ENVIRONMENTAL MANAGEMENT

| Paper 8291/01 |
| Paper 1 |

General comments

This November examination saw a slight increase in the entry with performances in both sections of the paper being similar in quality to previous equivalent examinations; marks ranged from the low 20's to upper 60's. Although most candidates found **section B** more to their liking than **section A**, this session did see some polarisation into Centres performing vary well in one section.

In the main candidates approached the paper positively and it was pleasing to see a continuing trend of local exemplar material being used in both short answers and longer essays. Candidates used their time well and there were no rubric errors.

Section A

The data response questions in **Section A** still pose more difficulties than the essays in **Section B**. A number of factors seem to contribute to this problem:

- specific terms such as in this paper '*seismic waves, particulates or acid rain*' are loosely defined or simply not understood
- candidates do not give sufficient attention to instructions such as '*state, describe, give reasons a*nd explain'
- in contrast to essays, data response questions are more tightly focused upon specific items of information.

Question 1

Candidates clearly find questions involving atmospheric pollution more to their liking than weather systems. Although a small number found this topic difficult, this years question on acid rain proved to be accessible to the majority of candidates. **Part (c)** was generally quite well answered whilst **parts (a)** and **(b)** proved to be a little more difficult.

(a)   In (i) few candidates recognised that carbon dioxide and methane were greenhouse gases and that particulates contribute to dry acid deposition. It is worth noting that Global Warming is the product of a type of pollution that produces greenhouse gases. In (ii) Fig. 1.1 proved to be a useful prompt for some lengthy and accurate descriptions of the effects of acid rain.

(b)   Although there were a small number of excellent analyses of the distribution of acid rain across the USA, most answers only went as far as describing the causes of high acidity in the north east. Most ignored the reasons for the dispersal of atmospheric acidity across the USA and a small number misinterpreted the pH values; clearly ignoring the key to the map.

(**c**)   This was quite well answered with spraying and flue gas cleaning receiving some very detailed and accurate descriptions. Oddly, the descriptions of wind farms were occasionally less secure. Some candidates saw wind farms as a mechanism for dispersing pollution rather than being a clean alternative source of energy.

Question 2

This was less well answered than **Question 1**. It began with short questions on the use of seismic evidence in relation to volcanic and earthquake activity and finished with a study of how urban planning might mitigate against the devastation that can be caused by an earthquake.

(a)   Answers to this section on the nature and use of seismic waves were quite varied. Whilst there were few difficulties in distinguishing between P and S waves approximately 50% made elementary errors on defining terms in **part (i)**. Few candidates recognised that shallow focus earthquakes occurred close to the earth's surface and that seismic waves are shock waves generated by an earthquake. **Part (iii)** required reference to how recordings from three or more seismic stations are needed to pin point the focus of an earthquake.

(b)   This proved to be the weakest part of this question with few candidates recognising a pattern of harmonic tremors prior to an eruption and smaller number not understanding the changes in seismic activity experienced during a volcanic event.

(c)   **Part (c)** was well answered with most candidates being well versed in the strategies that are used to mitigate against the devastating effects of earthquakes.

Section B

Questions 4 and **5** were answered by about 90% of the candidates with **Question 4** proving to be the most popular. Although **Question 3** was very unpopular, it did elicit some excellent responses; whilst responses to **Question 4** and **5** achieved a wide range of marks.

Question 3

As stated, although this proved to be the least popular question in *section B*, answers were of a high standard.

(a)   Answers focused on three of the following environmental effects, namely: noise, ecological damage aesthetic damage and traffic. Most of the outlines contained a clear identification of the effect supported by one or two elaborative points.

(b)   By using the phrase 'economic development on land' it was hoped that candidates would utilise their own experience and select from urban, industrial or rural (or both) land use. This small number of very good answers described and evaluated the strategies adopted to limit the effects of industry and mining. In each case, candidates made excellent use of examples and wrote well rounded and evaluative essays.

Question 4

Approximately 45% of the entry answered this question, with varied success. Marks ranged from 15 to 35 out of 40 and there was a fairly consistent pattern of performances with **parts (a)** and **(b)** being of similar quality. Following previous examinations where questions on weather and climate were extremely unpopular the responses of this session were encouraging.

