

Standards Booklet for AS/A level Thinking Skills (9694)

CONTENTS	PAGE
Introduction	2
The Scheme of Assessment	2
Study Skills	3
Teaching Strategies	4
Questions and Responses	6
Paper 9694/02	6
Question 1	6
Question 2	9
Question 3	11
Question 4	13
Paper 9694/04	17
Question 1	17
Question 2	21
Question 3	24
Appendix: Question Papers and Mark Schemes	29

INTRODUCTION

The CIE Thinking Skills curriculum is intended to:

- Provide students with a specific and transferable set of skills for solving problems, critical thinking and reasoning
- Encourage students to apply these skills to real or realistic scenarios
- Develop students' abilities to understand and engage confidently in argument and reasoning.

This booklet contains real answers written for papers 2 and 4 by AS and A Level Thinking Skills candidates during the June 2007 session. The answers have been selected to demonstrate strengths and limitations in candidates' responses to examination questions. Examiner comments highlight these strengths and weaknesses, explain why candidates have been allocated marks, and show how candidates could have gained higher marks. It is hoped that working through this Standards Booklet will help teachers guide their students towards becoming successful candidates. The responses of individual candidates are reproduced exactly and include original errors or grammar, spelling and punctuation.

The Scheme of Assessment

The Thinking Skills Advanced Subsidiary is assessed in Papers 1 and 2, which test Problem Solving and Critical Thinking through multiple choice, short and long answer questions.

- Paper 1: Problem Solving and Critical Thinking.
This paper has multiple-choice questions. Usually, each question tests just one critical thinking skill or one problem solving skill.
- Paper 2: Critical Reasoning.
From 2009 there are three questions. Question 1 provides information in text, graphical and/or numerical form. The candidate needs to evaluate this evidence and respond with a short answer to each of a number of questions. In question 2 the candidate is presented with various items of evidence and requires the candidate to engage in reasoning in a scientific context. Again, the candidate needs to give short answers to a number of questions. Question 3 requires the candidate to read a passage of about 350 words then evaluate and present an argument by writing an answer that is structured and is longer than the answers to questions 1 and 2.

The Thinking Skills Advanced Level is awarded on successful completion of Papers 3 and 4 in addition to Papers 1 and 2. These papers test both Problem Solving and Critical Thinking at a more advanced level than the AS papers.

- Paper 3: Problem Solving and Critical Thinking (Advanced).
This paper has multiple-choice questions. Each question tests just one or more critical thinking skills, one or more problem solving skills, or a combination of critical thinking and problem solving skills.
- Paper 4: Applied Reasoning.
Questions 1 and 2 test advanced problem skills using structured questions. Candidates are advised to bring a calculator into the examination. The purpose of question 3 is to assess the candidate's ability to interpret, evaluate and write about multiple references within a short timeframe - this simulates a situation that candidates may find themselves in during their first year at university or in employment. In question 3 candidates are presented with several documents and asked to analyze and evaluate an argument in one of the documents. The candidate must then go on to construct their own well-reasoned argument by selecting and synthesizing from the documents (which are of varying degrees of value) and by introducing their own ideas and arguments.

Study Skills

This qualification is skills based, and does not test the knowledge that candidates have acquired. It can – indeed should – be applied to candidates' other, knowledge-based subjects but is, in itself, a test of the way a candidate thinks in response to stimulus material. Although candidates have varying degrees of natural aptitude for thinking which are developed to greater or lesser extent by their academic and everyday lives – just as they have varying degrees of natural aptitude for gymnastics, which are developed to greater or lesser extent by their everyday lives – this natural aptitude can be improved by making these skills explicit, and by practising them.

Candidates should know from the outset that Thinking Skills is a course which teaches and tests skills which they themselves will have to practise. It cannot be passively imbibed or learned from a book or from simply listening to a teacher and taking notes. The student needs to participate actively, and to strive to improve. Just as very few people can turn a somersault on their first attempt, very few students can demonstrate advanced level thinking skills without patient, dogged, repetitive and increasingly challenging practice.

Candidates should be encouraged to work from the CIE endorsed textbook, *Thinking Skills*, by John Butterworth and Geoff Thwaites. They may also find access to parts of some of the other textbooks written for Critical Thinking useful, especially *Critical Reasoning: A Practical Introduction* by Anne Thomson. The syllabus document contains an extensive set of references.

Reading quality newspapers and magazines which include comment, analysis and evaluation of topical events and issues is another key way in which candidates can improve their thinking skills. They will improve their understanding of reasoned discussion, and develop the complexity of subject-specific language and concept necessary to really hone their thinking skills. UK publications which would be appropriate include:

- The Times (www.timesonline.co.uk)
- Independent (www.independent.co.uk)
- Guardian (www.guardian.co.uk)
- New Scientist (www.newscientist.co.uk).

However, although these so-called 'quality publications' can provide excellent topics, students beginning the course should also examine critically articles in newspapers which are known to be biased and/or sensational. Local newspapers can be a good alternative source to national newspapers.

Teachers should recommend and use similar publications from their own countries. Examples of English language sources used by CIE Thinking Skills teachers are:

- BBC www.bbcworld.com
- Aljazeera <http://english.aljazeera.net/English>
- New York Times <http://www.nytimes.com/>
- Mail and Guardian www.mg.co.za
- New Zealand Herald <http://www.nzherald.co.nz>
- Straits Times <http://www.straitstimes.com/>
- Jakarta Post <http://www.thejakartapost.com/>
- Bangkok Post <http://www.bangkokpost.com/>
- New Straits Times <http://www.nst.com.my/>
- Pakistan Dawn <http://www.dawn.com>
- Asia Times <http://www.atimes.com/>.

Where English is not candidates' first language, it might be useful for candidates to begin by reading this level of debate in their native tongue. This can help them really develop their concepts rather than manipulating terms in a foreign language for which they have no first language reference point.

Teaching Strategies

Examiners of knowledge-based subjects often comment that candidates have the subject-specific knowledge to succeed, but do not demonstrate the higher-level thinking skills which would enable them to access the top marks in these subjects. Teachers sometimes comment that their students do not see the relevance of a course specifically in thinking skills. Indeed, candidates occasionally make similar comments in their examination scripts.

One solution to these objections might be to encourage students to practise their thinking skills whilst learning or revising their other subjects. Students could be made aware of the proportion of marks awarded in their other subjects to thinking skills. In Sociology, for example, 40% of the marks might be available for subject knowledge, whilst 60% might be awarded for demonstration of what may broadly be called thinking skills (i.e. interpretation, application, analysis and evaluation).

During Thinking Skills lessons students can be explicitly taught what analysis and evaluation are. They can be helped to understand how to use these tools in other contexts. For example, candidates could be informed of the marks allocated for skills such as analysis, interpretation and evaluation for a range of commonly studied subjects, such as Law, History or Chemistry. They could then consider in groups how they might demonstrate analysis or evaluation in these subjects. Their suggestions could be compared with comments in the Standards Booklets for those subjects or with information from teachers of various subjects.

Teachers might discuss with students that evaluation, in, say, Psychology, might apply to evaluating evidence or theories. Evidence to support claims in an experiment could be evaluated by considering its reliability – source, type of claim etc, or its relevance – e.g. is the information in this investigation about student achievement specifically relevant to the claims about memory and social status? A theory could be evaluated in terms of how well it works: does it have any internal inconsistency or flaws in the reasoning which would weaken it from within? Does it make any unstated assumptions which, when made explicit, seem unacceptable and would thus weaken the theory? Does it have any undesirable consequences?

