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CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0680 ENVIRONMENTAL MANAGEMENT

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.

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1 (a) (i) Fastest birth rate decrease – Stage 3
Fastest increase in population growth – Stage 2
2 @ 1 mark [2]

(ii) Similarity – birth and death rates almost the same in both/low rates of natural population increase

Difference – birth and death rates much higher in Stage 1 (or vice versa for Stage 4), typical rates between 45 and 50 in Stage 1 compared with 10 to 15 in Stage 4. Or others such as fluctuations in Stage 1 compared with birth rate above death rate in Stage 4.
1 + 1 = 2 marks [2]

(iii) Natural increase – main/largest area in and across Stages 2 and 3
much smaller areas in Stages 1 and 4

Natural decrease – main area in Stage 5
smaller areas within Stage 1

Some areas shaded that are correct for natural increase = 1 mark
Some areas shaded that are correct for natural decrease = 1 mark
More complete for natural increase and decrease e.g. in Stage 1 = 1 mark
or absolute precision in shading in Stages 2 and 3, and 5 with shading matching the key
3 @ 1 mark

Some parts correct but others incorrect – then 1 mark provided that the correctly shaded areas are larger than those that are incorrect. [3]

(b) (i) Family planning – advice about limiting family size, easy availability of or free contraception
Urban growth – child labour less obviously useful in urban than on farms in rural areas, increases in wealth, change in cultural attitude/further away from rural traditions, greater availability of family planning
Education of women – makes women more career orientated, greater opportunities for learning of family planning, encourages a change in the role of women in society
Very high death rates – increase to a size that is above the birth rate, references to causes such as wars, spread of AIDs

Essentially 3 @ 2 marks for each chosen factor.
1 or 2 marks per factor depending on amount of elaboration for description limited to one element, or breadth in number of elements of the answer covered.
In cases of exceptional breadth/depth/use of an example, allow 3 marks to become a 3 + 2 + 1 route to all 6 marks. [6]

(ii) How – change from encouraging population increase, to a population policy encouraging a slow down in population growth

Why – government realised that it had made a mistake; great size of the predicted population of 100 million for 2005 (a 2.5 fold increase)
1 + 1 mark [2]

(iii) 30 million [1]

(iv) No more than two mistakes = 1 mark
Accurate plot of all seven values = 2 marks

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Line drawn to link plots = 1 mark [3]

(v) Data – between 1990 and 2000 the rate was cut by more than half from 5.6 to 2.5, or difference stated such as 3.1 decrease from 1990 to 2000.
Graph – this rapid decline is shown by the line being steepest during the 1990s.
References to both needed for 2 marks
2 @ 1 mark [2]

(vi) Big effect of the policy change had now passed rate down to an average of only 2 children per family with social comment on the significance of this or demographic comment if it is known that 2.1 is the stable population replacement fertility rate.
1 point made showing part understanding = 1 mark
2 points made along these lines showing understanding = 2 marks [2]

(c) Attitude of government matters a lot – for setting up family planning clinics, funding contraceptives, in poor developing countries where people couldn't otherwise afford and would not know about modern contraception. Government advertising/use of public notices/TV advertisements and promotional programmes are part of most successful national policies e.g. in Asian countries such as Thailand. It is the only one in a position to see the broader picture of the relationship to economic growth and development.

Sometimes government propaganda is used to increase population numbers with incentives, for motives such as increasing regional influence or world importance of the country.

Example of China and its one child population policy shows what a strong government, determined to reduce population growth, can do. This is an extreme example. Most other countries used more carrot than both carrot and stick.

Earlier Iran example shows what a difference a change in government policy can make.

Weak explanation; only one or two simple points made
Perhaps no more progress than repeating points already made about Iran, without broadening the response = 1 or 2 marks

Fuller and broader response focused on the effects of national policies on growth
Might use China and its one child policy without much in the way of broader references = 3 or 4 marks

Well focused, fully explained
Good use of relevant examples, including references to countries without meaningful national policies such as many African countries (e.g. Niger) and many Muslim countries (e.g. Saudi Arabia) = 5 marks [5]

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(d) (i) 15.1 per 1000 [1]

(ii) Stage 2 (late) or Stage 3 (early) but no separate marks for stating the stage without some qualification of position in the stage, either here or later in the explanation.

Up to 2 marks for explanation for relating to the graph in terms of still having quite a high birth rate (well below the 45 – 50 in Stage 1, but above around the 10 mark in Stages 2 and 3). The very low death rate could fit any of Stages 2 – 4, but it is the quite large natural increase that makes it fit either Stage 2 or Stage 3.

