

# ENVIRONMENTAL MANAGEMENT

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Paper 5014/11

Paper 11

## Key messages

- Candidates need to be precise in their answers. Vague statements where candidates state something is 'affected' are not enough for credit. They need to say how it was affected.
- The resources such as diagrams and photographs are important. While most candidates study them, a few seem to answer questions with no reference to the relevant resource.
- Candidates must be careful not to miss out questions that require completion of a graph. Not all questions will have answer lines.

## General comments

In **Section A** there was no one question that proved more difficult or easier than any other. Each question had some parts that were answered well and others that seemed beyond the knowledge and understanding of some of the candidates. In **Section B** candidates scored slightly higher marks on **Question 6** than on **Question 5**, possibly because **Question 6** contained more short answer parts and data/graphical questions. Nearly all the candidates attempted all the questions and completed the paper.

Candidates need to be aware of the meaning of command words. This particularly applies to the command words 'describe' and 'explain'. There is a tendency to just write a brief list or add explanation when description is required and to a greater extent describe or list when explanation is needed. Examinations are pressured situations, but a little time making sure they understand what the question requires will improve marks for candidates.

## **Section A**

### **Question 1**

- (a) (i) This was usually correctly identified. The descriptions were less good as few mentioned removing the soil and/or overburden.
- (ii) Weaker candidates tended to list a few disadvantages without explanation. They needed to state why noise, dust and traffic were problems.
- (iii) Most candidates realised the mine would provide employment opportunities.
- (b) This proved to be a fairly easy question, with comments about restoration and reclamation.

### **Question 2**

- (a) (i) A and B were well described, though some candidates did not recognise C as run-off or overland flow.
- (ii) Infiltration was only known by the better candidates.
- (iii) Answers were often vague, but some knowledge of interception and take-up by roots was shown. This was not always directed at the question, which asked about the effect on soil moisture.
- (iv) Most candidates were able to think of at least two reasons, such as for irrigation or for domestic use.
- (b) This proved to be a difficult question although there were plenty of possible answers.

### Question 3

- (a) (i) Most candidates answered this well.
- (ii) Good candidates identified the correct three-month period.
- (iii) Few candidates had an understanding of the need for a high sea temperature.
- (b) Candidates had good knowledge of the impact of cyclones.
- (c) Most candidates achieved at least some credit, usually concerned with the quality of buildings or length of advance warnings. The best answers frequently approached the question in terms of differences between developed and developing nations.

### Question 4

- (a) (i) Some candidates did not complete the divided bar, presumably because they are looking for answer lines and such questions do not have answer lines. Such graphs cause some difficulty as weaker candidates often superimpose the bars, starting all from zero. Two parts had been completed, but these were ignored by such candidates.
- (ii) Better candidates deduced that transport, mining or expansion of urban areas could be a cause.
- (b) (i) Some candidates struggled to come up with an answer. Loss of homes and their sources of food and fuel were the most frequent responses from better candidates.
- (ii) Few good answers were seen to this question. Answers needed to discuss selective logging, replanting after felling, etc.
- (c) (i) Most candidates correctly gave the answer, but could rarely explain why it was protected.
- (ii) This was another question that proved difficult for many candidates.

### Section B

#### Question 5

- (a) (i) Good answers provided a sense of what the climate was like, particularly noting the cold winters and the low annual precipitation along with reference to changes supported by data from the climate graph. Some weak candidates quoted data giving no indication that they understood what the climate was like.
- (ii) Low precipitation was the main problem, but comparatively few stated this. Many said it was too cold or the growing season was too short, but there is a seven-month growing season which is sufficient for many crops.
- (b) This was generally answered well, with detail on rate of decline, size and direction of retreat of the sea. Weaker candidates stated little more than the fact that the Aral Sea had shrunk.
- (c) (i) Most candidates scored well on this question. Those that lost marks missed labels on the axes and /or did not draw the y-axis to scale.
- (ii) Good candidates realised that 90% of the water was taken before reaching the Aral Sea and then performed the relevant calculation.
- (iii) This was a difficult question, though many earned credit for mentioning evaporation. Candidates needed to use the information provided within part (c) to state that evaporation exceeded the flow of water into the Aral Sea.
- (d) (i) Most candidates explained eutrophication and its effects, also salinity and poisoning, but with comparatively little reference to the ecosystem. Several restated the information provided that the climate had been affected without stating how this would affect the ecosystem.