Beyond this, teachers will find two strategies of key importance in helping students develop their thinking skills:

- Questioning
- Making repetition fun

Questioning is fundamental in helping students to think. It takes them beyond trying to guess what is in the teacher's mind, or wondering what piece of information is 'correct,' to really developing the skills of thinking. Why do you think that? What evidence do you have? What evidence would be useful? Why? What reasons do you have for that? Can you think of a counter argument? How would you answer that? Is that an argument? What's the conclusion? How could you make it an argument? How would you counter that conclusion? What else can we conclude from this information? Why not? What would be the best method to use here? What sort of hypothesis might we form here? How might we test it? Teachers might find it useful to present students with implausible evidence or a flawed argument, and encourage them to question this evidence or argument, rather than accepting it because it comes from a respected authority.

Repetition is also key to helping students think a little deeper, a little more clearly, using the appropriate skills. If this repetition is fun, students are more likely to own the skills, to internalise them and be able to access them at will. Multiple choice questions can be done as team games, or modelled on popular TV game shows rather than as a test. Information can be retrieved and selected from written materials posted around the classroom, rather than handed out on sheets of paper. Students can then manipulate this information. Students could be handed strips of paper with reasons or a conclusion, and move around the classroom until they find the person with the reasons or conclusion which works logically with their own.

Students could perhaps, write, 'Plausible' or 'Implausible' on opposite sides of a piece of paper. Each could then write an explanation for an event or piece of evidence. The teacher could read these explanations to the class and students vote on whether the explanation is plausible or implausible, and then explain why. Students can, with guidance, write multiple choice questions to test a particular skill, including a mark scheme and justification. These questions can then be set for the class to do, or the class can (sensitively!) evaluate and edit the questions. Mock trials (perhaps of famous historical figures or criminals) could be held, using evidence collected by the class, and evaluated in terms of the skills tested in paper 2 question 1. In all cases, teachers should remember to highlight and make explicit the thinking skills being used, to ensure that students realise that they are learning, and develop ownership of the skills they are practising, so that are able to transfer those skills from the immediate context.

Finally, it should be noted that CIE have produced a Scheme of Work which provides teachers with a unit level structure for teaching Thinking Skills. It also provides links to more teaching resources. At the time of writing, this Scheme of Work is available on the CIE Teacher Support website.

QUESTIONS AND RESPONSES

Paper 9694/02 Critical Reasoning

Question 1

- (a) What can be concluded from the position of Carla's car, and some of the other vehicles, as shown on the map? [2]
- (b) Evaluate the relevance and reliability of the evidence provided by Professor Smith, and compare it with the statement by Mrs Friel. [2]
- (c) Comment on the reliability of the statement by Mrs Thomas, taking into consideration Carla's statement. [4]
- (d) How likely is it that Dr Angelou deliberately damaged Carla Tay's car? Construct a short reasoned argument to support your conclusion. Use the evidence provided. [5]

General comment

A good answer would focus precisely on the skill being required by the question. A good answer would be precise, thoughtful and to the point, and avoid unnecessary additional comment. Good answers evaluate the evidence rather than restating it. The most common way not to get marks in this question is to restate the evidence or 'tell the story' rather than evaluating.

Individual Candidate Responses

Candidate A

- (a) The position of Carla's car is so it is the only car on the street blocking an entrance, Angelou's driveway. The car to the right of Carla's is parked the opposite direction of traffic flow. This means the car would have had to cut across traffic, possibly at an angle that could have damaged Carla's car.
- (b) Professor Smith's statement is very speculative at the beginning. He has no real proof that the car was already damaged when he arrived home. He speculates, not a reliable source, on what might have happened in terms of the damage being done by another car or cyclist. He does, however, give some insight into Tay and Angelou's relationship – one of past contention. His description of Angelou is very opinionated, and it is unclear whether he himself heard Tay say "She'd know who to blame" or if it was hearsay from Angelou. Considering all this, his statement has little, if any reliability. The fact that Smith's description of Angelou is opinionated is proven further by an opposite account of Mrs Friel. She said Angelou had threatened her car before. Smith and Friel juxtapose each other's thoughts on Angelou's character.
- (c) Mrs Thomas' statement reliability is jeopardised by contradictions in Carla's Tay's story. While similar in that Mrs Thomas came in the school after seeing a man having difficulty parking, the accounts differ after. Mrs Thomas and Carla Tay both say they saw Angelou come out of his car. He would only have done this one time. Mrs Thomas also stated that she "saw" Angelou do it. Tay, in relating her and Mrs Thomas' conversation says Thomas said "Oh him!" If Thomas had "seen" Angelou kick the car, she would have told Tay. Due to the fact that Thomas was questioned on the day after the incident, she could have decided in that time to blame, as she told Tay, that "horrible man". Thomas' statement is very unreliable.

- (d) It is not likely that Angelou damaged Tay's car. Mrs Freil's statement cannot be included as evidence against Angelou, because, in the general information, it said that many people on the street complained of the traffic problems the school parking situation caused. She also did not say when the incident occurred. Angelou could have just been angry that day. There is no proof that his threat was backed by any desire for real action. Mrs Thomas' argument, as discussed in part c, was invalidated due to many factors. The main reason being that if she had really seen Angelou kick Tay's car she would have told Tay. Professor Smith's statement, as discussed in part b, has limited, if any, reliability, because it is based on speculation and opinion. The only part of his statement with any sort of slight validity was that the car was already damaged at 4:30, which, if true, would also show Angelou to be innocent. Dr Angelou's statement supports not only his innocence, but corroborates the fact that he was not happy about the cars being parked in front of his house. It is therefore, likely a true statement. Carla Tay based her conclusion that Angelou damaged her car on the fact that he was "mean" and that he was "there". With everyone else's statements pretty much invalid, this reasoning has no backing, and no weight. It is not likely, based on the evidence (and its lack of validity) that Angelou purposely damaged Tay's car.

Candidate B

- (a) It can be concluded that she was blocking Mr. Angelou's driveway and blocking the bicycle lane. There are many other cars parked on the bicycle lane.
- (b) The reliability of Mr. Smith's evidence is not good. If it had been hit by a car that didn't stop there would have been scratches and paint marks. Mr. Smith and Mrs. Friel both say different things. Mr. Smith claims Mr. Angelou would never do something like that, but Mrs. Friel claims she was threatened by Mr. Angelou because she had left her car in front of his driveway to pick up her daughter.
- (c) Mrs. Thomas's reliability of her statement is weak. Carla and Mrs. Thomas's statements contradict each other. Carla said she was inside collecting her kids and said that Mrs. Thomas had said some fool was trying to park his car and blocking traffic around 5pm, then Carla went outside to look and found her car damaged and she told Mrs. Thomas and she said it seems like something he would do, but Carla did not say Mrs. Thomas had seen the accident. Then when Mrs. Thomas was asked she claimed she saw Mr. Angelou kick Carla's car.
- (d) It is very likely that Mr. Angelou damaged Carla's car. There was no evidence that suggests a car had hit it because there was scratches or paint marks. There is claims that Mr. Angelou had threatened people for parking in front of his house before. Mr. Angelou even stated that he asked Carla to park somewhere else before. Eye witnesses stated that they saw Mr. Angelou trying to park his car and blocking traffic.

Examiner Comment

The mark scheme for (d) puts considerable emphasis on candidates considering the plausibility of alternative scenarios as one of the strands of reasoning they consider in coming to their conclusion. Candidate A has not considered the plausibility of alternative scenarios, whereas Candidate B has. Thus, although the general quality of Candidate A's answer to (d) is higher, Candidate B's answer is only one mark lower.

Candidate A

- (a) The first point made by this candidate is a conclusion that can be drawn from the diagram. The second is attempting the right task, but is inaccurate because a car cutting across traffic could not have caused the blow to Angelou's car.

Mark awarded = 1 out of 2

- (b) The candidate gives a thorough evaluation of the reliability of Smith's evidence, making several credit-worthy points. They also comment on the relevance. Although the candidate slips somewhat by suggesting that that a contradictory account 'proves' their evaluative point without questioning the reliability of the contradictory source, this is a strong answer. Had there been more marks available for this question, the candidate could have accessed them with this answer. There were, however, only two marks, so the candidate has spent time on answering this question more fully than necessary, perhaps at the expense of marks which could have been gained elsewhere on the paper.

