ENVIRONMENTAL MANAGEMENT

Paper 8291/03
School Based Assessment

General comments

There were some very interesting projects undertaken by candidates for the June 2017 series. In the best pieces of work, candidates have been able to select a precise hypothesis that could be sufficiently tested using primary and secondary data collection and analysis. The majority of candidates now structure their reports in the logical order of introduction, methods (justified), results and analysis, conclusion and evaluation and many use these stages as chapter headings within a contents section.

There are still cases however where guidance by Centres should be undertaken to ensure candidates recognise the difference between a research report and an extended essay, given the assessed criteria **C2(c)**. In some cases, a more scientific investigative approach rather than an essay would be beneficial.

Reports need to contain a clear evaluation and a statistical tool. It is still the case that the best reports derive from the collection and collation of primary data obtained from either field investigations or laboratory work.

Some of the strongest candidates clearly demonstrated the ability to combine secondary data with their primary data, thus evidencing a rigorous report and investigation. The best reports have submitted detailed sources of information and a considered methodology with their environmental proposals. Candidates should be encouraged to undertake a test to determine, before they start, whether they will be able to collect data.

Some issues experienced this series in some Centres were as follows.
There are were a few cases where Centres are late in the dispatching of reports, the deadlines are available in our Samples Database.
An incorrect sample size, given the entry, was offered by some Centres. The details for the sample to be sent are available in our Samples Database.
Leniency, particularly in assessment criteria **C2(a)**, **(b)** and **(e)** and **C3(a)** and **(b)**, was found at some Centres with full credit being awarded when often partial credit was more appropriate.
Credit was given for some criteria when these aspects were not actually present in project reports, e.g. no credit can be given for use of a statistical tool when one has not been used, nor can full credit be given for conclusions that do not relate back to or include reference to data.

Candidates should be reminded to consider the following questions.
Will my hypothesis or question actually yield viable results?
Are my methods realistic, practical and relevant? Do they include data recording, collation and presentational techniques?
Are the results and analyses fully representative of the methods referred to in the previous section?
Does my conclusion sum up and relate my results to the original hypothesis or question?
Have I evaluated my work in terms of both its successful features and its limitations and considered what can be done to improve my work?

Comments on assessment criteria

Skill C1

Most candidates performed well in this skill area.

Either as the project title or as part of an introduction, hypotheses or questions were stated by most candidates and frequently, but not always accompanied by a clear explanation of its underpinning principles. The hypothesis should be clearly written and not implicit to the introduction; this is important as a significant number of candidates try to conclude that their hypothesis is correct, yet there is sometimes no evidence anywhere in the work to indicate this.

Stating and justifying a methodology was, in the main, adequate. Good quality research requires the formulation of a plan detailing research sites, equipment, expected data and how it will be collated and presented. It is imperative that a realistic time-frame and location is chosen for data collection.

Weaker reports had a methodology which was often a brief list without any explanation or justification.

Skill C2

There were a significant number of high quality research reports that did very well in this section. They made excellent use of relevant collected data, which was presented in a variety of ways including graphs, tables, diagrams and photographs; sometimes integrated into an analysis through the use of figure references.

Some candidates were not awarded much of the available credit for **C2(a)** as graphs and tables were poorly presented. Graphs were sometimes inappropriate for the type of data to be represented. Graphs should have axes containing labelled units and both lines and bars should be easily interpreted. Some reports, better described as extended essays, had very little data presented in the form of graphs and / or tables. As a consequence, it was difficult to achieve credit in criteria that required reference to data; also negating use of a statistical tool.

Some reports were heavily reliant upon photographic evidence with a limited amount of quantitative data. It is typically better when photographic evidence supplements other forms of information.

The use of a statistical tool is generally only seen in the stronger research reports. There is a difference between statistical methods that are used to describe data and statistical tools that are used to analyse data. The former might include bar charts or line graphs whilst the latter would include correlation, chi-squared tests and t-tests etc. Unfortunately, some Centres award this credit when there is no evidence of analytical statistics.

The majority of candidates received full credit for the general organisation of their work and the quality of written communication.

Skill C3

This important skill frequently forms the weakest part of a project. Often the main weakness in **C3(a)**, the conclusion, is a lack of reference to data presented in the report. **C3(b)** is also often quite limited, as only a small number of candidates refer to related environmental management principles. This element also needs reference to data within this section of the report.