- (ii) The most frequent correct answers concerned the reduction in fish catch and the effects this had on the people. Many thought they lost drinking water – it has never been a source of fresh water because of salinity. Few made references to decline in agriculture as rainfall decreased or health problems from the poisons.
- (e) (i) A few trees were left on the slope, but comparatively few candidates noted these as the natural vegetation.
- (ii) The best candidates recognised the signs of soil erosion and gave some indication of how it had happened, though few noted the deep gullies. Weaker candidates were unable to identify that soil erosion had taken place,
- (iii) The command word was ‘explain’. Some candidates just gave brief comments or a list such as terracing or contour ploughing. Some credit was given for such answers, but they needed to go on to explain how these could reduce soil erosion.
- (iv) Most candidates gained credit for stating ‘loss of fertility’ but they needed to go further to explain the effects on the population of the area. Very few mentioned the problem of river floods due to soil being washed into, and reducing the capacity of, rivers.
- (f) This was a challenging question but many candidates scored well. The best candidates understood the concept of sustainability and argued, using examples, that farming could increase production in a sustainable way. Candidates also realised that providing food for the growing world population would be extremely difficult without adding to environmental problems, i.e. they looked at both sides of the argument. Some good answers were seen that discussed the problems of food supply from the point of inequality and loss of food before it could be eaten and that solving these problems would allow sustainable farming to feed the world population. Weaker answers stated that it could and then gave reasons that conflicted with sustainability. Marks were awarded based on the quality of the response.

#### Question 6

- (a) Many candidates achieved full credit, though some confused habitat and population.
- (b) (i) A minority of candidates did not attempt this question. Care needs to be taken as not all questions have answer lines. Many candidates that attempted this scored well.
- (ii) Many candidates got this correct, though it is apparent that weaker candidates either did not understand the term or did not take sufficient care to extract the relevant figure from the graph and table.
- (iii) This proved an easy question for most candidates.
- (iv) Some candidates stated ‘summer’ without thinking about what the graph was showing, i.e. that temperatures were low when rainfall was low, so that must be winter or cool season.
- (v) Only about half the candidates appeared to recognise that this was a question about the natural vegetation of a savanna climate. There was much reference to crops and general quality of growth instead of grass and leaves. Some seemed to suggest that trees and bushes only existed in the wet season. Good answers mentioned the colour of the vegetation. The best answers mentioned the lack of leaves or, alternatively, the presence of leaves appropriate to the season.
- (vi) Most candidates realised that the amount of rainfall was the main factor.
- (c) (i) Most candidates noted that the elephants visited the area for water.
- (ii) Most candidates answered this question well.
- (iii) Many candidates identified that increased destruction to the vegetation would reduce the food available for other herbivores and thus their predators. Loss of habitats for insects was rarely mentioned.

- (d)** Some good candidates noted that the WWF was a nature conservation organisation, while many wrote about the fact that elephant populations were already under threat or faced extinction in some parts of Africa.
- (e) (i)** A number of candidates were imprecise. Some weaker candidates selected the wrong figure from fact sheet.
- (ii)** Most candidates gained full credit, usually for 'none in the north', 'few in the west' along with some statement about the distribution in the south. Some candidates need to be more precise in their descriptions of locations.
- (iii)** The majority of candidates obtained at least some credit, usually concerned with hunting bans. This was developed by the better candidates in terms of protection and government commitment to stop poaching.
- (f) (i-iv)** Candidates answered most of these questions correctly. Weaker candidates struggled with part **(iv)**. Careful study was required.
- (v)** This question required knowledge and thought. Quite a few candidates gave answers explaining why birth rates were high in many developing countries. Better candidates understood that this was to do with factors improving life expectancy and the fact that there were many women of child-bearing age.
- (vi)** This question offered candidates the opportunity to think about why an increasing human population is putting ever increasing pressure on the environment. The best answers explained in detail a number of key environmental issues. Others need to take notice of the command word, 'explain'. Such candidates tended to list with little or no explanation.

