

ENVIRONMENTAL MANAGEMENT

Paper 5014/12
Paper 1 Theory

Key messages

- Candidates should aim to provide sufficient detail to achieve the full range of credit available at this level.
- Candidates should pay attention to the command word in the question (state, describe, explain, etc.) as this will help in the understanding of the level of detail required in the response.
- Candidates should be encouraged to show their working when completing calculations.
- Descriptions of maps and photographs should be precise to prevent potential ambiguity.
- When asked to give opinions or conclusions, candidates should ensure these are supported by relevant evidence and examples.

General comments

It is important that candidates are confident in all subject areas and are also able to combine their knowledge from different areas of the syllabus to form opinions.

Candidates are reminded of the need to act upon the command word within the question as this will give an indication of the depth of response required. Some opportunities to gain credit were missed due to the lack of detail or justification provided.

Most candidates were able to apply skills in plotting data effectively although there were a few cases where errors in understanding scales or not applying the key limited the credit achieved.

Some candidates showed a lack of understanding of the advantages of fossil fuels (in this case, coal) although they clearly had an understanding of their disadvantages.

Comments on specific questions

Section A

Question 1

- (a) Almost all candidates used the divided bar chart to get the correct answer.
- (b) Most candidates were able to identify both the country and the value. Both were required to be stated correctly for credit to be awarded.
- (c) Most candidates were able to name two greenhouse gases. Some candidates incorrectly named nitrogen and oxygen, components of air but not acknowledged as greenhouse gases.
- (d) Candidates suggested a number of different reasons, from the level of development and industrialisation through to personal ownership of electrical equipment. Many candidates gained credit.

Question 2

- (a) This question was more challenging for many candidates, requiring them to describe the high risk water supply locations within South America. While this could be done in a variety of ways, most candidates related the locations to the coast. Commonly, candidates needed to use more precise descriptions such as defining location by the compass points rather than using terms such as above or below or left and right. A few candidates gave additional comments that were not solely related to South America, which could not gain credit.
- (b) This question required candidates to apply their knowledge to the location marked on the map. Many correctly identified that the location was a significant distance North of the Equator and correctly concluded it was likely to have higher precipitation or cooler temperatures, which might impact on the availability of water. Some incorrectly suggested that the area was near the coast so water would be available by desalination.
- (c) This question showed a general understanding within the cohort of the factors that would affect the overuse of water. The size of the population was the most commonly cited factor.
- (d) The question required candidates to suggest two strategies to reduce the impact of drought. This was generally answered well, many identifying the potential to use more drought resistant crops or developing a (named) method of storing or using water efficiently. The simple statement that 'water should be stored' required further clarification to gain credit.

Question 3

- (a) Most candidates attempted to answer this question. The most common correct answer was the presence of gullies or cracks within the soil surface where soil had been moved. Some stated that all the topsoil had disappeared, which could not be determined from the photograph.
- (b) Most candidates correctly suggested the impact of heavy rain. Fewer identified the potential risk from wind erosion or the impact sloping ground would have.
- (c) Most responses for this question included a mention of the role of planting vegetation so that the soil was stabilised by the roots, and a few also identified the role vegetation might have as a wind break. Those who suggested adding organic matter to the soil were also given credit due to its impact on soil structure, although stating the addition of fertiliser without further information was not considered sufficient as this might merely supply nutrients and not improve soil structure.

Section B

Question 4

- (a) (i) Candidates were required to interpret the scales on the graph correctly in order to calculate the change in population. The most common error was to omit the correct units within their response (billion).
- (ii) The correct responses identified that the rate of increase was reducing. A number of candidates described the graph rather than the rate of increase in world population.
- (iii) While many candidates understood the reasons for a range of potential populations within the prediction, they did not always explain these sufficiently well to gain full credit; commonly the potential reason for variance was missed.
- (b) (i) Most candidates were able to place the continents in the correct rank order and gained full credit.
- (ii) Most candidates correctly identified the continent with a predicted population decrease.

- (iii) This calculation proved to be more challenging to some candidates, although partial credit was given for the correct method even if the arithmetic calculation was incorrect. It is important that candidates show their working so that partial credit may be awarded in these cases.
- (iv) Many responses showed a good knowledge of factors that affected population growth. Responses often focussed on the issue of an increase in birth rate, but factors that reduced the death rate were also given credit.
- (v) Most candidates were able to name factors that cause migration. Those that simply responded 'push and pull factors' were not given credit unless a suitable example was also included.
- (vi) This was the extended response question marked using a level of response mark scheme. This question allowed candidates to write about a subject in more depth and combine knowledge from a range of areas within the syllabus to form a conclusion. The use of the phrase 'To what extent do you agree with this statement?' invited the candidates to provide a conclusion, which all but the weakest responses did. A range of possible conclusions were valid provided they were supported with reasons. The strongest responses also supported their viewpoint with specific examples and were able to evaluate both sides of the argument. The weakest responses gave their answer as a list and did not elaborate on their statements to form a more developed argument.

