

ENVIRONMENTAL MANAGEMENT

Paper 5014/01

Paper 1

General comments

Many candidates found the short questions in **Section A** more challenging than the two longer questions in **Section B**. Marks for **Questions 1** and **3** were often lower than those for **Questions 2** and **4**. Gaps in answering parts of questions were few and far between, but the majority occurred within **Questions 1** and **3**. One or two candidates had clearly mis-allocated their efforts within the time allowed and failed to finish all parts of the final question. However, most had no time problems, giving full answers throughout, and on occasions more than filling the lines provided for answering. Overall standards of answering the two questions in **Section B** were similar; it was rare for there to be a wide divergence in candidate performance between **Questions 5** and **6**.

One specific weakness from **Question 1** was the failure to make direct use of the photograph. Already by **1(a)(ii)** some candidates had stopped looking at the photograph, despite the question asking for evidence that layer Z was derived from parent material. In **3(c)** some candidates stopped using the graph after making an initial statement and digressed into more general answers about measures to increase fish populations.

A general weakness was a desire by some to give reasons when description alone was required by the question; this was noticed most in answers to **Questions 6(c)(i)** and **6(d)(i)**. These candidates were the ones least likely to use values in support of their answers, as they quickly moved away from direct references to the graph and diagram information. Another observed weakness was the reverse of this, namely a failure to give reasons in **Questions 5(c)(iv)** about differences in water use and **5(d)(ii)** about differences in access to safe water supplies between rural and urban areas; instead extended description of actual differences in water use and supply was given. Some candidates failed to make the switch from part **(a)** to part **(b)** in **Question 5**. The many answers of **B** and **D** in **(b)(i)** showed that candidates were referring back to the cross-section in **5(a)** instead of answering in relation to a named example of an actual dam. Candidates should be made aware that the lettering and numbering of question sub-sections is significant; a new letter usually denotes a fresh start and a different theme, even though it often follows on from what went before.

Comments on individual questions

Section A

Question 1

The correct answer **X** was the main one given in **(a)(i)**. The dark colour of the layer on the photograph was better evidence for most organic matter than roots and grasses. In many of the weaker answers it was clear that candidates had not realised that the diagram and the photograph were related. Some others chose **Z**, which showed that they did not have a clue. Part **(a)(ii)** was badly answered. One very popular answer was 'dark coloured at the bottom', which suggested weak candidate understanding of the different colour shades in a soil profile. Only a few noted the existence of rock fragments and pebbles. Of the three parts of **(b)**, part **(i)** proved to be the most difficult. Instead of explaining that sand has a medium or large grain size which gives the coarse texture, many answers began and ended with 'sand'. One mark answers were typical for **(b)(ii)**; although a majority of candidates stated that a soil with a pH of 4 was acidic, there was no attempt to claim a second mark by indicating that pH is used as a measure of acidity, or by noting the significance in relation to a pH of 7. In **(b)(iii)** most understood 'the coarser the texture, the larger the pore spaces' or vice versa. Answers to part **(c)** were more consistent. In the mark scheme at least five different advantages and disadvantages were listed, which meant that candidates had plenty of choices for answering **(c)(i)**. In **(c)(ii)**, although most recognised lack of fertility, some referred to the need to use pesticides when they probably meant fertilisers.

Question 2

The three most obvious features of location in part **(a)** were coastal areas, continental shelves and ocean currents; mainly in temperate areas (or mainly outside the tropics) was another alternative regularly mentioned and allowed. Few candidates failed to note at least two of these. Part **(b)** attracted many full answers with frequent references to the abundance of plankton and nutrients, especially in relation to the presence and meeting of ocean currents and shallow sea water. The weakest answers came from candidates who repeated location features from part **(a)** without describing any of the favourable conditions they provided for large marine populations. The strongest answers in part **(c)** came from candidates who dealt with the effects of the two measures one at a time, which best addressed the question demand for 'different effects'. The weakest came from those who described the line diagram as one, which made it impossible for them to focus on the question set.

