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## FOREWORD

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This booklet contains reports written by Examiners on the work of candidates in certain papers. **Its contents are primarily for the information of the subject teachers concerned.**

# ENVIRONMENTAL SCIENCE

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## GCE Advanced Subsidiary Level

Paper 8290/01

Paper 1

### General comments

Although the this Paper was taken by relatively few candidates it achieved a range of marks from 75% to 20% from quite a wide range of ability. Responses within this Core Paper were quite varied with some questions always well answered and others often obtaining no marks at all. Considering that all questions were strongly rooted in the syllabus and concerned with core elements to environmental science, it was quite disappointing that responses were so varied.

The general pattern was one of questions involving the biosphere and solar-sphere being well answered with those using topics from within the atmosphere and hydrosphere being poorly answered. It would seem that the quality of written English was not a limiting factor as some answers were well expressed. It is important that Centres take on board the points raised within the mark scheme, this report, and of course make certain of giving the syllabus components a balanced weighting in their teaching.

### Comments on specific questions

#### Question 1

Answers to this question were often quite poor and very few candidates achieved more than 5 marks.

- (a) Candidates were required to indicate on the diagram the passage of air from High Pressure to Low Pressure between the areas indicated. There was no need to show a vertical circulation and sadly many candidates thought that air moved from low to high pressure.
- (b) Full marks were obtainable by stating the effect of the earth's rotation on deflecting air and describing the coriolis force.
- (c) Very few candidates had any understanding of the passage of a frontal depression. Marks were obtainable by positioning the two fronts on the cross section and labelling stratus cloud at the warm front and cumulo-nimbus cloud at the cold front.
- (d) Most candidates made a worthwhile attempt at this section. Rainfall clearly occurs at each front due to warm moist air being forced to rise. There were weaker responses to the changes of temperature that accompany a frontal depression and many candidates sought to describe a high-pressure system despite values being given to the isobars on the map.

#### Question 2

Answers to this question were generally good with some candidates achieving full marks.

- (a)(b)(c) Candidates found few difficulties in referring to the stores and transfers in the carbon cycle model and showed a good understanding of photosynthesis and the nature of carbon sinks.
- (d) Although there were some very good descriptions of why many MEDC's have found it difficult to meet the requirement of the Kyoto protocol a significant number of answers were spoilt by a lack of clarity over three distinct reasons.

### Question 3

Candidates produced good responses to **(a)(ii)** and **(b)** whilst answers to **(a)(i)** and **(c)** were weaker.

- (a)(i)** The photograph of an area of tropical rain forest aimed at providing a prompt to a description of vegetation structure. Nearly all candidates mentioned trees forming a canopy but did not refer to the under canopy and shrub layers that were clearly evident. The weakest candidates described in very general terms a lush, green and dense vegetation.
- (ii)** This was well answered through reference to either: sun, temperature or moisture.
- (b)** Photograph **(B)** provided a suitable prompt for some very good descriptions of loss of habitat, local climatic change and soil erosion.
- (c)** Answers to Table 3 were rather disappointing as quite a lot of data was provided. The ecosystem descriptions offered candidates a progression from temperature and rainfall differences through to TRF producing more plant litter which is then decomposed more rapidly thereby producing less humus.

### Question 4

Candidates found few difficulties with this question and were well versed in the characteristics of the earth's incoming and outgoing radiation.

### Question 5

This question was poorly answered with some candidates making no attempt at all. The theme of this question combined the features of two sedimentary rocks (sandstone and clay) with the impact of metamorphism.

- (a), (b)** and **(c)** were concerned with the texture and origins of coarsely and finely grained sedimentary rocks.
- (d)** and **(e)** dealt with altering the sandstone by heat and compression into a quartzite (although it was not necessary to name the rock), limestone into marble and shale into slate.

### Question 6

There were some satisfactory answers to this question as well as some very poor. The question clearly revolved around the storage of water within an artesian basin. Although candidates were confident in their understanding of groundwater and the nature of water storage zone they were uncertain about the geological controls upon ground-water storage.

- (b)** This required candidates to use the cross section to describe water the role of the permeable and impermeable rocks in a down-folded structure (syncline), which permits the accumulation, and storage of water.
- (c)** Most candidates failed to point out that springs appear at the points where the permeable rock reaches the surface and that water will flow out at these points due to seepage and pressure.
- (d)** Boreholes are constructed to draw out water under pressure to supply a variety of human needs.