Points along these lines related to what the DTM shows. [2]

(iii) Economic – large numbers of children cost money for health care, schooling; they are economic dependents. May later swell the labour market increasing pool if the unemployed. Great numbers of people without formal employment. Pressure of numbers increases cost of other infrastructure services.

Environmental – increased pressure on natural resources; clearing forests for farmland for food, overuse of farmland leading to soil erosion, increased water and energy consumption etc.

Points made along these lines. Reserve one mark for each of economic and environmental allocated to the correct heading. [4]

(e) (i) People, often environmentalists, who believe that the world population growth is unsustainable point to evidence of overuse of Earth's natural resources, such as:
Continued clearance of forests, especially rainforests, with the accompanying losses of biodiversity
Land being destroyed/environmental degradation shown by soil erosion, desertification and salinisation
Water stress and water shortages affecting up to half the world's countries
Progressive exhaustion of non renewable energy resources and other minerals
Overall assessment along the lines that the net resource deficit each year is estimated at about 30% which, if correct, cannot carry on for ever, and will be worsened by the predicted continued world growth of population (even if at lower rates than previously).

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(ii) View does not matter for the marking; all marks are for the explanation.
Agree – continuation and extension of arguments put forward in part **(i)**; references to named areas and specific examples would strengthen the support.

Don't agree – inventiveness of humans, increases in technology, it will hasten the switch to use of renewables (e.g. to replace fossil fuels)
Further increases in agricultural output – previously Green Revolution, now possibly GM.

These are merely suggestions of the routes answers are likely to follow.

The two parts can be marked as an overall answer.

Unsustainable explained in a simple or limited way.
View either imprecise or weakly explained = 1 or 2 marks

Fuller explanation for unsustainable either from a broader range of references, or one or two unsustainable elements dealt with in more detail.
View likely to be clearer with some support = 3 or 4 marks

Unsustainable view well understood, perhaps with some attempt at an overview.
View made clear and effectively supported = 5 marks [5]

[Total: 40]

2 (a) (i) **1** South East Asia
2 Sub-Saharan Africa
3 South East Asia [3]

(ii) Smallest percentage change between the two dates, or lowest percentage without access to clean water in 1975.
One difference stated. [1]

(iii) The answer could be based on area with greatest change – SE Asia reflects growth in wealth and economic development, much of it associated with growth of manufacturing industry, that allows better public infrastructure – plus the rising demands for a better standards of living and improved quality of life.

The area with least change – Sub-Saharan Africa reflects more economic stagnation, most countries still rural societies where improved access is more expensive and difficult to provide. Political factors/attitudes of governments along with frequency of wars and corruption.

Or the answer could be based on factors – wealth & economic development, wealth of resources (e.g. oil in Middle Eastern countries), political stability, attractiveness to Aid providers.

Three points made that include valid reasons.
Maximum two marks if theme of great variations between developing world regions is not directly addressed. [3]

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(b) (i) Cholera and typhoid uniquely identified. [1]

(ii) Bilharzia is water-based, since the carrier (water snails) live in water
Malaria is water-bred, since the carrier (mosquitoes) breed in water.

Water-based and water-bred only (stated or by description) = 1 mark
Further basic details about differences = 2 marks [2]

(iii) Age groups – young because they have not acquired sufficiently high levels of resistance; more likely to play in and around surface water/elderly particularly those who are already infirm.

Poverty – people too poor to seek medical assistance once infected, or unable to afford to take measures of protection to reduce likelihood of catching the disease, or unable to have access to safe/clean water because of area's poverty.

Farmers and rural dwellers – live and work closer to surface water stores, least likely to have access to piped clean water compared with urban dwellers, plus reasons why.
Farmers at their busiest in the wet season when the risk from water related diseases are highest.

This is not exhaustive – there are other possibilities, such as people affected by natural disasters like earthquakes/flooding.

For identifying groups/types – if three different ones are mentioned = 1 mark merely for identification.

Rest of marks for explaining why; full 4 mark answers need references to at least two clearly different types/groups. If well done, answers can still be given all the marks.

Point mark within these guidelines – 4 @ 1 mark [4]

(iv) The most obvious sequence would be
less able/too weak to work (or words to the same effect) followed by less food grown (or words to the same effect such as 'less well nourished')
Others may follow a more medical sequence.

Mark according to worth
one worthy answer, or an illogical sequence of otherwise worthy answers = 1 mark
similar sequences to the above and logical = 2 marks [2]

(c) (i) Water shortage – live in an area that suffers from persistent periods of drought, great heat dries up river beds, women have to walk up to 10km which limits amount that can be carried to be used.

Water quality – have to take water from surface scoop holes, suggestions why these are likely to be dirty and polluted.