Mark awarded = 2 out of 2

- (c) In this answer the candidate becomes rather narrative. Despite this, they were credited 2 marks for a developed understanding of the contradiction between the two accounts, and 1 mark for quoting Mrs Thomas's words, 'that horrible man,' as a reason why she might have changed her story 'to blame' Angelou, thus hinting at prejudice. The candidate therefore gained a generous 3 marks of the available 4. To gain the fourth mark, the candidate would have had to make a further evaluative point.

Mark awarded = 3 out of 4

- (d) The candidate has produced a reasoned argument which considers which evidence should be taken into consideration, and how much weight the remaining evidence has when unreliable evidence has been discounted. It draws conclusions, considers plausibility and corroboration, and comes to a probable conclusion based on this reasoning. The candidate has not, however, considered the plausibility of alternative scenarios, beyond mentioning that Smith suggests that the car was damaged earlier. This means that the candidate gains 4 of the 5 available marks.

Mark awarded = 4 out of 5

Candidate B

- (a) The candidate has drawn two basic, observational conclusions, which were enough to gain 2 marks on this introductory question.

Mark awarded = 2 out of 2

- (b) The candidate did not make a point sufficiently well to gain any marks on this question. The first comment is a counter argument to Smith's (speculative) suggestion, rather than a comment on the reliability or relevance of Smith's evidence. Had the candidate said that Smith was speculating, they would have gained a mark. The candidate nearly gains a mark with the next point, that Smith and Friel 'say different things' which is quite close to saying that their statements contradict or contrast. However, it is not close enough, and is too vaguely expressed, especially as the candidate's elaboration of the difference picks a point that is not truly contradictory.

Mark awarded = 0 out of 2

- (c) The candidate gains 1 mark for a weak, confused explanation of the contradiction between Tay's and Thomas's statements. The answer is mostly 'she said' then 'she said' narrative rather than evaluation. To gain more marks, the candidate would have needed to comment on the reliability of this evidence, by talking about bias, vested interest etc and the probable effect of this on the reliability – for example, 'Mrs Thomas, like Carla, is part of the parking problem. This makes her likely to be prejudiced against Angelou, which increases the likelihood of her being less than truthful.'

Mark awarded = 1 out of 4

- (d) This answer is just about worth three marks. There is a conclusion supported by reference to the evidence, and suggestion that one of the suggested alternatives is not supported by the evidence. Other than this, the evidence is not evaluated, but key points of evidence have been selected.

Mark awarded = 3 out of 5

Question 2

- (a) What is the author's main conclusion? [2]
- (b) Identify an unstated assumption in the second paragraph. [2]
- (c) Consider the chain of events which illustrate the vicious circle, described in the three middle sentences of paragraph three. State which of the steps in this reasoning you think is the least convincing and explain why. [2]
- (d) How effective is the analogy relating to trains in the last paragraph? [3]
- (e) Give one further argument which either supports or counters the conclusion of the above argument. [3]

General Comment

Good answers are focussed, precise and answer the question. They demonstrate understanding of what argument is, and how to identify the component parts of argument such as conclusion, reasons, unstated assumptions. Good answers demonstrate evaluative skills in parts (c) and (d). Good candidates present their own, further argument in (e), with reasons to support a conclusion.

Individual Candidate Responses

Candidate A

- (a) The main conclusion is that we ought to be using insurance policies as little as possible.
- (b) The unstated assumption is that those who buy insurance will not benefit from it, even though when they suffer mishap, and people help them to pay the cost by insurance policies.
- (c) It is the least convincing to say that people are more willing to leave their cars in dangerous areas of a city if they are insured against theft.
This is because money is not the only factor that determine whether people want park park the cars in dangerous area. People might not want to get all the trouble to claim their loss over the stolen cars. Hence they will still be careful with their cars.

- (d) It is not so effective.

Both the cases show that people's expectations have gone up. Either for the service of the trains and also the coverage of their insurance.

Another similarity is that both the lateness of the trains, and perhaps can cause loss financially and in other aspects.

However, the lateness of the trains is the fault of the service providers that they have paid for it. Hence it is normal and reasonable for them to expect more whereas for the insurance, they have to pay more if they want to expect a bigger coverage of insurance against more things. It is a matter of playing safe, but not a matter of expecting something better.

- (e) It is wrong to say that we ought to be using insurance policies as little as possible.
Insurance ensures that things go more according to the plan and we can also expect the cost of premium for insurance but we cannot predict what mishaps are going to happen. Hence when some mishaps do happen, we get paid by the insurance and hence it reduces the effect of the mishaps. This is what is called risk management. It is true to say that we are helping the others to pay the costs of mishaps, but they are helping us when something bad falls on us.

Candidate B

- (a) The conclusion of this is that people feel the need to insure most everything, thus making their own expenditures increase. Also that it is causing people to be more careless about things they have insured.
- (b) Paragraph two is stating that the only people that benefit from from the insurance system are insurance brokers.
- (c) I think the statement that says car insurance makes people more willing to leave their expensive cars in dangerous areas of the city is the least convincing because people have to still pay an amount for their stolen car and no one would purposely leave an expensive car in inappropriate areas.
- (d) It is effective because it gives an example of how peoples expectations have gone up and the author was trying to tell the readers how people expectations have gone up.
- (e) People should be trying to use insurance policies as little as possible because people have to pay for the insurance and in turn actually helping pay for someone else's accident.

Examiner Comment

Candidate A

- (a) The candidate has identified the conclusion precisely and quoted it.

Mark awarded = 2 out of 2

- (b) The candidate has identified an unstated reason, 'that those who buy insurance will not benefit from it even though when they suffer from mishaps...'

Mark awarded = 2 out of 2

- (c) The candidate has written a convincing, plausible explanation to support their decision about which step in the author's reasoning was the least convincing.

Mark awarded = 2 out of 2

- (d) The candidate has made an overall evaluative comment. They give two points of similarity, but then evaluate in detail why these similarities are not as great as they appear, and why the analogy is not effective. This is an excellent answer.

Mark awarded = 3 out of 3

- (e) The candidate has written an argument with a couple of reasons, intermediate conclusions, a counter argument and response to counter argument, and the main conclusion. The reasons give good support to the intermediate conclusions, which in turn give good support to the main conclusion. The candidate has used the language of reasoning, 'hence' and 'it is true that...'. This is a lovely response which could have gained more marks had they been available.

Mark awarded = 3 out of 3

Candidate B

- (a) The candidate paraphrases some of the reasoning. They appear to be unaware of how to identify a conclusion, not merely mistaken about what the answer is.

Mark awarded = 0 out of 2

- (b) The question asks for an 'UNSTATED' assumption. The candidate answers by copying an intermediate conclusion from the passage i.e. a STATED part of the argument. Again, the candidate has performed the wrong task.

Mark awarded = 0 out of 2

- (c) The candidate gives one good reason why their chosen step is least convincing. This is sufficient for both marks.

Mark awarded = 2 out of 2

- (d) The candidate comments about the use of expectations but does not evaluate whether this is a good or parallel example of how people's expectations have gone up. The answer is too vague to gain credit.

Mark awarded = 0 out of 3

- (e) The candidate paraphrases the stimulus passage instead of giving a further argument. Once again, the wrong task has been attempted.