### Question 7

Most candidates found this to be a straightforward question. Carrying capacity is a concept clearly understood by most candidates and the two graphs **(A)** and **(B)** were identified respectively as referring to a fast producing short-lived species and a longer-lived species. Parts **(c)** and **(d)** invited responses to two models: one for the regulation of fish and the other a predator-prey relationship. Both models are well developed in a number of texts and the majority of candidates found little difficulty in writing valid descriptions.

**Question 8**

Although this question was also answered reasonably well, candidates found **(d)** more difficult.

- (a)(b)(c)** Population structure has in the past been a popular topic and the depiction of information through both population pyramids and graphs should not and did not prove to be a major problem. It is important that in explaining the features of these graphs that candidates do not simply repeat the depicted information but mention why developed and developing countries have different birth rates, mortality rates and life expectancies.
- (d)** This was the weakest part of this question as candidates ignored the words physical environment in the question. Rapid increases in population affect the physical environments in a number of ways and there was room here for a description of such issues as: loss of land, overgrazing, overcropping, desertification and pollution.

**Conclusion**

It is important for Teachers and candidates to realise that this Paper is a testing of core topics in environmental science. Although the syllabus is broad, the Examination Paper will contain questions derived from each of the: Lithosphere, Hydrosphere, Biosphere and Solar-sphere. All questions will contain a wide variety of data pertinent to the question topic and each question will locate within one of the four 'spheres'. The length of the Paper can at first sight appear quite daunting but closer investigation should reveal that the questions are quite short and the sheer size of the booklet is a product of the data that accompanies each question. Correct interpretation of this data requires a knowledge of the vocabulary of environmental science and it is important the candidates make an attempt at each question.

Finally it is worth stating that whilst there is need for candidates to express themselves clearly, this examination is not a test of written English but of Environmental Science. The input that the majority of candidates made in this examination was quite impressive and showed a high level of awareness of the majority of topics that comprise Environmental Science. This commitment needs to be both developed and, of course, refined.

<b>Paper 8290/02</b>
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<b>Paper 2</b>
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**General comments**

In many cases, candidates' depth of knowledge of the subject was insufficient to answer questions at this level. It seemed that some candidates were unsure about which option to attempt. This is a large syllabus to cover in the appropriate depth so candidates should not be in any doubt as to which questions they should answer. Some candidates appeared to have only limited general environmental knowledge, which was often rather muddled. This was seen where their answers constantly brought in references to greenhouse gases, CFCs and the ozone layer as a cover for lack of knowledge about other material being tested. There were some candidates who left large sections of the Paper blank and others who gave answers that did not answer the question set. Sometimes this was due to a lack of knowledge but there were also indications that some candidates found it difficult to read the Paper, where English is not their first language. The subject and syllabus require a substantial amount of scientific knowledge and understanding which can be applied and this may involve reading and understanding text and data so that implications can be extrapolated. Candidates should be made aware of this.

**Comments on specific questions****Question 1**

- (a) Most candidates did not appear to understand the concept of a wet bulb thermometer. The explanation should have stated that water evaporating from the muslin requires heat energy which would, therefore, result in a lower temperature reading.
- (b) Again, candidates did not understand the principle. This required the explanation that the humidity of the air would affect the rate of evaporation so at high humidity evaporation rate from the muslin is reduced and less difference in the two readings would be seen.

**Question 2**

- (a) There were some good answers but many were badly expressed, although candidates appeared to understand the effect that the roof would have when the Sun was at its highest in summer and the change when the angle was lower in winter. Few noticed that the windows being on the north side would maximise light in winter in the southern hemisphere.
- (b) This was not well explained. Candidates should have stated that the Sun is at a low angle in the early morning and the evening so would strike these walls but did not appear to consider the angle in this context.
- (c) This produced some good answers, describing the flow of air produced by convection currents set up in the house as warm air is less dense than cold air.

**Question 3**

- (a)(i)(ii) Many candidates realised that the pyramid of numbers would have a very narrow base as the tree is a single, large organism which can support many insects which are very small. At each level organisms will then increase in size and decrease in number. The pyramid of energy is then a conventional shape as energy is lost at each trophic level.
- (b)(i) Many candidates did not read the question carefully so did not answer the question set. The first part of the question required an explanation of differences, not simply a description.
- (ii) A number of candidates repeated their answers to (i), instead of giving reasons for differences and did not refer to the projected changes but to the conditions already existing. Candidates must read questions carefully, as credit cannot be given for irrelevant answers.