1 mark for each of water shortage and water quality taken from the report = up to 2 marks
3rd mark for some additional explanatory comment for at least one of them. [3]

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(ii) Solar power/photovoltaic panel drives the motor
the motor operates the pump
placed within the underground water layer
the pump lifts water to the surface (no manual work involved)
where it is stored in a water tower later to be distributed and used
flows by force of gravity to the water points.

Three points made like these – preferably stated in sequence
3 @ 1 mark
Limit of 1 mark for answers about what is there rather than how it all works
Limit of 2 marks for non-logical answers without an overall picture of how it works. [3]

(iii) *Points that can be made supporting sustainability*
Solar power is a renewable resource; evidence from earlier references to the weather that the sun is hot, and if a drought affected area, then there will be no clouds to block the sunlight. Thus this seems a suitable renewable energy source for this area.

Underground water store, provided that it has not been over-exploited, will provide water from earlier rains, stored where it cannot evaporate in the heat. People no longer tied to the vagaries of rainfall for amount of water supply.

Underground water stores are less likely to be polluted than surface stores; water was cleaned as it filtered down through the permeable rocks

Fact that women no longer have to walk up to 10km means that they can undertake more productive work, increasing family income and food supply, improving health etc.

Points that may be made in an unsustainable context
Motor and pump might break down; issues such as cost of repairs and know-how.

More efficient pumping of water could increase the speed at which water is taken from the underground store, making rate of use greater than rate of replenishment, with adverse long-term consequences.

More food, more water, fewer people die from malnutrition, more live births, more people leading to greater pressure on the land and land degradation.

Note – this is trying to cover the range of possible lines of reasoning; individual candidate answers will be much narrower.

Answer may rely upon just one line of reasoning (limited supporting breadth)

Not much in the way of explanation beyond stating candidate's view = 1 or 2 marks

Broader references to a range of different reasons; these can be either for sustainable or unsustainable or both. One or two of the reasons given may be further explained = 3 or 4 marks [4]

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(d) (i) Just below/to the south of the Himalayas which are the water source
Dam is below the point where two rivers meet to increase amount of water
Further details about how good a water source the Himalayas are relating to the great heights of the peaks, the high likelihood of stores of ice and snow
Or making the point that numerous rivers are shown on the map starting in the Himalayas before flowing south
And possibly that being so close to the mountains the valley is likely to be steep sided and good for building a dam/storing water.

Three points along these lines, either definitely shown on the map, or reasonably interpreted from it or from candidate knowledge of high mountain areas for water storage.
3 @ 1 mark [3]

(ii) 200km [1]

(iii) Evidence for economic disadvantages:
For the first time, farmers are short of water for their crops because building the dam has interfered with natural springs, their main source of water. Will lead to loss of income, perhaps loss of livelihoods
Sending a daily water tanker is not going to help much with amount of water needed for farming

Evidence for social disadvantages:
No other options but to migrate to Delhi, and social consequences of this
Also other possible social consequences from loss of income

Three points made along these lines, but for full marks the answer must include a valid reference to a social disadvantage and must include some explanatory comment beyond comments stated. [3]

(iv) One clue is in the comment from the Indian government official about the need to look at the bigger national picture, under the banner of economic development.
Further explanation either related to this or using understanding from the study of other large dams.

Some understanding; limited or simply expressed = 1 mark
More complete understanding shown by clear explanation = 2 marks [2]

(v) Not a good way is perhaps easier to justify, using reasons such as:
Will reduce food output in rural areas and will increase the urban problems of Delhi
i.e. problem of poverty is simply transferred from rural to urban areas, where the resources do not exist to provide for all new city migrants.

A good way can be justified, perhaps along the lines:
Growth in rural areas is stagnant/rural areas are backward
Modern services are more expensive and difficult to provide in rural areas
Cities are the places where modern economic growth is concentrated.

Mark the explanation, not the view expressed.

Some explanation but incomplete or unconvincing = 1 mark
View well explained using either one, or more than one point = 2 marks [2]

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(vi) Comment suggests that volume of water in the river is reduced by storage in the Tehri dam and by water distribution to farms,
explanation of possible consequences of this such as less water available in Kanpur to carry/flush away the waste or use in treatment works,
leading to higher concentrations of toxic pollutants from the tanneries like chromium and chemical by-products in the Ganges at and below Kanpur,
with consequences for river life (plants and fish) and habitats,
reference to water pollution contributions from farming.

Heavy reliance on the source information with limited development = 1 mark
Reasonable understanding, but the answer may be more general rather than referring to this example = 2 marks
Well arranged and focused answer along these lines = 3 marks [3]

[Total: 40]

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