CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0680 ENVIRONMENTAL STUDIES

0680/23 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.

General notes

Symbols used in Environmental Management mark schemes.

/ separates alternatives for a marking point – other valid 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) Close to/around/both sides of the Equator, or in the tropic
largest extent is in South America/Amazon Basin;
in Africa it is on the western side of the continent/Congo
in Asia islands and coastal areas of mainland in SE/Indo
in Australia narrow strip along the north east coast;
a smaller more local named example not covered by Madagascar;

Three descriptive features of distribution from the map; 3

(ii) *Hot all year*
lowest temperature 24°C;
all temperatures within the range 24-26º/only 2ºC annual range;
constantly high temperatures/hot in every month without much change;
no hot and cold seasons as in areas outside the tropics;

Wet all year
lowest precipitation in any month is 53 mm;
slightly drier in Dec–Feb but still some rain/rain even in the drier season;
very wet every other month with between 114 and 218 mm per month;
general comment about the uniformity in line with question;

Minimum 1 mark for each of temperature and precipitation.
Otherwise 4 × 1 mark **[4]**

(iii) *Evergreen appearance*
hot and wet climate allows growth all year/no season during which all trees need to lose their leaves at the same time;

Large plant biomass
hot and wet climate provides the best growing conditions in the world; most ideal climate with all that plants need for growth all year;

Rich plant biodiversity
species rich because there are no climatic limits to growth as in other biomes;

Distinctive forest layers
heat and rainfall allow canopy tree species to grow tall and reach the sunlight, leaving space for other species to grow in lower parts of the forest;

Three statements such as these linking climate to rainforest characteristic; more than one mark per characteristic is possible;
3 × 1 mark **[3]**

(iv) species which occupy a position in the forest where the survival exist = *1 mark for understanding, however expre*

obvious tropical rainforest examples of niche speci parasites. For other species less unique to rainforests s the ecological niche they occupy need to be given = *1 m*

Details relating to the named example may allow the already done so for the attempted definition.

(v) other tall tree characteristics;
straight/long/slender trunks;
thin smooth bark;
canopy/branches concentrated at top;
buttress roots;
leaves with drip tips/broad leaves;
leathery leaves;
deciduous habit;
species of trees widely dispersed;

Any three: 3 × 1 mark **[3]**

(b) (i) species-rich with more than half of Africa's wild plants and animals; **[1]**

(ii) **u**nsustainable
roads built through untouched forests for loggers and miners, both predatory activities extracting resources out of the forests. Driven to cut down and extract even more by the great demand and high world prices;
over-hunting is leading to threat of extinction of several monkey species;
even if the types of farming being practised are sustainable, the fact that farmers are under pressure to produce more and more to feed the growing population, leading to further forest clearances is important;

sustainable
e.g. small-scale subsistence shifting
cultivation and logging done selectively, but there is no evidence in the report of these;

the result of the unsustainable predatory nature of the activities that is that about four million hectares of forest being destroyed every year;

Question answered, but with limited support; explanation may be confined to just one of the human activities mentioned; there may be repetition of the main message on the theme of non-sustainability (1–2)

Better supported answer referring to a range of human activities (3)

Sound explanation which includes overall comment stressing the high degree of non-sustainability suggested by the report's contents (4)

[4]

(c) (i) Cameroon
Gabon answers mark on their merits.

(ii) *All the marks are for reasons why forests are at greater ri*
Reasons based on information provided:

Population: more people and higher density of populati therefore more population pressure to clear the land for f resources.

Economic: Cameroon suffering from economic decline, with a low income per head – therefore economic advantages from clearing the forest likely to be more attractive than in oil rich Gabon where average income per head is more than six times greater than in Cameroon.

Logging: much illegal logging in Cameroon compared with selective logging in Gabon – therefore uncontrolled / indiscriminate forest destruction is taking place in Cameroon, whereas only one commercially valuable tree is being taken from forests in Gabon, suggesting that the rest of the forest is left untouched and logging is controlled by the authorities.

States information which supports the choice of Cameroon, but with little or limited explanation of its significance. Alternatively, may concentrate only upon using just one of the reasons for explaining the choice.

