

ENVIRONMENTAL MANAGEMENT

<p>Paper 0680/12 Theory</p>

Key messages

Candidates should take care to ensure they answer the question posed rather than provide ancillary knowledge. It is important to respond to the context of the question.

When creating graphs, it is essential to use an appropriate scale, clearly label the axes, and follow all given instructions, such as connecting the data points with lines.

Candidates are expected to be able to identify and name the continents and major oceans on maps.

General comments

Candidates are expected to apply their knowledge to unfamiliar situations. Many were able to identify the benefits and limitations of using aircraft to apply herbicides but were more challenged by identifying which of three buildings was the most energy efficient.

Stronger candidates were able to provide detailed answers. Other answers were more generic and therefore did not achieve all the available marks.

Some candidates did not follow the instructions in the question, for example choosing to draw a line of best fit on the graph when they were instructed to draw straight lines between each plotted point.

Comments on specific questions

Section A

Question 1

- (a) Most candidates correctly completed the sentences. The most common error was to confuse crust with mantle.
- (b) Generally well answered, many candidates were able to interpret the diagrams and correctly name the plate boundaries. Boundary **C** proved to be the most challenging.
- (c) Candidates typically showed a clear understanding of the classification of rock types, often gaining full marks on this question.

Question 2

- (a) (i) Demonstrating a good understanding of the population pyramid, most candidates were able to identify the correct age group.
- (ii) Generally well answered, most candidates remembered to combine the values for male and female.
- (iii) Weaker candidates had difficulty in providing an explanation for the lack of population aged 100+. Some explanations did not express their answers clearly enough, for example the idea that the value would be less than 0.00% rather than rounded down from a value less than 0.05%.

- (b) A number of candidates attempted to interpret the pyramid in terms of birth rate or death rate rather than describing the pyramid as required.

Question 3

- (a) Relatively few candidates recognised that all organisms respire, often omitting to tick the box for decomposers.
- (b) Most candidates correctly stated the word equation for respiration.
- (c) Generally, a good understanding of the carbon cycle was demonstrated, most candidates named combustion/burning.

Question 4

- (a) (i) It was clear that a good proportion of candidates understood the use of booms. Many weaker responses did not apply this knowledge to the specific example. In this case, the booms were being used to protect the island rather than to enclose the spill itself.
- (ii) This question required candidates to name other ways of reducing the impact of oil spills. The use of double-hulled ships was often given but this is a strategy to reduce the likelihood of an oil spill rather than reducing the subsequent impact.
- (b) A wide range of potential answers were awarded credit. The question focused on the causes of marine oil spills which was sometimes not clearly expressed within the answers.

Section B

Question 5

- (a) (i) Candidates showed a good understanding of how geothermal energy is generated. Some descriptions included the involvement of a heat exchanger although this is not common in all systems. Mentioning this was not essential for a correct answer. Many candidates continued their description to include the use of the turbine, but many did not demonstrate clear understanding of the role of the generator in the production of electricity.
- (ii) There were relatively few correct answers to this question. Few candidates understood that the heat retained within the water would still be useful in the nearby town.
- (iii) Many candidates incorrectly identified the emissions as being smoke rather than steam.
- (b) The benefits and limitations of geothermal energy were generally well known. The benefits would often have been applicable to other renewable sources too.
- (c) (i) This graph was generally well drawn. Some candidates did not provide a suitable scale or show that the y-axis extended to zero. A few candidates attempted to draw a line of best fit rather than draw straight lines between each plotted point as instructed in the question.
- (ii) Candidates were generally able to use the plotted data to determine the required value.
- (iii) Relatively few candidates used the word 'extrapolate' within their answer, however descriptions that demonstrated knowledge of this technique were also credited.
- (d) (i) Only the stronger candidates were able to provide a valid response, usually relating to the opportunities of education.
- (ii) The concept of insulation proved challenging for many candidates. Many struggled to apply this to the unfamiliar context to explain that a well-insulated building is likely to retain snow on its roof as there is less wasted heat. Many correctly identified that this building was also the smallest of those labelled in the photograph.
- (iii) The majority of responses gained some credit, often relating to the availability of materials, although some candidates would have scored better if their responses contained more detail.

