ENVIRONMENTAL MANAGEMENT

> **Paper 0680/12**
> **Paper 1**

Key messages

Each question should be read carefully, looking for and then thinking about the command word used, e.g. describe, explain, state, suggest.

The mark allocation (shown in brackets) and the answer space should be taken into account before starting to write a response to a question. Sometimes a framework is provided for the answer, for example, the answer space for **Question 1(b)** had numbers and lines for describing four impacts of open cast mining on the environment.

When questions use resources (diagrams, graphs, maps, tables) the resource should be studied very carefully. This is particularly important when a question has more than one resource, for example, **Question 3** had two pie graphs and **Question 4** had a map and a table.

Sometimes the answer to a question uses figures or requires a calculation. The unit is often provided on the answer line as in **Question 3(a)(ii)**. At other times it is important to use the appropriate unit in the answer as in **Question 4(a)(i)**.

If an answer is continued on additional paper (or one of the blank pages at the back of the question paper) it is useful to indicate this. This can be indicated with a phrase such as, 'continued on page X'. It is important to write the correct question number clearly at the start of any extra work.

General comments

Candidates appeared to have no problems completing the paper in the time available. Most answered the questions within the spaces provided. Very few candidates left questions unanswered.

The standard of English was generally good and most answers were legible. The best answers were clearly focused on the questions set, revealing a good knowledge and understanding of the syllabus.

Comments on specific questions

Question 1
(a) (i) Many candidates found completing the table of features of the Earth's crust challenging. The most common error was reversing **D** (oceanic crust) and **E** (sediment).

   (ii) Most candidates were able to state the meaning of two of the three terms (igneous rock, metamorphic rock and sedimentary rock). Some candidates wrote that igneous rocks were formed by fire; others did not mention the cooling of lava or magma. Some candidates confused sedimentary and metamorphic rocks. There was good knowledge of examples of all three rock types although examples were not required for credit.

(b) Many candidates were able to describe four impacts of opencast mining on the environment making good use of the answer framework provided. Most candidates began by describing loss of vegetation and wildlife. Some responses focused entirely on noise, air, water and visual pollution. Some candidates described more than four impacts, either within the writing frame or by adding more numbers to the framework provided.

Question 2

(a) (i) Most candidates were able to complete the food chain accurately.

(ii) Most candidates correctly named phytoplankton as the producer in the food web. Some candidates thought the killer whale was the producer.

(iii) Few candidates correctly determined six as the largest number of trophic (feeding) levels in the food web. The most common answers were four and five. Some candidates gave ten (the number of species), others seemed to be counting the flows of energy.

(iv) Most candidates were able to explain that if the population of krill decreases there will be less food for the leopard seals. Some candidates wrote that the numbers of leopard seals would also decrease. Others wrote very detailed responses about the role of fish and penguins in the diet of leopard seals and how these species and the leopard seal could all be affected.

(b) (i) Few candidates were able to state four resources that oceans can provide although good use was made of the framework provided for the answer. The most frequent answers were fish, oil, natural gas, salt, sand and wave/tidal energy. Water was often included as a resource but some reference to desalination or the extraction of salt was needed to gain credit.

(ii) Candidates found this question challenging. Some wrote about the shallow depth of continental shelves without reference to ease of access. Others showed good knowledge of sunlight, nutrients and oxygen on continental shelves but did not link these to the abundance of organisms.

Question 3

(a) (i) Almost all candidates correctly named two of the four countries that are both producers and consumers of palm oil. Some candidates wrongly included 'other countries' as one of the two countries.

(ii) Most candidates calculated the percentage of world palm oil production produced by Indonesia and Malaysia successfully. Some candidates added together Indonesian production and Malaysian production and gave this as the answer.

(iii) Almost all candidates correctly named USA and Bangladesh as the two countries that consume the same amount of palm oil. Some candidates used graph **A**: palm oil production instead of graph **B**: palm oil consumption.