Question 3

In **(a)(i)** many candidates took their time to start to answer. There was a lot about rain water collecting in the jar first. Most, however, eventually showed that they understood that the rain water needed to be tipped from the jar into the measuring cylinder, on a regular daily basis, and read at eye level with great care. There were many references to the need to be sited in an open area in answers to **(a)(ii)**, but these were ruled out by the 'as shown in the diagram' part of the question. Some candidates stated site factors such as above surface level and half buried in the ground without explanation. However, for the remainder it was a relatively straightforward question. There were frequent references to snow and hail, and occasional mentions of ice and strong winds, in answers to **(a)(iii)**. Of these, only for hail was there no reward. Nearly all claimed the mark for low amount in part **(b)**, often supported by use of an annual total below 250 mm. For frequency, rain only on a few days a year was a more common answer than the other acceptable answer of irregular occurrence. 'Mainly light showers' was a frequent answer for intensity from those without a full understanding of a desert climate. In **(c)** virtually all candidates understood the meaning of trickle drip irrigation. Unfortunately, some focused on saving/not wasting water instead of reducing the harmful effects. Occasionally their answers led to the acceptable point of reduced evaporation; more rarely did it lead to salinisation. In fact, only a minority of candidates managed to establish the link between evaporation and salinisation.

Question 4

Answers between 18.0 and 18.4 were accepted in **(a)(i)**. The majority were correct, but some gave values around 9.0 because they had used one bar only, either for male or female. Any mistakes in **(a)(ii)** usually resulted from reversing male and female percentages. Some candidates circled two options in **(a)(iii)**; often these were the opposites 'decreasing slowly' and 'increasing rapidly'. Although increasing rapidly was the most popular answer, decreasing slowly had much support among less strong candidates, who were describing pyramid shape rather than interpreting what was being shown about a country's population. There were many different points that could be made in part **(b)**; this made it relatively easy for candidates to claim three or four marks. Many of those who had circled an incorrect option in **(a)(iii)** were still able to gain one or two marks, as they referred to problems associated with the high percentages of young people shown by the wide base of the pyramid. In part **(c)** references to religion, culture and tradition were more common than those to low GDP, poverty and the difficulty of introducing birth control in rural areas. Full answers were frequent.

Section B**Question 5**

Part **(i)** was the best answered part of **1(a)**. Most candidates stated either lake or reservoir for **B** and ice or snow for **C**. However, in **(a)(ii)** and **(iii)** many fewer than had been expected noted the closeness of the layer of sandstone rock to the surface at **D**, and the resulting possibilities for obtaining a fresh ground water supply. Instead a good number of candidates gave unsatisfactory and unlikely answers based on building pipelines to bring water in from elsewhere or damming the river at **D**. The choice of **C** made explanation easy in **(a)(iv)**, although some were able to make good progress with **B** by concentrating on sediment settlement in the bottom of a large surface water body. While **A** was perhaps the most obvious choice in **(a)(v)**, a good case could also be made for **B** as well. Some of the explanations, however, were too brief for a question with three marks attached to it.

In part **(b)** a few candidates used a letter from the cross-section in **(a)(i)** for their dam location; they could gain no more than three marks for a general answer. In the event many of their answers were too vague or too limited in range to reach even three marks. Of a different standard were the majority of answers based upon a named dam. Major dams such as Aswan, Three Gorges and Hoover were popular choices, but many also used an example from their home country, especially those candidates from Centres in Pakistan. This was likely to increase the amount of specific information included and thereby increase their chances of reaching full marks.

The correct answer of 135 litres was the almost universal answer in **(c)(i)**. However, answers of 3 times in **(c)(ii)** were almost as common as those for the correct answer of 4 times. Although cooking and drinking were almost invariably selected in **(c)(iii)**, some answers to **(c)(iv)** suffered from a repeated statement instead of a reason. The reason needed to relate to these as essential human activities, not dependent on a person's wealth or place of residence. The worth of some answers to **(c)(v)** was restricted either by too much description and too little explanation, or by over-concentration on one type of country so that real differences between developed and developing were not explained. The strongest answers came from candidates who referred to both types of countries and varied their language beyond the statement of direct opposites, one positive and one negative.

The practical task in part **(d)(i)** posed few problems. However, for the diagram to be a visual success, the key needed to separate out rural and urban areas and not the two countries. Some candidates drew their key using a pen and then used a pencil for showing the same shading on the graph, which was accepted provided that the type of shading was intended to be the same, but it was not the best way to do it. Strong candidates answered part **(d)(ii)** well; weaker candidates concentrated on describing how people in urban and rural areas actually gained access to water supplies. The best answers included references to the concentration of wealth, economic development and government investment in cities, often to the exclusion of rural areas.

