ENVIRONMENTAL MANAGEMENT

Paper 5014/12
Paper 1 Theory

Key messages

- Many candidates showed knowledge of a wide range of topics and were able to attempt all questions.
- Candidates must take care to read the questions thoroughly to ensure they provide the information required in their answer.
- Some responses were too general and not specific enough to gain credit as this level. Candidates should take the opportunity to provide sufficient context to any comments made.
- Some candidates needed additional time spent developing skills in data presentation, particularly ensuring that tables include units in an appropriate format.
- The ways in which genetic modification improves agricultural yield was not well understood.

General comments

Candidates are advised to use the maximum number of marks a question can award as a guide to the number of points they should make in their responses.

Some responses were too general to be given maximum credit and should provide context to phrases such as 'causes damage'. Candidates should continue to practise their technique in readiness for the six-mark level of response question which is a feature of each paper.

When plotting line graphs, candidates should ensure they are using an appropriate scale and clearly label axes and include units where applicable.

It is important that appropriate terminology is used within answers and that it is used accurately.

Comments on specific questions

Section A

Question 1

(a)   The majority of candidates used the diagram as a stimulus to answer the question. The generation of electricity from HEP was generally well known although the most common misconception was that water needed to be turned to steam to turn the turbine, which is not the case in this production system. Some referred to energy transfer which was given due credit.

(b)   This question was attempted by most candidates with a large number of creditworthy answers. Some were too generic in their approach and would have benefitted from more detail as justification.

(c)   The majority of responses were sufficiently detailed to gain credit; most usually linked to the lack of a suitable water supply or the cost of development.

Question 2

(a)   There was a common misconception on the use of the mesh tanks. Many responses implied that fish farming involved fishing in open seas which affected all responses in this question. As a result, many stated that the mesh tanks were used to catch fish rather than retain them.

(b)   Candidates were able to identify additional reasons for reducing overfishing of wild fish stocks. A common error was to describe the use of a large net rather than an increase in mesh size.

(c)   The strongest responses correctly identified the issues of fish waste, the risk of spreading disease to the wild fish community and the impact on the ecosystem if fish escaped from the tanks. Weaker answers showed a basic lack of understanding about the process of fish farming, many referring to the impact of trawling (a question on a previous paper).

Question 3

(a)   Candidates understood that point **X** on the graph showed growth but often did not use the correct terminology for this phase. There was some confusion between 'log' and 'lag'.

(b)   There was generally a good knowledge of strategies to control human population. Some stronger responses contained specific examples which earned credit whereas other answers were too generic to be creditworthy. There were relatively few examples of pronatalist polices such as those used in countries such as France or Russia.

Question 4

(a)   Most candidates were able to interpret the diagram of the carbon cycle to identify respiration and combustion. Some weaker responses referred to the source rather than the process.

(b)   A concept that was generally well understood; the majority correctly named the source of energy for photosynthesis as the sun.

(c)   While the majority of candidates were able to name two gases, some gave examples which do not add to the greenhouse effect and therefore were not given credit.

Section B

Question 5

(a) (i)   A large number of candidates were able to state that many countries within Africa are LEDCs but then struggled to clearly articulate why this results in fewer people having access to safe drinking water. Responses often referred to Africa and North America as countries rather than continents. There was sometimes a lack of clarity in relation to which continent candidates were referring to in their answer with a subsequent lack of comparison.

(ii)   The majority of answers demonstrated knowledge of a range of sources of fresh water.

(b) (i)   Candidates showed good skills in interpreting the data in the graph to name the correct year when the incidence of cholera was at its peak.

(ii)   A good interpretation of the graphical data meant most candidates correctly identified Africa as having the highest number of infections during the period indicated.

(iii)   While slightly more challenging, candidates were able to identify that the incidence of cholera was variable during this period. Candidates should have avoided giving a year by year commentary on the data.

(c)   There was evidence that many candidates were well prepared for this question, although some confused the spread of malaria with that of cholera. Some responses were very general in their comments and would have performed better with a greater level of detail.

Question 6

(a) (i)   It was clear that the majority of candidates were familiar with a food chain, although a common error was the suggestion that the arrows represented which organism preyed on another rather than showing energy flow.

(ii)   The trophic levels were generally well understood, the majority correctly identifying the hawk.

(iii)   The impact of predation on a population was a well-understood concept, most citing that caterpillar numbers would increase. Responses which identified that the caterpillars might become prey of other organisms were also given credit.

(b)(i)   Many candidates made good use of the stimulus material although some needed to read the question more carefully as they provided responses linked to the impact on humans rather than biodiversity.

(ii)   Some responses lacked appropriate focus, and often missed the key link between the generation of finance to support the upkeep of the wetlands or in increasing the level of education about their importance.