Mark awarded = 0 out of 3

Question 3

- (a) For each of the following, say whether it can be reliably concluded from the above passage. You must give a brief reason to support your answers.
- (i) It is not safe to convict defendants on fingerprint evidence alone. [2]
 - (ii) Courts should accept scientific evidence only from methods with extremely low error rates. [2]
- (b) Identify **two** reasons the author uses in the last three paragraphs to support his conclusion. [2]
- (c) How useful is the example of automated fingerprint recognition for the author's overall conclusion? [2]
- (d) 'It would be better to imprison a few innocent people than give the guilty an easy way out of jail.' How effective is this statement as an objection to the argument? [4]

General Comment

Good answers focus precisely on the questions, and provide concise, to the point answers which demonstrate that candidates are able to engage in scientific reasoning, interpreting data, drawing conclusions, using information to support or challenge a hypothesis – and evaluating the way others do this.

Individual Candidate Responses

Candidate A

- (a) (i) It can be reliably concluded from this passage that it is not fair to convict defendants on fingerprint evidence alone. As stated in the passage, nobody knows how often fingerprint examiners really are wrong. It has been shown in the past they are not always right, alike the automated fingerprint recognition systems. Thus it would be unjust to convict someone on an unstable basis.
- (ii) It cannot be concluded that courts should accept scientific evidence only from methods with extremely low error rates. Any method will have some error rate because nothing can be perfectly exact. However, the courts should have concluding evidence from multiple methods before a conviction is followed through.
- (b) The author supports his conclusion with the reasons that innocent people are being wrongly convicted and ignoring the existence of error prevents fingerprint analysis from being improved.
- (c) The author's example of automated fingerprint recognition strengthens his conclusion. By pointing out that even computers are wrong, it emphasizes the inevitable existence of human error in these methods.

- (d) This statement is not an effective objection to the argument. Although it would be unfortunate for some guilty to get past the system, putting innocent people in jail is unspeakable! Although the truly guilty can appeal if they were sentenced based on fingerprints, most cases would still be substantial enough to keep them imprisoned. However, putting innocent people in jail is immoral and unfair. There needs to be more than one matching fingerprint for conviction.

Candidate B

- (a) (i) This statement is reliable because it is proven that errors occur when using fingerprints to convict people who are charged with crime.
- (ii) This statement is not reliable because the point is to not convict an innocent man and even if you use a method with low error rates there still is a chance an innocent man may be convicted.
- (b) The author stated that ignoring the existence of errors in fingerprint analysis may prevent improvement of it and the author stated the longer we wait to improve the fingerprint analysis the more of a possibility that the judges and juries reject fingerprints as evidence so there is no time to waste in improving fingerprint analysis.
- (c) It is not very good because it contradicts what the author said in paragraph two about how we should acknowledge that there is an error rate and find out what it is because he said we know the error rates of the automated fingerprint recognition system really well.
- (d) It is very effective against this argument because the author is trying to say we need to improve the fingerprint analysis to make sure we do not convict innocent people. This statement is saying that it is better to let a few innocent people go to jail than let one guilty person walk.

Examiner Comment

Candidate A

- (a) (i) The candidate has given the right answer and referred to the text to justify their answer.

Mark awarded = 2 out of 2

- (a) (ii) The candidate has given the right answer supported by acceptable reasoning.

Mark awarded = 2 out of 2

- (b) The candidate has identified and quoted two reasons accurately.

Mark awarded = 2 out of 2

- (c) The candidate has provided a concise, to the point answer demonstrating understanding of how the example works in the argument.

Mark awarded = 2 out of 2

- (d) The candidate provides a good evaluation of the comment, taking a moral stance. They look at the issue of both the innocent and the guilty, and refer to the counter argument in the passage about the guilty appealing, showing that appealing against fingerprints would not provide an easy way out of jail. However, they do not really address the question of how effective this statement is as an objection to the argument. They concentrate on it being immoral to put the innocent in jail rather than seeing that the author is arguing for a measure which should prevent the innocent being put in jail, as well as ensuring that the guilty stay there.

Mark awarded = 3 out of 4

Candidate B

- (a) (i) The candidate has correctly answered the question and referred to the text to answer it.

Mark awarded = 2 out of 2

- (a) (ii) The candidate has correctly identified that the statement cannot be concluded, but has given the wrong reason for this.

Mark awarded = 1 out of 2

- (b) The candidate has accurately identified two reasons.

Mark awarded = 2 out of 2

- (c) The candidate shows a complete misunderstanding of the meaning of the passage.

Mark awarded = 0 out of 2

- (d) The candidate has identified a tension between the author claiming that we should improve fingerprint analysis to avoid imprisoning innocent people, and the statement, which accepts the imprisonment of innocent people. This is worth 1 mark. However, the candidate wrongly says that this makes it an effective objection, and the rest of the answer is paraphrase rather than evaluation.

Mark awarded = 1 out of 4

Question 4

- (a) Show that you have a clear understanding of the argument by identifying its main conclusion and the reasons used to support it. [5]
- (b) Evaluate the argument by identifying any unstated assumptions and discussing any weaknesses or flaws. [5]
- (c) Offer one further argument which could be used in support of or against the main conclusion. [3]

General Comment

Good answers precisely identify and quote the main conclusion, and the main reasons (or intermediate conclusions) given to support it. Excellent answers also show understanding of the reasoning given to support these intermediate conclusions. Good answers identify unstated assumptions and consider whether it is reasonable to accept these hidden claims. They also evaluate weaknesses in the pattern of the reasoning, rather than disagreeing with the premises or providing counter argument. Good answers include a new, further argument, which would provide additional reason to support the conclusion or a completely different reason to challenge it. The argument would have at least one reason and a stated conclusion. It would probably be developed with an example, or include an intermediate conclusion.

Individual Candidate Responses

Candidate A

- (a) The main conclusion is that the name of the games (the Olympic Games) should be updated to reflect the change in purpose, where the change refers to that the Olympic Games no longer celebrate physical greatness.

The whole argument is based on 3 main strands.

First,

R1 – It is the rich countries that have the worst problems with unfit, obese population.

IC for R1 – they cannot be winning so many medals through being the best in sport.

R2 – And yet the few rich countries dominate the Games.

R3 – The games can only succeed with sponsorships from a major international corporation, that based in rich countries.

IC for R3 – People from poor countries do not stand a chance winning medals at Olympics.

R4 – Hosting the games provides an opportunity for rich countries to show the rest of the world how big, how rich and how important they are.

IC for R4 – The Olympic Games can be seen to encourage the senseless and shallow spending of the rich.

IC from all the ICs above, the Olympic Games now only celebrate the might of money.

Second strand,

R1 – The games which are supposed to create inter-countries friendships among citizens but now it does not do so.

R2 – They feel insulted when the athletes of homeland are beaten.

IC for R1 and R2 – the national competitiveness could lead to wrong.

Third strand,

R1 – Many idiotic hobbies that do not test the physical prowess are included.

R2 – The games were about celebrating human physical prowess.

IC for both reasons – The Olympics has already got nothing to do with sports anymore.

IC from 3 strands – The Olympics Games no longer celebrate physical greatness.

Main conclusion is based on last IC.

- (b) In paragraph 2, it is assumed that when a country has problems with unfit, obese populations, they are not supposed to win so many medals. This is a flaw as the countries can still train the only few individuals who are involved in the games to win. It has not much to do with the general situations of obesities.

It is also assumed that when the sponsorship is from the corporation based in rich countries, rich countries have more chance, and poor countries have no chance to win medals.

It is wrong to assume this connection. Winning or not, it is based on the ability of the athletes but not sponsorships.

In paragraph 3, hosting the games actually generates incomes for the countries, which then can be used in other aspects including helping the poor ones. This challenges the statements stated in the passage.

In paragraph 4, the writer is exaggerating the situation by saying that the games can indirectly lead to wars rather than friendships. This is not true. There might be some conflicts but a war is too much for it. Furthermore the author states that the conflicts will evolve, without giving any evidence. People could benefit from the games, by meeting friends from other countries.

In the last paragraph, it is assumed that the hobbies such as darts and fishing do not test the human physical prowess. This might not be true as the games still need physical strengths. Other games such as running are still included, hence it is wrong to say that Olympics has nothing to do with sports anymore.

