

MARK SCHEME for the May/June 2006 question paper

5014/01 ENVIRONMENTAL MANAGEMENT

5014/01

Paper 1

maximum raw mark 120

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2006 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Section A

- 1 (a) Region has less (%) landfill than country/ 61 v 81%
more (%) incineration/ 31 v 8%
less (%) recycled/ 8 v 11%
- accept converse or a comparison of reasonably correct percentages/proportions* [3]
- (b) ugly
air pollution
e.g. carbon monoxide/dioxins/toxic emissions/heavy metals/ nitrous oxides etc
possible danger to health
delivery lorry nuisance
difficulty of disposal of potentially toxic residual ash
noise
recycling more environmentally acceptable [3]
- (c) radioactive
for a very long time
difficult to find suitable sites for disposal
if deep underground could be washed out in groundwater elsewhere
could contaminate water supplies
danger to health (people or animals) [4]
- 2 (a) (i) correct plots for June 5200 and July 6700 and joined by line [1]
- (ii) A more useful = 1
- reason* A has a more even flow
A has water all year = 1
- (If B is chosen allow excess water in summer can be stored for 1 mark) [2]
- (iii) frozen
dry season/drought
precipitation exceeded by evaporation/seepage etc.
over-abstraction
temporary diversion
allow elaboration [3]
- (b) evaporation losses
seepage losses
cost of construction
cost of pumping
uses otherwise useful land for canal
have to be bridged/effect on communications
deposition on bed of channel over time reduces flow/needs dredging
pollution possible from runoff/may need extra cost to treat for algal growth
etc. [4]

- 3 (a) (i) warmest 1995 and coldest 1965 [1]
- (ii) accept 6.5 to 7°C
- (iii) after 1990 temperature increases/ higher/warmer
- (iv) maximum and minimum thermometer/Sixes thermometer/digital continuous reading thermometer [1]
- (v) max + min divided by 2 [1]
- (b) longer growing season
 faster crop growth
 different crops could be grown
 drier soils/(increased) risk of drought
 need for (more) irrigation/farm storage reservoirs
 adapt livestock housing to cope with higher temperatures
 livestock outside more
 more/different pests/diseases
 effect on income [3]
- (c) greenhouses/glasshouses/use of glass
 plastic sheeting
 smudge pots/heating
 under-soil heating (by electric cable)
 mulching
 etc. [2]
- 4 (a) terraces
- prevention of soil erosion
 reduces run-off/encourages infiltration
 easier for machinery
- concrete lining
 channel straightened
- prevents loss through seepage
 prevents erosion of banks
 faster movement of water
 more easily dammed (for irrigation)
- one from each group + 1 = 5* [5]
- (b) irrigation/add water
 spray
 rotor/pivot [2]
- (c) bare soil/lack of plant cover
 dry/light soil
 loose soil particles
 removed by wind
 steep slopes (in background)
 heavy rain
 gullyng [3]

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Section B

- 5 (a) (i) 3 marks for all 6 plotted accurately
2 marks for 4-5 plotted accurately
1 mark for 2-3 plotted accurately
- 1 mark for finishing the key in a manner which matches the plots [4]
- (ii) Clean water supplies and sanitation are often disrupted, so also are food supplies and normal patterns of living, medical services are stretched and are too busy looking after rescued people, some diseases spread quickly among people in epidemics e.g. typhoid, cholera, also factors particular to disaster types e.g. floods lead to much surface water and breeding grounds for malarial mosquitoes, earthquakes break links with outside help/aid.
- Three points like these made in an explanatory manner 3 @ 1 mark [3]
- (b) (i) Earthquake is shaking of the ground
Volcano is eruption of lava etc. on to the surface
Some further comment useful to the question e.g. new land/mountains built up by volcanoes
- 3 @ 1 mark, but maximum 1 mark for accurate answers for only one of them [3]
- (ii) Rarely is there any advance warning of an earthquake/cannot be predicted, even though the areas in which they are likely to occur are well known, many people live in countries/area on or near plate boundaries, volcanoes give advance warnings like earth movements, rising temperatures, some are not explosive and it is easy to get out the way of lava flows, these are more likely to be located along constructive plate boundaries.
- Three points made along these lines 3 @ 1 mark
- Maximum 2 marks for an answer without or with only weak comparisons [3]
- (iii) building structure e.g. deep foundations, steel frame
earthquake planning e.g. trained and equipped emergency services, education of citizens about what to do in an earthquake/emergency drills
land use zoning e.g. keeping buildings away from fault lines, houses separate from industries which can blow up like oil refineries
- Name of any two strategies, whether from the same heading or not [2]
- (iv) All need money and/or organisation and equipment that are more readily available in developed countries,
building standards are more likely to be adhered to and checked in developed/more chance of corruption in developing countries,
generally higher levels of education and training in developed countries.
- Points identified and developed like these; one well developed theme can claim all the marks, provided that it matches the comparative theme of the question.
- 3 @ 1 mark
- Maximum 1 mark for non-comparative answers [3]

