Principal examiner reports for teachers

Principal examiner reports for teachers summarise what candidates did well and what candidates needed to improve for this examination series only.

This report is to be used in conjunction with the question paper and mark scheme.

For guidance on teaching and learning we provide resources for many of our syllabuses.

Resource	Where to find it
Grade descriptions – Grade descriptions describe the level of performance typically demonstrated by candidates achieving the different grades awarded for a qualification.	School support hub Select: Subject > Resource finder > Syllabus and specimen materials
Schemes of work – Schemes of work are designed to support you in your teaching and lesson planning.	School support hub Select: Subject > Resource finder > Teaching and learning
Lesson planning – Guidance on how to plan a lesson.	Lesson planning
Resource plus – There may be additional resources such as teaching packs containing lesson plans, resources and worksheets and videos for aspects of your syllabus.	School support hub Select: Subject > Resource finder > Teaching and learning
Teaching tools	Teaching Tools
Exemplar candidate responses	School support hub Select: Subject > Resource finder > Teaching and learning
Learner guide – A guide for students to help them understand what the course involves.	School support hub Select: Subject > Resource finder > Teaching and learning
Community forums – Do you have a question or something to share? Our online forums are great way to keep up to date with your subject and the global Cambridge community.	Community forum on the school support hub
Access to scripts for this series.	Access to scripts service
Results analysis is available for some syllabuses.	Results analysis
Test maker is available for some subjects.	Test maker

Other services from Cambridge International Education

- **Digital mocks service**
- **Insight assessments**
- **Professional development**
  - Focus on assessment
  - Online marking workshops

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ENVIRONMENTAL MANAGEMENT

Paper 0680/12
Theory

Key messages

What candidates did well
- Candidates generally had a good understanding of the broad range of topics covered within the syllabus.
- Good use of scale within the graphical based question.
- Evidence of planning prior to completing the answer for the final, extended writing question.
- The given formula was applied to the data provided.

What candidates needed to improve
- Greater understanding of the causes and impacts of climate change, ozone depletion and acid rain. These three concepts were sometimes confused.
- Check for questions where the response is needed on a diagram or table. Some candidates omitted these questions.
- A greater understanding of the command words (state, describe, explain etc.). Some responses lacked the detail required to meet the full demands of the question.
- Ensure the axes of graphs are fully labelled.

Comments on specific questions

Section A

Question 1

(a) Comprehensive responses
- Demonstration of a good knowledge of soil components, correctly identifying both animals and microorganisms as being part of the organic content of the soil.

Limited responses
- Less accuracy in answers, frequently ticking more than two components. Candidates often included mineral particles as part of the organic content.

(b) (i) Comprehensive responses
- Identification of sand, silt and clay and application of their knowledge of relative size to align them with the image and labels.

Limited responses
- If correctly stated, the three particles were not correctly ordered by size. Many incorrectly listed mineral ions rather than soil particles.

(ii) Comprehensive responses
- A clear, correct label to a space between the soil particles, not in an area shaded as a location of water.

Limited responses
- Incorrect responses drew the line to an area of water or to a soil particle itself. A proportion of candidates did not draw a label as instructed in the question.

(c) Comprehensive responses
- Clear and precise statements of both nitrate and phosphate ions.

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Limited responses

- While often using the correct chemical symbols, the responses did not always show the correct formulae in relation to the oxygen component or the electrical charge of the ion.

Question 2

(a) **Comprehensive responses**

- Correct statement of the population density within the table as instructed. Units given as people/km^2 or people km^{-2}.

Limited responses

- Variable responses were seen, with area not always expressed in km^2. Some candidates did not add the unit to the table as instructed in the question.

(b) **Comprehensive responses**

- Clear identification of both the country with the greatest population and that with the smallest area from the data in the table

Limited responses

- Incorrect use of the information in the table. A common error was to provide information on the smallest population rather than the smallest area.

(c) (i) **Comprehensive responses**

- Successful interpretation of the data in the table and its application into the formula provided.
- Candidates were able to accurately express their answers to two decimal places.

Limited responses

- While some candidates were able to apply the formula correctly, they were not successful in expressing their response to two decimal places.
- Candidates who did not show working could only be assessed on their final response so missed the opportunity to demonstrate appropriate application of the formula.

(ii) **Comprehensive responses**

- Use of the formula provided to calculate the population of Rwanda. Rounding the final total to a whole person was included.

