UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

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

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Cambridge is publishing the mark schemes for the October/November 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 (a) (i) at least 80 per cent of the gently sloping ocean area next to the coast shaded in; [1]

(ii) flatter / gently sloping / smooth;
shallow water / less deep;

One of these or similar. [1]

(iii) from magma (from the mantle / inside of the Earth) which reaches the surface;
associated with constructive plate boundaries;
some parts built up by volcanoes / lava flows;

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

(iv) more light penetrates the water because it is shallow;
more nutrients to support plant and animal life;
some carried from the land in river sediments;
some brought by ocean currents (especially cold currents);
richest where cold currents upwell from deeps / warm and cold currents meet;
related example used;
food chain / web supporting other life in the oceans;

Points made like these which lead to effective explanation. 4 @ 1 mark [4]

(v) depth of water – cheaper and easier to exploit resources in shallow waters;
more difficult to discover deep water resources;
increased distance from shore to provide equipment and supplies for workers;

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

(b) (i) 75m tonnes; [1]

(ii) growth in demand either from growing world population;
or the value of fish in the human diet as a source of protein / food source;
improved technology for discovering fish shoals;
example of improved / larger scale methods of fishing;

Two human reasons like these. 2 @ 1 mark [2]

(iii) fish stocks are plentiful when the cold Peruvian current upwells near the coast;
cold waters rich in plankton on which anchovy feed;
shoals of anchovy migrate from coast in years when warm equatorial current from the west brings warmer less nutrient-rich water to the coast;
periodic climatic change which causes stronger winds from the west blowing the warm waters;

Understood and reasonably complete explanation = 3 marks
Outline understanding without complete explanation = 2 marks
Some understanding, perhaps misunderstandings and inaccuracies as well = 1 mark [3]

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(iv) Natural factors

- only likely if new fishing grounds in the ocean are being exploited as a result of new technology, and in sustainable quantities;
- limit to the amount of fish that the natural ecosystems can support;
- plentiful evidence of overfishing and formerly rich fishing grounds producing less such as the Grand Banks off North America and the North Sea in Europe;

Human factors

- improvements in technology for locating big shoals of fish (such as sonar), for catching fish (bigger nets and larger boats) and for preserving and processing fish caught (such as factory ships); NB some clues in later question information in part **(d)**.
- widespread evidence of overfishing strongly suggests human factors are more responsible than physical ones;

Clear conclusion with relevant supporting detail = 2 or 3 marks according to amount and quality of explanation
Comment but without a clear answer to the question or a clear answer without much support = 1 mark
Answer to question without relevant support = 0 marks [3]

(c) (i) fish stocks with fish of all ages, including young fish which will grow to maturity;
so that overall numbers will be maintained / may even increase;

Understood and clear explanation = 2 marks
Some understanding = 1 mark [2]

(ii) 17% over-fished + 8% depleted / exhausted; working = 1 mark,
answer 25% = 2nd mark;
1 mark max for answer of 77%. [2]

(iii) from the Atlantic Ocean / off the coast of Morocco; [1]

(iv) mainly near the coast of Africa (rather than Europe);
largest breeding grounds are towards the eastern side of the Mediterranean (off Libya and Egypt);
closer detail about the location of one or more of the four breeding grounds marked;

Two more general points (along the lines of the first two), or one general and one that is more local = 2 marks
Only description of separate locations for individual breeding grounds = maximum 1 mark [2]

(v) two exhausted breeding grounds off Spain and Italy suggesting overfishing has occurred; [1]

(vi) Accurate plots = 2 marks
(At least 4 correct = 1 mark)
Plots linked by a line = 1 mark
Bar graphs – 1 mark max for accurate plot [3]

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(vii) big drop in breeding age tuna between 1970 and 2005 by 130 000 tonnes;
peak was in 1975 and lowest in 2005 (by 170 000 tonnes / under one quarter);
a big drop in the 10 years since 1995 strongly suggesting overfishing;
comment about the significance of these being fish of breeding age;

3 relevant points along these lines without necessarily being the same as these.
3 @ 1 mark, but a maximum 2 marks for answers without the use (as opposed to mere statement / repetition) of values. [3]

(d) (i) differences in size and age of the boats;
local fishermen as opposed to multi-national companies as operators;
method of fishing, trapping with nets compared with large nets and hi-tech equipment;
further comment about the significance of individual differences;

Stating information from source without adaptation to question need = 0 marks
Valid difference(s) using information but without comment to question = 1 mark
Differences adapted to question need and commented on = 2 or 3 marks [3]

(ii) traditional fishermen are going back to coastal ports where catch can be monitored; whereas modern boats take the catch to fish farms in the Mediterranean without going into ports;
then loaded straight on to boats for export so that amount is impossible to control fully;

Variations on this line of argument are possible – credit answers according to validity.