*Option 1 – The exploitation of energy resources***Question 4**

This question was often very well answered with a number of candidates gaining full marks.

- (a) This was stated accurately and both marks were gained.
- (b) Most candidates knew that the units are *joules*.
- (c) The majority of candidates carried this out correctly and gave the answer as 18 000 J. It is essential that candidates show their working as credit may be given for a correct method where an error in computation has been made.
- (d) Candidates were aware that energy transformations are not 100% efficient and that energy would be "lost" as heat.

**Question 5**

- (a) Most explanations included the idea of a very long time scale for production from the decomposition of organic remains and involving heat and pressure. Examples were also included but few referred to them as a store of energy or mentioned the Sun as the original energy source.

- (b)(i) Candidates were aware that sulphur in fossil fuels is released into the atmosphere as  $\text{SO}_2$  which dissolves in rainwater.
- (ii) Candidates seemed well aware of the various effects of acid rain. The question required an indication of the actual effect on each example mentioned for a mark to be given for that example.

#### Question 6

- (a) Definitions of fission and fusion were not very accurately stated. The ideas of splitting or fusing atoms were generally correctly assigned but the actual processes were not well known.
- (b) Most candidates mentioned that the use of nuclear energy could reduce greenhouse gas emissions but fewer gained a second mark by mentioning that there are large reserves of nuclear fuel and that it could also conserve dwindling fossil fuel supplies.
- (c) Candidates did not understand the difference between nuclear power generation and reprocessing spent nuclear fuel. The question referred to the latter so many answers were irrelevant.

#### Question 7

- (a) Candidates could have made it clearer that  $m$  represents the mass of water moving through height  $h$  under the force of gravity  $g$ . Whilst it seemed that most understood the equation, explanations lacked clarity.
- (b) Candidates indicated that the rise and fall of tides could be used to turn turbines in generating electricity but did not mention the gravitational forces of the Moon and the Sun as the source of this form of energy.

#### Question 8

- (a) The finite nature of oil reserves was the basis of most correct answers.
- (b)(i) Few candidates gave answers that indicated that they understood the data provided, where it was clear that the level of noise from the wind turbine is low by comparison to other everyday sounds. Candidates who gained marks realised that the siting of wind farms in quiet areas would be significant. The effects at night, when other sound levels are lower could also have been mentioned.
- (ii) Candidates were generally able to give one advantage and one disadvantage of wind power. The advantages were, perhaps, better known than the disadvantages.
- (c)(i) Definitions of geothermal energy were poor. There seemed to be little understanding that this is generated within the Earth's core.
- (ii) In contrast to (i), this was better known and many responses included a diagram which helped to clarify the answer.

#### Question 9

- (a) Many candidates did not know what is meant by the term *photochemical smog*. The action of ultraviolet radiation was missed completely as was its effect in producing low level ozone. There were some references to the effects of the topography of the land around cities and industrial areas but these were not very clear as the basic idea of the photochemical smog had been missed. There were many irrelevant and confused references to greenhouse gases, CFCs and ozone 'holes'. This points up the fact that many candidates lack detailed knowledge of material specified by the syllabus and resort to generalised topics about the environment, which will not gain marks unless relevant.
- (b) Answers here were better than in the first section as candidates realised that smog in any form would be produced by industrial and traffic emissions so could give answers related to reducing these.

## Option 2 – The Management of Non-Biological Resources

**Question 10**

- (a) The idea of interception of rain by the plants was understood but there were some incorrect references to transpiration, rather than evaporation from leaf surfaces. Transpiration would imply that the plants had taken in the water, which would have to have been absorbed by the ground for this to happen.
- (b) One or two candidates realised that the ground surface would harden, making it difficult for infiltration to occur but most could give no explanation.
- (c) Ideas of erosion were well understood so that this section was answered better than the rest of the question.

**Question 11**

- (a) Few candidates could complete the table accurately. This is simple recall of knowledge. Candidates should expect to know the material specified by the syllabus in this sort of detail, as they are required to study only one of the options. It is essential that the option selected is covered fully.
- (b)(i) Most candidates mentioned the possibility of generating hydroelectric power but did not link the building of a dam with water supplies. The possibilities for recreational use were mentioned but the provision of a fishery was not.
- (ii) 'Habitat destruction' was a common correct answer but few mentioned the effects on human populations who could be displaced. There were some references to flooding dangers but not to earthquake risks.

