

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2005 question paper

0680 ENVIRONMENTAL MANAGEMENT

0680/02

Paper 2, maximum raw mark 80

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*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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

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Question 1

(a)(i) Accurately completed divided bar graph = 2 marks
 At least one sector correct = 1 mark
 Key completed to match what is shown on the graph = 1 mark [3]

(ii) Water vapour [1]

(iii) Dust – bare ground / land surfaces e.g. in deserts
 Smoke – areas of human settlement / use e.g. in cities
 Salt – from sea surfaces e.g. over the oceans
 Source = 1 mark
 Location indicated (either type or a named example) = 1 mark [2]

(iv) Carbon dioxide
 – used by plants in photosynthesis,
 it is part of energy flow along with light and water,
 plants are the primary producers supporting other forms of life on Earth,
 linked to the greenhouse effect and global warming.
 Water vapour
 – this is the source for all types of precipitation from the atmosphere,
 it is another element forming a vital part of the energy flow referred to above,
 water is vital in several different ways to human existence on Earth.

It is reasonable to expect 2 marks + 2 marks for answers which are kept separate, but because of the potential for overlap, in some cases it may be easier to mark the answer as one, worth up to 4 marks, provided that something positive has been mentioned about both gases.

(b)(i) 9,000 metres / 9km [1]

(ii) Between 20,000 and 30,000 metres / in the stratosphere [1]

(iii) Ozone absorbs ultra-violet from the sun,
 gives protection to surface life forms that are harmed by excess energy of this wavelength,
 examples of damage which can be caused e.g. skin cancers.
 Any 2. 2 @ 1 mark [2]

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- (c)(i) Thinning of the ozone layer to the point of a serious depletion,
discovered first over Antarctica in winter,
natural seasonal thinning of the layer made worse by human activities. [4]
- (ii) Few people live in the areas where the ozone hole is greatest,
pollution has come from all the populated areas of the world,
CFCs used in refrigeration / air conditioning systems worldwide are thought to be most responsible,
they are long-lived in the atmosphere (so need controls),
Montreal Protocol was the international agreement for phasing out CFCs.
Overall, four points made along these lines, with at least one that is relevant to each part. [4]
- (d) All three accurately plotted = 2 marks. [2]
1 or 2 accurate = 1 mark [2]
- (e)(i) Sulphur dioxide and oxides of nitrogen [1]
- (ii) Carbon monoxide leads to tiredness and headaches, more serious is that four of the emissions lead to chest / breathing / lung problems. [2]
- (iii) Carbon dioxide = 1 mark
Concentration in the atmosphere is low,
it can be absorbed by plants,
it is breathed out during respiration.
Any one for the second mark. [2]
- (f)(i) One from carbon monoxide, nitrogen oxides, black smoke and soot particles, sulphur dioxide
- (ii) One from carbon dioxide, nitrogen oxides, sulphur dioxide
Both need to be correct for the 1 mark. [1]
- (iii) Greenhouse gases are international / worldwide,
acid rain can be carried by winds to another country,
example of UK to Scandinavia (or others) could be used,
bad effects on health result from higher than average local concentrations,
such as amount of traffic / being trapped / not dispersed by wind / not absorbed by precipitation.
3 @ 1 mark for the explanatory comments like these. [3]

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(g)(i) High pressure / sinking air – traps the pollutants near the surface
 Inversion of temperature – surface air containing pollutants cannot rise and escape
 Sunshine – encourages formation of photochemical smog / means that it is dry (without the rain that wash pollutants from the air)
 In a hollow / basin / valley between the hills – easier for pollutants to be trapped
 Wind blocked by mountains – wind disperses pollutants
 Basically 3 @ 1 mark. Use the 4th. mark to reward the inclusion of a developed or well elaborated point. **[4]**

- (ii)** Possible strategies for reducing pollutant emissions
- catalytic converters on cars
 - using low emission fuels for vehicles e.g. gas
 - schemes to keep traffic out of city centres / cars limited to certain days
 - install scrubbers on factory / power station chimneys
 - replace old vehicles / factories / power stations with those that are more energy efficient
 - encourage greater use of public transport / bicycles / walking

Any two valid points. 2 @ 1 mark **[2]**

- (iii)** A variety of routes to answering can be used:
- people's love of the private car
 - increased prosperity is allowing greater car ownership both in the developed and developing worlds
 - the growing dominance of road transport for moving people and goods
 - the continuing sprawl / increasing size of cities meaning greater travelling distances between centre and edges
 - the non-stop growth of cities in the developing world as a result of in-migration
 - weak controls and enforcement of regulations in many cities in the developing world

* Answer which tends to list rather than explain, or is confined to one aspect = 1 or 2 marks

* Fuller answer with at least two aspects covered effectively = 3 or 4 marks

* Attempt at a full explanation by including a range of points, well stated towards the question theme = 5 marks **[5]**

Total 40 marks

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Question 2

(a)(i) Most in Africa,

also in the Middle East and south west Asia,

some finer detail about location e.g. above 7.0 in parts of East and West Africa, or not in the extreme north and south of Africa.