Some Centres need to inform their candidates that the evaluation needs to be a brief summary of those things that went well and not so well, i.e. success and limitations. There is still confusion between an evaluation and a conclusion. Some candidates focus on evaluating their secondary data, instead of appraising their methodology (success and limitations of the methodology). A small number of weak candidates did not include an evaluation at all.

Concluding comments

It is very pleasing that most candidates engage enthusiastically with this element of the environmental management syllabus. It is also particularly pleasing to see that the vast majority of topics selected have focused on some very key and current environmental issues and Centres are to be commended for their guidance here.

It is most important that candidates are given close guidance in respect of their project title as a significant number try and review global data, which is extremely challenging given the assessment criteria and word count, often the title can be too broad in scope.

In addition to the topic, there is the opportunity to learn about some research techniques and put them into practice. As in previous sessions, the better topics and final reports are typically derived from locally based research and tended to utilise primary data.

ENVIRONMENTAL MANAGEMENT

| Paper 8291/11 |
| Paper 11 |

Key messages

In **Section A**, candidates should note the credit available for each part question and write their answers accordingly. This will give them an indication of the amount of content and detail expected.

It is important that instructions are followed carefully. Candidates should ensure they are clear about the differences in meaning of command words such as state, suggest, explain and describe.

General comments

There was a reasonably good response to all questions on this paper. Some candidates found the troposphere questions challenging.

Many answers showed a good understanding of terms and attention to detail, with effective use of exemplar material.

The strongest answers included effective use of appropriate examples to illustrate key points along with supporting details while using appropriate terminology.

Comments on specific questions

Section A

Question 1

(a)(i) Many candidates gained full credit. Some weaker candidates were too vague.

(ii) Candidates generally made good use of the stimulus material in stating the effects of weathering.

(iii) Candidates must be careful to avoid limiting their answers to opposites. Strong answers referred to the formation of the two rock types and how this led to the differences in structure.

(iv) Strong answers gave two different factors and provided clear explanations for each.

(b)(i) Some weaker candidates interpreted the diagram as a subduction zone and referred to an earthquake. Some weaker answers described the effects shown by the diagram rather than the causes of creep. Stronger answers described the effect of various factors with explanation.

(ii) Strong answers described specific methods. Weaker responses did not provide a description. The question referred to any mass movement but some candidates simply repeated their previous answer.

Question 2

(a)(i) Some weaker candidates did not identify this number from the graph.

(ii) Many candidates found the calculation challenging. Weaker candidates incorrectly dealt with the minus sign.

(iii) Many candidates found this challenging. Stronger candidates typically identified water bodies and evaporation.

(iv) Many candidates found this challenging. The strongest candidates typically gave a succinct and clear answer with clear explanation.

(v) Most candidates were successful in describing the constituents of the air with fewer correctly suggesting the relative proportions.

(b)(i) Most candidates gained full credit for this question.

(ii) The strongest answers described clear reasons. Weaker candidates limited their answer to the idea of heat rising. Some candidates made good use of the stimulus material in stating the role of the mountains. Weaker answers often erroneously used the terms temperature, moisture, volume and density.

(c) Weaker answers listed weather types rather than explanation of the hazards to people. Very weak candidates described earthquakes and volcanoes as weather. Strong answers showed a depth of knowledge and avoided repetition.

Section B

Question 3

(a) Many candidates provided very good descriptions of the diagram and the distribution of ground-level ozone and the strongest could provide appropriate reasons. Weaker answers did not provide the reasons and in a few cases misinterpreted high and low as levels of ozone depletion.

(b) There was good understanding of types of atmospheric pollution and the movement across international boundaries. Many candidates made good use of examples but weaker candidates tended to provide too much detail about global warming and did not include other aspects. Few candidates named examples of international agreements and protocols. These weaker responses referred to generalisations instead. However, stronger candidates gave detailed descriptions of named protocols and evaluated their outcomes.

Question 4

(a) Most candidates made a choice and successfully argued at least some points. The strongest answers analysed both and made the choice based on the evidence in the table. Weaker answers confused the two types of eruption leading to erroneous statements or contradictions.