- (c) The games still celebrate physical greatness. It involves competitions like running or swimming et cetera. Furthermore it helps to generate more incomes for the hosting countries, fostering relationships among the participating countries, it should not be said that it celebrates only the might of money.

Candidate B

- (a) The conclusion is that the goal of the Olympics has changed from celebrating physical strength, ability, and greatness to boasting the greatness of one's own country. This is shown in the fact that it's breeding international competition more than international friendships. Rich countries host, and rich countries win. The public gets angered or offended when their country loses rather than being impressed by another's ability and congratulating. Some events included in the Olympics have even now become more competitive hobby-like events than physical sports. Money for humanitarian aid, a +ve international friendship building, is re-challenged into "look at us" monuments and stadiums. This supports image and glitz more than international friendship.
- (b) It is an unstated assumption that many countries could host the Olympics without "wasting" tons of money on stadiums. This is also a flaw in the argument. Rich nations host the event, because with billions of people coming to play and watch, facilities need to be able to contain and move, safely and properly, such masses. This article is also flawed in that poorer countries have smaller populations, and less time to participate and excel in sports, which could affect their medal placings, or lack thereof. They're tending to farms or tribal matters as opposed to getting together a soccer tournament. This article assumes that money can "buy" an athlete the ability, and a medal. A weakness also comes in the highly opinionated statement of "idiotic hobbies". The text suggests that the only celebration of "physical prowess" is in activities which "test the human body to its limits". This excludes sports of talent, which may be difficult but not life-threatening. This would exclude skiing, an art form that is fast. Historical examples of this lack of sportsmanship the author speaks of would support his/her argument as well.
- (c) While poor athletes may not win medals as frequently as "rich country" athletes, their participation in Olympic events gives their country international exposure and attention. Their flag, issues, and culture may be highlighted in the hosting city and through media coverage. Countries otherwise forgotten have a chance to re-post their name in the universe, gathering attention to their needs.

Examiner Comment

Candidate A

- (a) The candidate has produced an impressively detailed and largely accurate analysis of the structure of the argument.

Mark awarded = 5 out of 5

- (b) The candidate accurately identifies unstated assumptions, which is a difficult task. They also consider whether these are reasonable, and offer counter argument and evaluation, always re-focussing on the passage and whether a particular claim is supported. It is not invariably correct, but certainly enough for 5 marks.

Mark awarded = 5 out of 5

- (c) The candidate produces relevant comments, but does not really offer a new argument to support or challenge the conclusion.

Mark awarded = 2 out of 3

Candidate B

- (a) The candidate has paraphrased an intermediate conclusion as the main conclusion, and given gist of the argument. Because this intermediate conclusion is close to the main conclusion, the candidate appears to have understood the 'direction' of the argument, so this is just enough for 2 marks. To gain a score of 3, the candidate would have needed to accurately identify the main conclusion. To gain more marks, the candidate would also have needed to identify and quote the main reasons (or intermediate conclusions) used to support the conclusion.

Mark awarded = 2 out of 5

- (b) The candidate attempts to identify an unstated assumption, but finds one which is not made by the passage. This is the most common mistake amongst those who do try to find the unstated, hidden assumptions rather than copying chunks of text. The candidate then provides counter argument and some factually inaccurate disagreement which demonstrates little evaluation of the passage, but quite a lot about the candidate's general knowledge (which is not being marked, of course). Towards the end of the passage the candidate makes a more evaluative point about the author excluding sports of talent, then weakens it by using the bizarre example of skiing. To improve on this score, the candidate would have needed to evaluate the reasoning, looking for flaws and weaknesses, such as the **slippery slope** flaw present in the penultimate paragraph, or the **generalisation** that because many citizens of rich countries are obese, they all are, so none can be world leading athletes. Or, the candidate could have considered whether the reasons really support the conclusions. For example, 'even if it were the case that the Olympics encourage the senseless spending of the rich, this gives no support to the claim that the Olympic Games no longer celebrate physical greatness. It would be possible for the Olympics to do both.'

Mark awarded = 2 out of 5

- (c) The candidate makes some relevant comments which would support the benefits of the Olympics to poor nations, but which have little relation to the conclusion, and are not used as part of an argument. There is just enough for 2 marks. The candidate appears to have run out of time (having spent longer than necessary answering earlier questions in the examination).

Mark awarded = 2 out of 3

Paper 9694/04 Applied Reasoning

Question 1

- (a) Calculate how much it would cost to run the 24-hour vital appliances for the entire expedition using only Diesel B generators. You need to include the cost of purchase and the cost of running the generators. [1]
- (b) Is it possible to produce all the necessary power using diesel power only, given the \$10000 spending limit? Explain your conclusion by showing the costs of purchase and diesel required. [3]
- (c) If solar power was to be used to provide as much of the power requirements as possible, what would be the minimum cost of the provision of the solar power? [2]
- (d) (i) Assuming that the diesel generator(s) run at full power all the time, investigate possible combinations of the power sources. Give one example of a combination of power sources which fits the requirements of the expedition, and is within the budget (\$10000). [2]
- (ii) You should find that your combination produces more than the required total power. With the aid of the graph in Figure 1, calculate the minimum cost to produce exactly the required power if the generators can be run at reduced power to lower diesel costs. [2]

General Comment

Candidates found this to be a demanding question.

- (a) All that is needed to gain the mark for this is the number 8760. Minor deviations resulting from (appropriate) estimation from the graph were permitted (but infrequent).
- (b) A mark was given for each of the three possible combinations considered: the bare minimum to gain each mark was an explicit statement of the correct number of generators needed, and a comment on the impossibility of affording the fuel. This requires less than the question asked for: in general candidates struggled to work through the calculations without numerical errors, and hence the Examiners' re-orientation towards candidate strategy alone.
- (c) This question was answered fairly well by candidates, although there was a tendency (throughout the paper) to answer numerically without any comment. In this question, this led to some candidates being penalized (if they calculated the costs for both of the Solar units, and didn't choose which was the answer, they forfeited a mark).
- (d) (i) A review of candidates' responses showed that this question was demanding. The decision to credit candidates with either of the aspects which would have characterized a complete correct answer was an attempt to offer a fair response to this. There is a danger in a question of this kind that the candidate becomes immersed in searching for the *correct* answer, irrespective of time constraints. Candidates must appreciate that their aim is to win as many marks from the paper as possible, which involves sensible time management.
- (ii) This required a sensible answer to part (i) in order to merit a correct follow-through adjustment of the cost. Very few candidates managed this.

Individual Candidate Responses

Candidate A

- (a) 24 hr appliances: 2100W
3 diesel B generators = \$5400

3 diesel B generator running at 700W per hour
costs \$1.41 an hour 47c x 3
\$1.41 x 24 hrs x 100 days = \$3384 for fuel
 \$5400
 \$8784 for total cost

- (b) total w per hour = 4350W
All diesel B engines: would take 5 generators to put out needed power
 Cost of 5 Diesel B generators = \$9000
 Fuel of 5 diesel B generators running at 870 w/hr = \$7080
Diesel A & B mixture: 1 Diesel A & 2 Diesel B costs = \$8600
 Fuel of diesel A running at 3000 w/hr & 2 Diesel B at 675 w/hr
 For total expedition: Diesel A = \$2400 Diesel B = \$2160
 Total cost = \$13 160
All Diesel A: 2 Diesel A generators required. Cost \$10 000.