**Question 12**

- (a) The idea of nutrient enrichment was understood. No details of its consequences were required here although some candidates attempted to explain them. This information was required in another section of the question. Candidates should ensure that they answer the question set as marks will not be transferred from one sub-section to another.
- (b) Most candidates mentioned the excessive use of fertilisers and the effects of run-off but some confused this with the effects of herbicides and insecticides. Whilst these could have serious environmental consequences they are not directly related to eutrophication.
- (c) There were some incorrect references to *anaerobic* bacteria. As eutrophication results in reduced oxygen levels by the action of *aerobic* bacteria, this indicates a less than sure grasp of the topic, in many cases.

**Question 13**

- (a) Candidates seemed to have little knowledge of landfill as a means of waste disposal so few were able to make sensible suggestion about the role of the liner as a means of preventing leachate escaping.
- (b)(i)(ii) Candidates did not know what leachate is so could not give an explanation of why it is hazardous. Again, there seemed to be lack of detailed knowledge of material within the option studied.
- (c)(i)(ii) Lack of knowledge of the topic was again evident. Control of pests and smell and the idea that covering each layer would then fill the site more quickly were the answers required.
- (d) This is a relatively low cost method of waste management and consequential methane production can be seen as useful benefit. Few candidates could give a relevant answer here.

**Question 14**

- (a)(i)(ii) Knowledge of the characteristics of a podzol is specified by the syllabus but many candidates seemed to have little knowledge of this topic and could not answer either of these sub-sections. Again, the question requires only simple recall of facts which should be known to all candidates who have studied this option.
- (iii)(iv) Candidates who identified **X** as a hard *pan* were able to cite poor drainage as being the problem caused.
- (b)(i) *Salinisation* did not seem to be a familiar idea to many candidates. There was a great deal of information in the diagram which should have helped those who had some idea about the meaning of the term but few were able to use the data provided to give a coherent response. The effect of salts on water uptake was seldom mentioned.
- (ii) Candidates did not relate lining the channels to the prevention of water loss by seepage.
- (iii) Many candidates were unable to give any response here as this topic was one with which they clearly had no familiarity. Methods involving the conversion of salts to harmless forms or to lowering the water table were looked for in answers.

**Question 15**

- (a) Accounts of the formation of minerals should have included details of hydrothermal deposition, metasomatism and magmatic segregation. Few candidates attempted to do this and many seemed unsure about what constitutes a mineral, with answers simply giving basic information about the rock cycle.
- (b)(i) The definition of a bulk material is that it is non-metallic and needed in large quantities such as sand or gravel. Some candidates seemed to think that gold and coal are bulk materials.
- (ii) As candidates were confused about what constitutes bulk materials, it was unsurprising that their answers were not always relevant. However, those who discussed quarrying were able to mention some of the environmental problems that it produces. No-one mentioned dredging, which is another significant method of obtaining such materials.

*Option 3 – The conservation of biological resources***Question 16**

- (a)(i) Candidates who read the question carefully realised that the answer would be “underfishing”, with fish stocks increasing.
- (ii) Most candidates realised that the measurement of factors involved would be difficult, although they were not always able to express this clearly.
- (b)(i) Most candidates were aware of the use of quotas and many also referred to laws relating to mesh size of nets or similar points.
- (ii) Candidates found it difficult to explain the problems of policing controls but this idea was seen in most answers.
- (c) Reduced pressure on wild fish stocks was the usual correct answer as an advantage, although reference could have been made to a means of cheap protein production. Some candidates seemed to think that this would be an expensive process and gave this as a disadvantage but few seemed to consider possible environmental impacts as a significant disadvantage.

**Question 17**

- (a)(i) Most candidates mentioned leaching and run-off, each gaining a mark but no-one mentioned the possibility of spray drift.
- (ii) The idea of accumulation through the food chain was known, although not very well described in terms of the numbers of organisms eaten at each level. The storage of pesticide in tissues, particularly fatty tissue was not mentioned. Again, this question revealed a lack of the detailed knowledge expected.



