CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0680 ENVIRONMENTAL MANAGEMENT

0680/21 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

1 (a) (i) Africa; **[1]**

(ii) (almost entirely) within the tropics;
on both sides of the Equator in South America and Africa;
only in Africa is it found on the Equator;
slightly greater extent in the southern hemisphere than in northern;
more detail about the distribution in one area e.g. Australia not covered within the general points above;

2 descriptive features × 1 mark each **[2]**

(iii) (Hot) desert / example of what is clearly desert vegetation such as cactus **[1]**

(b) (i) accurate plot for all 12 months;
at least 8 correct = 1 mark, all correct = 2 marks
plots linked by a line;

If bars used, maximum of 1 mark for an all-correct graph plot. **[3]**

(ii) 97; *circled (or otherwise clearly indicated to the exclusion of the others)* **[1]**

(iii) *The answer can only be taken from the temperatures,*
shows that it is hot all year / in no month does the temperature fall below 22°C; **[1]**

(iv) grasses – in the wet season they grow tall (up to 2 to 3 metres high);
whereas in the dry season the grass withers, dies down, turns brown;
trees – are deciduous with leaves in the wet season;
and then shed their leaves during the dry season;
general appearance – greener and lusher (looking well vegetated) during the wet season compared with a brown almost desert-like look towards the dry season;

Two descriptions from these; if precise, marks can be obtained just from trees, or grasses, or appearance. **[2]**

(v) *advantages*:
hot enough for an all year growing season;
minimum of 22ºC enough for many sub-tropical and temperate crops;
high rainfall and high temperatures for tropical crops to grow in wet season;

disadvantages:
very little rainfall for 7 months / only 5 months of good rains;
high temperatures mean high rates of evaporation / great soil water losses;

2 + 1 marks or 1 + 2 marks for advantages and disadvantages.
Max. 2 without reference to temperature (or rainfall, although less likely). **[3]**

(c) (i) growing crops and keeping livestock (cattle); **[1]**

(ii) crops grown in three or four small fields / plots of land;
evidence from sketch of different crops being grown;
men standing / watching their animals as they graze;
small numbers of animals / small scale of the work;
close to the living area of small circular huts;
large area of land needed for making a living;
no sign of anything modern like machinery;
evidence of other elements of traditional subsistence life such as women carrying water on their heads from the river back to the settlement;

Three points like these based on observation from the sketch; 3 × 1 mark each.

Allow a maximum of 1 mark for negative points about what is not there that would be modern, provided it is written in association with comment about traditional subsistence farming i.e. 0 marks for a list of what is not there. **[3]**

(iii) much more likely to show a pattern of large fields;
evidence in cropped areas of use of machinery / irrigation;
larger herds / flocks of animals with fenced off grazing areas;
buildings for storage of produce before being sent off to market;

Two valid ways suggested along these lines; 2 × 1 mark each. **[2]**

(d) (i) signs of soil erosion on slopes leading down to the river in right foreground;
only a small number of trees dotted around to protect the soil against rain / wind;
bare hill sides / steeper slopes in the background;
general comment about the extent of the bare exposed surfaces compared with the size of areas covered and used;
animal grazing as an activity which can lead to overgrazing;

Two points like these directly based on evidence from the sketch; 2 × 1 mark each. **[2]**

(ii) *tree planting D* – increases rainfall interception, stops heavy rains hitting the soil surface directly, windbreaks provide shelter from prevailing winds, trees break up flow patterns of strong winds sheltering the soil surface, tree roots help to hold the soil together on steep slopes.

This is the one that the majority of candidates will choose; basically it is two of the four marks, but allow 3 marks for precise and full answers.

dry land farming E – spacing plants more widely than in wetter areas; leaving land fallow every other year for moisture to build up; keeping surface rough or covered with a layer of straw during fallow;

rural development programmes F – making soil conservation part of a programme of improvement, supported by training and advice from agricultural extension services; improvements may be for water supply re-afforestation on slopes and less fertile land, soil conservation is part of changes made to increase rural output and incomes; occasionally done in association with land reform;

community participation G – planting trees on slopes for income / for use by local people; allowing local people to harvest grass and other low level vegetation from within

plantations; use as feed for animals instead of damaging grazing on forest floors; animal dung can be used as fertiliser in community used woodland;

2 × 2 marks each; allow 3:1 ratio if justified by amount of description about how it helps. **[4]**