Some candidates failed to give views about change and development in **(e)(i)**. Part **(e)(ii)** was an easier question; candidates explained why well water was likely to be cleaner than surface water, and how a better water supply could help both people's health and economic activities such as farming. In answers worth four and five marks candidates typically named examples of water-related diseases, and made reference to reasons for health improvements in young children and women in particular. In **(e)(iii)** not all candidates concentrated upon referring to reasons why outside help from charities was vital, such as lack of money, resources, know-how and technology, particularly in rural areas in a continent such as Africa. Instead, some repeated answers already covered in earlier questions about how bad the water supply situation was, which did not address the question effectively.

Question 6

Some candidates used a lot of words to reach the relatively short and simple answers of converging and diverging (or their equivalents) in part **(a)(i)**. Many were attempting to answer a much bigger question than the one set, more like 'Explain what is happening at plate boundaries **A** and **B**'. The majority possessed the knowledge and understanding needed in **(a)(ii)** to claim at least two of the three marks. The best answers to **(a)(iii)** concentrated on the presence of lines of weakness and fractures, as well as the pressure from earth movements which allowed magma to reach the surface. Part **(iv)** was the least well answered part of **(a)**. Several headings were available to candidates for establishing one difference, such as cone shape, materials erupted, nature of volcanic activity and location. Many relied upon location, for which there was some help on the diagrams. Some of the answers given to **(a)(v)** were more appropriate for earthquakes than volcanoes. Otherwise in well-focused answers candidates used a variety of reasons, with some useful references to actual eruptions, notably those of Mount Etna, included as well.

How geothermal power was generated was well understood in part **(b)**. Occasionally weaker candidates lost sight of the geothermal power theme in **(b)(ii)** and somewhat unaccountably began to state advantages of the use of volcanic areas for human settlement such as fertile soils, presence of minerals and tourism.

The overall message that could be taken from the graph in part **(c)** was that the production of geothermal power was relatively cheap compared with most other ways of generating electricity, especially many of the alternatives. A majority of candidates realised this. Those who quoted relative costs to elaborate upon this, as well as upon the cheapness of fossil fuels, soon claimed all three marks in **(c)(i)**. Part **(c)(ii)** was a good discriminator. Many candidates used words to the effect that the relative cheapness of clean geothermal power would make it a great alternative to dirty fossil fuels as they are used up. This had some merit, but was not as good an answer as the one from candidates who showed awareness that opportunities for cheap generation are restricted to areas with certain favourable natural conditions such as Iceland and New Zealand.

Provided that candidates restricted themselves to description using only the demand line, it was straightforward for them to gain at least two of the three marks in **(d)(i)**. The most common reason for the loss of one mark was lack of use of any values. For the loss of two or more marks, the causes were either digression into explanation for increased demand, or attempts to relate variations in demand to discovery. The worst type of answer in **(d)(ii)** was to do no more than list individual values without any attempt to establish the context. Single quoted values such as 'Discovery of oil was 57 billion barrels in 1965' or 'Demand for oil was 25 billion barrels in 2005' were not enough by themselves to indicate oil reserves running out or unsustainable use. An answer of this type was never going to satisfy all the needs of a four mark question. Much superior were answers from candidates who attempted to use several values to make a relevant point. One of the most effective responses was adding up the totals from the second and third columns under total global oil, in order to make the point that people have already used more oil than is known or likely to be available for use in the future. In **(d)(iii)** all the evidence given suggested that demand will keep rising. This was easy to explain by reference to growth in world population, continued economic development especially in China and India and the important uses of oil in car and air transport. Almost equal credit was given to the opposite suggestion of falling demand, provided that explanation was given in terms of the greater use of alternatives, technological breakthroughs in their development, increased energy efficiency and savings in use imposed by higher prices and lower availability.

In general candidates found it more difficult to expand upon what was already stated in the speech bubbles for **A** than for **B** in part **(e)(i)**. Most showed themselves to be familiar with the dangers from radio-activity, contaminated waste, leaks, explosions and accidents in **(e)(ii)**. References to Chernobyl were frequent. In **(e)(iii)** the majority opinion among candidates was against nuclear power, but only slightly. One common view was to increase the use of nuclear power as an already proven alternative, which would help to reduce the frequency of power cuts in developing countries. Some candidates made the point that there have been no major disasters since Chernobyl, which showed that nuclear can be safe. A frequently expressed opposite view was that nothing could justify the use of something as dangerous as nuclear power, no matter how great the energy need. As is always the case in questions which ask for a candidate's view, the strength of the argument is what is assessed and not the view held. The weakest answers came from candidates who gave equal weight to both sides of the argument; often they had little new to add what had already been written in **(e)(i)** and **(ii)**.