(b) Few candidates were able to produce a convincing description of temperature and precipitation during the year in an equatorial climate. There were references to 'hot', 'high', 'wet', 'wet and dry seasons' and 'monsoon'. Some candidates appeared to be describing the climate of a hot desert. The best answers gave accurate data for average temperature and annual rainfall and referred to the small temperature range or daily thunderstorms.

(c) Few candidates were able to suggest two advantages and two disadvantages of replacing tropical rainforests with palm oil trees. The most common advantages were about jobs and the economic benefit to a country. The most common disadvantages were about loss of biodiversity, loss of habitat, extinction of rainforest species and problems associated with monoculture.

Question 4

(a) (i) Most candidates correctly stated 2 745 000 km^2 and Asia as the size and the continent with the largest wetland shown on the map and in the table. Although some also named the wetland (West Siberian Lowland) this was not required for credit. A common error was omitting the unit, km^2.

(ii) Almost all candidates correctly named the continent with the largest number of wetlands as North America and the number of wetlands as four.

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(iii) Naming the largest tropical wetland proved more challenging with about half the candidates correctly naming the Amazon River Basin. The most common incorrect answer was the West Siberian Lowland. The River Nile Basin, the Pantanal and the Congo River Basin were sometimes named. The candidates were expected to use the Tropic of Cancer and the Tropic of Capricorn on the map to identify the tropics / tropical zone and use the table to identify the largest wetland in this area.

(b)(i) Most candidates could suggest at least two reasons why people drain wetlands. The most common reasons suggested were related to agriculture, housing and the control of water-related diseases.

(ii) Candidates found suggesting four reasons why wetlands should **not** be drained more challenging. Most candidates wrote about the various species in the wetland losing their habitats. There were some references to the economic use of wetlands for tourism and fishing. Few candidates wrote about wetlands filtering harmful waste or reducing flooding.

Question 5

(a)(i) Almost all candidates were able to use the diagram to state correctly that 1950 was the year with the largest percentage of children aged 0 to 14.

(ii) Almost all candidates were able to use the diagram to state correctly that 2010 was the year with the largest percentage of the population aged 30 to 64.

(iii) Most candidates were able to use the diagram to determine that in 2050 between 14% and 15% of the population of Japan will be aged 80 or over.

(b) Candidates found this question challenging with few gaining full credit. The better answers described how governments could introduce policies or incentives to encourage couples to have more than one child. These answers went on to give examples with references to various payments on the birth of children, free or subsidised education and healthcare, maternity and paternity leave. A few candidates described how visas could be used to attract young immigrants to a country with an ageing population.

(c) This question was slightly less challenging than **Question 5(b)** with most candidates successfully stating one or more possible problems for a country with large numbers of young people aged between 0 and 14. The most common problems were linked to increased demands on education and healthcare budgets or facilities in the country. Some candidates wrote about the dependency ratio and how a small working population had to finance a large number of dependants. There were also references to shortages of food, water and living space.

(d) Few candidates correctly stated that the Demographic Transition Model is the name of the model that shows the changes in birth rates, death rates and total population over time in a series of stages.

Question 6

(a)(i) All candidates attempted the six gaps in the passage using words from the diagram. The most common error was reversing the 'lower' and 'upper' reservoirs.

(ii) Most candidates could state **one** advantage of using wind power instead of oil to generate electricity. The most common answer was that wind was a renewable source of energy but supplies of oil would run out.

(b) Many candidates could describe how the conservation of biodiversity or of ecosystems was a purpose of a biosphere reserve. Some had good knowledge of biosphere reserves and wrote about the three zones (core, buffer and transition) and referred to research, monitoring and education. Few candidates mentioned ecotourism or the sustainable use of natural resources. Some candidates seemed to misunderstand the question and either wrote about different ways of generating electricity or described the energy supplies available on the island of El Hierro.

(c) This question was well answered with many candidates gaining full credit for suggesting reasons why people live on the volcanic island of El Hierro. Fertile soils for agriculture, geothermal energy, tourism and job opportunities were the most frequent reasons suggested. Responses indicated wide ranging knowledge with some candidates writing at length showing a sound understanding of the economic aspects of volcanic areas.