(iii)   This question provided a range of stimulus material to support the answer. The strongest responses used the material and developed concepts or ideas to enhance the basic statements. The highest achieving answers were able to refer to both the advantages and disadvantages, while still developing a conclusion, often with supporting evidence from specific examples.

Question 7

(a)   The formation of metamorphic rocks was generally well understood as a topic. The majority of responses identified the role of temperature and pressure on existing rocks.

(b)(i)   Candidates were generally able to complete the bar chart, plotting the information correctly. In a few cases, the bar did not match the width of the other bars on the chart. The provision of a sharp pencil and ruler was helpful in candidate accuracy.

(ii)   This question required the candidate to perform a mathematical calculation and was completed successfully by the majority of candidates.

(iii)   There were opportunities for a wide range of different creditworthy answers within the scenario of this question. Many identified the role that mechanisation might have on employment numbers, others considered the possibility that reserves might be depleted or that mining was no longer profitable. Many statements were well supported by suitable examples.

(c)(i)   Candidates were generally able to provide benefits of living near the coal mine, although some responses mentioned employment at the mine (which was included in the stem of the question).

(ii)   Some responses were generic in their approach and required more detail. Many potential uses omitted key early stages such as reclamation or restoration of the land.

(d)   Most answers included a reference to cost, although many of these comments needed to be qualified and used as part of a comparison. More developed responses also identified the lack of suitable alternative energy resources or indeed to significant reserves of coal that may be present in a country. More sophisticated answers also included the ease of using an existing technology compared to the transition to a new one.

Question 8

(a)(i)   The table was successfully completed by most respondents. Some candidates missed answering this question.

(ii)   Common errors in plotting the line graph included omitting accurate labels for the axes (including units), the use of inappropriate scales which did not make good use of the graph paper and not drawing a line between the plotted points. Some candidates plotted the total yield rather than the increase as instructed.

(iii)   The majority of responses were able to conclude that there would be no further increase in yield.

(iv) A wide range of environmental factors were suitable for credit, although some responses focussed on management techniques such as soil cultivation, changing soil pH or addition of fertiliser which did not answer the question.

(b) Answers demonstrated a broad understanding of the reasons fertilisers enter rivers. Some attempted to describe eutrophication which was not required in this question. Some candidates were confused between fertilisers and insecticides/ pesticides. Responses occasionally did not use key terminology accurately.

(c) The ways in which genetic modification can increase yield was less well understood. Candidates often listed modifications that could be made rather than their role in increasing yield.

Question 9

(a)(i) Candidates were generally able to use the information in the text to provide a suitable definition of a flood plain.

(ii) Most candidates were able to use the stimulus material to form the basis of their answers, although stronger candidates developed their responses further.

(b) This question required candidates to provide a table of the key information in the stimulus material. This was achieved successfully in most responses although some needed to provide suitable column headings (and express units in an appropriate manner). Some did not read the information in the text box fully and presented a table with one set of data missing.

(c) This six-mark level of response question allowed for candidates to write a more extensive answer and develop their arguments for or against the statement given. Whilst most responses featured evidence in support of and also against flooding, there were many examples of a conclusion not being reached. Similarly, many responses were at a low level in their evaluation and could have been improved with specific examples to support assertions made. Some candidates did not focus on the issue of small-scale flooding and whilst the size was not explicitly defined, their answers related more closely to the impact of large-scale flooding.

The strongest answers showed a balanced response to the statement and often an indication of planning of the answer prior to its commencement. Candidates would continue to benefit from practising answering this style of question which is common to all these papers.

ENVIRONMENTAL MANAGEMENT

Paper 5014/22
Paper 2 Management in Context

Key messages

- Candidates who have practical experience of sampling techniques such as quadrats and transects are more likely to be able to accurately describe these methods.
- Some candidates would benefit from practising using and interpreting keys.
- A range should be given as the calculated difference between the largest and smallest value in a data set.
- Graph axes must always be fully labelled and include any relevant units. Appropriate linear scales should be chosen that cover over half of the graph paper provided.
- The units for tables should be included in the column headings and not in each cell. The expected format is e.g. distance / km or distance (km).

General comments

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 row or heading rather than the individual table cells.

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

Comments on specific questions

Question 1

(a)(i) The majority of responses gave a correctly calculated value for the number of people over 65. A common error was to give 3621000. As the response line included 'million', these answers were incorrect.

(ii) Two impacts of an increasing number of older people were well known. An increased requirement for healthcare and an effect on the economy such as paying more pensions were common correct responses.

(b)(i) Some responses presented the range as 170 to 38 or 38 to 170 without performing the calculation. A range should be given as the calculated difference between the largest and smallest value in a data set.