Limited responses

- While the formula may have been correctly applied to the data, responses were not rounded to a whole person.

Question 3

(a) **Comprehensive responses**

- Good interpretation and use of the image to identify both items X and Y.

Limited responses

- Less precise use of language, sometimes referring to X as being a pipe rather than a well and a description of Y as being underground rather than groundwater.

(b) **Comprehensive responses**

- Able to provide one of a wide range of potential examples of alternate sources of fresh water.

Limited responses

- Some candidates identified seawater as a source of fresh water and included desalination as the method. Some responses also repeated the answer given for item X.

(c) **Comprehensive responses**

- Demonstrated clear understanding of the process of interception, both in the impact on speed of water reaching the soil and the parts of the tree where interception occurs.
- Some candidates also linked the increase in tree numbers to an increase in interception.

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Limited responses

- Some candidates confused interception with infiltration in the water cycle and gave an inaccurate account of the role of trees.

(d) **Comprehensive responses**

- Candidates were able to identify a clear similarity within the processes of through-flow and ground water flow and state a key difference.

Limited responses

- A significant level of uncertainty about the differences between through-flow and ground water flow was seen, with candidates often erroneously identifying one as occurring above ground.

Section B

Question 4

(a) (i) **Comprehensive responses**

- Clear descriptions of the changes in the trend of mean global atmospheric ozone concentration. Three clearly distinct observations made.

Limited responses

- Some valid observations were made. Interpretation of the data was not always accurate, and future data was sometimes included, although this was not required by the question.

(ii) **Comprehensive responses**

- Accurate interpretation of the graphical data.

Limited responses

- Errors in reading data from the graph or use of a previous year rather than one in future as required by the question.

(iii) **Comprehensive responses**

- Two clear, distinct and valid reasons given for potential errors in future ozone concentrations.

Limited responses

- Vague responses often repeating that future data would be predicted (a statement from the stem of the question).

(b) **Comprehensive responses**

- The question required both an impact and an explanation. Many candidates understood the potential increase in skin cancers and cataracts and were able to explain how the increase in UV levels would impact these issues.

Limited responses

- Some impacts given were too vague, for example a generic statement such as diseases.
- Explanations lacked detail or included inaccurate information in relation to the reduction of the ozone layer and its impact on radiation from the sun.

(c) **Comprehensive responses**

- The majority of candidates were able to identify the location of the ozone layer correctly.

Limited responses

- Most incorrect answers named other layers of the atmosphere.

(d) **Comprehensive responses**

- Most comprehensive responses referenced the need to control the production or disposal of CFCs. Some included the use of named alternative materials.

Limited responses

- Responses often confused ozone depletion and climate change, meaning that suggested solutions were not appropriate for this scenario.

Question 5

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(a) (i) Comprehensive responses

- A demonstration of a clear understanding of the information in the table identifying Burundi, Honduras and Brazil.

Limited responses

- While most candidates correctly identified two countries, they often omitted to include Brazil.

(ii) Comprehensive responses

- Correct analysis of all four statements to conclude whether they were supported by the data provided.

Limited responses

- While many correctly classified two or three statements, many did not understand the implication of the term 'mean' in the second statement.

(b) (i) Comprehensive responses

- Made valid observations from the photograph, as directed in the question. Three clear and distinct negative impacts given.

Limited responses

- Limited use of the photograph or the use of very generic statements which were imprecise. Some candidates incorrectly stated that there would be loss of land, which would not necessarily be the case if cattle were concentrated in one area.

(ii) Comprehensive responses

- Demonstrated understanding of the impact of methane and carbon dioxide on the enhanced greenhouse effect.
- Responses typically stated the processes that produced these gases, the way they interact in the atmosphere and finally the impact on the climate.

Limited responses

- Often merely focused on methane (which was prompted within the question), in many cases candidates were unable to articulate how the increase in methane would impact the climate. Some responses confused ozone depletion with the greenhouse effect.

(c) Comprehensive responses

- Demonstration of a clear understanding of the process of selective breeding, remembering that the process typically takes more than one generation which also requires the selection of good genetic examples from the offspring.

Limited responses

- While understanding the need to start with good genetic parents, descriptions were often subsequently vague or incomplete.
- Many responses did not focus on nutrition and animal health in relation to milk yield.

