

ENVIRONMENTAL MANAGEMENT

Paper 5014/12
Paper 1 Theory

Key messages

- Some responses lacked sufficient detail to achieve the full range of credit available at this level. Some candidates needed to be more specific in their responses.
- Candidates should be encouraged to show their working when completing calculations even if this is not specifically asked for in the question.
- Descriptions of maps should be precise to prevent potential ambiguity, using compass points in answers rather than terms such as 'above' or 'below'.
- Opinions or conclusions should be supported by relevant examples where possible.

General comments

It is important that candidates are confident in all subject areas covered in the syllabus and are also able to combine their knowledge from different subject areas to form opinions. There was evidence of candidates planning questions prior to completing their final submission which can be useful in longer response questions.

Most candidates were able to apply skills in plotting data in **Question 7**, although there were a number of candidates who appeared to have missed the instruction and did not complete the bar chart.

Some candidates showed a lack of understanding of ecological reserves and how they may be protected in **Question 8**.

Candidates were generally competent at mathematical tasks although some struggled with calculating the annual increase in height (**Question 5(a)(ii)**) and expressing information as a ratio (**Question 6(a)(iii)**).

Most candidates attempted all questions with a good volume of written work provided in the more extensive questions.

Comments on specific questions

Section A

Question 1

- (a) The concept of terracing was not generally well understood by candidates and many described the presence of vegetation as being the reason for reduced soil erosion rather than the reduction in gradient and slowing down of water flow rate.
- (b) Most candidates were able to state two other methods of reducing soil erosion.

Question 2

- (a) A significant number of candidates were unfamiliar with the interpretation of the growth curve. Those who showed understanding tended to achieve full credit.
- (b) Most responses successfully described two methods of controlling the birth rate of a population.

Question 3

- (a) (i) In this question, candidates were required to interpret the photograph to answer the question. This was generally achieved to a good standard, with a wide range of potential responses given credit.
- (ii) Many candidates were able to provide two distinctly different ways a supply of safe drinking water could be provided.
- (b) Most candidates were able to calculate the percentage increase. The importance of showing working was illustrated here as candidates were able to gain partial credit for the intermediate arithmetic step even if the final answer was incorrect.
- (c) While this question proved to be accessible to all candidates, some responses required further clarity to gain full credit.

Question 4

Candidates were required to describe the damage they could see in the photograph. Some answers did not fully respond to the question posed and gave responses related to the impacts on humans or the design of buildings to reduce the impacts of earthquakes.

Section B

Question 5

- (a) (i) Most candidates were able to correctly interpret the data in the table to identify the age a teak tree reaches its maximum height. The most common error was to quote a range of ages rather than a single age.
- (ii) Candidates needed to divide the height reached at 50 years by 50 to calculate the annual increase in height. This calculation proved challenging for many candidates.
- (iii) Most candidates were able to explain that the data showed the diameter of the tree continued to grow while the height of the tree had peaked.
- (iv) Candidates were generally very competent at using the formula to calculate the circumference of the tree trunk.
- (v) This calculation of the yield of timber from an area proved to be accessible to most candidates.
- (b) Candidates gained credit for many different observations, for example the change of the area from many to one tree species. Weaker responses identified that biodiversity would be affected but needed to go on to provide specific details as to how or why. A few stronger responses also identified the opportunity the extensive planting of a new tree would have to allow new species to colonise an area.
- (c) There was a lack of clarity in many responses regarding the technique of selective logging. A few successful candidates suggested a range of reasons such as the retention of biodiversity and the opportunity of selective logging to allow an income from the forest.

Question 6

- (a) (i) This question required candidates to review the newspaper article to extract relevant information and complete a calculation. Most candidates were able to complete this competently; some candidates used incorrect data relating to low and middle income countries.
- (ii) Some candidates did not fully answer the question, missing the issues facing low and middle income countries. Few mentioned the causes of indoor air pollution.
- (iii) This calculation involving ratios proved to be more challenging for many candidates.

- (b) Most candidates were able to state that air pollution caused a form of lung disease. Other responses were too generalised and needed to be more specific to gain credit.
- (c) There were a good range of responses to this question exploring why governments have difficulty in reducing air pollution. These included the need for retaining economic growth, the difficulty in enforcing legislation, the challenges faced by persuading individuals as well as the impacts of the actions in other countries.