No it is not possible to produce all the necessary power using only diesel power

- (c) Total power 4350 w/hr
Solar A = 175 w/hr
4350/175 w = 25 solar panels of A at \$900 a piece = \$ 22 500

- (d) (i) total max power = 4350 w/hr
All wind power: requires 10 Wind A's to produce 4500 w/hr at \$750 apiece: \$7500
9 Wind A = 4050 w/hr = \$6750
2 solar A = 350 w/hr = \$ 1800
4400 w/hr at a total cost of \$8550
or
8 Wind A = 3600 w/hr = \$6000
1 Diesel B = 900 w/hr = \$1800
4500 w/hr \$7800
 +\$1440 fuel cost
 \$9240 total cost

- (ii) 8 Wind A = 3600 w/hr = \$6000
1 Diesel B = 900 w/hr = \$1800
4500 w/hr = \$7800 cost of machinery
Total watts required 4350 w
 - 3600 w
 750 w
50 c/hr to run Diesel B at 750 w/hr
50 c x 24 hr x 100 days = \$1200
\$7800 + \$ 1200 = \$ 9000

Candidate B

- (a) required generators = 3
cost of purchase = $1800 \times 3 = 5400$
cost for running for a day = $2(24 \times 60/100) + 24 \times 20/100$
= \$33.60
cost for ----- 100 days = \$3360
Total cost = 8760

	power required at day	power required at night
vital	2100	2100
day only	1000	---
other day night	<u>1250</u>	<u>1250</u>
TOTAL	4350	3350

It is not possible to use Diesel A because we would require two of them (as one only gives 3000) and all \$10 000 would be used up. We won't have any money for running them.

We would need 5 Diesel B to get the required energy

cost of obtaining them = \$9000

Then we would be left only with \$1000 as the running cost which is not enough. We require \$3360 only for running vital appliances for the whole expedition as calculated in Answer A.

So it is not possible to produce all the necessary power using diesel power only given the \$1000 limit.

- (c) Max power required during day = 4350 W
we would need about 25 solar A panels
minimum cost of provision = 25×900
= \$22500

(d) (i)	Product	Purchase cost	running cost	total cost	max power
	Diesel A	5000	2400	7400	3000
	Wind A x 3	1500	-	<u>2250</u>	<u>1350</u>
				9650	4350

- (ii) No answer presented.

Examiner Comment

Candidate A

- (a) This is a rare example of an appropriate estimation from the graph which produced an answer not equal to \$8760. This is because the candidate has decided to split the 2100 watts of power equally between the three generators, and thus been forced to estimate the cost of 700W from the graph. Careful working ensured that the candidate was credited for this.

Mark awarded = 1 out of 1

- (b) Clear working is presented here, with appropriate conclusions, ensuring that the candidate won all three marks here.

Mark awarded = 3 out of 3

- (c) No need for justification here, and therefore the single (correct) case considered gains the full marks.

Mark awarded = 2 out of 2

- (d) (i) Although the candidate failed to pay appropriate consideration to the restrictions on the different types of power, she considered all three types of power output, and offered combinations which fitted within the budget – and was therefore credited with full marks.

Mark awarded = 2 out of 2

- (ii) Marks were only available to candidates who had assembled an entirely correct collection of power sources for the expedition.

Mark awarded = 0 out of 2

Candidate B

- (a) A correct solution.

Mark awarded = 1 out of 1

- (b) Only two of the possibilities are considered.

Mark awarded = 2 out of 3

- (c) As with candidate A, the single correct solution is all that's needed here.

Mark awarded = 2 out of 2

- (d) (i) Because the candidate does not consider all three power sources, she can only gain one mark.

Mark awarded = 1 out of 2

- (ii) No response presented.

Mark awarded = 0 out of 2

Question 2

- (a) Alice has made monthly payments of \$110 since she joined the credit union 4 months ago. She would like to borrow \$2700. Assume she continues to make the same monthly payments.
- (i) How many more payments must be credited to her share account before she can borrow \$2700? [1]
- (ii) How many months will it then take for the loan to be repaid? [1]
- (b) Ben has made 5 payments of \$150 per month towards repaying a loan of \$2400.
- (i) How much of his 5th payment was credited to his savings account? [3]
- (ii) Following a pay rise, Ben has decided to increase his payments to \$200 per month. He does this after he has made his 5th payment. How much sooner will he pay off the loan than originally expected? [2]
- (c) The introductory loan example in Table 3 claims that if a loan of \$300 is repaid at \$50 per month then the total interest is \$12.80 and \$87.20 is paid into the savings account. Using other information given, show that these figures are correct. [3]

General Comment

- (a) (i) & (ii) One mark each – one clear statement of the answer needed. Working is ignored.
- (b) (i) & (ii) Although all that is needed is a clear statement of the answer, working may enable an answer with numerical errors to gain some marks.
- (c) A clear demonstration is needed here. A table makes this process easier for candidates and Examiners. Some comment will enable Examiners to credit method marks, but is not vital for a full-scoring answer.

Individual Candidate Responses

Candidate A

- (a) (i) 5 more months
 $2700 \div 3 = 900$ at \$110 monthly installments
 take 9 months to get 900
 she has 4 months, needs 5 more
- (ii) 31 months
- (b) (i) \$120 each payment towards loan
- | | | | | | |
|----------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 2400 | 2280 | 2160 | 2040 | 1920 |
| | 1 st | 2 nd | 3 rd | 4 th | 5 th |
| interest | 24 | 22.80 | 21.60 | 20.40 | 19.20 |
| savings | 6 | 7.20 | 8.40 | 9.60 | 10.80 |
- \$10.80
- (ii) 20 month original at \$150 – 5 months 15 left
 now 12 months at \$200
 saved 3 months of payments
- (c)
- | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|------|-----------|
| | 300 | 260 | 220 | 180 | 140 | 100 | 60 | 20 | |
| interest | \$3 | 2.6 | 2.2 | 1.8 | 1.4 | 1.0 | .6 | .2 | = \$12.80 |
| savings | \$7 | 7.4 | 7.8 | 8.2 | 8.6 | 9 | 9.4 | 29.8 | = \$87.20 |

Candidate B

- (a) Clear and correct answers given to both of these questions. The slightly confused working for part (i) was ignored. This response highlights **the need to make the final answer to a question clear to the Examiner**: since the answer is not a clear product of the working, it could be seen as ambiguous amidst the (possibly erroneous) working. If the Examiner is unclear what is the intended final solution, marks may not be awarded.

Mark awarded = 2 out of 2

- (b) (i) The candidate was credited with one mark for the appreciation that the balance is being reduced by \$120.
- (ii) This response shows just enough detail for the Examiner to see the candidate's misconceptions. Unfortunately none of the working merits a mark. The candidate has assumed that Ben will pay off the remaining loan in simple equal installments, rather than through the loan repayment scheme offered in the question. The candidate also miscalculates the change in repayment time given this information.

Mark awarded = 1 out of 5

- (c) The choice of .256% is unexplained and it is unclear where the number comes from or how it would help. It may have been part of a sensible strategy, but it is not the Examiner's job to creatively explore this.

Mark awarded = 0 out of 3

Question 3

- (a) Read Document 1 and provide a brief analysis of the argument presented by Miss B. [6]
- (b) Give a critical evaluation of Miss B's reasoning.
You will need to justify your assessment clearly by identifying strengths and weaknesses and any unstated assumptions in Document 1. [8]
- (c) 'Sustainable development is incompatible with real human development.'
Construct an argument either for or against the above statement by critically referring to Documents (1) – (5) and introducing your own ideas in support of your case. [16]

General Comment

- (a) Answers to this question needed to focus on the conclusion to the piece, and the precise extraction of the key reasons. Too many candidates offered a general feel for the argument (for instance, "this is about the exploitation of the poor by big companies"), or begin to evaluate the arguments. Evaluative points score nothing in part (a), and the points cannot be scored in part (b) if they are written in the wrong section. Bullet-points (with full sentences) would be satisfactory here in part (a).
- (b) Candidates found this question hard. In terms of mistaken approaches to the question, the most common one was for candidates to detail an array of issues/points which the author has "failed to consider". **Although they are weaknesses in the author's overall strategy, they are not seen as being strengths/weaknesses in the author's reasoning.** Answers should focus on what the author has said (rather than on what she/he hasn't said).
- (c) The first priority of candidates in this part of the question is to be clear on what they are arguing for, to state it, and to ensure they stay focused on it. An essay plan is not a bad idea. A number of candidates gave sustained answers of this kind, focusing on what constituted the difference between 'sustainable' and 'real human' development. What candidates found more difficult was judiciously commenting on the sources. **Candidates do not need to comment on all the sources, but a good response would draw out the main supporting reasons and counterarguments from the documents, and evaluate them. Some sources may well be more relevant and/or credible than others, and good candidates will identify and use the more relevant and/or credible sources when constructing their own argument.**

In the following responses, the emboldening of text has been done by the Examiner for the purpose of highlighting certain points in the context of this Standards Booklet.