Question 6

(a) (i) Comprehensive responses

- Many candidates provided clear responses linked to the landscape shown in the photograph.

Limited responses

- Responses not linked to the specific scenario shown in the photograph or two very similar causes provided.

(ii) Comprehensive responses

- Comprehensive responses provided three distinct negative impacts on people with reference to the situation shown in the photograph. These frequently included the impact on crops and the loss of homes.

Limited responses

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- While impacts were often listed, some were not relevant to the scenario in the photograph or related to other wildlife and not specifically to people which was the focus on the question.

(iii) Comprehensive responses

- Able to provide good suggestions with regards to the opportunities the flooding may provide, linking the arrival of silt with an increase in fertility of land.
- Some candidates were able to describe the opportunities for other trades (such as builders) to restore damaged infrastructure.

Limited responses

- Often very generic responses provided. While migration was often cited, it was not considered to be a positive opportunity for the people affected.

(b) (i) Comprehensive responses

- Correct responses to all 5 statements to complete the sentences on malaria.

Limited responses

- While often able to correctly complete the final statement, most candidates found completing the others correctly challenging. Many candidates seemed to be unfamiliar with the organism Plasmodium and the role of the vector. There was a general unawareness of how malaria reproduces in the human body.

(ii) Comprehensive responses

- Candidates were able to describe that the drug killed the organism and therefore prevented its reproduction.
- Candidates also understood that if the malaria is no longer present in the human it will not be transmitted to others via the vector.

Limited responses

- Confusion was sometimes seen between the role of the anti-malarial drug and that of a vaccine which produces antibodies.

(iii) Comprehensive responses

- Two distinct methods to control malaria given, often including vaccination and a method to eradicate the vector.

Limited responses

- Some confusion with regards to how malaria is spread, incorrectly stating that clean water sources are needed.
- A focus on methods that would reduce mosquito bites rather than methods to control the insect.

Question 7

(a) (i) Comprehensive responses

- Two distinct abiotic factors named which would be relevant to the photograph. There was not a requirement for the candidates to be specifically familiar with mangroves.

Limited responses

- Where the term abiotic factor was understood, responses were often limited in precision, for instance stating water rather than specifying oxygen content, temperature, or pH.

(ii) Comprehensive responses

- Correct identification of the four organisms in the list to form the food chain.
- Inclusion of arrows in the correct direction.

Limited responses

- Incorrect inclusion of additional organisms to form a food web rather than a food chain.
- Omission of arrows in the chain or pointing in the wrong direction.

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(iii) Comprehensive responses

- A clear, simple description of a producer including information of the products or reactants.

Limited responses

- Often describing the role of producers or its location in the food chain which does not answer the question.

(iv) Comprehensive responses

- Provided both terms related to the mangrove ecosystem.

Limited responses

- Key terms were not always used accurately, with many incorrect alternatives provided.

(b) (i) Comprehensive responses

- Neat completion of the line graph in pencil.
- Inclusion of labelled axes (including units).
- Clear plots against a logical linear scale.
- Neat joining of plots with no extrapolation of the line.

Limited responses

- Axes were not labelled.
- Line sometimes drawn as line of best fit, rather than following the directions given in the question.
- Line extended beyond the plots.

(ii) Comprehensive responses

- The majority of candidates identified the correct 5-year period.

Limited responses

- Relatively few incorrect responses, however some candidates only quoted one year.

(c) Comprehensive responses

- Typically, balanced responses considering both sides of the argument to form a conclusion which could either agree or disagree with the argument.
- Use of a broad range of points to support the argument.
- Inclusion of specific examples to support the points made.
- Written in a cohesive manner in full sentences.
- Often extensive in length.

Limited responses

- Often focused on one or a limited range of ideas.
- Typically, did not provide a balanced response, looking at both sides.
- An answer to the question ‘how far do you agree or disagree with the statement?’ was not always provided.
- Written as bullet points or a simple list.
- Information was inaccurate or confused.

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ENVIRONMENTAL MANAGEMENT

Paper 0680/22
Management in Context

Key messages

What candidates did well
- See commentary on each question.

What candidates needed to improve
Candidates should
- Understand the difference in meaning of the command words describe, explain, state and suggest.
- Read the instructions of a question with care to ensure they are answering the exact question that is being asked. For example, **Question 1(c)(v)** asked about differences in age distribution, not a description of the pyramids of LEDCs and MEDCs.
- Show their working when completing calculations. Where more than one step is involved in the answer, correct working may still be evident even if the final answer is incorrect.
- Use a sharp pencil and ruler to draw graphs.
- Learn definitions.