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| Paper 0680/22 |
| Paper 2 |

Key messages

Candidates used a range of skills within their responses to the paper and had a greater understanding of the 'command' verbs such as describe or explain. This ensured that many questions were answered thoroughly.

All teachers should take special care to prepare their candidates for the final part of each question where six marks are available for a knowledgeable, balanced and carefully considered answer. It is vital that the candidate reads and understands this question before responding.

A few candidates responded well to most questions on the paper but failed to complete graphs and therefore missed credit that was readily achieved by their peers.

General comments

Candidates generally responded well to the paper and were well prepared. Answers were generally comprehensive as candidates used the space allocated to them for their responses and structured their answers according to the number of marks available.

Calculations were completed well. The quality of graphical plotting was also good.

Comments on specific questions

Question 1

(a)   Most candidates achieved full credit, identifying the correct letter for each term. Where there were mistakes they were usually the reversal of **B** (dam wall) and **C** (reservoir) or **D** (generator) and **E** (turbines).

(b)(i)   While a good attempt was made by most candidates, some stated that South Africa had a dry or desert climate, or lack of rivers instead of considering the large demand from the country.

(ii)   Most candidates identified at least one reason why the government of Lesotho wanted to build the Highlands Water Project. A wide range of economic and water supply responses were credited.

(iii)   Requiring the candidates to use the information from the map, this question caused few issues.

(iv)   Candidates found this question more challenging, some considered the need for a pipeline rather than 'canal' whilst others explained that only the water from the Katse Dam went to South Africa. Some responses identified the cost or logistical issue of using road transport.

(v)   Many candidates made good use of the resource to answer this question.

(vi)   Most candidates gained credit for loss of habitat. Those who considered pollution rarely explained why this was a significant impact – a missed opportunity to gain credit. A few candidates gave human instead of environmental impacts.

(c) (i) This data-based question was tackled well by most candidates who were able to answer the question correctly.

(ii) Attempted on most answer papers, a number of candidates failed to read the question sufficiently closely – describing the data for the whole year rather than the range requested. Others gave the monthly figures or simply the fact that it had increased or decreased on a month by month basis. These were not considered worthy of credit.

(iii) Another more challenging question. Most candidates seemed to have an understanding of El Niño, but many wrote about its effects instead of causes. Many candidates achieved credit for 'weaker (trade) winds' and 'warm current off Peru'.

(d) (i) Most candidates achieved high credit. This was mostly for statements about crop failure and poverty. Not all the quotes were relevant, i.e. going to work in the city, rivers drying up.

(ii) Most candidates listed a range of ideas to reduce the impact of drought, some expressed better than others. Some did not fully understand or describe the means of storing water, or educating farmers in more sustainable use of water. Some methods stated were more suitable for domestic rather than farming use. Credit was not given to some less feasible solutions such as importing water (the text identified that Lesotho is developing) and desalination (map showed the country to be surrounded by land).

(iii) There was significant overlap credited within the two sections of the answer. Many described the loss of minerals within the land rather than focussing on soil erosion which was stated within the question. Few candidates really considered the problems that arise when a period of wet weather follows a drought.

(e) A six mark question requiring candidates to provide a more reasoned, developed answer. Most candidates stated that this was a difficult problem to solve completely, especially at a time of increasing urbanisation and industrialisation in many countries. Few went on to successfully explain measures that could be taken. There was much reference to eutrophication and acidity in lakes and better answers went on to present solutions such as using GM crops to increase yield instead of fertiliser and pesticides. Also some candidates considered filters and scrubbers in chimneys to remove industrial pollutants.

There was far less consideration of other ways in which industrial emissions can be controlled, or how domestic rubbish and effluent can be reduced. Some candidates strayed into aspects of reducing air pollution, especially those causing global warming. Others ignored the reference to rivers and lakes and wrote about issues such as oil spills that are much more likely at sea.