(b) Weaker candidates did not provide methods of monitoring, some gave only a vague description and often of only a single method. Some candidates just described evacuation routes and planning for after the eruption. More successful answers described a range of monitoring methods and compared different areas of the world, typically based on level of economic development.

Question 5

(a) Many candidates provided very good descriptions of the diagram and described the stages of the tropical cyclone. The strongest answers included calculations of the time spent at each stage and explanations of the different stages. The weakest answers simply described the tropical cyclone getting stronger and did not make much use of data from the figure.

(b) Strong answers included methods of gathering data to support the forecasting, as well as how it could be of value in managing the effects of the low-pressure systems. Candidates generally showed a good understanding of this topic and provided a good range of measures and responses.

ENVIRONMENTAL MANAGEMENT

Paper 8291/12
Paper 12

Key messages

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General comments

There was a reasonably good response to all questions on this paper. Some candidates found the weather questions challenging.

Many answers showed a good understanding of terms and attention to detail, with effective use of exemplar material.

The strongest answers included effective use of appropriate examples to illustrate key points along with supporting details while using appropriate terminology.

Comments on specific questions

Section A

Question 1

(a)(i)   Most candidates gained full credit. Horizon C was occasionally less well understood by weaker candidates.

(ii)   Most candidates gained full credit and had good understanding of the formation of humus.

(iii)   Candidates provided a good range of answers covering all the points in the mark scheme. Weaker answers tended to be lists of ways rather than two developed and explained ways.

(b)(i)   Candidates demonstrated a very good understanding of the process of salinisation and provided well written and full responses. The weakest answers included reference to the salt evaporating rather than the water.

(ii)   Some candidates provided more than two ways resulting in a list and consequently less detail. Some candidates described techniques for sustainable agriculture rather than specifically techniques to manage the particular soil referred to in the question. The strongest answers showed a clear understanding of the topic with two suitable named techniques and supporting detail.

Question 2

(a)(i)   Most candidates gained credit.

(ii)   Most candidates gained credit.

(iii)   Most candidates gained full credit. The weakest answers did not refer to data in the figure.

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(iv)   Strong candidates used terminology accurately and performed well. Some weaker candidates confused temperature and pressure effects in their responses.

(b)(i)   Candidates found this question challenging. Some were successful recognising high and low pressure areas. Some confused these or reversed the fronts.

(ii)   Most candidates were awarded credit.

(iii)   Stronger candidates clearly stated two characteristics.

(iv)   The responses were mixed. Stronger candidates had very few problems describing the likely weather at each location. Weaker candidates seemed to struggle with interpreting the pressure and other data.

Section B

Question 3

(a)   Stronger candidates provided good descriptions of the pattern shown in the figure and showed good knowledge of ocean floor spreading. Strong answers also referred to continental drift and the theories about Pangea. Weaker answers tended to be purely descriptive.

(b)   Stronger answers included descriptions of monitoring methods to provide early-warning and implementing the planning / evacuation systems in place. Many candidates opted to compare areas with different levels of economic activity in considering the likely success of the management.

Question 4

(a)   Most candidates made good use of data and effectively compared the main parts of the graph. However, fewer candidates attempted data manipulation in descriptions. Stronger answers could explain the implications while weaker answers just described the data.

(b)   There was a good understanding of the factors which determine different energy policies. Some strong candidates successfully linked geography and climate to energy policy.

Question 5

(a)   Most candidates made good use of data and effectively compared the two gases, describing the similarities and differences shown. However, explanations were generally less well expressed in particular with reference to the sources of methane by weaker candidates.

(b)   There was good understanding of types of air pollution leading to global warming and the movement across international boundaries. Many candidates made use of examples of greenhouse gases but weaker candidates tended to provide too much detail about the process of global warming. Many candidates did not name examples of international agreements and protocols but referred to generalised laws instead. Stronger candidates gave detailed descriptions of named protocols and evaluated their outcomes.

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ENVIRONMENTAL MANAGEMENT

Key messages

In **Section A**, when considering source material candidates should analyse and use the information to support statements made in answers.

Data should be manipulated where possible rather than simply quoted from graphs and bar charts.

Key terms should be defined precisely.

In **Section B**, candidates should use examples from specific locations accurately to allow for relevant evaluations of the strategies used in environmental management.