2 @ 1 mark.

[2]

(ii) North of the line – fertility rate everywhere is less than 2.5,

only occasional places as low South of the line e.g. China,

majority are 2.5 and above in South America and higher elsewhere.

2 @ 1 mark

[2]

(iii) Low fertility in developed countries – long history of birth control, long period of decline in fertility, greater wealth and social systems in place so less need for children etc.

Very high in world's poorest countries in Africa – many couples do not practise birth control, especially in rural areas where children are seen as economic and social assets; religious practices and culture do not always promote birth control; lack of education of woman is a reason in some countries; remoteness and lack of development do not allow for family planning clinics etc.

Named examples of low fertility are likely to include China, which has a well organised and ruthlessly applied birth control policy.

* Answers which deal with only very high or low fertility = 1 or 2 marks.

Only with the mention of a valid example can these go to 3 marks.

* Answers which make valid points for both very high and low fertility = 3 or 4 marks

* Answers supported by references to named examples or those which use a developed example = 5 marks [5]

(b)(i) Increases throughout the time period,

but the rate of increase is different as it is shown to slow down from about 1970 onwards,

point made supported by use of relevant values.

2 @ 1 mark.

[2]

(ii) For the first time there were more people living in cities in developing countries instead of developed. [1]

(iii) The upward trend is set to continue,

use of values to show the big size of the increases.

2 @ 1 mark.

[2]

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- (c)(i) Average income in Cairo is E\$1,100 higher.
- (ii) Greater access to water and sanitation shown by using values,
percentage difference between urban and rural is almost the same (drinking water 42% and sanitation 41%),
many diseases that make people ill are water related,
examples of water-based or water-borne or water-bred diseases given,
infant mortality rate is worse by 18 per 1,000 in rural areas,
infants are the age group most vulnerable to inadequate health care,
people earn more in Cairo and may be able to afford better health care.
4 points made along these lines, including a mixture of description and reasoning. [4]
- (d)(i) Made of a varied collection of building materials,
assembled in a haphazard / self help manner,
examples of building materials used e.g. tin sheets, cloth /canvas and wood,
has the appearance of a squatter settlement / shanty home.
3 observations made along these lines – 3 @ 1 mark. [3]
- (ii) First place reached / only area of empty and un-used land / cannot afford to live inside the town / may be near to work places e.g. factory zone.
One suggestion of this kind that has validity. [1]
- (iii) One problem – urban area grows outwards increasing the sprawl.
Further description – unplanned / without controls resulting in loss of agricultural land,
perhaps also countryside and habitats.
This is the most obvious problem. Other problems used should be judged according to merit e.g. increased air pollution from long journeys to city centre, increased pressure on provision of urban services. Check that 'this edge of city location' has not been forgotten if more general urban problems are examined.
Problem stated and made relevant to the edge of city location = 1 mark
Some further description or an example = 2nd mark [2]

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- (e)(i) Properly built / made of proper building materials.
Supplied with services e.g. electricity / water.
2 @ 1 mark. [2]
- (ii) Community participation – been together long enough for community association to develop and co-ordinate work together to improve services and housing.
Urban planning – area zoned / re-designated for housing by local authorities who provide essential services, after which other improvements become easier.
Environmental improvement – schemes from authorities, charities or housing associations to improve the environment, often by improving access and services first and then the housing.
Self improvement – people find work and family income increases so that they can afford proper building materials and home improvements.
Two choices such as these. Essentially 2 marks + 2 marks, but allow 3 + 1 marks for answers in which one reason has been well developed and / or exemplified. [4]
- (f)(i) The name needs to be precise enough to be recognisable for the technique chosen. The name of a country would represent the minimum level of acceptance. If in doubt about awarding the mark, check ahead to the next part. [1]
- (ii) General answers about the technique = maximum of 2 marks. Content plus references to a relevant example = 3 marks. [3]
- (iii) Relevant evidence from earlier parts of the question
- * high fertility rates mean population growth in developing countries
 - * urbanisation expected to continue at a fast pace in developing countries
 - * income and services are higher in urban areas
 - * housing improves with time
- Together they provide a convincing case that rural to urban migration will continue and that reducing the numbers is unlikely or impossible. The disadvantages of using irrigation and the Green Revolution could be used to support this view, as also could references to other agricultural problems like soil erosion.
- Can migration be stopped? Governments and aid agencies would need to invest more in rural areas instead of giving preference to urban areas, in order to bring service levels up to those in cities. It may be possible to increase the amount of agricultural land e.g. by clearing more of the forests in Brazil, or by new technology giving a boost to agricultural output (e.g. GM crops).
- * One or two statements made, but little substantiated, so that content is thin = 1 or 2 marks.
 - * View more fully expressed and supported = 3 or 4 marks.
 - * View well expressed and supported in a manner which makes clear why the candidate believes one is more likely than the other = 5 marks. [5]

[Total: 40 marks]