UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

0680 ENVIRONMENTAL MANAGEMENT

0680/22 Paper 2, maximum raw mark 80

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UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) (i) Process of photosynthesis.
Plants absorb carbon dioxide from the atmosphere,
give off oxygen to support life on Earth.
Correct statement of the formula.

3 @ 1 mark [3]

(ii) Decay and decomposition of leaves on forest floor,
work of decomposers releases nutrients,
taken up by plant roots and reused for new growth

2 @ 1 mark [2]

(iii) Evaporation of water into water vapour by heating,
feeds the rising warm air until it cools and moisture condenses,
further cooling leads to fresh precipitation on to the Earth's surface.

2 @ 1 mark [2]

(b) (i) Canopy – possible bullet points:
- Stops the impact of heavy rain on the ground.
- Helps to prevent soil erosion.
- Reduces leaching of minerals in the soil.
- Provides a habitat for birds and animals.

Two advantages such as these – 2 @ 1 mark [2]

(ii) Tree roots – possible bullet points:
- Anchor soil / prevent it moving and eroding (especially on slopes).
- Absorb water from the soil which is transpired through the leaves.
- Absorb nutrients from weathered rock.

Two advantages such as these – 2 @ 1 mark [2]

(c) (i) Early clearances were along the coast (on both sides of the mouth of the Amazon), and in long strips following the main river valleys, whereas most recent clearances are along the southern edges, almost whole length but more extensive in east / thinner trail in far west.

Three points such as these 3 @ 1 mark, but a maximum of two marks for separate statements without establishing a difference. [3]

(ii) Likely reasons include:
Early access from the sea, using the rivers to reach inland areas and penetrate the forests, whereas recent settlement is from the south from the more populated part of Brazil (map evidence from the number of cities and label for the economic core of Brazil).
Trail of clearances in the south west going across river valleys suggest now following roads rather than the rivers in order to penetrate deep into the forests.
Some of the interior forests may be protected forest areas.

Understood, with well stated reasons for the differences – 3 marks
Suggests valid reasons without full coverage – 2 marks
Limited understanding and progress – 1 mark [3]

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(d) (i) Journey time to reach the river port of Santarem would be much reduced especially during the wet season / description of the problems on the dirt part.
Remembering that distances are massive, (1700km from Cuiaba).
Soybean and beef are important exports for the economy of Brazil.
Would open up / encourage more forest land to be used for economic activities.

Credit statement of advantages as well as elaboration. [3]

(ii) Economic reasons are strong will be the easiest view to explain:
To use more fully natural resources such as timber and extend farming area, especially in the time of high soybean prices.

One approach if economic reasons are considered to be weak would be to focus on the short-term nature of profits before environmental damage reduces the economic benefits.

Mark according to answer worth; for both marks, the explanation must be appropriate for the strength level suggested for the economic reasons. [2]

(iii) Evidence from the information given can be assembled to show the potential for great forest losses to occur, such as:
Trees have already gone from sides of unpaved sections despite the land being government owned.
Logging already dominates at the expense of the rule of law, 'Trees, not gold are the wealth of the Amazon'.
Already people are buying up land in anticipation that the road will improve access.
Roads are doing what rivers did in the past, by providing access into the dense rainforests.
Also plenty of evidence of the economic opportunities (at least in the short term) for selling hardwoods, soybeans and beef.

Comment about what could hold it back:
Greater pressure from international environmental groups.
Idea mooted for carbon payments whereby developing countries are paid to keep their rainforests as carbon stores.
Global economic downturns.
Attitude of the government of Brazil etc.

Statements from the information given, but limited or no comment towards question asked = 1 or 2 mark answers.

Valid comment about the question asked, well supported = 3 or 4 mark answers [4]

(e) Greatest biodiversity on Earth.
Elaborated upon or exemplified.

Greatest mass / highest primary productivity of any forest.
Elaborated upon by references to the mass of plants filling all manner of forest niches.

More vertical layers to the forest than in any other (4 or 5 of them).
Elaborated upon by stating examples.

Identification of relevant factor = 1 mark.
Elaboration = 2nd mark.

2 + 1 marks or 3 @ 1 mark [3]

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(f) **(i)** Using / living from natural forest resources only, cannot overuse them or it leads to starvation / loss of living.
Only a small proportion of the resources available are taken to allow natural replacement.
They move to other areas of the forest when resources are reduced.
'No forest, no living' made clear in the answer.
Further description of individual activities to show how they match these descriptions.

Three points / comments made along these lines. [3]

(ii) Provide a living / allow survival but nothing more than this.
Can't generate surpluses without over-using natural resources.
Subject to the vagaries of nature / little or nothing stored.
Only low levels of development.

OR

Being pushed out / way of life destroyed by invasion of outsiders.
As natural ecosystems are being exploited in previously untouched areas.
No resistance to diseases, superior technology etc.
Also population pressure from outside leading to larger scale / more intensive farming.

Points made like these that demonstrate understanding. [2]

(iii) Sustainable logging involves using techniques such as cutting only mature trees, isolating and felling individual trees and in some cases replacement, whereas Brazil style logging (as elsewhere) is clearing the whole forest, using the commercially valuable trees and leaving or burning the rest.