# ENVIRONMENTAL MANAGEMENT

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Paper 5014/12

Paper 12

## Key Messages

- Accuracy in reading graphs is an important skill that will benefit candidates in examinations.
- Candidates do need to think about their answers. Time spent on interpreting and using resources will increase the credit that can be awarded.
- When answering questions such as **5(e)** and **6(g)** candidates should try to look at reasons for and against and reach a conclusion based on evidence.

## General Comments

In **Section A, Question 2** was best answered with consistent high scoring on all parts. In **Section B**, both questions were answered to a similar high standard, with certain parts causing some difficulty for all but the best candidates. Nearly all candidates completed all the questions. A few wrote at unnecessary length on some part questions so they were short of time as they attempted the last few part questions. The number of marks and the space provided for responses are good indicators of the length of response needed to answer the question.

## Comments on Specific Questions

### **Section A**

#### **Question 1**

- (a) (i) Many candidates used the diagram well to answer in terms of the heavy frames and chains being dragged along the sea bed causing damage.
- (ii) The size of the net and the fact that other species live close to the sea bed were frequently given.
- (b) The best candidates were able to explain in detail how food chains and breeding were affected. They usually went on to make sound observations about the impact on people, such as loss of income, jobs and food supplies. Some developed their answers to write about impacts on fish processing plants and even the local economy. Weaker candidates need to avoid vague statements such as 'overfishing affects the food chain'. They need to state how it affects the food chain.
- (c) This was usually the weakest answer within **Question 1**, though the best answers covered a variety of reasons from fishermen ignoring regulation as they need food and income to support their families, to the difficulties and cost of policing the oceans.

#### **Question 2**

- (a) (i) A few candidates wrote about the rocks rather than the temperatures. Most candidates gave the correct answer.
- (ii) Many candidates gained full credit, though a few thought hot water turned the turbines.
- (iii) Fewer candidates were able to name geothermal energy, with the others usually thinking it was a hydro-electric power station.

- (iv) The majority were able to write about the lack of pollution and that it was a renewable energy source.
  - (v) Some correctly reasoned that geothermal was too expensive to develop for developing countries. More candidates correctly worked out that hot rocks were not found close to the ground surface in all countries.
  - (vi) Most correctly identified earthquake. The most frequent incorrect answer was flood.
- (b) The formation of igneous rocks was well known.

### Question 3

- (a) (i) This question illustrates the need to read the question and carefully study the resource. Quite a number of candidates described the changes from the ozone hole line. In answers on the correct line, there were some candidates who needed to be more accurate in their reading of altitude.
  - (ii) Some candidates could not accurately identify the two heights.
- (b) The use of CFCs as refrigerants and as a propellant in aerosols was identified in many answers. The best answers were able to then provide details of how the chlorine in CFCs catalyse the breakdown of ozone to oxygen.
- (c) (i) Winds were correctly stated in the majority of answers.
  - (ii) The long life of chlorine in the atmosphere was described well by some candidates.
  - (iii) Skin cancer was circled by almost every candidate. Cataracts were identified by a smaller proportion of candidates.

### Question 4

- (a) (i) A few candidates did not draw in the bar on the population pyramid. Nearly all candidates that did, however, completed the bar accurately.
  - (ii) This proved to be an easy task for nearly all candidates.
  - (iii) Some candidates needed to be more accurate in the reading of figures from the graph. Others omitted the thousand.
  - (iv) The decrease in birth rate was noticed by around one third of the candidates.
  - (v) There were a large number of acceptable answers. Weaker answers were often too vague for much credit, while better candidates realised that the large population below the age of 35 would cause issues regarding sufficient employment and the costs of education, for example.
- (b) This question was well answered by most candidates. Some candidates had few ideas beyond birth control and family planning.