Question 6

- (a) (i) This question was challenging for many candidates, many named the country, not the continent.
- (ii) The majority of candidates named the ocean correctly.
- (iii) Most candidates were able to show the correct wind direction, however, many showed the currents incorrectly despite going on to provide the correct description in **Question 6(b)**.
- (b) This question required a more detailed, longer response to gain all the available marks. Many candidates understood the impact on fisheries and provided clear answers. There were a few candidates who were confused with the role of upwelling.
- (c) (i) Many candidates found the interpretation of the graph challenging, not understanding the significance of the cumulative data.
- (ii) Most responses gained credit here, the most common error was to try to explain the pattern rather than the effect.

Question 7

- (a) (i) Another question confidently answered. Most candidates named the layer correctly.
- (ii) The natural greenhouse effect was not well described. Many explanations confused their answers with ozone depletion.
- (iii) In this question, credit was given for the increase in production of greenhouse gases and the impact this has on preventing heat loss from the atmosphere. There was some confusion with the impact of CFCs.
- (b) (i) The information on the map was generally well interpreted. There were relatively few examples of descriptions using the terms 'above, below, top, bottom'. While the general trends were understood, some responses lacked accuracy in the use of data. Stronger candidates correctly identified that although emissions in some areas had reduced in size, the number of emission sites shown on the map had increased.
- (ii) Some candidates were able to provide valid reasons why the conclusion may not be correct, often identifying that sulfur dioxide is still being released, making the link between this and acid rain and the fact that other named pollutants also have an impact.
- (iii) While candidates often knew the effects of acid rain, many did not articulate this clearly in their responses. Answers such as 'pollution' were too vague.

Question 8

- (a) (i) The idea that herbicides kill weeds was generally well explained, although a few candidates incorrectly referenced pests and diseases. Candidates were often able to support their answer with a valid reason to control weeds.
- (ii) Most candidates were able to apply their knowledge to the context and provide at least one benefit and one limitation of the use of aerial application. Only the strongest candidates gained full credit for this question.
- (b) (i) Generally well answered. The most common incorrect answer was crop rotation which cannot be identified in an image taken at one point in time.
- (ii) Responses commonly identified the benefit of fruit trees as a wind break and the role of the roots in retaining soil.
- (c) This 6-mark, level of response question provided the opportunity to demonstrate knowledge over a wide range of topics. The strongest responses provided a balanced view from both sides of the

debate and were able to support their observations with relevant examples. This helps the candidate to demonstrate that they understand the subject in detail.

ENVIRONMENTAL MANAGEMENT

<p>Paper 0680/22 Management in Context</p>
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Key messages

Candidates should read questions carefully to identify the command word when deciding how much detail to give in an answer.

Candidates should consider the mark allocations and the number of answer lines given when providing a response.

When shading pie charts, candidates should make sure the shading matches the key. Sectors should be drawn clockwise in rank order (including other) with the largest sector starting at 'noon'.

When describing information from a map, candidates should use the north arrow to support descriptions of distributions with points of the compass instead of using terms like top, bottom, downwards, left or right.

Working should be shown when completing calculations. If more than one mark is available for the question, partial credit may be awarded.

General comments

This paper required candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country. Many candidates demonstrated good understanding of and made good use of the source material. Written responses were often clearly expressed. The mathematical and graphical questions were challenging for some candidates.

Comments on specific questions

Question 1

- (a) (i) Some candidates found estimating the area of the lagoon from the map challenging.
- (ii) This question was generally well answered with candidates giving correct reasons for the location of the factory.
- (iii) Most candidates gave acceptable examples of biotic and abiotic components of a lagoon ecosystem, with only a very small number giving vague answers such as 'living environment'.
- (b) Candidates were asked to identify environmental impacts of sea salt extraction. Some candidates identified one type of pollution that could be caused by the process, but listing different types of pollution did not score more than one mark. Some candidates also discussed impacts not directly related to the sea salt extraction process, such as storage of salt on land. These answers did not gain credit.
- (c) The most common points made by candidates who gained credit were about limiting hunting in biosphere reserves, followed by points about education and awareness raising.
- (d) (i) Many answers to this question lacked sufficient detail and were often based on the definition of sustainability only, not on sustainable tourism specifically.