General comments

In **Section A** there was generally good use of information from source material and, generally, in the more successful answers numerical data was manipulated.

In **Section B** there was accurate use of subject specific vocabulary and some effective use of appropriate examples for the longer questions. Weaker candidates would be advised to focus on developing points and on providing evaluations where appropriate.

Comments on specific questions

Section A

Question 1

(a) (i)   This was well answered in part with a precise definition of what is meant by the term infiltration using appropriate terminology. The meaning of run-off was often less precisely stated.

(ii)   Stronger answers included reference to the data. Numbers were sometimes just quoted rather than differences calculated. Most answers however demonstrated basic understanding of the hydrological cycle and explained the idea that water can be returned to the ocean from other stores and flows within the cycle.

(iii)   This was generally well answered, with a range of processes outlined. In effective answers the process was clearly linked to the change in state of water in the hydrological cycle and changes in water stores, such as the melting of ice from a glacier or transpiration of water from vegetation. Care must be taken by weaker candidates not to confuse condensation with evaporation.

(b) (i)   This question was well answered. The graph was generally effectively used to support the description. In particularly strong answers the specific changes in sea-level were accurately read from the graph and the differences were calculated to illustrate the changes between highest and lowest levels. Some weaker answers just referred to year and not to sea-level. Generally, both axes of a graph should be referenced when quoting data.

(ii)   A wide range of interesting answers about the changing scientific methods, recording of data and reliability of sources were suggested. The lack of technology was often cited as a reason for the large range in data and many suggested that the values had therefore been estimated.

(iii) There was a good response to this question with generally good use of the information from the figures. The most effective answers considered the effects of increasing sea-levels on people balanced with the effects on the environment. The effect on people was generally very well described with reference to the displacement of people from particular settlements, the impact on agriculture and the impact of increasing population density on other areas. The effects on the environment, the salinisation of fresh-water stores and soil were less likely to be mentioned. It was generally recognised that the area of land would be reduced but estimates of land area flooded were rare. To be effective answers needed balance; some weaker responses described changes in the sea-levels, mentioned the inundation and flooding but did not outline the effects or referred only to short-term effects of flooding.

Question 2

(a) (i) Answers needed to cover the community of organisms and environment in a description. Instead of an ecosystem, a habitat was described by some weaker candidates. There were some references to an abiotic community, non-living organisms and abiotic organisms by the weakest candidates.

(ii) Candidates found this part of the question more challenging. The majority of candidates identified a biotic factor correctly although fewer identified an abiotic factor correctly. The most effective answers exemplified the influence of the factor on the ecosystem clearly. Some very strong answers showed a detailed understanding of the influence of pH.

(b) This question was challenging for some candidates. Some excellent answers explained the transformation from one ecosystem to another clearly, showing understanding of a succession from open water with changes in the community and a change in the environment over time, the development of soil from the sediment and the colonisation by terrestrial organisms. While many answers explained how the lake would progressively dry out and sediment input would fill the lake, weaker answers conveyed limited comprehension of the process of succession.

(c) (i) This question was answered well by the majority of candidates. A wide range of reasons for conserving the lake ecosystem were given. There were some good examples of the ecological and economic benefits of conserving the lake and aesthetic, ethical and social justifications.

(ii) This question was also answered well. Candidates were confident in providing many strategies and methods for conserving an ecosystem and some had obviously studied similar case studies with the figure stimulating some appropriate conservation management strategies.

Section B

Question 3

(a) In the most effective answers trends were identified and compared. Particularly strong answers demonstrated developed reasoning for increased water extraction rates in all three sectors. Many candidates used some data to support their answer but few calculated by how much the use had increased and only stronger candidates commented about faster rates in some time periods compared to others. In less effective answers general trends were just described, they were not compared and the increasing use in all sectors simply linked to population increase, without any further elaboration of the increased demands within each sector.

(b) Strong answers to this question were characterised by the use of examples of countries and how fresh-water supplies may become limited as a result of population growth with detail relevant to examples given. The level of development and population growth in contrasting countries was considered. The reasons why more economically developed countries were generally better able to cope and the demands placed on resources and access to water supplies were considered in relation to the enhancement of water supplies through the use of various methods including reservoirs, redistribution, desalination and rainwater harvesting schemes. Water use in each sector was analysed for each particular country and specific water resource problems were identified. In weaker answers often there was no mention of specific water resources or impact on water resources through pollution or depletion.