## Section B

### Question 5

- (a) (i) A number of candidates did not answer the question as set. They either described the route of the Ganges or described the pattern of rainfall. The majority of candidates found plenty to write about and gained credit.
- (ii) Most candidates gained credit for identifying the positive relationship. Only a few gained full credit by noting that the rise and fall in flow occurred a month or so after the rise and fall in rainfall.
- (iii) This was another question where accurate study of the graph was required. Only a few obtained full credit by noting when the flow exceeded 25 000 m<sup>3</sup> per second. Those that gave a shorter period could be awarded only part credit.

- (iv) Candidates scored well on this question.
- (b) (i) Most candidates correctly interpreted the resource.
  - (ii) Roughly half the candidates gave the correct answer. A few ignored the 'million'. Other candidates used the wrong figures or could not calculate 3%.
  - (iii) There were many clues to the answers to this question in the resource, these were used by better candidates. Others ignored the information provided and struggled to gain much credit. Several included salt water in their answers.
- (c) (i) Some candidates counted the oil spills in the ocean instead. They needed to read the question with care.
  - (ii) Weaker candidates simply gave a list by ocean or continent. Good answers noted the clusters to the south of North America and around the coast of Europe. They also noted that most occurred close to coasts, in the Northern Hemisphere or in the Atlantic.
  - (iii) This question proved challenging. Candidates often wrote about icebergs or storms and ignored the possibilities that most spills occurred on shipping routes between oil exporters and oil importers. Another good suggestion was that they happened where there was oil extraction from beneath the sea.
  - (iv) Some excellent answers were seen here. Many knew about the impact on light entering the water and its implications for photosynthesis and the food chain. They also were aware of how oil affects fish gills and the feathers of birds.
- (d) Most pie graphs were accurately drawn, though some candidates need to be more careful, especially where the percentages are quite small.
- (e) In 5(d) candidates were provided with information about sources of marine pollution. Most ignored this useful information. Some answers were not directed at the question and discussed overfishing, for example. A considerable number wrote at length about oil pollution with little about why international cooperation was needed to tackle the problem. To achieve the top level candidates need to realise that the oceans are linked and currents spread pollution across all the oceans. Good answers also showed awareness that all countries, even landlocked ones contribute. They then concluded that a small number of nations controlling pollution will have limited effect as their seas will continue to be polluted from sources outside their control. Candidates need to think to answer such questions well.

### Question 6

- (a) (i) Candidates need to be accurate in reading figures from graphs.
  - (ii) Nearly all candidates identified the correct temperature, though they were less likely to be accurate in stating how many years ago the highest temperature occurred.
  - (iii) The positive relationship was stated by most for part credit. Comparatively few identified the current anomaly for further credit.
- (b) (i) A few candidates overlooked this question. The vast majority completed the graph accurately.
  - (ii) Many candidates explained that burning fossil fuels was the reason. Few mentioned that fossil fuels contain a high percentage of carbon.
- (c) (i) The answer of 4 billion or doubled was given by most. A few forgot the 'billion' and gave 4 alone.
  - (ii) Weaker candidates simply gave a list, often with inaccuracies as they misread the graphs. The best answers noted, for example, that all continents had increased their emissions, Europe only a little, Asia by a vast amount and that continents such as Africa or Oceania had doubled or trebled their emissions. This illustrates the importance of describing rather than listing.

- (iii) One of the key words in the question was 'strategies'. Examiners credited actions that could be interpreted as strategies, such as replacing fossil fuels with renewables for electricity generation. Similarly promoting the use of public transport gained credit, but individual actions such as travelling by bus or walking could not be seen as strategies.
- (d) (i) This question was answered well.
- (ii) As with the above question, candidates had little problem answering this question.
- (e) (i) Many candidates gained full credit, usually for stating something about the removal of the soil, the use of explosives to loosen the rock and the use of machinery to load the rock onto trucks.
- (ii) Most candidates answered the question well with loss of habitats, noise and dust from explosions and machinery, and the pollution of water bodies frequently seen. Some candidates wrote about reclamation so did not answer the question.
- (f) (i) The fact that this form of electricity generation does not emit carbon dioxide / greenhouse gases was written by nearly all candidates. Candidates who thought about the resource realised that the reduction in transport of raw materials was an environmental benefit and so gained further credit.
- (ii) Reasons against a nuclear power station were stronger than the reasons in favour. Good answers included the possibility of employment, reliable electricity supply and improvements to local infrastructure.
- (g) Quite a lot of candidates started by agreeing or disagreeing with the statement. They then went on to give evidence in support of their decision and frequently ignored counter arguments. Some, if arguing against, would add a sentence stating renewables were better, usually without giving reasons. There was no correct answer; responses were marked on the quality of the argument and those in the top level made some attempt to look at both sides and reach a conclusion based on the evidence in their responses.