ENVIRONMENTAL MANAGEMENT

Paper 5014/02

Alternative to Coursework

General comments

The paper focused on Tanzania, in Africa. The questions considered the possible effects of development on biodiversity and sustainable agricultural activities. The style of questions was similar to those of past papers and candidates had no difficulty presenting answers to all the questions. Overall candidates seemed to be engaged in the context presented to them, although there were occasions when the examiners felt that the candidate had spent insufficient time reading and thinking about some questions. The majority of answers were well presented and easy to read.

Comments on specific questions

Section A

Question 1

- (a) (i) Three strategies were presented to candidates and they had to assess the likely impact of these on a rare and endangered animal. Most candidates suggested that Strategy 1 would lead to extinction but many candidates did not identify the limitations of keeping the animals in captivity or that Strategy 3 should enable some animals to survive in their natural habitat.
- (ii) Many candidates were aware of the need to carry out an environmental impact assessment, and many described this clearly.
- (iii) The majority suggested that the extinction should be prevented either because of its effects on food chains, or because humans should always try to avoid causing extinction. A small number argued that the development project was very important and if the animal became extinct this was an acceptable loss. Both types of answer gained credit.
- (b) (i) Candidates often found it difficult to explain that collecting from the wild depletes the population and therefore reduces breeding so the population is further reduced.
- (ii) Nearly all candidates selected **Farm B** and gave one or two good reasons for their choice.
- (c) (i) There were a large number of correctly plotted graphs with both axes labelled correctly with units.
- (ii) Most candidates identified that juveniles in enclosure **X** grew to a greater length than those in enclosure **Y** but many did not express the fact that they were growing faster or that they achieved a 35 mm difference by the end.
- (iii) Most selected the correct diet.
- (iv) There seemed to be only a limited appreciation that the natural vegetation would need to regenerate or that there would be a risk of disease.
- (v) Some candidates suggested that by taking more animals from the wild they could just produce even more animals. This missed the point about maintaining genetic diversity and preventing inbreeding or developing hybrid vigour.

Question 2

- (a) The details of a traditional cultivation were given to candidates and many did suggest advantages and disadvantages that were in the context of the questions. A small number of candidates only gave answers from their knowledge without consideration of the information given.
- (b)(i) Some candidates gave two sensible factors that should be the same whilst others often stated the number of plants, on this occasion not worthy of credit as the number of plants were shown on the diagram.
- (ii) Only a minority of candidates weighed the yield. Many just said count the maize plants.
- (iii) Some candidates made reference to a quadrat, although not required here. If this had been developed to a yield per unit area (with repeats) it could have gained credit.
- (c)(i) There were a wide range of sensible suggestions, many candidates clearly had some good ideas about variation within a set of data.
- (ii) Nearly all candidates showed working and arrived at an answer, a common error was to not calculate a percentage from the ridge only method.
- (d) Both parts of this question were generally well answered with a logical sequence of events. The examiners often awarded three or four marks.

Question 3

- (a)(i) Candidates did not require any specialist knowledge of mercury poisoning. If they used their knowledge of the effects of heavy metal pollution in the contexts presented, they could gain maximum marks. Only a minority of answers gave details of the possible effects on humans and the food chains locally. There were a number of references to pollution of the marine environment which did not help to answer the question.
- (ii) A good number of candidates outlined a logical series of consequences for the village when gold extraction stopped and they usually gained two or three marks here. Only a very small number of candidates just said they would run out of money.
- (b) Irrigation, generating energy or domestic water supply were often cited here.
- (c)(i) The answers of age, number and breed of goats as factors to keep the same were given but not as frequently as expected.
- (ii) Measuring the success of the trial seemed to be more readily answered. However, it would help to give some details as to how the measurements could be taken and even giving appropriate units helped candidates gain credit.
- (iii) A large number of well presented tables were seen and units were required for the headings in the table.
- (d) The majority of candidates completed the diagram successfully and gave the correct answer of 15.
- (e) The candidates that recognised that 1 kg of crop waste was eaten every other day usually worked out the correct answer. For those that carried out the correct method but arrived at the answer of 8 goats were given one mark.
- (f) The examiners allowed some overlap between the two sections but did not credit the same point twice. Nearly all the answers confined themselves to development in this local context and they gave a wide variety of good answers. Vague statements about helping the economy of the country did not gain credit unless some detailed explanation was given.