Question 4

(a) In the most effective answers the trends in biodiversity were identified, described in detail using the biodiversity index data and together with a detailed account of the reasons for these trends, increases and decreases in diversity were considered.

(b) There were some well organised and interesting responses to this question some of which included specific details of case studies. In strong answers examples were used to explain the approaches, the differences between the approaches and to provide advantages. Protected areas and the selection of species in an area featured more prominently than captive breeding and reintroduction programmes. Weaker candidates needed to differentiate between the two methods of conservation so that their answer highlighted the advantages of each approach, rather than focusing on the advantages of conservation generally.

Question 5

(a) The strongest candidates were able to link the information in the diagram, were able to state the types of pollution produced by each source and were able to name specific pollutants, most often those from agricultural and domestic sources. Candidates were very good at describing the processes of contamination and often used the correct vocabulary in their answers. In weak answers information was usually taken straight from the diagram and lacked exemplification of the sources, specific pollutants or further explanation of the process of contamination.

(b) Most candidates referred to the sources and pollutants they had identified in **(a)** and then said they could be fixed by careful management and were able to state a range of strategies designed to reduce pollution getting into the ground and ways of preventing pollution at source or ways of containing pollutants. Weaker answers needed to elaborate upon how the groundwater stores could be managed rather than listing additional pollutants.

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Paper 8291/22	
Paper 22	

Key messages

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Data should be manipulated where possible rather than simply quoted from graphs and bar charts.

Key terms should be defined precisely.

In **Section B**, candidates should use examples from specific locations accurately to allow for relevant evaluations of the strategies used in environmental management.

General comments

In **Section A** there was generally good use of information from source material and, generally, in the more successful answers numerical data was manipulated.

In **Section B** there was accurate use of subject specific vocabulary and some effective use of appropriate examples for the longer questions. Weaker candidates would be advised to focus on developing points and on providing evaluations where appropriate.

Comments on specific questions

Section A

Question 1

(a) (i) Definitions of biomass were often precise. Trophic level was generally less well defined.

(ii) Most candidates were successful in their response to this question. Less precise answers did not specify the types of consumer. In some weaker answers multiple alternatives for a level, some of which were not appropriate to the particular trophic level, were given.

(iii) This was generally well answered with most candidates demonstrating a good understanding of the relationship between the trophic levels and linking the decreasing biomass to the decreasing energy available as less energy is transferred through the trophic levels. Only the strongest answers detailed the energy lost to the surroundings from each trophic level in respiration and other processes.

(b) (i) This question was generally well answered. In strong answers the overall trend was described and data carefully selected to illustrate trends or the overall percentage of coral loss calculated. In weaker answers the reading of the axes often contained inaccuracies.

(ii) This question was very well answered both in terms of the range of human activities considered and in the development of how these contribute to loss of coral cover. Answers tended to demonstrate a good understanding of the extent of the problem and also expressed awareness of that the difficulty of managing the problem of coral loss. In the most effective answers human activities were well documented and the actual link between the activity and the loss of coral cover in terms of the damage to coral, removal of the coral and coral bleaching were outlined. The impact of some human activities that resulted in loss of coral cover through ecological effects were

generally less well covered. Coral cover was occasionally mistaken for forest cover relating to a terrestrial ecosystem rather than an aquatic marine ecosystem.

Question 2

(a) (i) Definitions of evaporation, interception and run-off were usually expressed succinctly. In less effective answers a definition of run-off was vague and the process of evaporation was sometimes confused with condensation. In weaker answers the definitions lacked precision so that the definition given could also have applied to a range of other terms.

(ii) Strong answers were those that described a local hydrological cycle and emphasised a balance of inputs and outputs. In less effective answers inputs and outputs were not clearly identified or were just listed. In some answers parts of the figure were listed without linking these processes and addressing the balance between them.

(b) (i) Candidates made good use of the stimulus material. The vegetation, extent of soil and processes were contrasted in the forested slope before and after deforestation in strong answers. Weaker answers referred to processes of the hydrological cycle but without emphasising the contrasts.

