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

0680/21 Paper 2, maximum raw mark 80

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UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) (i) Moving apart / away from each other towards west and east; [1]

(ii) Constructive / diverging; [1]

(iii) At this plate boundary / as plates diverge magma reaches the surface.
New material from mantle / interior of the Earth.
Eruptions of lava are frequent / regular.
Usually non-violent outpourings of runny lava / basalt.

Two points made along these lines = 2 marks [2]

(iv) Geothermal power named.
Description about how it is obtained – up to all 3 marks.
Surface sources of hot / boiling water such as hot springs taken in pipes and used to heat buildings and homes.

Any route to three marks [3]

(v) Plates are moving together which makes it a destructive boundary.
Eurasian plate is crashing up against Indo-Australian / African plates.
One plate (oceanic plate) is destroyed in the subduction zone.
Great friction / pressure as rock is forced to move against rock.
Creates shock waves underground felt at the surface as earthquakes.

Possible to use a sketch to show some of these points, equally valid.
Four points made along these lines. [4]

(b) (i) To stop buildings from collapsing:
Steel frames, damping and bracing systems, foundation piles of alternate layers of steel and rubber, good quality building materials, checks made that builders are sticking to standards set, low rise buildings.

(ii) To reduce number of deaths after the quake:
Train specialist emergency and rescue teams ready for immediate action, sniffer dogs, stockpiles of emergency supplies such as tents, blankets, drugs and drinking water, drills and people educated in advance about what to do.

Other points can be considered if relevant and precise.
Credit both separate and developed points.
Min 2, max 3 for each part, but in exceptional circumstances allow 4:1. [5]

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(c) (i) Usually impossible to know exact numbers of dead.
Variety of reasons for this such as buried bodies not recoverable, chaos/confusion and remoteness of the location.
Larger the earthquake / casualties then the less the chance of an exact number.

Points made along these lines 2 @ 1 mark [2]

(ii) Indonesia and Iran. [1]

(iii) Not regular / uneven pattern / haphazard.
Some years with none (e.g. 2000, 2002, 2007),
One year with three (2005).
Gaps between them within a year variable as well / sometimes consecutive months.
Concentration in the years 2003–06.

Two descriptive points such as these [2]

(iv) No reliable chance of people predicting when and where, but it shows that some places along the boundary are more at risk of activity, although anywhere along the boundary remains at risk.

General conclusion stated = 1 mark
Elaborated upon with table evidence = 1 mark [2]

(v) Evidence for this includes:
The strongest (Indonesia 2004) had greatest loss of life.
Two other strong ones (7.9 and 7.6) had big losses of life.
Least strong (Iran 2006) had smallest loss of life.

Evidence against this includes:
Only 1300 dead in the second strongest.
Third largest loss of life (Iran 2003) was among least strong.
It and another at 6.5 varied greatly with loss of life (30,000 and 300).
Wide variations in deaths for earthquakes between 6.0 and 6.5.

Points made along these lines.
General point = 1 mark Supported by comment to appropriate references = 2 marks.
Min. 1 and max. 3 for each of 'for' and 'against'. [4]

(vi) Stronger for the earthquakes of greater strength above 7.0 than those for below.
There is definitely an element of truth in it but with wide variations, mention in passing of factors that might matter more than strength such as location, preparedness etc.

View with some support = 1 mark
Well supported view = 2 marks [2]

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(d) (i) Nineteenth.
Many of them, with six in a 50 year period in the middle of the century.

Twentieth.
Only two of them, with long gaps between eruptions (34 years, 38 years and 56 years).

Weakly stated difference / unsupported / very one sided = 1 mark.
Well supported difference stated = 2 marks. [2]

(ii) Fertile soils or its equivalent such as minerals in an agricultural context. [1]

(iii) Realisation that they are all ways of monitoring changes to give as early a warning as possible of a full eruption. 1 mark.

Further descriptive comment such as:
Seismograph and tiltmeters record physical movements / changes.
The other two are more to do with heating up and signs of increased activity.
Comment about how either of these are useful indicators.
Earthquakes sometimes trigger off volcanic eruptions.

2 points made = 2 marks
Overall 1 mark + 2 marks [3]

(iv) Increase in activity may not lead to a full eruption / all the activity may be confined to the crater.
Volcanoes (especially those on destructive margins) are unpredictable.
Pressure building up inside the volcano may have no external signs with an eruption that is sudden and violent.

One worthwhile suggestion = 1 mark.
Fuller elaboration, or wider range of suggestions = 2 marks. [2]

(v) Easy?
Italy is one of the rich developed countries; developed countries have the money to make advance plans and train people to put it into effect.
There is a plentiful transport system of roads, railways, private cars.

Difficult?
Massive logistical problems in trying to move those numbers of people in only a short period of time; and to where?
Problems of persuading people to leave before an actual eruption begins.
Reasons for people's reluctance to leave homes and possessions behind, such as fears from looting etc.
Many people will believe that the volcano will not affect them.