(a)   Satellites, balloons and direct observation from weather stations were the most popular selection of ways in which short term weather forecasts can be made. The majority of candidates achieved credit by firstly identifying the method and then describing why it is used. The major weakness in these answers lay in describing what was actually being observed and drawing the link between recordings and making a short term forecast e.g.

satellite images contain details of current weather from which forecasts can be made.. although correct the candidate does not mention how clouds can indicate wind direction, and moving weather systems.

Strong answers developed these linkages and weak answers did little more than identify a technique. A small number of candidates opted for computer modelling but only on rare occasions did they link it with short term forecasts or indeed draw a link with recordings of air pressure, temperature, cloud cover etc.

(**b**)   This type of question has previously proven to be a successful choice and this year was not an exception. Most answers were well structured with greenhouse gases/global warming, acid rain and ozone depletion occurring in most essays. Most descriptions of these features of atmospheric pollution were accurate and there was little confusion between the processes. The major omission in the majority of answers lay in evaluating the contribution of natural causes and current policies towards reducing pollution

Question 5

Although answered by a similar numbers this question on slope instability posed more problems than **Question 4**.

(**a**)   Outlining how terracing a slope for building construction might lead to slope instability proved well within the scope of the majority of candidates and Fig. 5.1 was a useful prompt. There were some excellent descriptions of the processes that would contribute to instability. Such factors as increased gradients, building load, removal of vegetation and lubrication were well developed. The major omission by a significant number of candidates was to relate the altered slope, which now has unstable sections, to the original gentler gradient.

(**b**)   Responses to how the damaging effects of landslips and landslide can be limited were a little disappointing. Most answers contained a listing of a wide range of techniques that lacked elaboration and for which, examples were not utilised. It would have been far more effective to have selected a small number of studied examples of slope instability and tied the management strategies to the problem. A significant number of candidates were content to use illustrative examples in Fig. 5.2 about which they had little detailed knowledge. There were however a small number of excellent answers that satisfied all parts of the question.

Conclusion

Overall the paper proved to be a suitable test of a candidate's ability to manage data response questions and write good evaluative essays on either the atmosphere or the lithosphere. Examiners continue to be impressed with the enthusiasm with which candidates approach such environmental topics.

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General comments

Although an identical entry to paper 1, this Biosphere and Hydrosphere examination elicited some differences in the pattern of results. The results for paper 2 showed a wider range of marks (from 11 to 72 out of 80) with a significant number of stronger candidates achieving marks of over 60. This combination of a wider spread of marks accompanied by better performances at the higher end possibly reflected three factors:

- some candidates generally find aspects of paper 2 more accessible
- candidates may have benefited from the experience of having already taken paper 1
- many projects are based on ecological or hydrosphere topics

Like paper 1 the majority of candidates approached this examination positively and the trend of using local exemplar material continued. Noticeably there was some equivalence of quality in *sections A* and *B* of this paper. Candidates seemed to have used their time well and there were no rubric errors.

Section A

Both **Questions 1** and **2** proved equally accessible with most candidates achieving similar marks for each. Like paper 1 there is still some difficulty in defining relatively simple terms. However unlike paper 1 the data in both questions was well used by most candidates.

Question 1

Ecological processes and contrast between Savanna and Deciduous woodland formed the focus of this question. Performances in **part (b)** were generally better than in **part (a)**

(a)   Responses to the first half of this question were mixed. A significant number of candidates had clearly learned the correct definitions of ecosystem, npp and biomass and achieved the full 6 marks. Weaker answers to **part (i)** omitted the interaction of biotic and abiotic factors in an ecosystem, losses due to respiration for npp and were vague about the measurement of biomass. **Parts (ii**) to iv were moderately well answered as most candidates were able to draw together relationships between biomass and npp for each ecosystem.

(b)   Most **c**andidates made good use of the 'Greenpeace' passage. There were some effective descriptions of how, by providing a roadmap, Greenpeace highlighted both issues and a route to recovery. Most saw a moratorium as useful in providing necessary legislation. There were few difficulties in reviewing the effects of logging upon food webs and many candidates drew upon personal experiences to assess why many nations rejected the Greenpeace recommendations.

Question 2

This question is based on the topic of gains and losses to natural sources of water within a drainage basin. Answers in **part (a)** were of similar quality to those in **part (b)**.