# ENVIRONMENTAL MANAGEMENT

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Paper 5014/21

Paper 21

## Key Messages

Candidates should:

- use the information given in the paper to support answers
- plot graphs carefully with both axes fully labelled with units
- take careful note of the mark allocation for each question

## General Comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Belize. Many candidates understood and made good use of the source material and their written responses were clearly expressed. The mathematical and graphical questions did pose some difficulties for a minority of candidates.

Candidates had no problems completing the paper in the time available.

Overall the demand of this paper was very similar to past papers and Centres should work through past papers to help candidates see how to make the best use of the information given for each question.

## Comments on Specific Questions

### Question 1

- (a) (i) Most candidates gave at least one impact of hurricanes on the economy of the country. Some candidates described the impact on humans, which did not answer the question.
- (ii) Most candidates realised that relatives would be able to send money.
- (b) (i) Most candidates described the benefits of adding manure to the planting hole appropriately.
- (ii) Only a few candidates made full use of the data from the table. Nearly all candidates correctly suggested that as planting density increased so did the yield. All the other points on the mark scheme were seen but only thoughtful candidates gave several of these answers.
- (iii) Most candidates managed to give one sensible answer as to why planting at the highest density would not be suitable for many farmers. All the points on the mark scheme were seen but only a few candidates managed to gain full credit.
- (iv) A wide range of answers were given, only a minority of candidates gave one of the correct answers.
- (v) The role of legumes was clearly described by many candidates.
- (c) (i) Some candidates completed the table incorrectly as they did not appreciate that the mass of the bowl needed to be taken into consideration.
- (ii) Candidates nearly always calculated a percentage of the papaya that could be eaten. Only a small number were incorrect even when allowing for a mistake in part (i).

- (iii) Nearly all candidates correctly identified some of the equipment needed. However, many did not list sufficient items to gain full credit.
  - (iv) Many candidates correctly commented on the need for care with the knife. Credit was not given for suggestions such as get an adult/teacher to do it or use a blunt knife.
  - (v) Nearly all candidates made two suggestions worthy of credit.
- (d) (i) This question asked candidates to suggest the benefit to the government of encouraging papaya farming. Most candidates could give one reason. Some candidates drifted on to thinking about farming from the farmer's point of view which could not gain credit here.
- (ii) Many candidates gave reasonable answers here.
  - (iii) Questions about plant breeding are often answered with vague or inaccurate terms. Developing new crops by selective breeding or genetic engineering is an important topic.
- (e) (i) Most candidates correctly identified that the papaya flesh would be long lasting but most failed to develop their answers further.
- (ii) Most candidates gave good reasons as to why dry papaya flesh production might not be profitable.
  - (iii) Most candidates gave a description of subsidies and gained credit.
  - (iv) Many candidates rather lost sight of the key point of the question about sustainability of production. The fact that plants could be used that were resistant to diseases was suggested by some.

## Question 2

- (a) (i) Candidates who carefully considered the information given completed a transect line at the correct position. A significant minority repeated one of the transect lines already given on the diagram which could not gain credit.
- (ii) Many candidates gave good reasons for carrying out plan three.
  - (iii) Most candidates plotted the graph accurately. There are still some candidates who do not fully label both axes so maximum credit cannot be awarded.
  - (iv) The pattern of the data was frequently well described.
  - (v) Candidates that gave careful consideration to the statements about biodiversity and the data given gave answers that gained credit. Unfortunately some candidates just assumed that cutting down trees would reduce biodiversity.
  - (vi) Candidates often only gave rather vague suggestions as to how to find out more about biodiversity around power lines. They only needed to describe some suitable survey methods to gain the marks for this question.
- (b) (i) The candidates often gave good answers as to why the project was an example of sustainable development.
- (ii) Most candidates appreciated that the costs of building the dam had to be recovered from the cost of electricity.
  - (iii) Candidates gave logical answers to support either point of view. The candidates that appreciated that the macaw was only locally extinct gave the best answers.
  - (iv) A significant minority of candidates appreciated that dams cause siltation behind. Candidates who just stated that water would be used up did not gain credit.