Question 7

- (a) (i) Most candidates were able to interpret the data correctly and plot the information on the bar chart. There were a number of candidates of all abilities who appeared to have missed the instruction and did not complete the bar chart.
 - (ii) Many candidates were able to identify the year with the highest number of large oil spills. The most frequent error was to quote the year with the highest total number of oil spills.
 - (iii) Most candidates were able to quote the correct number of small oil spills. The most frequent error was to quote the total number of oil spills.
 - (iv) Generally, candidates did well in this question requiring them to describe the trends in oil spills, most notably the reduction in oil spills over the stated period. The most common error was to focus on the differences in specific years rather than the overall trends.
 - (v) Most responses correctly identified the impact of the introduction of double-hulled oil tankers. Some responses required greater clarification, for example there were references to new technology without clarifying what type.
- (b) Candidates appeared to be well prepared for this question on the impact of oil spills in the marine environment, often referring to the impact of the lack of light on photosynthesis. Stronger responses linked this to an impact on the food webs.
 - (c) Candidates were well prepared for this topic. A wide range of potential answers were available, with the focus on major sources of oil pollution.

Question 8

- (a) This question was attempted by most candidates, although many responses used language such as 'above' or 'below' rather than using the points of the compass to describe the locations.
- (b) (i) Many candidates suggested that the decrease in the area of the coral reef was due to tourists (human damage). Some candidates also suggested climate change.
- (ii) Most candidates were able to complete this calculation correctly, with few examples of errors.
- (c) Many candidates understood the concept of ecological reserves, and needed to apply their ideas to the marine environment. Many incorrectly suggested that there would be problems in relocating a coral reef and its associated organisms, which in reality would not be needed. The strongest responses identified the challenges in patrolling a large area, the impact the designation may have on tourism or fishing and the problem of water pollution entering the area from nearby areas.

Question 9

- (a) A well-answered question in which candidates needed to make sure that they expressed their ideas with sufficient detail. It was important that statements were made in comparison to subsurface mining to provide context.
- (b) While most candidates attempted this question, there was a large variance in their abilities to classify the rocks according to the three categories provided. It was incorrect for candidates to assume there would be an equal number of rocks in each category.
- (c) Most responses showed a good knowledge of the formation of metamorphic rocks, citing their origin in other rock types and the requirements for heat and pressure.

- (d) This extended-answer question was marked using a Level of Response mark scheme. This focuses on the quality and depth of the response rather than simply the number of points made and allows for a more extensive or detailed answer. The strongest responses identified the strengths and weaknesses of the opposing points of view and were able to put together a coherent response with examples to support their comments. They also provided a conclusion related to their point of view. Weaker responses often discussed the issues in general terms and tended to put forward a narrow view of the topic. Answers were generally well laid out and presented in a logical and clear order, demonstrating that responses had been planned prior to starting the answer.

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<p>Paper 5014/22 Paper 2 Management in Context</p>
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Key messages

- Candidates should read the whole of each question carefully. For instance when plotting graphs, they should check whether the type of graph, line or bar, is specified.
- Not all questions are answered on answer lines so candidates should check if answers have to be written elsewhere, for example, in a table or on a diagram.
- Candidates should be encouraged to show their working when completing calculations even if this is not specifically asked for in the question.
- Candidates should study the command word, mark allocation and the number of answer lines provided for a question before starting to write a response as these will give an indication of the length of response necessary.

General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Madagascar. Many candidates understood and made good use of the source material and their written responses were clearly expressed.

The mathematical and graphical questions posed some difficulties for a small number of candidates. It is beneficial to show working as in some cases there is still the opportunity to gain some credit even if there is an error in achieving the final answer.