(iii) isolation and remoteness; no sign of road links to towns and cities;
traditions and cultures; tend to do as they have always done;
both mean absence of knowledge and understanding of new methods;
often suspicious of outsiders / no tradition of cooperation;
great poverty of people; where will the money come for planting trees?;
looks like a dry area with limited new income opportunities;
very few trees left in the area shown on the sketch; not a good starting point for planting more;

Points made along these lines which are likely to be applicable to poor traditional communities in the African savannas.
3 × 1 mark each for separate problems, or 2 + 1 for including developed details. **[3]**

(iv) value of children; need for help with farm work, carrying water, domestic chores, usefulness in looking after parents when old;
strong cultural, religious and traditional reasons for having large families;
role of women in societies, arranged and early marriages;
remoteness from family planning services / absence of clinics;
lack of strong government population policy;
Credit specific references to countries such as for population policies, and to religions for attitudes to birth control.

Limited range of reasons with any elaboration limited in its amount; one problem dealt with in more detail in what is a narrow answer to the question – 1 or 2 marks
Reference to two or three different reasons; more likely to be some mention of their significance or importance. In some answers, possible mention of four or more reasons, but identification is stronger than development – 3 or 4 marks
At least three noticeably different reasons referred to and supported, either with detail about their importance or with specific references – 5 marks **[5]**

(e) (i) accurate plot *(on or slightly below the lower two double plot below 200*). **[1]**

(ii) value within range 315 to 325 mm. **[1]**

(iii) *higher years – above average*
flood risk increases – washing crops away, stopping land from being worked;
intense nature of heavy rainfall – making soil erosion, washing soil away, leaching soil nutrients more likely;
Credit references to the four really high April rainfall (320-370mm), when these problems were most likely to occur.

lower years – below average
drought risk increases – lowering crop yields, drying up pastures, in extreme cases causing total crop failures, increased risk of soil erosion without good surface vegetation cover;
reduces available water supplies for watering crops / livestock, also for domestic supplies necessitating spending more time walking for water;
Credit references to low years of rainfall with five years of 50–100mm April rainfall

Placed into general context
often marginal existence with average conditions;
several wet or dry months together can worsen the poverty cycle;

Basic points for higher and lower without much elaboration; or one aspect not really covered in the answer – 1 or 2 marks
Wider reference to problems; some progress with both higher and lower, with a feeling of understanding conveyed – 3 or 4 marks **[4]**

[Total: 40]

2 (a) (i) around the western and eastern edges of the Pacific Ocean;
although not entirely continuous e.g. off the coast of North America;
link across North Pacific between Europe and Asia;
very close to coasts of South and Central America;
east of / passing through the island chains off Asia / Australasia;

Two descriptive points such as these; 2 × 1 mark each. **[2]**

(ii) two plates are moving towards each other / converging;
(heavier) oceanic plate is sinking below the (lighter) continental plate;
sinking into the subduction zone;
where the oceanic plate is being destroyed;

Three statements about what is happening; 3 × 1 mark each. **[3]**

(b) (i) ring – because they form a circle around three sides of the Pacific Ocean;
fire – when volcanoes erupt hot glowing molten lava is emitted from the crater;

One mark for satisfactorily dealing with each part. 2 × 1 mark each. **[2]**

(ii) *Answers need to be explanatory, going beyond the descriptive statements in* **(a)(ii)**.

rock of the oceanic plate melts as it destroyed in the subduction zone;
due to great pressure and heat as the plate sinks lower / forced against the other plate, forms magma;
magma forced upwards to the surface through the vent / pipe in a volcano;
lava and other materials erupted build up to form a volcanic cone / mountain;

Three explanatory statements. 3 × 1 mark each. **[3]**

(c) (i) smoke, ash, rocks, gases (SO_2). **[1]**

(ii) authorities evacuated 3,500 people to temporary shelters in safe areas;
previous volcanic eruptions in the area (1960 & 1921) meant that the risks were known / had previous experience so that the authorities were prepared / warning systems in place / monitoring;
suggestion that not a large population in the area if only 3500 were evacuated;
suggestion that many people had already moved from the area after earlier eruptions;