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- (c) (i) In the tropics over the sea/Atlantic Ocean (or similar) [1]
- (ii) Sea water temperatures are at their highest at end of summer, above 25°C, hot surface heats air and encourages it to rise through the atmosphere, rising air holds a great deal of moisture, this cools and condenses to form giant cumulo-nimbus/thunder clouds, deep area of low pressure forms, steep pressure gradient around it causes very strong winds.
- Points made along these lines 3 @ 1 mark [3]
- (iii) Westwards and northwards/north-west [1]
- (iv) Numbers noted on the correct islands [1]
- (v) Deaths reduce the further/further north Hurricane Ivan travels (or similar) [1]
- (d) (i) Evacuation of people, stores of food and water, board up windows and move to hurricane shelters = the 4 actions to be placed around the branches of the spider diagram. [1]
- (ii) Best choice – evacuation of people = 1 mark for choice
Reason – people taken out of the way of the storm to areas where it will be less strong = 2nd mark
- 2nd best choice – move to shelters = no mark for choice, but up to two marks for well stated reasons and showing knowledge/understanding of what can be used as hurricane shelters.
- Other two choices – likely one mark answers for explanation about how they save lives; the quality of the explanation would need to be exceptional for the second mark to be given. [2]
- (iii) Grenada was the first place where Hurricane Ivan hit land, its track through the Caribbean was well known by the time it reached Cuba, by Cuba weather forecasters were able to predict more accurately, map shows that Cuba is a larger island than Grenada, there were places on Cuba to which people could be evacuated, whereas the whole island/90% of homes were devastated in Grenada.
- Points such as these made in an explanatory manner 3 @ 1 mark [3]
- (iv) From the report, 'no water, electricity, food' = the 1 mark answer, about the consequences from their lack = 1 or 2 marks. [2]
- (v) The general answer is emergency aid, which may be illustrated by stating types needed in relation to shortages noted in the previous answer = 1 mark answer.
- However, given the scale of the devastation, only aid from outside from governments and/or aid organisation and charities = converted into a 2 mark answer. [2]

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(vi) Farming crops

Devastation was total 'wasteland of ...damaged vegetation', will take time to clear land, re-work the soil, buy seeds and replant, new bush and tree crops would take several years to produce.

Up to 2 marks

Tourism

Ruined properties could be hotels, holiday homes/ no longer beautiful with vegetation, reasons for tourists going there have disappeared/island has lost its attractions, stories of fear when the hurricane was blowing will not encourage others to go/reputation of the island has suffered badly.

Up to 2 marks

Overall comment/possibilities

It looks bad for Grenada for several years unless a massive amount of development aid from outside agencies manages to replace quickly the lost infrastructure.

Up to 2 marks

Summary of marking

1-2 marks Brief references to one or both income sources, but dependent on the source; any comment is general in nature and lacking support.

3-4 marks Stronger content; perhaps without balance between the sources or a strong enough overall comment.

5 Balanced coverage of the question, supported by meaningful comment about prospects and possibilities. [5]

[Question total: 40 marks]

6 (a) (i) no risk in developed countries

- (ii) more high risk countries in Africa than elsewhere, some high risk in South Asia/central parts of South America/named countries, low risk dominates in Central and South America, also in North Africa/interior Asia, medium risk mainly restricted to smaller areas/individual countries, either in Asia or sub-Saharan Africa

Description made along these lines

Reserve 1 mark for reference to developed countries; otherwise 3 @ 1

[4]

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- (b) (i) Algeria, Egypt and Sudan from North Africa; any country which practises irrigation in the Middle East; Pakistan, India and Sri Lanka in South Asia; Spain, Greece, Italy and Cyprus from within Europe; from rest of world USA, Australia, China and Pakistan. Name a named country or region with a dry climate known to use irrigation water.
- (ii) use of irrigation water in dry climates, over-use of irrigation water/not well targeted as in trickle irrigation, high temperatures evaporate water leaving residue of salts, salts drawn up from lower levels in soil to the surface by high rates of evaporation.

General points like this or more scientific statements like residual sodium ions left as dominant in the soil solution after calcium and magnesium are precipitated as carbonates by evapotranspiration.