If Gabon is chosen, speculation about why forests might be under more pressure at some time in the future after more tropical rainforests have gone. Gabon answers are unlikely to progress above this level. *(1–2)*

Two or more reasons are used and well explained, so that the answer makes clear why forests in Cameroon are at greater risk than in Gabon. *(3–4)*

[4]

(d) (i) A Preserves tropical forests;
and many of the habitats as well;
much of the ecosystem can continue to function in a

B eliminates the shade given by the tall/canopy trees;
more chance of heavy rain reaching the ground/soil;
loss of animal habitats/less variety of habitats;

1 mark each for a brief relevant comment, along the lines marks

3rd mark awarded for fuller/more precisely stated answers = 1 mark **[3]**

(ii) *biological reasons*
higher rates of pollination due to presence of large number of midges,
no need to add chemical pesticides as the cocoa trees suffer from little disease,
it is benefiting from having much of the original forest around them which is still a working ecosystem

methods of farming
a variety of crops are grown in **A**, not just cocoa and nothing else as in **B**,
B needs more use of chemicals including fertilisers because of monocropping,
and pesticides because cocoa plants are subject to a variety of disease without the natural controls in **A**,
B is an example of more specialised commercial farming on a larger scale.

Points made along these lines placed under the appropriate heading; 4 × 1 mark
Expect 2 + 2, but allow 3 + 1 or 1 + 3 if the quality of the one of the answers justifies claiming one of any marks unused. **[4]**

(iii) much higher output of cocoa per hectare from **B** / or use of figures which show this. **[1]**

(iv) the information is useful in suggesting reasons – cocoa trees are productive for only 10 years; constant replacement is needed so that trees planted before 2000 will be producing less if they have not been replaced.

also cocoa plants are vulnerable to a variety of diseases; perhaps this explains falling yields. It could also be suggested that diseases have become resistant to the chemical pesticides used.

another valid suggestion would be decreasing soil quality, from monocropping and from the effects of more of the heavy rains reaching the surface without the forest canopy as protection.

Two valid reasons, or one reason elaborated upon so that it is well explained = 2 marks. **[2]**

(e) (i) fluctuation in world price/price goes up and down
best values to support this are peaks and troughs
e.g. 2003 2500 compared with below 950 in 2000 and 20

steep rise in prices from 2008 to 2010/highest ever price
values e.g. from 1500 in 2008 to almost 4000 in 2010
e.g. 2010 price 4000 compared with 950 in 1990

Identification of each of these two main characteristics; 1
Using supporting values; 1 + 1 marks = 2 marks

2 + 2 marks

Some will try to use minor characteristics relevant to only part of the graph, for example five years of similar values between 1993 and 1998. Mark each choice on its merits to a maximum of 1 mark, provided that there are supporting values for the identification. **[4]**

(ii) Fluctuations in world prices – related to supply and demand. For this it might be more variations in supply, such as poor harvests in a main producing country due to bad weather or spread of disease, or political instability.
Also reduction in output as was referred to for the Ivory Coast, the world's largest producer of cocoa, probably because of inadequate replacement of old trees.

Record high world prices/big price increase since 2008 – also related to supply and demand. The same factors apply as for fluctuations. Additionally it could reflect significant growth in world demand.

Two points made along these lines; 2 × 1 mark **[2]**

[Total: 40]

2 (a) (i) ***a***rrow heads to show the plates moving towards each oth

(ii) C on diagram placed so that is clearer that the actual crat

2 × 1 mark

(iii) **D** – mantle;
E – mountain range/fold mountains;

2 × 1 mark

(iv) *volcanoes:*
friction causes destruction of rock in the subduction zone;
rock melts to form magma which forms emissions from the volcano;

earthquakes:
great friction/forced movement of rock against rock in the subduction zone;
leads to movement underground which causes waves at the surface;

At least one specific point for volcanoes and earthquakes must be included
1 + 1 mark
3rd mark can come from another of the specific points above, or from more general comment about what is happening in the subduction zone.

3 × 1 mark **[3]**

(b) (i) focus is the point of origin of the earthquake underground; while the epicentre is the point where it first reaches the surface/where shock is the strongest on the surface;

1 mark for valid definition of only one for them, or imprecise definitions for both.
*2 marks for accurate definitions of both which show clearly that the difference is known.***[2]**

(ii) greatest in the centre with buildings almost totally destroyed,
compared with some obvious, but less than total, damage to buildings further away, while further away still buildings are little affected so showing declining effects.

force of the earth tremor decreases away from the epicentre,
in centre fire damage from disruptions to gas and electricity supplies add to the scale of the damage and destruction.

Minimum 1 mark for how (description from diagram), and 1 mark for why.
3 × 1 mark **[3]**

(c) (i) the strength of a 7.1 earthquake is many times greater th

(ii) focus 4 km below surface compared with 10 km – close effects on the surface

epicentre 5 km from the city centre compared with 40 tremors was closer to where there were more businesses

time was during the day on a weekday compared with d meaning that people were in offices, at work, on the stree

general point that recovery from the earlier 7.1 shock was not complete; already damaged and weakened buildings were more likely to collapse even in less strong earthquakes.

4 × 1 mark for state and explain.
Use give and take for reasons stated without explanation e.g. 2 marks for stating depth of focus, position of epicentre, time of day and severe aftershocks without any worthwhile explanation.