Comments on specific questions

Question 1

(a) (i) Comprehensive responses
- There were many good responses with accurate use of compass points. The most frequent answer was that nuclear power stations were close to or along large rivers. Another good answer was identification of stations along the coast.

Limited responses
- A common mistake was to indicate that stations were close to, or in, the capital city, whereas use of the scale showed otherwise.

(ii) Comprehensive responses
- Responses were rare.

Limited responses
- Answers relating to demand for energy did not address the question. Very few responses suggested that availability of land was important or ease of distribution.

(b) Comprehensive responses
- Candidates performed well on this question. There were some good descriptions of how nuclear fission of uranium is used to boil water into steam which rotates a turbine that rotates a generator.

Limited responses
- A common response was to state that uranium is burnt, which is not consistent with the process involved. Other responses included both nuclear fission and fusion, which are different processes.

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(c) (i) Comprehensive responses

- Responses to this question varied. Explanation of why nuclear power is not renewable was not always clearly described, with reference to the decay of radioactive uranium isotopes and the finite nature of the process not always included.

(ii) Comprehensive responses

- Most candidates identified two types of renewable energy. The most common response was solar energy.

(d) (i) Comprehensive responses

- A range of responses was seen, with many candidates giving descriptions of environmental impacts of the power station shown in the question. Loss of habitat or biodiversity were common responses.

Limited responses

- A common response was to assume the clouds coming out of the towers were carbon dioxide or smoke. This was not consistent with descriptions of air pollution or contribution to climate change. Some responses did not distinguish that steam, or water vapour is produced from nuclear power stations, and that this is not associated with carbon emissions or smoke.

(ii) Comprehensive responses

- Many candidates were able to describe that nuclear power is more energy dense than fossil fuels.

Limited responses

- Many answers that correctly described no release of carbon dioxide were then linked to no release of greenhouse gases or no risk of global warming, which is not consistent with the process. Some responses did not take into account that water vapour released from the towers is a greenhouse gas and contributes to climate change.

(iii) Comprehensive responses

- Many candidates gave good descriptions of the risk of radiation leaks, potential accidents or hazardous waste. There were also good qualifications of cost, for example of construction or maintenance.

Limited responses

- Answers were sometimes too vague or described disadvantages that were not specific to nuclear power. Responses did not always focus on the requirements of the question.

(e) (i) Comprehensive responses

- Many candidates gave clear descriptions of the trends for both lines shown on the graph. An overview of the broad trends was often included rather than step-by-step detail.

(ii) Comprehensive responses

- Answers were mixed with many able to manipulate the graph to identify that 49 per cent of the total electricity generation is not accounted for and that this does not support the candidate's conclusion.

Limited responses

- Support for the conclusion was not always clearly explained, with many answers remaining too vague.

Question 2

(a) Comprehensive responses

- The majority were able to give the correct answer. Working should be shown, as correct methods may still be evident even if an earlier value is incorrect.

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(b) (i) Comprehensive responses

- This question was generally well answered, with most candidates identifying at least one relevant point and many identifying several. The idea of random sampling over a large area was well understood.

Limited responses

- The idea of scaling up results to estimate population over a large area was less well understood. Not all parts of the question were addressed in some responses.

(ii) Comprehensive responses

- Many candidates showed understanding that the use of quadrats to estimate the population of black salamanders is not suitable. The most popular answer was that the salamanders can move, leading to miscounting. Another popular answer was that it was time-consuming.

Limited responses

- Other answers were sometimes too vague. Some responses did not address the suitability of using quadrats to sample mobile animals, as implied by the photograph.

(iii) Comprehensive responses

- There were few comprehensive responses.

Limited responses

- Responses to this question varied. Many answers were sometimes too vague. The majority focused on environmental requirements of black salamanders already given in question part **(b)(i),** rather than the aspects of climate change asked for. Knowledge of specific animals was not required. Some responses referred to extreme temperatures or changes in rainfall patterns leading to floods or droughts as potential risks.

(iv) Comprehensive responses

- There were few comprehensive responses.