(ii) A common error was to omit the axis labels on both the axes. The *x*-axis label 'month(s)' was frequently missing and the unit for average temperature was rarely seen. Plotting was generally good, with many graphs plotted using a sharp pencil and using clear crosses. A linear scale for the *y*-axis was usually given in an appropriate format.

(iii) Responses usually linked an increase in energy demand with increased use of air conditioning as temperatures increased. Some answers suggested that energy demand would decrease as heating would not be needed; these were also credited.

(iv) It was common to see comments regarding plentiful light; linking this to photosynthesis was seen less often.

Cambridge Assessment
International Education

© 2020

(c) (i) Good descriptions were seen. Occasionally, the direction of the hurricane was reversed, or it was suggested that each circle represented a different hurricane. Some candidates would have benefited from practising using and interpreting keys.

(ii) Many responses recognised that transportation would stop and flooding was likely to occur. Some weaker responses stated that export and extraction would be affected, without stating what this effect would be.

(iii) Successful responses used the information given to support their view on whether the strategies were effective. Weaker answers simply copied out text from the question paper which was not creditworthy.

Question 2

(a) (i) Most responses could give a reason why **A** and **D** were not used. Candidates found **C** more challenging. A minority answered in terms of sampling method **B** and did not address the question as they did not refer to **A**, **C** or **D** in their answers.

(ii) The majority of candidates used the graph in their response, as required by the question.

(iii) This was well answered. Candidates who have had experience in using questionnaires in field work and writing their own questionnaires are likely to perform well on this type of question.

(iv) The original questionnaire required yes/no/do not know answers and a minority of responses did not follow this format.

(v) Stronger candidates used the scale, clearly showed this on the diagram and explained their working out in their response. Weaker responses did not give evidence of using the map and did not include a reason for their answer. A few incorrect scale conversions were seen.

(vi) The environmental impacts of clearing vegetation were well known. Weaker responses stated habitats or biodiversity 'are affected'; this is too vague and the effect should be stated.

(vii) One reason was often stated, usually efficiency of extraction. A second correct reason was more rarely provided.

(viii) Most responses could suggest why land reclamation is preferred by some companies. Expense was the most commonly seen answer. Many beneficial uses that would provide an economic benefit to the company were also given.

(b) (i) Nitrogen and potassium were widely known.

(ii) Two reasons for using fertilisers were often correctly given.

(iii) Concern for the impact of overuse of fertilisers leading to eutrophication was a common answer. The high cost of fertilisers to farmers was also frequently suggested.

(c)(i) Many clear tables were presented. Some did not include units in the column headings or incorrectly included units in each cell of the table. A few candidates sketched a bar chart rather than a suitable table.

(ii) Candidates found this question challenging. Many incorrectly suggested that the concentration would be greater to the north of the mine.

(iii) The time frame for the formation of oil was often stated as 'thousands of years' or 'many years'; this should be 'millions of years'. Many candidates needed to include the information that oil formed from dead marine organisms.

(iv) Most candidates answered correctly. Occasionally, weaker responses suggested that carbon dioxide caused ozone depletion or acid rain.

(v)   Many good suggestions for reducing carbon dioxide concentrations in the atmosphere were stated.

(vi)   Few candidates were able to express the idea that the atmosphere has no boundaries or that atmospheric circulation or wind carries pollution from country to country.

Question 3

(a) (i)   Many candidates correctly calculated the area of the Everglades in 2018.

(ii)   This question was generally answered well.

(iii)   Candidates gave good suggestions for other ways to protect the Everglades.

(b)   Candidates occasionally struggled to express themselves clearly. An awareness that the two species were likely to be confused and crocodiles killed by mistake if alligators are not protected was rarely seen. It was common to see the statement from the question paper directly copied 'Alligators and crocodiles look very similar'; this approach did not gain credit.

(c) (i)   Orchid was mostly correctly stated as the producer.

(ii)   Candidates were familiar with strategies to make an area malaria free. Some incorrect references to using antibiotics or discussions about sewage were seen.

(d) (i)   Candidates found this a challenging question. It was common to see responses that answered about the benefits of the pepper plant, which was not the subject of the question.

(ii)   A few responses reversed the limitations and advantages. Some weaker responses stated 'cost' and needed to explain whether they were referring to high or low costs.

(iii)   Candidates who have carried out practical field work are likely to perform well in this type of question. Some responses indicated that candidates were not familiar with quadrats or transects. It was common to see confusion between random and systematic sampling methods. Methods of data collection is an area in which candidates would benefit from more practice.

(iv)   Two good suggestions were often seen, including the risk of the fires getting out of control and burning native species of plants and animals.