Question 2

(a) A map-based question, most candidates analysed the distribution in terms of the proximity to the Tropics and Equator, which did not work well for this particular distribution. Others made reference to plate boundaries which were not shown on the map, and east and west parts of the map. Most credit was gained by reference to the Pacific Ring, western America and a named country.

(b) (i) A small number of candidates incorrectly identified boundary **B** as a 'conservative', most other candidates identified the boundaries correctly.

(ii) Those that stated 'conservative' in part **(i)** were still able to gain credit for explaining how stress builds up by the friction caused by the two adjacent plates moving against each other. Many candidates described the melting of plates and the creation of volcanoes which was not the focus of the question.

(c) (i) Candidates were able to describe damage shown in the photograph, most responses gained maximum credit.

(ii) Another well answered question. It was clear that this was a topic that was broadly understood by those taking this paper.

(iii) There was a lesser understanding of the spread of cholera. Many incorrectly linked it to the spread of dust from the collapse of buildings, relating it to air pollution. Few achieved full credit; those that achieved credit often identified the spread by faeces and the impact on the transmission of the bacterium through contaminated water sources.

(iv) Many responses showed a confidence in answering a question relating to preparations for future events. The most common error was linked to the perception that earthquakes could be predicted so that residents could be given warnings.

(d) (i) Most candidates who responded to this question plotted the data correctly, however a small number of candidates omitted this question and therefore limited their potential credit for this paper.

(ii) Using the data from the table, most candidates correctly identified the two countries.

(iii) Most candidates correctly interpreted the graph to give the waste incinerated in Sweden.

(iv) While definitions varied greatly, most candidates gave an acceptable description that gained credit.

(v) Few candidates gained full credit for this question. Many responses did not satisfactorily describe the types of pollution created and the costs involved in recycling were not fully known or understood.

(vi) A range of potential approaches were available to answer this question and most candidates achieved some credit; either through the issue of affordability or technological availability. Others identified the link between the amount of waste produced and the amount available for recycling. This was also worthy of credit.

(e) A longer response question with six marks available. A wide range of responses were provided across the cohort. Some good answers considered how these problems can be reduced, however for many candidates this question provided an opportunity to write at length about reducing the use of fossil fuels, especially cars.

Most showed some understanding of the 3Rs – reduce, re-use, recycle – although ideas were sometimes confused with those measures to control global warming. A few candidates achieved the highest level of credit by presenting a number of key themes together with clear strategies for their implementation.

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Paper 0680/03
Coursework

General comments

There were some interesting environmental issues explored by candidates this series. Getting candidates involved in local environmental problems can be an extra benefit of carrying out the coursework.

Comments on specific questions

Domain A

Domain A proved to be well reported with most candidates having a firm grasp on the aspects of the problem that they had decided to explore. However, the environmental impact of the issue was not always thoroughly explored.

Domain B

This series work tended to lack primary data, with most investigations carrying out a brief interview. There needs to be more hands-on experience when investigating the environmental issues under consideration. As long as safety is taken into account there is a lot of experimental work that can be carried out by the candidates themselves. The lack of this type of data leads to limited credit in **Domain B**.

The analyses tended to be descriptive in many reports and there was a lack of recognition and discussion of the limitations of the data. This limited credit on Criterion 6.

Domain C

Credit on **Domain C** suffered due to a lack of a thorough sustainable development plan. It is not enough to give a list of choices available to decision-makers. To improve credit, the choices need to be evaluated and then worked into a possible strategy. An evaluation of advantages and disadvantages is crucial to gain credit in Criterion 9, when a sustainable plan is proposed.

The value positions and a thorough assessment of the factors behind them need to be carried out on all interested parties for Criterion 7. It is not enough to report answers to a questionnaire or interview.

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Paper 0680/42
Paper 4

Key messages

• Read the source material and the question carefully.

• Use data from either graphs or tables to help describe trends or patterns.