- (ii) This was a well-answered question. Most candidates gave answers relating to limiting numbers of boats, limiting numbers of tourists, limiting boat speeds and ensuring whales were not disturbed.
- (e) (i) A good proportion of candidates correctly calculated the mean decrease per year in the porpoise population, but there were also some that made an error in their calculation. Most candidates did show their working, resulting in them being able to access the mark for the calculation itself or for correct rounding.
- (ii) This question was well answered with most candidates giving a plausible reason why it is difficult to estimate the porpoise population.
- (iii) A large proportion of candidates stated that porpoises get caught in nets and/or that fishing reduces the food supply for porpoises. However, quite a few candidates stated that the porpoises were being hunted themselves and sold at a profit. This answer did not gain credit.

Question 2

- (a) (i) Most candidates identified the correct month from the graph.
- (ii) This question was generally well-answered, although some candidates stated June-September.
- (iii) Candidates usually plotted the data correctly. It was sometimes difficult to see exactly where plots lay due to the large size of the point.
- (iv) For full credit, candidates needed to provide three comparative statements using information from the graphs. A range of correct answers were seen, however some candidates misread the graph and looked at the temperature line instead of the precipitation bars, resulting in incorrect trends being described.
- (b) (i) Many candidates who did not gain credit for this question described the river joining the Sea of Cortez or international boundaries as reasons for the low water supply by the river. However, there were also a good number of candidates who did gain credit here; increased demand for water was the most common correct answer.
- (ii) Most candidates successfully named two sources of fresh water.
- (c) (i) Many answers to this question lacked sufficient detail to gain credit, such as water being used as drinking water without any further qualification.
- (ii) Some candidates correctly recalled the correct formula for nitrate ions although this question appeared challenging for many.
- (iii) Generally, a well-answered question with the most common correct answer being about fertilisers.
- (iv) The process of eutrophication was well described in answers to this question.
- (d) Many answers to this question were too vague, often focused on perceived longer-term effects such as there being more water available in the future, rather than on the effects on the people experiencing the water rationing.
- (e) (i) This was a very well-answered question.
- (ii) Most candidates scored a mark for stating that sewage in water causes diseases and the other mark points were also seen frequently.

Question 3

- (a) (i) Most candidates drew a suitable bar chart. The most difficult bar to plot seemed to be the one for Kenya given that most candidates used a scale of 20 for 5 boxes on the y-axis. Only a very small number of line graphs were drawn.
- (ii) Most candidates calculated this correctly. The most common incorrect answer was 63.

- (b)(i) The most difficult part of this question seemed to be the conversion from 9.2 million to 9 200 000. Some candidates also divided the numbers the wrong way round.
- (ii) This was a well-answered question. Job opportunities, better healthcare and access to education were the most common correct answers.
- (c)(i) A significant proportion of candidates answered this incorrectly; 12 or 15 hours were common incorrect answers.
- (ii) This question was answered well.
- (iii) Some answers were not credited here as they did not mention suitable times of day, for example only stating, 'vehicles were used' rather than 'more vehicles were used between 6am and 6pm'.
- (d)(i) Many candidates gave incorrect gases for the formation of smog. Candidates often described the formation of smog with a basic description of smoke and fog gaining the first marking point.
- (ii) Many candidates answered this question well. Some candidates gave a list that covered the same mark point, for example use more EVs, use more renewable resources and reduce use of fossil fuels instead of stating other mark points.
- (iii) This was a fairly well-answered question although some answers were too vague, for example only mentioning respiratory 'problems' rather than a specific condition.

Question 4

- (a) Most candidates scored at least one mark for this question. The most common mark points were awarded for mentions of deforestation and over-harvesting.
- (b)(i) Candidates found this question challenging. Some candidates gave very vague answers, often only repeating the scaffolding given in the question. Where more detail was included, candidates often missed mark points by not being specific enough, for example not describing the transect as some sort of line. Many candidates missed the 'repeat' mark despite this being a very common answer to include in any experimental question. Overall, candidates did not demonstrate a clear understanding of what a transect is, or how it is used.
- (ii) The process being time consuming and the area being large were the most common correct limitations of sampling with a transect given by candidates. Some answers were too vague to gain credit, for example, only stating 'not accurate' or 'biased' without further explanation.
- (c)(i) Many candidates gained a mark for stating that seed banks conserve biodiversity, but other answers given were often too vague to gain credit. Most candidates only gained one mark.
- (ii) Candidates often scored at least some of the marks for this question, often for stating that storage in seed banks is expensive, that not all seeds store well and that only limited numbers of seeds can be stored. Some candidates did not show a clear understanding of how seed banks work, for example stating that seeds are grown there rather than being stored there.