(a)   Answers to **parts (i)** and **(iii)** proved to pose more difficulties than **(ii)** and **(iv)**. Candidates did less well in analysing the broader features of a drainage basin, a factor exemplified by some poor definitions of 'drainage basin' and some very confused descriptions of the gains and losses of water within a drainage basin. However few difficulties were encountered in defining and reviewing the flows and stores needed in **parts (ii**) and **(iv)**.

(b)   It was pleasing that candidates responded so well to the data on the Murray river basin. **Part (i)** was well answered with nearly all candidates achieving at least two marks; many all four. Most mentioned the need for irrigated farmland, reservoir storage and the utilisation of water within towns such as Loxton. The best answers elaborated upon excessive rates of evaporation and losses due to infiltration. Although **part (ii)** proved slightly more difficult, most answers contained information on the accumulation of salts downstream and general trends in salinity. Some weaker answers worked from the Sea towards the reservoir i.e. mouth to source and were confused in their descriptions on salinity. **Part (iii)** posed more difficulties as most candidates either outlined two strategies instead of one or described a measure that required a supply of water that was not obviously present; the major requirement being to provide more reservoirs in the highland source region.

Section B

In attracting approximately 50% of the candidate's **Question 4** proved to be the most popular; the remainder spread fairly evenly across **Questions 3** and **5**. Most candidates recognised the 10/30 division of marks for these questions and only a small number spent too much time on **part (a)**. As with previous sessions there was a wide variation in the quality of answers with marks ranging from 5 to 40 out of 40.

Question 3

This question has the underlying theme of the positive contributions human activity can make towards the sustainable use of ecosystems. This was achieved through a case study of how the Chagga people of Tanzania practice agroforestry, followed by an essay on National Parks. Although only 10 marks **part (a)** produced some high quality and lengthy analyses of Fig. 3.1.

(a)   Describing three ways in which agroforestry helps to maintain biodiversity proved to be quite a straightforward task. Fig. 3.1 was used well and most answers referred to the maintenance of the forest canopy, livestock management and irrigation. Occasionally answers were spoilt by the candidate failing to draw out the linkage between agricultural practices and maintaining biodiversity.

(b)   Answers were quite varied in both content and quality. High quality answers drew upon one or more National parks and clearly outlined how their management strategies enable the conservation of ecosystems. Weaker answers, whilst outlining the value of National Parks failed to utilise examples and the strategies they use to maintain their ecosystems. The range of examples drawn upon by many candidates made these answers interesting to read; these candidates clearly engaged with the question.

Question 4

Although a popular question, it was not always answered as well as candidates might have expected. Performances were quite varied with marks concentrated in the 15 to 30 range.

(a)   This section was well answered by those candidates who realised that it was not about the causes and environmental consequences of global warming per se. Instead it involved an analysis of the likely effects of global warming on the volume of water contained in the flows and stores of the global hydrological cycle. Although not always quoted, good answers made effective use of the data in Fig. 4.1 in a consideration of water in its solid, liquid and gaseous states. As implied weaker answers achieving less than four marks were more concerned with describing the process of global warming and aspects of climatic change.

(b)   This was quite a straightforward question on a topic with which Centres will have some familiarity. Most candidates were able to utilise examples they have studied and to varying degrees describe the advantages and disadvantages of dams and reservoirs. The fundamental difference between strong and weak answers lay in the breadth and depth of their descriptions. The weakest answers more or less listed some advantages and disadvantages without reference to any examples.

Question 5

This question had a focus on deforestation and the restoration or regeneration of forests. This question proved to be more difficult than 3 and 4 and consequently answers were generally of a lower quality.

(a) Although there were a small number of high quality interpretations of Fig. 5.1, most answers achieved 6 or less marks. Whilst most answers were structured into the three **parts A**, **B** and **C** they tended to contain fairly simple descriptions of the vegetation cover rather than analyse how biotic and abiotic factors interact. These processes are vital to the vegetation succession shown in Fig. 5.1.