Limited responses

- Answers were mixed. Many were challenged to demonstrate knowledge of captive breeding, instead focusing on selective breeding. Others were able to adequately describe provision of suitable conditions with the top answer as removal of predators or a ban on hunting. Very few understood the idea of releasing the offspring back into the wild or selection of salamanders from different areas or genetic stock. Teachers can help candidates by reviewing the process of captive breeding compared with selective breeding or artificial insemination.

(v) Comprehensive responses

- This question was generally well answered with the majority able to suggest national parks or wildlife corridors as a suitable strategy. Other good answers seen were extractive reserves and zoos. Candidates should be reminded to be specific in their replies and provide different answers per answer line. For example, a wildlife reserve is the same as a protected area.

Question 3

(a) (i) Comprehensive responses

- Candidates performed well on this question. Some neat bars drawn with a ruler and correct plotting were seen. Both axes were properly labelled in most responses.

Limited responses

- A common mistake was to assume the bars were plotted in the same order as shown in the table, therefore mixing up the *x*-axis bar labels.

(ii) Comprehensive responses

- Most answers were correct. Working was shown clearly in many responses

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(iii) Comprehensive responses

- Many responses showed understanding of the idea of insufficient recycling facilities or limitations in the recycling process. Other answers included the expense of recycling and the use of alternative disposal methods, such as landfill or littering.

(b) (i) Comprehensive responses

- This question was generally well answered. Answers for benefits were job opportunities and improvement of infrastructure were given. The most popular answer for negative impacts was qualification of a type of pollution with noise and air pollution being the most common. Others were able to correctly identify loss of trees or habitat from the photograph.

(ii) Comprehensive responses

- Most candidates described land restoration clearly.

Limited responses

- Some answers suggested the site be used as a landfill for domestic waste. The photograph shows a forested area surrounding the sand mine, giving a clue to the expected answers.

Question 4

(a) (i) Comprehensive responses

- Nearly all candidates gave a correct description of bycatch.

(ii) Comprehensive responses

- Were able to specify that the bycatch species population is reduced and that this means a disruption in the food chain. Some other good answers explained that catching juvenile fish leads to reduction in breeding of that species.

Limited responses

- Many gave vague responses describing a reduction in the general fish population without qualification.

(iii) Comprehensive responses

- Many used the diagram to suggest damage to the seabed, corals and aquatic plant life living on the seabed. The question asks for impacts other than bycatch and candidates should read each question carefully before answering.

(iv) Comprehensive responses

- This question was well answered showing a good understanding of environmental conditions on the continental shelf.

(b) (i) Comprehensive responses

- Many were able to describe proximity to a body of water for ease of transportation of turbot, access to food for turbot or disposal of waste. Some answers also identified the road links for access

(ii) Comprehensive responses

- Candidates performed well, with the majority showing understanding of the benefits and limitations of fish farming. The response for benefits often referred to a guaranteed catch for a constant supply of turbot all year round. The most common response for limitations was disease outbreak.

(c) Comprehensive responses

- There were many responses showing understanding of how fishing net mesh size and closed seasons help restore fish populations. Some responses were specific in describing juveniles rather than smaller fish.

Limited responses

- Smaller fish could simply mean a smaller fish species, which does not answer the question.

Question 5

(a) (i) Comprehensive responses

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- Most candidates read the graph correctly to identify the year 1984.

Limited responses
- A common mistake was to misread the *x*-axis scale or the wrong crop.

(ii) Comprehensive responses
- Most candidates compared wheat and potatoes qualitatively and quantitively.

(iii) Comprehensive responses
- There were few comprehensive responses.

Limited responses
- Responses to this question varied. The question assessed how candidates questioned the choice of data presented, rather than knowledge about the growth of particular crops

(b) (i) Comprehensive responses
- There were some good answers. A common answer was that fertilisers improve the rate of growth.

Limited responses
- Descriptions were not specific enough about mineral ions contained in fertiliser. Nutrients is too vague a term in this case.

(ii) Comprehensive responses
- This question was well answered by most, demonstrating a good understanding of what herbicides are and how they reduce competition for a named resource to increase crop yields.

(c) Comprehensive responses
- Many responses showed understanding of waterlogging, soil salinisation, as well as soil erosion and leaching. Where these specific terms were not used, clear descriptions of these processes were still seen.

Limited responses
- A common mistake was not being specific enough with an idea such as suggesting a reduction in air spaces without mention of reduced oxygen.

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