Maximum 2 marks without something that ties the comment to the named area or for answers without an acceptable named area. [3]

- (iii) Shortage of farmland
For any other answer, the context would need to be made clear. [1]

- (iv) These often result from major climatic events/they are natural hazards, such as tropical storms/years without any rain falling, they can be much greater than average so that they are on too large a scale/too widespread for people to prevent.

Two comments made along these lines 2 @ 1 mark [2]

- (v) Statements which lead to two of the following relevant answers
Overgrazing
Over-cultivation
Monoculture
Use of heavy machinery
Other examples of bad farming practices different from the above
Clearing **more** trees (remember the context of 'farmers' causing soil erosion).

2 @ 1 mark [2]

- (vi) 1 Steep hillsides
Contour ploughing and terraces are the most obvious answers
Both reduce the movement of soil down slope during cultivation – however stated.

- 2 Flat lowland areas with low rainfall
Wind breaks, dry land farming (including crop rotation)
Top soil is less exposed to wind during dry weather – however stated.

Some will try to use other strategies, notably tree planting, which is not a good answer for either part because of the question focus on crop growing areas. It is unlikely to lead to acceptable answers unless it is stated in the context of planting crops between / under bushes and trees (which some candidates might call agro-forestry) or in the context of windbreaks.

In general one mark for naming the method and another for describing how it will help.

Typically 2 + 2 marks, but if merited allow 3 + 1 marks. [4]

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- (c) (i) Poverty will arise from unemployment / lack of economic growth in the first world. The migration of poor people from rural areas leads to cities full of poor people, if they do not have work they cannot afford housing so have to look after themselves. City authorities do not have the money to build houses that the poor can afford.

1 mark for establishing a link between poverty and what is stated in the diagram
 1 mark for linking two points in the flow diagram in an explanatory statement
 3rd mark for fuller explanation by linking diagram information in a causal manner [3]

- (ii) Possible labels on sketch

Tin sheet roofs,
 sides/fronts of wood,
 but also mixed materials like cardboard and cloth,
 cloth cover extends on to street,
 small windows/windows without glass,
 houses closely packed together,
 in a line at the front but less organised plan elsewhere.

4 @ 1 for labels to the relevant feature
 If all marks not claimed, credit 1 mark for a good quality sketch. [4]

- (iii) Possible strategies for improving shanty town environments

* Improving the environment by laying on public services like electricity, clean water and sanitation; paved road access to the rest of the city – by City Authorities/Governments/Housing Associations/NGOs; giving titles to the land making them official residential areas

* Community participation including the above, but also provision of building materials to allow shared work on building 'proper' houses.

* Planning new areas of affordable housing, sometimes new towns (e.g. Cairo) often housing in a pre-planned area.

Maximum 3 marks for an answer without content that can be clearly linked to a named example.

Mark on basis of amount of relevant information provided. [5]

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- (d) (i) Land under cultivation, number of crops grown per year and agricultural production all increased.

Any two of these

- (ii) Land under cultivation – 50 hectares
 Number of crops grown – increase of 1, 2 or 3
 Agricultural production – yield per hectare up by 3100

2 @ 1 mark for choices used in part (i).

[2]

- (iii) Water supply/water availability increased to all the year = 1 mark

Therefore could grow crops all year/2-3 crops per year instead of 0-1,
 allowed increase in the area of land cultivated,
 greatly increased output per hectare.
 One of these for the second mark

[2]

- (iv) The main reason would seem to be the great increase in household incomes,
 some comment about the significance of this,
 using values such as migration rate down by 73% or period of migration reduced by 8 months

Up to 2 marks for this

Evidence that quality of life has improved,
 with all year supplies of drinking water/more food to eat,
 values to support these,
 other likely benefits e.g. less disease/less infant mortality
 Up to 2 marks for these

Maximum three marks without answers that include at least one difference in value used as part of a point worthy of credit.

[3]

- (v) All the evidence points to the answer 'yes', that it is a good strategy; this is easier to justify with arguments such as

* people are happy to stay in rural areas if income levels and services are as good as in the cities; there is less to push them out of rural areas

* many problems in urban areas are caused by the continuous flow of poor people out of the rural areas (see earlier in the question); cities will be given a breathing space to improve housing and services

* in other words, it can be better to stop a problem from arising than trying to solve a problem that is already big

An answer no is more difficult to justify and it will be less easy to claim all the marks. One line of argument could be the strength of pull factors in urban areas irrespective of what happens in the countryside. Also it does not bury the need to solve the urban problems that still exist, which need their own solutions.

1 mark for answers which include something worthwhile without meeting all the question needs.

2 marks for understanding question need and giving a little supporting comment

3 marks for good understanding generating an answer well focused on question need [3]

[Question total: 40 marks]