5th mark for good quality/precise explanation when explaining at least two of the reasons. **[5]**

(iii) Best answer is 'highly unlikely' because of:
lack of resources (to pay off the house owners);
lack of organisation to create and enforce zone of no housing;
lack of government interest; in developing countries governments often have other prioritise, or are too corrupt, or take the attitude that people should help themselves, or rely on aid providers from outside;

Either two different reasons suggested = 2 × 1 mark
Or one reason suggested and explained in reasonable detail = 2 marks **[2]**

(iv) many earthquakes since September 2010 – almost a year later in June 2011 there was still an average of 20 aftershocks per day; February 2011 earthquake had shown how strong and damaging aftershocks can be.

all the signs that the plate boundary/faults are going through an active phase of almost constant movements;

feeling that hope had disappeared; people had become nervous and frightened; worn down the persistence and shocks of the quakes; convinced them that there was little point in staying;

time to move; government giving them the value of their homes meant that they had the money to buy another house in a safer part of the country;

despite the fact that people are always unwilling to move after a natural disaster because it means leaving jobs, friends, businesses, everything familiar;

Reasons suggested such as these. One reason well developed could be enough for all 3 marks. Mark on the basis of either range of reasons, or development of reasons, or both. **[3]**

(d) (i) 85%;

(ii) bar graph for water-related diseases in the world
plots all correct = 2 marks
(One or more correct = 1 mark for this bar)

bar graph for deaths from natural hazards
flood and drought separated out = 1 mark

key – four boxes filled in with shading/colouring to mat
labelled flood, drought, landslide and disease epidemics = 1 mark. **[4]**

(iii) Floods make up half the water related disasters, but almost half the deaths from natural hazards occur in droughts;
Or droughts are responsible for 42% of all deaths, but make up only 13% of the number of water related disasters;

Understanding shown based on using the percentages, however expressed. = 1 mark **[1]**

(iv) meteorologists able to forecast when heavy rain is likely to fall,
easier to receive warnings downstream about rivers flooding because it take time for flood waters to reach lowland areas,
in some places/climate wet season rainfall is always heavy so that there are regular floods which people are used to dealing with.

droughts occur in places where the rainfall expected does not fall,
it is almost impossible for meteorologists to forecast that rains will not arrive before the time for the wet season beings,
often if rains arrive late there is not enough time to plant and grow that season's crops.

droughts have knock-on effects for people who are poor, especially subsistence farmers who do not have sufficient stores of crops or enough surviving animals to keep them going during the season. Worse when there are several consecutive years of lower than average rainfall. Poverty cycle worsens.

droughts can cover a wider area/be of a greater extent than floods.

illustrated by references to well known drought prone areas such as the Sahel and Horn of Africa.

Outline answer simple points relevant to floods or droughts or both, but without being developed into a more effective answer. (1–2)

Fuller answer; relevant points more fully developed, or a wider range of pertinent points made. Answer might be enhanced by referring to an example of a drought prone area and why so many people become ill and die. (3–4)

[4]

(e) (i) **m**alaria:
female (anopheles) mosquito is the vector (carrier) for m
breeds in stagnant water in swamps, ponds and lakes;
bites people at night and sucks blood;
when it bites a person whose blood contains the malaria
it transfers the disease to next person it bites;
thousands of tiny parasites pass through the person's blo
where they multiply so that after about two weeks the
fever;
they continue to multiply until people without immunity or

cholera
people drink or eat contaminated water or food;
it is an intestinal infection;
which causes diarrhoea;
leads to rapid dehydration and death if not treated;
easily spreads from food touched by one contaminated person to another person;

4 points made for chosen disease **[4]**

(ii) malaria:
more likely after floods because of plentiful standing surface water;
also possible after earthquakes from leaks from broken water pipes;
more places for larva to pupate and increase the numbers of mosquitoes;
floods may be in areas where it is not normally so wet that immunity levels in the local population are lower than elsewhere;
in the distribution in the aftermath of a disaster protection against/treatment of the disease are likely to be less easy;

cholera:
earthquakes cause broken water pipes so that fresh/clean water supplies are disrupted;
can also break sewerage pipes leading to surface contamination/mixing with water supply;
water flooding everywhere washes away and carries sewerage from works and latrines,
normal water supply may be contaminated in flood waters without people living further away realising;
disruption in the aftermath of the disaster sometimes means people living close together in emergency camps;
makes it easy for the disease to spread from person to person;
inadequate medical resources to treat it in time in the aftermath of the hazard;

Three points such as these relevant to the chosen disease and the context of after a natural disaster; 3 × 1 mark. **[3]**

[Total: 40]