Good understanding = 2 marks
Some understanding = 1 mark [2]

(iii) industrial suggests 'factory' / also commercial business practice;
'tuna ranches' in the information suggests fish farming on a large scale;
it is the type of organisation of an industry that would be expected of large companies;

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

[Total: 40]

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2 (a) (i) 50 metres (allow 46 to 52 metres); [1]

(ii) around 30 metres / a value or range between 25 and 37 metres; [1]

(iii) have buttresses above the surface / on the forest floor;
shallow root systems below;

2 @ 1 mark [2]

(iv) high density;
with four or five different layers;
plants like lianas / creepers occupy spaces between the trees;
lack of branches on trees until canopy is reached due to competition for sunlight;

hot and wet all year creating ideal conditions for plant growth;
typical temperature around 27ºC all year (well above minimum for plant growth);
high annual rainfall above 1 500mm and lack of wet season;

Two marks for 'describe' and two for 'explain', but allow three for strong explanation and weak description. [4]

(v) niche – fill spaces between the tall trees using the trees for support;
using the tall forest trees for support allows them to reach the sunlight above the mass of forest vegetation while having their roots anchored in the ground;

Full answer = 2 marks
Part answer = 1 mark [2]

(b) (i) Likely choices of habitat:
Canopy / middle and higher levels in the forest – in the crowns and among the branches where food supplies include leaves, fruits, nuts and berries; for birds such as toucans and animals like monkeys, and possible other advantages;

Forest floor – ground vegetation such as ferns, less rich food supply from plants directly but fruits, berries etc. that have fallen to forest floor; some animals are vegetarian like the tapir, many are carnivores eating smaller creatures such as jaguars and snakes;

Habitats identified and differences between them stated – up to 2 marks
Related to forest creatures present and the differences between them – up to 3 marks [4]

(ii) producers – fruit, berries, leaves;
At least two named for 1 mark.

primary consumers – toucan, tapir, monkey (also frogs, birds, butterflies and insects);
At least two named for 1 mark.

secondary consumer – jaguar (also snakes, insects and birds, only if specified such as birds of prey);
One named for 1 mark.

Fourth mark for completeness and accuracy of the food web overall with arrows used to link the different layers from producer to primary consumer to secondary consumer – 1 mark.
4 @ 1 mark [4]

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(iii) consume both plants and animals / wide variety of available food sources;
Indian tribes hunt, fish and collect and gather forest products / hunter-gatherers;
humans have the technology / know-how to kill creatures and use all food sources;

Understood and well explained = 2 marks
One or more points made to show some understanding = 1 mark [2]

(iv) the decomposers; [1]

(c) (i) plate tectonics / continental drift; [1]

(ii) at the destructive margin where the Indian plate meets another plate (Eurasian Plate);
sediments folded up / rocks melted in the subduction zone cause volcanic activity;
led to formation of the Himalaya (if 'where' is answered from knowledge);

Two points along these lines. 2 @ 1 mark [2]

(d) (i) diversity of species found nowhere else on Earth;
seen as part of the great natural biodiversity that exists on the Earth's surface;
explanation of the importance of this biodiversity to people – plants as a genetic pool for crops, for medicines etc.;
comment about the long term advantages of keeping the natural forest and species as opposed to the short term financial advantages from mining and logging;
losses destroy local food chains and webs;

Answer remains close to what is already provided in the introduction to the question; a little explanation beyond is likely to make the answer worth two marks instead of one. 1 or 2 marks
Explanation is developed in relation to the importance of biodiversity and / or advantages of maintaining rich and varied ecosystems, especially those that are unique as in Madagascar. 3 or 4 marks [4]

(ii) IUCN – The World Conservation Union;
link organisation between governments, government agencies and many different non-governmental organisations;
its slogan is 'The Green Web';

WWF – World Wide Fund for Nature;
uses the slogan 'taking action for a living planet'; Charity / NGO funded by supporters focuses on conservation of wildlife and their habitats, as well as the wider implications of man's activities on the environment;
funds particular conservation projects of endangered species such as tigers in India;

CITES – Convention on International Trade in Endangered Species of Wild Flora and Fauna;
an international agreement between countries to ensure that the international trade in specimens of wild animals and plants does not threaten their survival;
high profile examples include trade in elephant ivory and rhino horns;

Description of work showing
basic knowledge = 1 mark.
fuller description = 2 marks.
Description showing a good idea of work undertaken = 3 marks. [3]

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(e) (i) Tourism that is environmentally and ecologically sound, i.e. it takes into account needs of natural environments, habitats and species as well as local communities, ensuring that their ways of life and traditions are maintained.

Some understanding – perhaps the environmental without the social = 1 mark
Well understood and stated = 2 marks [2]

(ii) tourists will only come if the forests and their wildlife are preserved since these are what they are coming to see / the attractions;
results in protection from hunting / forests patrolled and guarded;
by giving local people income and involving them, they become less likely to clear the forests and capture animal species;
they are very poor people and need an income to stop them doing this;

Two points made along these lines. 2 @ 1 mark [2]

(f) (i) forests are carbon stores, trees trap carbon dioxide as part of the process of photosynthesis, when cleared and burnt the carbon dioxide is released into the atmosphere contributing to the 'greenhouse effect' and global warming;

locally, forests contribute to high rates of evapo-transpiration which maintains water sources in the atmosphere for condensation and rainfall;

(ii) possible advantages – developing countries receive an income / foreign exchange, instead of selling logs, mining and using the land for agriculture, all of which involve forest clearances – with all the advantages that maintaining natural forests brings globally, financial incentive for governments to conserve forests will exist;

possible disadvantages – may be difficult to monitor with much clearance continuing because many of these areas are not under direct government control, also existence of corrupt local officials, money may also be siphoned off by corrupt politicians, perhaps unlikely that local people will see any financial benefits;

Only general comment throughout with little development for either description or explanation. One part may be a lot better answered than the other = 1–2 marks.
Fuller responses, meaningful description and explanation, perhaps a lack of balance in the strength to the two parts = 3–4 marks.
Full responses and well balanced = 5 marks. [5]

[Total: 40]

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