	yes	no	(1)

credit on the basis of the row or pair being correct (1 mark for each row) **[4]**

(c) award two marks for each process;
the answer must be concerned with processes
answers should include: greenhouse gases in troposphere (1) absorb radiated long wave energy (1) ozone depletion is a catalytic process (1) operating in the stratosphere involving chlorine and ozone (1) **[4]**

[Total: 20]

Section B

Answer one question from this section

3 **(a)** a normal sea wave is produced by wind pushing on the windward side and low pressure on the leeward side; water particles circulate beneath the wave; produces a swell; on reaching a shore/beach the circular wave motion is disrupted through friction; ultimately resulting in a breaking wave; speed and height depend on wind speed

tsunamis are fast moving standing wave within which there is no water particle circulation; at sea they may be no more than 1/2 metre high but can travel at speeds > 50 kph.; on reaching a gentle shore friction with the sea bed causes the water to pile up to heights in excess of 20 m; thereby invading the coastline; some better candidates may mention the withdrawal of the sea prior to the reaching the shore

8 to 10 mark answers should be clear about the nature of the waves at sea and the different manner of breaking in terms of height and speed. Answers must cover the devastating effects of tsunamis
4 to 7 mark answers may focus on tsunamis, or simply relate how they break onto a shore; expect simplistic answers
1 to 3 mark answers will be very simplistic a give a few details on impact but nothing on process **[10]**

(b) the question has three requirements:
describing/explaining the effects of an earthquake close to the epicentre
describing/explaining the effects of an earthquake distant from the epicentre
an assessment of measures

suggested annotations: e.g. eff = effects; n = near; d = distant; m = measures

the question needs the use of recent examples, including Loma Prieta, Aceh, Chile; perhaps with references to historically distant earthquakes
near effects include shock wave (L waves) devastation. local tsunamis, aftershocks, urban destruction and loss of life
distant effects: on land lesser shocks with limited effects; at sea, tsunamis can be devastating
measures depend on the examples but should include: warnings; evacuation, rescue, and aid
annotations: e.g; n = near: d = distant; m = measure

Band 1 answers must select a recent example and give balance to the requirements of the question. These requirements will be. The selected measures should be clearly assessed
(25–30)
Band 3 answers will develop at least two of the question requirements. Expect some lack of detail and dislocation of effects and measures from the examples (13–18)
Band 4 answers although relevant should expand local effects but be unclear about the tapering of terrestrial effect and compounding of marine effects. Measures may have superficial coverage (6–12)

[Total: 40]

4 **(a)** distribution: China and S.E. Asia = over 150 the highest; followed by Eastern Europe, Russia, Australia, India/Nile states, W Europe and SW Asia have the lowest 0–60; Americas and NW Africa 60–100
reward answers that make accurate but generalised comment
reasons: can be: economic, social, natural environment, population density, degree of concern

8 to 10 mark answers must clearly locate area of high, medium and low urban pollution and give two reasons with elaboration
4 to 7 mark answers may give a generalised account of the distribution with weak reasoning. Some answers with less than two reasons
1 to 3 marks answers will be very general and lack detail on both elements **[10]**

(b) the question requirements are to:
understand the characteristics of air pollution in chosen examples
evaluate the measures for reducing air pollution
evaluate how the effects of air pollution are being reduced

suggested annotations: ev = evaluation; m = measures; r = reduction

measures might include: cleaner fuels, motor vehicle emission controls, chimney scrubbers, noise reduction, wider roads with greenery, waste treatment, alternative driver days
effects: hospitals and medical help, cleaning buildings, face masks; other aspects will be integrated into the appropriate measures
evaluation of the measures is required and this should be a little more than simple success or failure statements
annotations: e.g.; m = measure; ev = evaluation

Band 1 answers will satisfy the three requirements of the question. Examples will be well chosen and evaluations will be clear and justified (25–30)
Band 3 answers may contain general references to the measures used to reduce air pollution. Reducing effects may have scant reference and evaluative statements will be brief (13–18)
Band 4 answers will be brief and contain weak references to reduction methods. There will be very little evaluation, if any (6–12)

[Total: 40]

5 **(a)** candidates need to relate the changing size of the Earth's population to the other factors
as population rises (mainly 20th century), its needs are met by a steep rise in industrial and agricultural output
this causes resources to gradually decline and pollution to rise
by 2030 it is estimated that the problems associated with the decline in resource production and industrial output will accompany a fall in population.
ref. to this as a pessimistic scenario, almost Malthusian

8 to 10 mark answers will display a clear interaction of factors in the two stages outlined above
4 to 7 mark answers may omit up to two of the factors and give the interactions superficial coverage
1 to 3 mark answers may consider population change but fail to link it to the other factors

[10]

(b) the question requirements are to:

assess the extent to which MEDCs and LEDCs will meet the future demands of the populations

assess why MEDCs are more likely to succeed

select appropriate examples from both set of countries

suggested annotations: f = future needs; e.g.; e = extent

this essay is essentially concerned with the use and provision of resources for the future

natural resources are there to be utilised to provide people with food, buildings, transport, fuel and energy etc

arguably MEDCs have the wealth and technology to meet these requirements whilst many LEDCs will struggle

the question of 'extent' relates to whether or not the nation is under populated, overpopulated or at optimum population size and includes:

population size and projected growth

levels of wealth, technology and education

the amount and type of natural resources

natural inhibitors such as drought, isolation, flooding

a nations ability to steady its population growth rate

annotations: e.g.;   f = future resource needs

Band 1 answers will fully cover the question requirements with appropriate detail, assessment and use of appropriate examples   (25–30)

Band 3 answers may be poorly balanced, giving either MEDCs or LEDCs greater coverage. Balanced answers will be fairly general and be lacking in assessment and comparison (13–18)

Band 4 answers are likely to be very brief, often poorly balanced and have little or no assessment   (6–12)

[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 some 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 a limited range of 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	