(ii) This question was answered well by many candidates. Answers tended to be confident in providing many strategies and methods for conserving an ecosystem and many candidates had obviously studied similar case studies. A wide range of appropriate methods were suggested relating to forest management and afforestation and many linked these to slope management techniques and flood control measures appropriate to the situation in the figure.

Section B

Question 3

(a) Different approaches were used to answer the question both of which were successful. The first approach described the different sector use in each of the three countries in turn and suggested reasons for the different percentage shares of each sector, for each country. An alternative approach considered each type of sector (agriculture, domestic and industry) and reasons for differences between each country for the sector type were suggested. In effective answers percentages were compared and differences between sectors both within and between countries were calculated. In weaker responses there was a lack of reference to data or data was quoted rather than compared. Some weaker candidates did not use the key accurately and misquoted data.

(b) Effective answers provided good examples of water management strategies from a specific country, for example Mexico. Successful approaches tended to either explain how water was managed in each of the three sectors within the specific country. Alternatively, answers referred to different types of water sources for the country and explained how each water source is used to meet various demands. In strong answers the effectiveness of the water management based upon specific issues pertinent to the chosen LEDC or MEDC were assessed. Other answers were more generalised and were not focused on specific issues affecting water management. A common problem was to broaden the essay into a comparison of two countries or to refer a range of countries with a range of water resources and management approaches, the question required only one country to be considered.

Question 4

(a) In strong answers the terms ecosystem, biotic and abiotic factors were used clearly and with accuracy. Components of the illustrated mangrove, a coastal water ecosystem, were chosen to illustrate how the named factors influenced the ecosystem and its structure. Less effective answers confused terms. Only the strongest candidates made reference to the structure of the ecosystem shown in the figure and typically included reference to the vegetation and adaptations to the varying water levels. Biotic and abiotic factors were sometimes interchanged in the weakest answers.

(b) In strong answers the terms biosphere and preservation were defined. The strongest essays balanced information on organisations and protocols. These clearly outlined why preservation of the biosphere was needed and used examples effectively. There was assessment of the varying

levels of effectiveness of both protocols and organisations in relation to some examples of ecosystems and biodiversity. In weaker essays there was greater focus on organisations such as the WWF and less emphasis on the protocols. There was often more detail on why a protocol or organisation was needed rather than an assessment of its effectiveness.

Question 5

(a)   Strong answers demonstrated an understanding of the relationship between death rate, birth rate and population and the increasing level of economic development. In these answers the model shown in the figure was often separated into the various stages of the demographic transition model and the characteristics of each stage and the reasons for the economic development of each stage were exemplified. In weaker answers birth rate and death rate were described independently from population growth, the later stage of declining population and ageing population tended to be omitted and these answers did not explore the reasons for changing socio-economic conditions.

(b)   Strong essays were exemplified by reference to examples of both MEDCs and LEDCs and to examples of both overpopulated and underpopulated countries attempting to achieve an optimum population. In the most effective essays both the sustainable use of resources and management of population growth were considered. Weaker responses contained a limited range of suitable examples, often referring to MEDCs and LEDCs generally without reference to specific countries.

ENVIRONMENTAL MANAGEMENT

Key messages

In **Section A**, when considering source material candidates should analyse and use the information to support statements made in answers.

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In **Section B**, candidates should use examples from specific locations accurately to allow for relevant evaluations of the strategies used in environmental management.

General comments

In **Section A** there was generally good use of information from source material and, generally, in the more successful answers numerical data was manipulated.

In **Section B** there was accurate use of subject specific vocabulary and some effective use of appropriate examples for the longer questions. Weaker candidates would be advised to focus on developing points and on providing evaluations where appropriate.

Comments on specific questions

Section A

Question 1

(a) (i)   Definitions of biomass were often precise. Trophic level was generally less well defined.

(ii)   Most candidates were successful in their response to this question. Less precise answers did not specify the types of consumer. In some weaker answers multiple alternatives for a level, some of which were not appropriate to the particular trophic level, were given.

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(b) (i)   This question was generally well answered. In strong answers the overall trend was described and data carefully selected to illustrate trends or the overall percentage of coral loss calculated. In weaker answers the reading of the axes often contained inaccuracies.