(b) This essay fell into the following compartments:

- the effects of deforestation upon soils
- the effects of deforestation upon hydrological systems
- in areas within and beyond the deforested region
- an assessment of how areas might be restored after deforestation

  Most answers however, described the effects of deforestation upon environments in general, were unsure about how areas beyond the deforested zone would be affected and provided little detail on how hydrological systems would respond. For Instance the frequently used case studies of deforestation in the Himalayan foothills clearly links deforestation to soil erosion and increased surface runoff, sedimentation in rivers and an increased likelihood of flooding; in this example the effects are seen well beyond the affected region.

  The second part of the essay was slightly better answered as candidates were able to outline the positive effects of forest recovery/reforestation. Descriptions of these measures were frequently accompanied by some effective evaluations.

  Although there were a very small number of answers that considered each of the bullet points the majority considered the first and last, and were very brief in detail.

Conclusion

Like paper 1 this proved to be an effective test of a candidate's knowledge of the subject area and their ability to manage data response questions and write good evaluative essays. As stated earlier there some outstanding performances and the vast majority of candidates engaged well with the compulsory *section A* questions and their selection in *section B*.
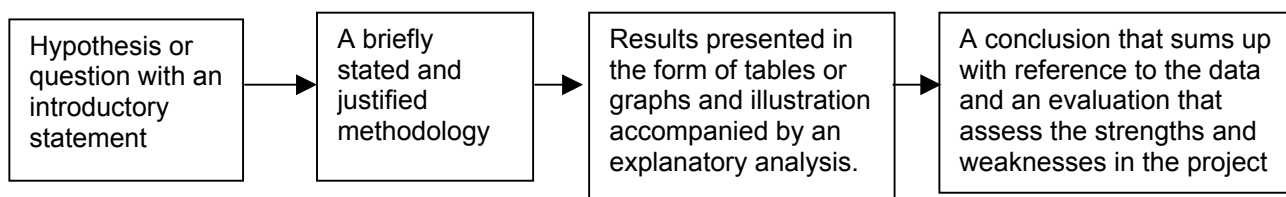
ENVIRONMENTAL MANAGEMENT

> **Paper 8291/03**
>
> **School Based Assessment**

General comments

Although this November entry for this examination is much smaller than that of May, the variety and quality of reports submitted this session was impressive. It is quite apparent that candidates are being made fully aware of the syllabus requirements and following a structure similar to that shown below.

Hypothesis or question with an introductory statement	→	A briefly stated and justified methodology	→	Results presented in the form of tables or graphs and illustration accompanied by an explanatory analysis.	→	A conclusion that sums up with reference to the data and an evaluation that assess the strengths and weaknesses in the project

Although there were no administrative nor assessment errors in this Novembers session it is worth repeating some points that were made last summer.

- It is important that marks are only awarded for criteria actually present within the report. This particularly applies to skills C1 (a, c and d) C2 (e) and C3 (c).
- The MS1 form must accompany the sample of projects.
- The initial mark must be doubled to a mark out of 40.
- Please do not use half marks in the centre assessment

Comments on skills C1, C2 and C3

Skill C1

The skill area generally achieved high marks. Most projects began with a clear statement of intent through a central question or hypothesis accompanied by relevant background material. As the majority of projects involved a fairly local issue, such a start provided a useful basis for developing a well structured research project. The only real weakness in a small number of reports was the failure to justify the stated methodology. This element is important as it enables the candidate to see whether or not the methods will be effective at testing the hypothesis.

Skill C2

This continues to form the strongest element of the report; it also carries the most marks. The majority of reports contained data presented though tables, graphs and illustrations. Significantly some weaker reports either lacked such material or contained information that had been copied and pasted from various Internet sites.

It was also impressive that most candidates supplied detailed and relevant analyses of their collected data.

Skill C3

Although skill C3 has been a weakness in past sessions, there has been a marked improvement. Most conclusions were supported by reference to presented data and some thought had been given explaining environmental management principals and trends.

The only weakness in this skill area lies in the presentation of the evaluation. It seems that whilst many candidates are very keen to criticise their own work they do not suggest how improvements might be made. It would also be nice if candidates referred to things that went well, and said why.

Conclusion

After 5 years with this syllabus the majority of Centres seem to be comfortable with the requirements of the research report. Probably the most important advice for future sessions is that candidates are made aware of the benefits of selecting topics that are issue based, small in scale and accessible. Projects that involve field work and/or laboratory work are invariably much better structured than the more 'global' topics that rely upon secondary information.

This session's reports were well written, varied and interesting to read.