Individual Candidate Responses

Candidate A

- (a) Document 1 titled 'Sustainable development: a deception?' discusses the ill-effects of sustainable development and talks about how environmentalists have the opposite effect of what they hope for. **It gives affirmative beliefs and strong arguments why 'sustainable development' supporters, who aim to eradicate poverty in the Amazon are indeed achieving the undesired effect.**

Miss B feels strongly about the harms of sustainable development and expresses her opinion through clear examples. She obviously is opposed to the ideas put forth by environmentalists and believes that people who support sustainable development are deceiving the inhabitants of the Amazon into poverty. She states that large multinational corporations are supporting 'sustainable development' for their own benefit.

Miss B clearly sees through the pseudo-hex she believes has been set upon us by environmentalists and multinational corporations. **She states that environmentalists are confusing environmental preservation and social needs.** This document written by her is an attempt to clear the heads of the people who fall prey to the campaigns by corporations on sustainable development and expose them to the truth. **She gives the reader enough proof to believe that we have 'manipulated the economy for tens of thousands of years' and can continue doing so, for our profit.**

In conclusion Miss B states that 'sustainable development, which hopes to meet the needs of the present without curbing the needs of future generations, is a paradox in itself as it clearly fulfill either the needs of the future or the present.

- (b) In Document 1, Miss B reasons that sustainable development is a deception set forth by environmentalists to fool the peasants in the Amazon into poverty. However, Miss B fails to take into account the positive effects of sustainable development initiatives and look at the bright side they could bring to the future. She fails to observe that large-scale projects do in fact, ignore Amazon peasant and leave them problems.

Miss B also does not consider the social needs of poor peasants to be as important as environmental preservation as she clearly states in Paragraph 2. She does not also consider the harmful effects of mega-projects keeping in mind long-term goals and the future. Her primary concern seems to be the 'human being', as of now, ignoring the harms our actions could result to in the future.

Miss B believes in taking advantage of what we have right now and exploring it to the fullest. She believes in using each resource available around us, not considering the possible future damages, as she states in the last paragraph that sustainable development is 'anti-experimental'.

Lastly, one of the major disadvantages of this argument is that **Miss B only deals with the negatives of sustainable development in the Amazon**. She forgets to take into consideration our other forest and natural resources and how sustainable development could actually help them.

- (c) 'Sustainable development is incompatible with real human development.'

Yes, I do agree with the above statement. After reading documents 1 to 5, and considering the pro's and con's of sustainable development, I agree that **it is not possible to achieve the needs of the future and present, and simultaneously advance human development**. The two do not walk hand in hand and one must be chosen.

For example, in Document 1, we are first exposed to the concept of sustainable development and how, according to Miss B it is holding human development back. And I agree. If we, as world-leaders, decide to stick with sustainable development, then the progress in human development must be curbed. It is not possible to advance in technology by coming up with new ways to increase agriculture by cutting down forests, while preaching and believing in agroforestry. The two things are contradictions in themselves.

As we explore human potential to the maximum, we are going to come up with new ingenious ways to make life more comfortable, easy-going and relaxed. However, **human comfort is not synonymous with nature's harmony**. Take, for example, if we think about cutting down huge tracts of forest for cultivation; how can we expect our natural resources to grow?

The 2nd document which deals with needs and wants gives a clear argument of why we have to choose between the two. Human needs are basic necessities; but human wants are what encourages that selfish child in all of us. Human development explores human wants, as both believing and achieving the maximum possible out of our environment. Whereas sustainable development is like human needs. They both exercise control, limits and distinctions between what is necessary and what is not. The simplest example could be examining the choices given to a child. Say a 2-year-old child needs to be fed. He can either be fed in a regular dish or a gold plate. The regular dish in which his food must be kept, is of course, his need; but the gold dish which is extravagant and unnecessary, could be his want. Now making a clear-headed decision would mean choosing either of the two, sustainable development, which is the regular dish, or human development, which is the gold plate. Whatever the decision might be, the point is that there has to be a decision between the two. Together they are simply not compatible.

Parenthetically, the 3rd document investigates and **exemplifies how human development is not in harmony with natural development**. It is only when disaster strikes closest to home that we realize a decision must be made. The villagers adjoining the mangrove forests would never have imagined how trees could save their lives. Similarly, we never know how exercising sustainable development right now could help us in the future. The ones who cut down the trees suffered nature's wrath; as they are the ones who went with selfish interest by engaging in fuel wood, agriculture and what not. This again, illustrates the difference between sustainable development (ie villagers with mangrove forests) and human development (ie villagers who destroyed the forest).

The fourth document, initially discusses how sustainable development can help in the future and how productive it is. It does, nevertheless have complication to it, but that is not our concern here. Our concern is regarding the compatibility of sustainable development vs human development which is obviously low. Even the final document deals with the problems regarding forest conversion.

Our problem is the decision that must be made between sustainable development and human development. Sustainable development if looked at from one angle is quite a self-explanatory phrase. To 'sustain' means to keep in control and 'development' means to increase or grow. Therefore **sustainable development means to grow in moderation, in control as opposed to human development which engages in maximum potential growth**. In conclusion, sustainable development is clearly a contradiction to human development and therefore incompatible.

Candidate B

- (a) Miss B starts her argument with a counter-argument. **The conclusion of this counter-argument is that sustainable development initiatives are better than large-scale development projects**. The reasons given to support the counter-argument, which work separately, are that large scale projects are implemented authoritarily, that large-scale projects destroy the Amazon's natural resources, that large-scale projects do not give work to most of the Amazon's poor peasants, and that sustainable developments offer the peasants more opportunities and control of their own development.

Miss B goes on to argue against this counter argument. She states, but does not support, merely reiterate her statement, that **the issues of environmental and social needs being confused is wrong and helps to keep people in the Amazon poor**.

Miss B's next paragraph supports **the intermediate conclusion that it is up to humans to explore how best the Amazon can serve human needs**, supporting the intermediate conclusion that mega-projects express a progressive attitude. The reasons supporting the first intermediate conclusion are that **the Amazon has no development needs**, itself an intermediate conclusion supported by the reason that the Amazon spontaneously evolves, and that humans are the most important factor in the development of the Amazon, again an intermediate conclusion supported by a reason.

Miss B then argues as another intermediate conclusion that we can now more fully exploit the Amazon, which leads to further intermediate conclusion that large development programs are an attempt to promote real human development.

Miss B then develops an argument leading to the intermediate conclusion that **small scale and local initiatives can only result in poverty**.

- (b) On the whole Miss B's argument is weak. There is **an assumption throughout that what is best for humans is best**. She does not back up her statement that environmental and social needs must be considered separately, **nor is she consistent as she does not consider them separately, but both in the same argument**.

She does not answer any real concerns about authoritarian methods and peasants' control over their own development, but just reiterates that they will be poor if the "environmentalists" get their way.

There is a **'straw man' fallacy - environmentalists do not base their plans solely on social needs, as she accuses them of doing**. However, Miss B makes some good points, that **the Amazon is not a static resource, nor one with plans of its own**, for example.