Question 5

- (a) Many candidates gained full credit for their description of the formation of coal. Some candidates displayed some confusion with the process for the formation of oil. Common omissions were the requirement for heat and pressure within the process or the inclusion of the timescale.
- (b) While many candidates had a basic understanding of the disadvantages of using coal, there was less awareness of the potential advantages (such as the relative cost, accessibility, etc.). As this question implied a comparison with other energy resources, the use of a comparison was helpful. Some candidates stated that coal may cause 'air pollution' as a disadvantage; this was too vague to gain credit. Candidates that went on to name the gases involved and the problems caused achieved credit.
- (c) (i) This question tested the candidates' ability to plot data on a graph. This was completed successfully in most responses, with few examples of the scale being incorrectly read.
 - (ii) Most candidates were able to identify the correct answer from the data, although it was expected that the full name was provided (Asia and Oceania).
 - (iii) This was answered correctly by most candidates.
 - (iv) A more challenging question, requiring candidates to describe the changes in Europe within a specified period. Most candidates achieved some credit. It was important for candidates to describe the main trends rather than the data for each particular year. Common errors were the incorrect use of data or its omission and the description of the trends for a different time period to the one specified.
 - (v) While most responses were able to correctly identify the reasons for an increase in the energy used in Asia and Oceania (increasing population, greater affluence, increased industrialisation), candidates found identifying the reasons for the changes in consumption in Europe more challenging. Some incorrectly referenced the change to alternative sources (which would still be included in the total). Relatively few focussed upon the role of greater energy efficiency in the change to the amount of energy used.

Question 6

- (a) Most candidates gave a good overview of the changes in the data, although there were some errors in the use of data, and in some cases data were omitted.
- (b)(i) Candidates were required to complete the pie chart. It was important that the segments were presented in rank order, commencing at the top and working clockwise. There were some plotting errors within the cohort. Most candidates correctly linked their pie chart to the key.
- (ii) This question, requiring the candidates to define the two types of agriculture stated, was answered well and most achieved full credit, with only an occasional example of the two definitions being reversed.
- (iii) Candidates were well prepared for a question on the causes of deforestation and most were able to supply a suitable response.
- (iv) While many candidates were aware of the impacts of deforestation, some responses required greater focus on the command word 'explain' and needed to provide more detail or further clarification in order to gain credit.
- (c)(i) Most candidates were able to interpret the food chain correctly; the most common error was to identify the heron as the tertiary consumer.
- (ii) Many responses achieved full credit by positioning the organisms in the food chain in the correct order and showing the pyramid decreasing in size with similar style boxes used.
- (iii) Most candidates were able to describe photosynthesis and many responses successfully achieved full credit. It was expected that the inputs and outputs were both mentioned, together with the site of the reaction and the requirement for sunlight.
- (d) Candidates were required to make an accurate and direct comparison between the percentage losses of the two wetland habitats. Some candidates found this challenging.

ENVIRONMENTAL MANAGEMENT

Paper 5014/22
Paper 2 Management in Context

Key messages

- Candidates are advised to follow the rubric of the question. If one example is asked for, candidates should provide one example only.
- Candidates who have practical experience of sampling techniques such as quadrats and transects are more likely to be able to accurately describe these methods.
- Candidates are encouraged to attempt every question, including diagram completion. Diagram completion often does not have dotted response lines and candidates should take care not to overlook this style of question.

General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Iceland. Many candidates understood and made good use of the source material.

Candidates should avoid simply copying out the text already given in a question, without adding their own interpretation of the information.

Many candidates would benefit from practising table completion. This should include the use of units in the column or row heading rather than in the individual table cells.

Plotting bar and line graphs and interpreting pie charts was challenging to some candidates. Bars should be the same width and have shading that matches existing bars or a key. Plotting should be completed with a sharp pencil.

Using scale drawings was an area of weakness for many candidates.

Comments on specific questions

Question 1

- (a) (i) Most candidates identified that a significant portion of Iceland is covered by permanent ice and snow. Some responses stated that towns were located around coastal areas for economic, farming or agricultural reasons. Weaker responses stated that people lived near the coast but did not give a reason for this.
- (ii) Most responses calculated the population correctly.
- (iii) The question required a distribution description. Stronger answers described the three sections of the population pyramid; the high percentage of young dependents, working age population and a reduction in numbers from 60–64 onwards. Weaker responses gave a list of population for multiple bars without relating this to the overall population distribution.
- (iv) Many correct factors were suggested. It was not sufficient to state 'push and pull' factors without qualifying with examples.