(ii)   This question was very well answered both in terms of the range of human activities considered and in the development of how these contribute to loss of coral cover. Answers tended to demonstrate a good understanding of the extent of the problem and also expressed awareness of that the difficulty of managing the problem of coral loss. In the most effective answers human activities were well documented and the actual link between the activity and the loss of coral cover in terms of the damage to coral, removal of the coral and coral bleaching were outlined. The impact of some human activities that resulted in loss of coral cover through ecological effects were

generally less well covered. Coral cover was occasionally mistaken for forest cover relating to a terrestrial ecosystem rather than an aquatic marine ecosystem.

Question 2

(a) (i) Definitions of evaporation, interception and run-off were usually expressed succinctly. In less effective answers a definition of run-off was vague and the process of evaporation was sometimes confused with condensation. In weaker answers the definitions lacked precision so that the definition given could also have applied to a range of other terms.

(ii) Strong answers were those that described a local hydrological cycle and emphasised a balance of inputs and outputs. In less effective answers inputs and outputs were not clearly identified or were just listed. In some answers parts of the figure were listed without linking these processes and addressing the balance between them.

(b) (i) Candidates made good use of the stimulus material. The vegetation, extent of soil and processes were contrasted in the forested slope before and after deforestation in strong answers. Weaker answers referred to processes of the hydrological cycle but without emphasising the contrasts.

(ii) This question was answered well by many candidates. Answers tended to be confident in providing many strategies and methods for conserving an ecosystem and many candidates had obviously studied similar case studies. A wide range of appropriate methods were suggested relating to forest management and afforestation and many linked these to slope management techniques and flood control measures appropriate to the situation in the figure.

Section B

Question 3

(a) Different approaches were used to answer the question both of which were successful. The first approach described the different sector use in each of the three countries in turn and suggested reasons for the different percentage shares of each sector, for each country. An alternative approach considered each type of sector (agriculture, domestic and industry) and reasons for differences between each country for the sector type were suggested. In effective answers percentages were compared and differences between sectors both within and between countries were calculated. In weaker responses there was a lack of reference to data or data was quoted rather than compared. Some weaker candidates did not use the key accurately and misquoted data.

(b) Effective answers provided good examples of water management strategies from a specific country, for example Mexico. Successful approaches tended to either explain how water was managed in each of the three sectors within the specific country. Alternatively, answers referred to different types of water sources for the country and explained how each water source is used to meet various demands. In strong answers the effectiveness of the water management based upon specific issues pertinent to the chosen LEDC or MEDC were assessed. Other answers were more generalised and were not focused on specific issues affecting water management. A common problem was to broaden the essay into a comparison of two countries or to refer a range of countries with a range of water resources and management approaches, the question required only one country to be considered.

Question 4

(a) In strong answers the terms ecosystem, biotic and abiotic factors were used clearly and with accuracy. Components of the illustrated mangrove, a coastal water ecosystem, were chosen to illustrate how the named factors influenced the ecosystem and its structure. Less effective answers confused terms. Only the strongest candidates made reference to the structure of the ecosystem shown in the figure and typically included reference to the vegetation and adaptations to the varying water levels. Biotic and abiotic factors were sometimes interchanged in the weakest answers.

(b) In strong answers the terms biosphere and preservation were defined. The strongest essays balanced information on organisations and protocols. These clearly outlined why preservation of the biosphere was needed and used examples effectively. There was assessment of the varying

levels of effectiveness of both protocols and organisations in relation to some examples of ecosystems and biodiversity. In weaker essays there was greater focus on organisations such as the WWF and less emphasis on the protocols. There was often more detail on why a protocol or organisation was needed rather than an assessment of its effectiveness.

Question 5

(a)   Strong answers demonstrated an understanding of the relationship between death rate, birth rate and population and the increasing level of economic development. In these answers the model shown in the figure was often separated into the various stages of the demographic transition model and the characteristics of each stage and the reasons for the economic development of each stage were exemplified. In weaker answers birth rate and death rate were described independently from population growth, the later stage of declining population and ageing population tended to be omitted and these answers did not explore the reasons for changing socio-economic conditions.

(b)   Strong essays were exemplified by reference to examples of both MEDCs and LEDCs and to examples of both overpopulated and underpopulated countries attempting to achieve an optimum population. In the most effective essays both the sustainable use of resources and management of population growth were considered. Weaker responses contained a limited range of suitable examples, often referring to MEDCs and LEDCs generally without reference to specific countries.