Comments on specific questions

Question 1

- (a) (i) Most candidates were able to calculate the percentage of people living in rural areas correctly.
- (ii) Most candidates were able to suggest at least one reason why local people in Madagascar do **not** think they will benefit from sustainable tourism.
- (iii) Most candidates were able to identify at least some services required by tourists. Some candidates repeated their ideas.
- (iv) The most common environmental problems listed as being caused by large numbers of tourists were named examples of pollution (e.g. atmospheric) and various ways the natural environment could be damaged.
- (b) (i) Many candidates correctly calculated the percentage of all lemur species in Madagascar that are **not** at risk of extinction. Those candidates who showed correct working were able to gain partial credit even if their final answer was incorrect.
- (ii) Most candidates could define the term habitat correctly.
- (iii) Most candidates were able to gain partial credit for explaining why deforestation can occur in less economically developed countries.
- (iv) Many candidates gave detailed accounts of how soil erosion can occur after trees have been removed to gain maximum credit.

- (v) Although most candidates were familiar with the term consumer, some had more difficulty distinguishing between a primary and secondary consumer.
- (c) (i) A small number of candidates gained full credit here. Some candidates did not appreciate that surveys need to be repeated to discover if the populations are declining, maintaining numbers or increasing over time.
 - (ii) Those candidates who took note of the word 'sustainable' in the question usually described ways in which sustainable farming can take place successfully. Only a small number of candidates named farming methods that were not suitable.
- (d) (i) Most candidates plotted the data correctly as a line graph and labelled both axes correctly.
 - (ii) Most candidates were able to successfully predict the estimated sales of stoves in year 8.
 - (iii) Many candidates suggested at least one advantage to local people of using fuel-efficient stoves.
- (e) (i) Most candidates identified that producers are able to photosynthesise or gave an appropriate description of the process.
 - (ii) Many candidates found describing a method to monitor the population of orchids challenging. The pieces of equipment were shown to prompt candidates to think about survey methods that could be used in the field. A small number of candidates gained maximum credit.

Question 2

- (a) (i) Most candidates were able to identify the type of mining shown in the drawing.
 - (ii) Most candidates were able to suggest at least one benefit of surface mining.
 - (iii) Many candidates gave detailed descriptions of how igneous rock is formed and gained maximum credit. A small number of candidates described metamorphic rock formation.
 - (iv) A small number of candidates made appropriate suggestions as to why the ore was processed at the mine. Reducing transport costs was the most frequent correct response.
 - (v) Nearly all the candidates gave sensible descriptions of the environmental impacts of starting a new mine, gaining full credit.
 - (vi) Many candidates identified at least one economic impact of mining.
- (b) (i) Most candidates completed the calculation correctly. Those candidates who showed correct working were able to gain partial credit even if their final answer was incorrect.
 - (ii) Most candidates gave at least one reason to explain why the world price of chromite might decrease.
 - (iii) Many candidates suggested that recycling could contribute to the sustainable use of chromite. Some candidates gave further sensible suggestions.
- (c) (i) Most candidates made some use of the information shown in the graph to suggest why there was a high risk of toxic chemicals being washed out of the mining waste. Further detail was needed in most responses to gain full credit.
 - (ii) Many candidates displayed some knowledge and understanding of the process of bioaccumulation but needed to give further detail to gain full credit.
- (d) (i) Most candidates gave a suitable reason as to why there were very few large fish in the lake.
 - (ii) Most candidates found it difficult to describe the possible changes in the food chain in a logical sequence.

- (iii) Most candidates suggested that fishing in the lake was not a sustainable activity. Some explanations lacked the clarity required to be awarded credit. A wide range of points were made and some candidates gained full credit.
- (e) Candidates usually suggested a suitable use for the water hyacinth removed from the lake.
- (f) (i) Nearly all candidates completed the table correctly.
 - (ii) Most candidates appreciated that pot **A** was required in the method to act as a control or to be used as a comparison.
 - (iii) Many candidates identified suitable factors to keep the same during the experiment. A small number of responses stated two factors that had already been keep the same in the method described in the question.
 - (iv) Almost all candidates described the pattern of results adequately. Careful use of the information given allowed many candidates to gain full credit.
- (g) Most candidates gave a sensible reason as to why sample **R** was likely to have the highest concentration of toxic chemicals. Only a small number of candidates supported their answer using data from the table.
- (h) (i) Many candidates correctly suggested that high temperatures and rainfall would lead to high rates of evaporation.
 - (ii) Most candidates identified the correct months with a supporting reason to explain the highest and lowest concentration of toxic chemicals.