- (b)(i) The idea of resistant strains of bacteria was expressed in many responses but the way in which these arise, as natural genetic variation or chance mutation did not appear to be well-understood. Many candidates implied that development of resistance is a 'deliberate' act on the part of the bacterium! The fact that bacteria can reproduce very fast, so that resistant colonies are quickly produced, was not mentioned.
- (ii) Only a few candidates clearly explained that the result could be that antibiotics used for humans might then be ineffective.

### Question 18

- (a) Candidates must read questions carefully. The question specified products from grazing animals. It was, therefore disturbing to find candidates referring to eggs in this context. This could only conceivably be accepted as a correct answer if it was made clear that this was for embryo implantation and even in this context it would be a doubtful answer. A question as simple as this should have provided two easy marks, with milk and dairy products, meat, hides and wool, bone and horn all possible answers. Dung is not really a major economic product, although it may be useful.
- (b) Many candidates expressed the idea of overgrazing and its consequences but the term itself did not appear to be familiar to all.
- (c)(i) Candidates referred to the loss of vegetation, as a result of overgrazing, coupled with the fact that goats can eat a wider range of material and therefore find food more easily. There was evidence that candidates had read and understood the data provided here and in many cases had been able to apply it to their answers.
- (ii) Again, candidates realised that the goats' ability to eat a wider range of material was the factor involved.
- (iii) The impact of a lack of organic material on the soil was not realised by many, with candidates still trying to relate answers to the effect on the sheep or goats. The question mentioned an *environmental* problem, which should have indicated the type of response required.

### Question 19

- (a)(i) The idea that the tree roots bind the soil particles was seen in most answers and a number of candidates also mentioned the effects of interception. Reduction of speed of water flow down the slope could have been mentioned but was not seen.
- (ii) There were few sensible suggestions here. This is an instance of where candidates found difficulty in applying knowledge to an unfamiliar situation. Reducing water speed or trapping soil particles would have been accepted answers.
- (iii) Again, candidates seemed to be unable to apply knowledge. It was expected that they would realise that weeds would provide soil cover, so lessening rain impact and binding the soil with their roots.
- (iv) The references to 'fast-growing' and 'strong roots' in the question should have given candidates clues about possible answers. Fast growing grass would give quick cover which would be speedily restored after cutting and the strong roots would stabilise the soil. Many candidates concentrated on the provision of animal fodder, which was of limited relevance. The question throughout concentrated on methods of cultivating sloping land so that candidates should have appreciated that prevention of erosion was the main issue. Candidates should be encouraged to use the diagrams and other data to extrapolate ideas, using their knowledge. This question demonstrated a lack of familiarity with this idea, on the part of many candidates.
- (b) Most candidates mentioned that lack of dung would mean that soil nutrients would be lost and some credit was given for this. However, nutrients can be supplied by non-organic fertiliser. The main loss to the soil is the addition of organic matter which improves soil structure, improving water holding and drainage and reducing erosion risks.

**Question 20**

- (a) Most candidates were able to suggest two factors here, namely poaching and loss of habitat but few could come up with a third, such as killing by farmers to protect livestock. Some candidates mentioned poaching twice, giving a different reason for poaching in each case, such as the desire for skins and the use of body parts in medicine. This simply repeated part of the question stem, without indicating much thought on the part of the candidate so was only given credit once.
- (b)(i) This was well answered with candidates referring to the possibility of cross-breeding being increased, with its consequences on genetic diversity. It was also realised that the tigers would be able to escape from adverse conditions if necessary.
- (ii) Here the effects of a very small gene pool, coupled with inbreeding, were looked for in answers. Whilst there is some inter-linking of ideas in both sub-sections of (b), candidates should beware of simply providing identical answers to the two. They must ensure that the points made are relevant to the specific question asked. The effect of a very small populations would be problematic, whether or not there was movement between reserves.

**Question 21**

- (a) Some candidates confused the idea of genetic engineering with artificial selection in conventional breeding programmes. Some of those who referred to the transfer of genetic material using a vector seemed to have little further knowledge and so compensated for this by describing artificial selection. It was disappointing that there were few examples given, which would have illustrated usage.
- (b) Again, lack of knowledge of the topic was evident as candidates generally were unable to produce arguments for or against genetic engineering technologies. Increased food production and reduced use of herbicides and insecticides are claimed as advantages whilst effects on the environment of escaped GM organisms such as fish from fish farms and arable crops into wild habitats are potential disadvantages. These and other possibilities are topics of world-wide discussion at present so it is particularly disappointing that candidates studying this subject seemed to have so little knowledge or appreciation of them.