Known and understood = 2 marks
Some idea = 1 mark [2]

(iv) Ecotourism takes into consideration the natural environment and needs of local people – instead of just what tourists want.
National Parks etc, help to preserve the natural forest and its wildlife, which is what the tourists go to see.
Local people have expertise useful to tourism – drive the canoes, act as guides as well as for general tasks.
For the future of the rainforests – motto 'if it pays, it stays' so forests are more likely to be safe in tourist areas, but the returns are steady long-term as opposed to the big short-term gains from logging and farming, which make pressures for clearance difficult to resist.

Also allow critical references to ecotourism if placed in question context such as loss of traditional indigenous values.

Knowledge and understanding of ecotourism – up to 3 marks.
Comment about the broader theme of the question – up to 3 marks. [4]

[Total: 40]

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2 (a) (i) The three main parts (for the most obvious labels) are funnel, inner container and outer cylinder (allow other names and descriptions).
Other labels are possible, such as 30cm for the height above the ground.

Three accurate labels = 3 marks. [3]

(ii) To reduce / prevent evaporation of the rain water collected before it is measured, or similar. [1]

(iii) Water collected is emptied into a measuring cylinder, which is placed on a level surface such as a table top to be read.
Reading taken at eye level.

Two points such as these. 2 @ 1 mark. [2]

(iv) Best answer **D** = 1 mark.
In an open area on grass = 1 mark. [2]

(v) **A** splash back from the hard surface / also sheltered from rain by the building / cannot be partly buried on a hard surface.
B in shelter of building.
C under the shelter of trees which would block some of water.

2 @ 1 mark. [2]

(b) (i) Percentages shown with high level of accuracy = 2 marks.
At least one drawn correctly = 1 mark.
Sectors labelled or shown in a key = 1 mark. [3]

(ii) Formation.
In hot ocean areas / over the oceans near to the Equator.

Movement.
Away from the Equator towards the two tropics, towards the west (north west in northern hemisphere, south west in the southern),
Circular patterns of movement (clockwise N, anticlockwise S of Equator).

Areas affected.
Narrow coastal strips of land,
on windward / mainly eastern coasts.
Examples of areas affected.

1 mark reserved for each heading = 3 @ 1 mark.
4th mark for further detail / elaboration for any one of them. [4]

(iii) Dangers come from very strong winds and heavy rainfall causing floods,
also the strong winds piling up the waves and driving sea water inland.
Explanation why the winds are so strong and rainfall so heavy

Up to 3 marks.

Types of damage from high winds and / or flooding.
Difficult to build homes capable of withstanding high winds above 150km/hr, especially as many countries in tropics are developing countries.

Four points made along the lines suggested. [4]

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(c) (i) Landlocked – however expressed or indicated.
Reference to its latitude about 15–20° north of the Equator / in the tropics.

(ii) Well away from the ports on the coast / long road journeys through other countries.
Has to rely upon aid materials coming by air which is more expensive.
Also cannot bring in the same amounts of food and other supplies as by sea.

Three points made along these lines, with one mark reserved for each part. [3]

(iii) Temperature:
Hot all year / lowest temperature 24°C in January (mid-winter).
Highest temperature 34°C in April and May.
Annual temperature range 10°C.
Temperatures fall in the wet summer season / with the arrival of the rains.

Precipitation:
Wet season May to September / summer.
Highest rainfall 188mm in August.
Dry season October to April/May / winter.
No rain in the four months November to February.

Four descriptive points with one mark reserved for each of temperature and precipitation. [4]

(iv) Savanna (or one of the recognised alternative names), [1]

(v) Points that might be made:
High temperatures all year mean high rates of evaporation.
Complete mid-winter drought.
Therefore crop farmers must rely upon the summer rains (as there is no moisture stored in the soil).

Understood and clearly explained = 2 marks.
Some understanding = 1 mark. [2]

(vi) Unreliable means that summer rains do not always come / wide variations in rainfall amounts from year to year = 1 mark.

If the expected rains do not arrive, in particular for two or more years, the result is drought – everything dries up / crops fail in areas where it is not normally expected to happen = 1 mark. [2]

(d) (i) In Niger the drought led to deaths of people (over 3 million) and animals (70% of Fulani livestock). Emergency food aid was needed.

In Europe the drought led to reductions and losses (in farm output, and electricity) and inconveniences (not watering gardens and filling up swimming pools) but there was no mention of deaths.

Effects in Niger = 1 mark.
Effects in Europe = 1 mark.

Comment on differences / different nature clearly established = 1 mark. [3]

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(ii) Recognition that the two factors are poverty and population increase, however stated. Both needed for the mark. [1]

(iii) Poverty in Niger meant that there was nothing in reserve for dealing with the drought, which is why people and animals died. Aid was needed to alleviate its effects. Made worse by the high birth rate – population growth and more and more mouths to feed so that surpluses could be not be built up to prepare for years with bad harvests.

Contrast this with livestock farmers in France able to use stored winter fodder.
No mention of deaths and aid because shortfalls in farm output could be offset by buying food elsewhere.

Understood and clearly stated = 3 marks.
Some progress = 1 or 2 mark answers. [3]

[Total: 40]

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