- (b) (i)** Many candidates were not confident in their graph plotting skills. The precipitation bar was often not the same width as the other bars and was not shaded to match the existing bars. The values for temperature were often incorrectly plotted.
- (ii)** Good responses dealt with both the temperature and precipitation aspects of the graph; fewer candidates gave an explanation that supported the information they described from the graph.
- (c) (i)** Most responses stated that the length of time and cost were significant factors; other relevant suggestions were less commonly seen.
- (ii)** This was well known by candidates. There were a number of responses that gave more than the two techniques required by the question. Candidates are advised to follow the rubric of the question as no further credit is available for additional suggestions in such questions.
- (d) (i)** The process of water being heated by hot rocks and turned into steam was generally poorly described. Higher performing candidates clearly stated that the steam caused the turbine to rotate and that this caused the turbine to turn the generator and produce electricity.
- (ii)** Most of the responses correctly named a renewable energy resource other than geothermal power.
- (iii)** Most candidates were able to gain some credit for considering the environmental impacts of geothermal power compared with fossil fuels for electricity generation. Higher performing candidates considered both positive and negative environmental impacts.
- (e) (i)** Candidates found this a challenging question and many answers were incorrect.
- (ii)** This was found to be one of the most challenging questions on the paper. Many responses repeated the question and did not gain credit.
- (f) (i)** Many candidates were unable to use the scale to determine the distance between the port and the proposed location in km.
- (ii)** Most candidates used the information in the map to correctly suggest the lake as the source of fresh water. Some candidates suggested the ocean but as the question asked for fresh water, it was necessary to state that the water was desalinated in order to gain credit for this approach.
- (iii)** The role of an environmental impact assessment was unfamiliar to many candidates.
- (iv)** Good responses recognised that there were no questions directly about expanding the aluminium industry and that the questions were potentially biased. Some candidates did not follow the instruction in the question to give reasons. A simple statement agreeing or disagreeing with a point of view is insufficient at this level and the reasons and explanations should be the areas candidates focus their response on.
- (v)** Two limitations of the sampling method were sometimes seen. A few candidates gave responses that used the syllabus terminology of random and systematic sampling in a correct and meaningful way.
- (g) (i)** Some good tables were seen. Most had column or row headings and some gained additional credit by including the units in the headings. A common error was to include 5 km without converting this to 5000 m.
- (ii)** Some candidates had difficulty drawing a conclusion from the numerical data. Approximately equal numbers of candidates incorrectly suggested that the levels were unsafe as those who correctly explained they were below the safe level of 30 mg/kg.

Question 2

- (a) (i)** This part-question was often left blank, suggesting that some candidates did not read the question carefully enough and did not appreciate that an answer was required on the map.
- (ii)** Most candidates were able to correctly identify the type of plate boundary shown on the map.

- (iii) The stronger answers were precise in their descriptions, such as 'on the ridge' rather than 'in the middle'. These responses referred to north, south, east or west rather than up or down.
- (b) Many correct suggestions were seen here. Some candidates were able to provide two different reasons for maximum credit.
- (c) (i) Stronger answers used the text provided in the question as stimulus and added to this information. For example, 'air traffic was disrupted so this caused a decrease in profit'; 'flooding may have caused crops to be washed away, which led to food shortages'. Weaker responses that copied out the text rarely gained credit.
 - (ii) Candidates gave good descriptions of what the graph showed about the volcanic eruptions.
 - (iii) Many good answers were seen that were presented as bullet pointed lists of reasons for the higher number of deaths.
 - (iv) Candidates commonly suggested the increased fertility of soils and tourism; many found suggesting another reason more challenging.

Question 3

- (a) (i) Candidates found this question particularly challenging and very few were able to suggest how forests are involved in carbon storage. For carbon capture, respiration and photosynthesis were often confused.
 - (ii) This was generally well known. Using fertilisers or pesticides was a common incorrect answer.
 - (iii) Many detailed descriptions of what eroded soil looked like were given rather than the *impacts* of soil erosion; these descriptions did not answer the question.
- (b) It was common to see large sections of the text repeated in answers and this rarely achieved credit. Stronger responses used the text to support their explanations. For example, 'the lupine spreads 30 cm so takes up a lot of land space'; 'it makes a herbal drink which could be sold for a profit'; 'it creates a shady canopy so other plants cannot photosynthesise'. A bulleted list that separated the benefits and negative impacts was often a successful approach to this question.
- (c) (i) Candidates were not confident describing this experimental procedure. Descriptions often included irrelevant and confused material and this question was often left blank. Those candidates who have had practical experience in sampling techniques are more likely to perform well on this type of question. Descriptions of practical techniques are often best approached using bullet points.
 - (ii) Two abiotic factors were often correctly stated.
 - (iii) Very few candidates were able to suggest how the total number of plants in Iceland could be estimated. This question was often left blank.