• Avoid statements such as 'use the same amount of chemical' without any further detail. Candidates should always make suggestions using precise terminology such as concentration, volume or mass.

General comments

This paper invited candidates to consider environmental issues and methods of gathering and interpreting data in the context of one country, Kazakhstan. Many candidates understood and made good use of the source material and their written responses were clearly expressed. The mathematical and graphical questions did pose some difficulties for some candidates.

Candidates had no problems completing the paper in the time available.

Candidates may benefit from working through past papers to help see how to make the best use of the information given and apply their knowledge in context.

Comments on specific questions

Question 1

(a)   Most candidates gave the correct answer.

(b)   Most candidates suggested two sensible human needs.

(c) (i) Nearly all the candidates attempted to describe the pattern of population in the country. Some candidates only presented the population data given in the key without clearly identifying the distribution. Many candidates did identify the centre of the country as the lowest population density.

(ii)   Many candidates only managed to suggest one of the points on the mark scheme that might explain why there was a high population in the desert. All the points on the mark scheme were seen regularly.

(d)   Many candidates studied the graph carefully and described the changes in migration to gain full credit. Some candidates gave reasons for the changes in migration, which was not the focus of this question.

(e) (i) Nearly all the candidates suggested at least one reason why the governments wanted to build the high-speed railway link.

(ii) Candidates frequently suggested setting up a wildlife reserve and protecting the wild Ass by fencing off the railway. Some candidates wanted to move the animals from their habitat into a zoo, this was not given credit.

(iii) Although many candidates correctly suggested that placing a species on the IUCN red list would help to raise awareness of the problems faced by a named species, their answers frequently claimed that the red list could directly fund a conservation programme. This suggestion was not given credit.

(iv) The high cost and the difficulty of getting agreements between countries were often suggested and given credit.

(f) (i) Many candidates correctly identified two problems with plan **A**. A small number of answers were too vague to gain full credit.

(ii) Most candidates gave two good reasons why plan **C** was better than plans **A** and **B**.

(iii) Candidates always completed the questionnaire with three questions. Most of the questions were related to the focus of the questionnaire so full credit was frequently awarded.

(iv) All the selection methods shown in the mark scheme were suggested by some candidates. However, the descriptions of some methods did not have sufficient detail to gain credit.

(g) (i) The candidates that described economic reasons why the government were concerned about the risk of earthquakes readily gained credit. However, many candidates described the effects of earthquakes on a city without reference to possible economic effects.

(ii) Most candidates could suggest reasons why people would choose to stay in a city prone to earthquakes. All the points on the mark scheme were seen regularly.

(h) Many candidates correctly referred to the half-life of radioactive waste to explain why the problem would remain for many years. They went on to give examples of risks as shown in the mark scheme. A small number of candidates gave general answers that could be applied to any form of waste; these suggestions did not gain credit.

Question 2

(a) (i) Most candidates correctly estimated the reduction of the Aral Sea.

(ii) Many candidates gave clear descriptions of the impacts of reducing water levels in the Aral Sea. A small number of answers were too general in their nature and were not worthy of credit.

(b) Most candidates gave three clear descriptions of the problems faced by people living in shanty towns.

(c) (i) Most candidates correctly transformed the data given into an orderly table with headings and units.

(ii) Many candidates correctly selected field four, however, to gain the mark it needed to be clear that this field had the highest yield. This was not always the case.

(iii) Most candidates correctly suggested pH as the variable the student should have measured.

(iv) Candidates usually managed to give at least one reason as to why this data did not make a clear link between pH and crop yield.

(d) (i) Most candidates identified that the growing season for sugar beet was only five months.

(ii) Many candidates gained credit here. Some candidates did not read the question carefully and calculated the average temperature rather that the range of temperature.

(iii)   Most candidates found this question demanding as they did not make enough use of the information given.

(e)   Most candidates made good use of the information given to describe a suitable development plan. A small number of candidates copied out some of the information provided without giving any of their own ideas or reasons as to how or why their plan should be carried out.