# ENVIRONMENTAL MANAGEMENT

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Paper 5014/22

Paper 22

## Key Messages

Candidates should:

- use the information given in the paper to support answers
- plot graphs carefully with both axes fully labelled with units
- take careful note of the mark allocation for each question

## General Comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Guatemala. Many candidates understood and made good use of the source material and their written responses were clearly expressed. The mathematical and graphical questions did pose some difficulties for a minority of candidates.

Candidates had no problems completing the paper in the time available.

Overall the demand of this paper was very similar to past papers and Centres should work through past papers to help candidates see how to make the best use of the information given for each question.

## Comments on Specific Questions

### Question 1

- (a) (i) The majority of candidates readily understood the positive effects of an increase in world demand for cardamom.
- (ii) Nearly all candidates were able to do this calculation.
- (iii) The question proved difficult for most candidates. This was the control experiment to compare with the effect of an acid on seed germination.
- (iv) Many candidates realised that farmers might think the process would be very time consuming for very little gain. All the points on the mark scheme were seen regularly.
- (b) The 'heavy metal' part of the question was ignored by many candidates.
- (c) Most candidates appreciated that the mineral nutrients would recover and the seedlings would then grow well.
- (d) (i) The advantage of using two sets of trays was appreciated by most candidates.
- (ii) Most candidates could see that measuring the seedlings on two separate days was an advantage. Most of the other marking points were only given by a small number of candidates.
- (iii) Most candidates gave a list of pieces of information that were relevant to the methods described. Most candidates obtained most of the available credit in this question.
- (e) (i) The graphs were usually plotted correctly. However some axes were not fully labelled.

- (ii) The pattern of the graph was often described adequately. To just state that there is an increase in seedlings was not sufficient, the plateau needed to be described as well.
- (iii) Those candidates who had responded well to the previous two questions often gave the farmer correct advice. Answers needed to contain quoted figures.
- (f) (i) The command word 'calculate' meant that one temperature value must be subtracted from another to give the correct answer. Some candidates identified the two values but did not perform the subtraction.
  - (ii) Candidates performed well on this question.
  - (iii) Most gave the loss of crops as a possible effect of high rainfall. Descriptions of surface run-off leading to erosion were rare by comparison.
- (g) (i) This question required an understanding of the process and effects of selective breeding. A small number of candidates described this well. Many could not move far beyond the source material given.
  - (ii) This was a question requiring some knowledge of genetic engineering. Some candidates could describe the process of genetic engineering in outline.

## Question 2

- (a) Many candidates suggested sensible disadvantages of the power generation methods. There did seem to be some confusion about geothermal energy as it was regularly suggested this could only be developed in volcanic regions.
- (b) Most candidates realised that the north of the country was remote and mountainous. The additional cost to supply and small population were the most frequent suggestions.
- (c) (i) There was a lack of detail given in the proposed methods for a survey of biodiversity. The importance of being able to identify the plant species was not appreciated by many candidates and the methods were frequently confused.
  - (ii) The best answers stated the survey should be repeated beside other power lines in similar forests. Vague answers about repetitions were not sufficient for credit.
- (d) (i) Most candidates correctly identified the time of lowest demand. Some candidates needed to inspect the graph with greater care.
  - (ii) Most candidates realised that most of the population would be at home and suggested sensible reasons for an increase in electricity consumption.
  - (iii) This question was a demanding one as the question required arguments to persuade the government rather than individuals. If candidates appreciated that reducing demand was likely to be more cost effective than generating more electricity they usually continued to make some of the other points on the mark scheme.
- (e) (i) Most candidates gave a correct answer.
  - (ii) Most candidates directed their questions towards electricity supply and gave respondents reply options. This question was generally done well by candidates.