Comments made along these lines, for any answers from all easy to all difficult. No need to address both sides for full marks.
Some comment but not developed – points mentioned rather than explained = 1–2 marks.
Fuller comment showing wider appreciation = 3 marks. [3]

[Total: 40]

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2 (a) (i) Correct plot = 2 marks.
One segment correct = 1 mark.
Completing the key (provided that the graph is attempted) = 1 mark. [3]

(ii) Water vapour
This is the source for cloud formation and precipitation in the atmosphere (water cycle). Water is needed for plants (the producers) to grow and to keep both animals and humans alive. Water is lost by transpiration and perspiration.

Carbon dioxide
Soaked up by plants for photosynthesis; plants are the producers upon which consumers depend, herbivores directly and carnivores indirectly, and they release oxygen – also it absorbs heat radiated from the surface and stops the Earth cooling down massively on a night. Without it, the Earth would be much colder and lifeless.

Ozone
Located high in the atmosphere, it absorbs ultraviolet rays which would otherwise harm plants, animals and humans (e.g. skin cancer).

Minimum 1 mark, maximum 3 marks for each of these.
Otherwise any combination / route to the 6 mark total. [6]

(iii) Through various cycles and energy flows,
e.g. carbon cycle: from intake of carbon dioxide by green plants to decay and respiration by plants and animals, e.g. nitrogen cycle from use by plants after the work of bacteria in root nodules to death, decay and excretion from plants and animals, return to atmosphere by dentrifying bacteria.

Basic idea or mention of cycle(s) without use = 1 mark.
Elaboration or exemplification = 2 or 3 marks. [3]

(b) (i) Line drawn linking tops of bars to show trend. [1]

(ii) Before 1960.
Steady (but persistent) increase.
Increase of 140 billion tonnes in 100 years.

After 1960.
Noticeably faster increase.
Larger increase of 200 billion tonnes in just 40 years.

Trends without fully establishing the difference = 1 mark.
Trends with difference emphasised = 2 marks.
Emphasised trends supported by use of values = 3 marks. [3]

(iii) 'Thicker layer' / greater concentration of carbon dioxide in the upper atmosphere.
More radiated heat trapped while incoming sunlight stays the same.
The greenhouse effect, accelerating a natural process to increase average world temperatures by about 0.8°C between 1900 & 2000.
Carbon dioxide is just one of the greenhouse gases along with methane, CFCs and nitrogen oxides.

Three points made along these lines. [3]

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(c) (i) Together they account for about half of total world emissions.
China responsible for slightly more carbon dioxide emissions than USA, but much lower amount per head than in USA.
Per head consumption in USA is 4 times greater than in China.

Three of these. [3]

(ii) Many industries owned by American companies have moved to China.
They have taken their carbon emissions with them.
Goods made in Chinese factories are exported and sold in the USA.
Moving emissions to China has left the USA a cleaner place.
Any further comment about the reasons for this movement.

Three points made along these lines. [3]

(d) Order of infilling for the boxes:
Rising sea levels.
Sea defences breached.
Flooding of low lying coastal areas such as deltas.
Previously populated areas abandoned.

All placed in the correct order = 3 marks.
2 or 3 correct = 2 marks.
1 correct = 1 mark. [3]

(e) (i) Nowhere on the Maldives is above 2.4 metres above sea level; unlike other countries, there is no place to retreat away to avoid rising sea levels, and its income heavily dependent on tourism will just disappear.

Some understanding = 1 mark.
Well understood including comparative mention with other countries = 2 marks. [2]

(ii) Only answer easy to justify is totally true if climate change is due to the enhanced greenhouse effect. This is because industries and transport in developed countries have mainly been responsible for the emissions, the USA in particular, many of which have been reluctant to adopt measures for a reduction. Also relevant are references to recent and likely future increases in China and India.

OR

A supported view that climate change is natural is a way to try to explain a partly true or a not true answer.

View and some supporting explanation = 1 mark
Precisely explained / supported view = 2 marks [2]

(iii) Possible problems:
Finding a country willing to sell land.
Land and environments elsewhere are likely to be very different from home.
What will the economic opportunities be?
Getting everyone to leave especially as flooding is likely to be phased.

Likely problem identified with little further description = 1 mark.
Identified and further elaborated upon = 2 marks. [2]

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(f) (i) Person B
Some of these climatic disasters are regular events in the areas named.
e.g. annual monsoon in India, cyclone season each year in Bangladesh.
Ethiopia is on the edge of the Sahara desert and in the Sahel. They are to do with the world pattern of pressure and winds i.e. normal climatic events, such as the hurricane season in the Gulf of Mexico.

Person C
Poor people in developing countries are more badly affected by natural hazards than are rich people in developed countries. The answer lies in preparation before the event and provision of emergency services after the event, both of which are money related (for both people and the economy).
Reference also to big populations and rapidly increasing populations in Asia and Africa could also be made.

Views explained – 2 marks for each view 2 @ 2 marks.
(Exceptionally only allow 3:1 or 1:3). [4]

(ii) Some people like A are now of the opinion that climate change is causing climate hazards that already exist to be worse / more intense / more frequent e.g. stronger cyclone seasons, more protracted droughts.

However, it is possible that because of better communications more people learn about them faster; it could be that there are simply more people to be affected in areas regularly hit by them.

Explaining strength of view A, or why the views of B and C may be stronger.
Mark the explanation rather than the view expressed.

Statements made that support view taken = 1 mark.
'How far' part of the question addressed as well = 2 marks. [2]

[Total: 40]

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