Three reasons such as these; 3 × 1 mark each. **[3]**

(iii) prevailing westerly winds carried the ash clouds eastwards;

thrown out to high levels in the air (10km) which is why the winds could carry it so far / free flow of winds at high levels away from friction / relief of surface / great thickness and size of the cloud

second mark for explaining why it was carried so far
2 × 1 mark each. **[2]**

(iv) *Evidence of economic effects are:*
tourist towns in Chile for visits to the stunning volcanic scenery were empty;
airport closed at Bariloche in Argentina stopping skiers from reaching town;
airports closed in Melbourne and Sydney in Australia;

Strength of economic effects:
right in the middle of ski tourist season in Argentina; airport closure stopped arrival of high spending Brazilians at the worst time of the year;
the two Australian airports that were closed were the country's two biggest international airports, and therefore likely to cause most economic disruption;

These comments in the information suggest that the effects would appear to be more serious outside Chile; this appears to be the easier view to justify;

Mark the explanation not the view expressed.
Recognition of what is meant by economic effects / examples of economic effects without additional comment = 1 mark

Explanation with comment towards the view expressed = 2 marks **[3]**

(v) sore eyes and skin – most likely to be caused by release of gases such as SO_2;
one of the main constituents of acid rain;
OR
chest infections – reference to air pollution and falling ash probably more relevant here;
air full of choking ash and dust which people would be forced;

More general answers elaborating upon high levels of air pollution or part answers to one of the above = 1 mark. **[2]**

(d) (i) 3 or any point lower marked on the pH scale; **[1]**

(ii) recent volcanic debris; not enough time for the lava and rocks to be weathered and broken down into fertile silt soils; time is needed to create fertile volcanic soils;

climate at the tops of high volcanic mountains is worse than on surrounding lowlands; certainly colder, often more rain and snow; growing season may be too short;

closer to the volcano, the more dangerous the location in another eruption; farming efforts more likely to be destroyed again, as well as being a more dangerous place for the farmer and his family to live;

more difficult access and steeper slopes than on surrounding lowlands;

careful explanation is needed for both marks, since this is not as strong a reason as the others;

Another reason clearly / precisely stated = 1 mark
Some explanation for it = 2nd mark **[2]**

(iii) pie graph completed (with reasonable accuracy);
key to show sectors; minimum need is marked labels on graph;
overall appearance and completeness (e.g. key with boxes); **[3]**

(iv) point marked on the pH scale between 5 and 8. **[1]**

(v) well balanced soil between the three components,
has large pore spaces (sand) to allows free flow of air,
has small pore spaces (clay) to retain water,
therefore capable of retaining moisture for plants to use while also allowing free drainage,
silt often provides the nutrients as well as helping to make the soil easy to work.

Three explanatory points about good soil texture; 3 × 1 mark each. **[3]**

(e) (i) made of volcanoes – still 45 active volcanoes / an all volcanic island;
soil deposits carried from the volcanic mountains to the lowlands by erosion; **[2]**

(ii) 60 % circled or otherwise clearly indicated. **[1]**

(iii) 60 % of the country's people live in Java, yet the island is only 7 % of the total area of Indonesia.
OR
the density is over 1000 per sq. km., which is incredibly high,
merely stating / repeating it without comment on its significance is not enough for the mark. **[1]**

(iv) 11 per 1000, or 1.1 % **[1]**

(v) *Mark explanation rather than the view expressed.*
Relative comments about one or the other two not chosen are relevant, but at least two and possibly 3, or even all four of the marks are for explanation of the chosen one.

Manage the land:
Comments made about methods of soil conservation, especially those that are likely to be useful in the types of areas specified in the introduction, such as terracing and benefits from leaving tree cover for interception and retaining soil.
Weakness – still involves ever more intensive use of the land; may be too late in some areas.

Manage population increase:
Comments made about methods for doing this; possible to explain in terms of dealing with the underlying problem of increasing pressure of population for food output.
Weakness – takes time to bring the birth rate down since involves change in rural attitudes to the usefulness of children.

Promote economic development (city based):
Comments about advantages of industrial growth and its contribution to national economic development. Change of social attitude towards family size with greater income.
Weakness – transfers rural problems of poverty to urban areas, leading to and increasing the already large number of big city problems, especially housing, also public services.

Basic answer; one of two relevant points made without much explanation; 1or 2 marks
Fuller answer; more detailed development / explanation to support the chosen view; 3 or 4 marks; max 4 marks; **[4]**

[Total: 40]