<b>Paper 8290/03</b>
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<b>Individual Research Report</b>
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**General comments**

The May 2003 examination attracted 37 reports from 7 Centres. Even with such a small entry it was pleasing that there was a wide variety of topics incorporating experimentation into plant growth rates, urban environmental analyses, meteorological studies and ecology. It is commendable that Centres and their candidates maintained the generally high standard of previous sessions. Most candidates clearly understood the background to their research themes and the majority of the report contained a strong input of primary data. Nearly all research projects contained either field or laboratory analyses comprising a variety of valid techniques yielding results of both a numerical and pictorial (photographic and graphic) nature.

Whilst nearly all reports contained division into: an introduction, methods, results and analysis, and a conclusion, it is important to stress that some reports were far too lengthy. In some reports this was derived from an over-elaboration of the background to the study and in one case the inclusion of too much Internet material, which although interesting, did not really add to the quality of the report.

**Comments on specific skills****Comments on Individual Research Reports**

As in previous years, this section of the report addresses performances within skills C1, C2 and C3.

**Skill C1**

This was generally of a very high standard. Most candidates began their reports with a clear introduction and a hypothesis thereby showing a good understanding of the principles and theories underpinning their research. Nearly all candidates were able to provide and justify valid and viable methods of investigation. Topics were of a sufficiently localised nature as to permit field and/or laboratory investigation.

Questionnaires once again proved to be a popular field technique it was good to see that more thought had been given to their construction with results displayed in graphic and descriptive form. The collection of primary data was a central concern of the majority of candidates and the most successful reports were concerned with localised topics such as: water pollution, waste disposal, flooding and local urban environments. It is a particularly impressive feature of this year's projects that candidates undertook detailed recording and measurement using a wide range of field and laboratory equipment. The majority of questionnaires were also of a very high quality.

**Skill C2**

As in previous examinations this skill yielded quite high marks in parts 'a to d' as most candidates presented data derived from primary sources. Information was generally presented in a clear and relevant form. The most popular techniques used to present data were tables, pie charts and bar graphs. It is important that candidates realise that line graphs should be used with continuous data and bar/pie graphs with discrete data.

Many candidates took on board the use of statistical techniques to verify their data in order to verify the validity of their survey and sample. For many the 't' test proved to be the most popular and it is surprising that candidates do not use simpler methods to validate and illustrate their results. Techniques such as rank correlation (Spearman or Pearson), scatter graphs, regression, chi squared and cumulative frequency are relatively simple and often at this level easier to describe. Such tests can be used within the concluding sections of the report where some basis for evaluating the research data is needed.

Overall skill C2 proved to be the strength of many candidates; and the use of a statistical test was certainly a valid refinement for some candidates.

**Skill C3**

This once again proved to be the weakest part of many reports. The skills associated with the environmental principles (c, d and e) in the research, were moderately well covered; however parts 'a and b' were often either poorly covered or absent.

It is important that candidates develop a conclusion, which is distinct from their evaluation. The conclusion should review the results and assess the level of agreement of this information to the initial hypotheses. The evaluation should review the level of success or degree of failure of the investigation, i.e. assess its limitations and where necessary indicate modifications as required in skill C3 (a and b). A critical evaluation of the chosen methods and the validity of the results will not have a detrimental effect on the quality of the research. Please note that unless there are extenuating circumstances 'lack of time' cannot really be regarded as a limitation. Such points could be raised through two final sections titled, conclusion and evaluation.

### **Concluding notes**

It was most pleasing that once again candidates took on the true spirit of the environmental science syllabus and opted for topics fully worthy of research. To the credit of their Teachers, nearly all candidates showed the benefits of the teaching and instructions they had received, through both the content and structure of their reports.

It is important that the guidelines in the syllabus are closely followed and all Teachers and candidates should refer very closely to the section titled 'Coursework: The Research Report' in the current syllabus. The project should deal with issues or a topic on a small or local scale and lend itself to field and laboratory research. Once primary data has been collected, it should be collated and a variety of statistical techniques utilised to present the information. Whilst secondary information will provide useful background to the study it should not be the sole focus of the study. Please avoid including too much internet data within the main part of the text as it often masks the candidate's personal input and does not always add to the quality of the report. If included within the Internet data, newspaper reports and other secondary information can always be attached as appendices.