- (c) **Sustainable development is compatible with real human development**. Real human development is not about needs or about wants. If we take real human development to mean more and more wants fulfilled, as discussed in Document 2, then yes, it may be incompatible with sustainable development.

Real human development is however about becoming responsible. That is what development in children is, they become responsible and realize that actions have consequences. If you swing pussy round by her tail, yes, you probably will get scratched. In the same way, **we need to recognize that complete disregard of ecology has consequences**. Some of these are shown in Documents 5 and 3.

And we need also to be responsible to others, those whom our actions may affect. This is another reason to choose sustainable development as not just compatible with real human development, but vital to it. **We have a responsibility to those who now are children or not yet born.** We have a responsibility to leave them as far as possible a planet not suffering from our use of it.

Sustainable development challenges us to think of new ways of doing things. **Document 4 mentions we must look for the most environmentally friendly ways of doing things.** Again this is entirely compatible with real human development. We would be shocked if, as a child developed, all that happened to it was it wanted more things. Mental development and development of a sense of responsibility are types of real human development. Therefore sustainable development is most definitely compatible with real human development.

Examiner Comment

Candidate A

- (a) The three marks given here were for the three emboldened sections. The first one ('it gives affirmative beliefs...') is a (vaguely stated) main conclusion. Candidates should aim to identify a precise statement of the main conclusion – which can often be extracted, with care, directly from the text. Candidates should begin their analysis with an attempt to identify the conclusion. Of the two reasons that follow, the first is an adequate summary of the author's response to the counter argument of the first paragraph. The second is barely sufficient. The reasoning from which it is taken builds up to the intermediate conclusion: 'it is... up to us to explore how best the Amazon can serve human needs'. This response is borderline 2/3 marks, and has been given the benefit of the doubt.

Mark awarded = 3 out of 6

- (b) The three marks given here were given for the two critical points emboldened. The first one was deemed to be a well-expressed weakness in the argument, and therefore was awarded two marks. The second refers to the lack of balance in the argument, which is a barely sustainable criticism given the first paragraph.

A comment on the points which did not win marks: the statements that the author has failed to consider are certain particular points (for instance, 'the harmful effects of the mega-projects...', 'the positive effects of sustainable development', and 'possible future damages'). Any argument will be incomplete, and such omissions are appropriate for the creation of further arguments (and therefore welcome in answer to question (c)), rather than assessment of what the author has said.

Mark awarded = 3 out of 8

- (c) The strengths of this answer are its clarity of conclusion, its sustained orientation towards the conclusion, its survey of the documents and its original stance on the question. The continuity of focus and the depth of critical comment immediately qualified it for the top band (12 to 16 marks). The variety of points considered and the references to the sources sustained it there.

There were minor weaknesses. Firstly, there is some lack of clarity (e.g. 'Human development explores human wants, as both believing and achieving the maximum possible out of our environment. Whereas sustainable development is like human wants'). Secondly, there is insufficient explicit evaluation of the sources: the candidate picks the documents which fit his/her viewpoint, and dismisses the others without explanation ('it does have complication to it, but that is not our concern here'). Explicit explanation of why the most convincing counter-arguments should be dismissed would be required for the highest marks.

Mark awarded = 14 out of 16

Candidate B

- (a) This candidate lays out the structure of the argument in an appropriately clinical style. As can be seen from the highlighted sections, the number of correctly considered points puts this in the top band. The use of technical language is initially impressive; but the impression that is gained by the end is that the candidate does not have a firm grasp on what an intermediate conclusion is (in particular, there appear to be intermediate conclusions with no supporting reasons, which condemns them to being just reasons). This, combined with vague phrasing of the main conclusion, prevent the response being awarded full marks.

Mark awarded = 5 out of 6

- (b) There are three well-expressed weaknesses here: the assumption made about 'what is best', the inconsistency shown by the author, and the straw-man fallacy. To have been awarded full marks, further comment on the assumptions about 'what is best' was needed (for instance, whether it is a good assumption). **Many candidates forget that an assumption is not necessarily a bad thing.** And some evaluative comment is needed on a further weakness.

The point about the author 'not backing up her statement that environmental and social needs must be considered separately' is not credited, since it refers to what the author doesn't say rather than what she does. See General Comment above.

The final point would have gained a mark with a little more comment. Candidates rarely refer to strengths in the argument; they are aware that to simply repeat what is expressed in the argument is not enough, and balk at the prospect of explaining it. Here a comment such as 'this does support the idea that a sense of human purpose is stronger than that of nature's needs' would explain the example given.

Mark awarded = 7 out of 8

- (c) Strengths of this response are that it has a conclusion, it contains a good deal of appropriate original thought, and it refers to a range of documents. The argument is compact, and there is little irrelevant reasoning.

However, it is uncritical in its use of the documents and fails to fully address the question of what 'real human development' is. As such it is a middle band answer. This lack of a critical response to the documents is most clearly seen in the cursory way the candidate refers to them: 'some of these are shown in documents 3 and 5', and 'as discussed in document 2'.

To achieve a higher mark, the candidate would need to offer a response to the reasoning in the documents, and to explicitly comment on the weaknesses of counter-arguments to his/her position.

Mark awarded = 9 out of 16

APPENDIX 1 – QUESTION PAPERS AND MARK SCHEMES



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

THINKING SKILLS

9694/02

Paper 2 Critical Thinking

June 2007

2 hours

Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the booklet.

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** the questions.

Start each question on a new answer sheet.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question.

This document consists of **6** printed pages and **2** blank pages.



1 Study the following evidence and answer the questions that follow.

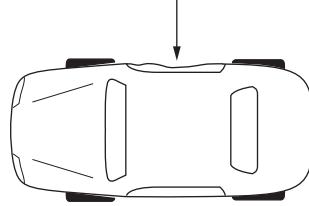
Carla Tay, an assistant at Tree Top School, has accused Dr H J Angelou, of 41 Bush Avenue, of causing **deliberate damage** to Carla's Toyota car on the afternoon of Thursday 14th December.

General information:

The car was parked outside number 41 as usual. (See map). There have been many complaints from local residents about the traffic problems caused by the school, and arguments with drivers bringing children to school.

Garage inspection report (extract)

There is a single deep dent in the right-hand (driver's side) door, but no other scratches or paint marks. It appears to have been struck in the direction of the arrow on the diagram.



Police Statements

Carla Tay (6.15pm 14 Dec.):

'At around 5pm Mrs Thomas, who was collecting her child from the school, announced that 'some fool' was outside trying to park their car and blocking all the traffic. My Toyota was parked over the road, so I went out to check. I was horrified to see it was badly damaged. The man at number 41 was in his driveway just getting out of his car.

I said to him: "Look at my car. It's got a big dent in the side."

He said: "What a shame. Perhaps it will teach you to park more carefully, in future."

I went back into the school and told Mrs Thomas that Dr Angelou had damaged my car.

She said: "Oh him! That doesn't surprise me. He probably did it on purpose. He's a horrible man!"

Dr Angelou (7pm 14 Dec.):

'I have no idea who could have damaged her car, but I'm not surprised or sorry. It's out there all day every day causing an obstruction. I asked her if she could park somewhere else.

She replied: "I pay my road tax and I'll park where I like."

The Smiths, next door, have had problems with her too.'

Professor Smith, 43 Bush Avenue (14 Dec.):

'I'm sure the damage had already been done when I walked up the hill, about 4.30pm. It was probably hit by a passing car that didn't stop. Or kicked by a cyclist. They get very annoyed at people who park in the bike lane. She's had arguments with Dr Angelou in the past. She said if she finds so much as a scratch on her car she'll know who to blame. Dr Angelou is a decent, professional man. He may get irritated, like we do, but he wouldn't do anything like that.'

Mrs Thomas, questioned the next day (15 Dec.):

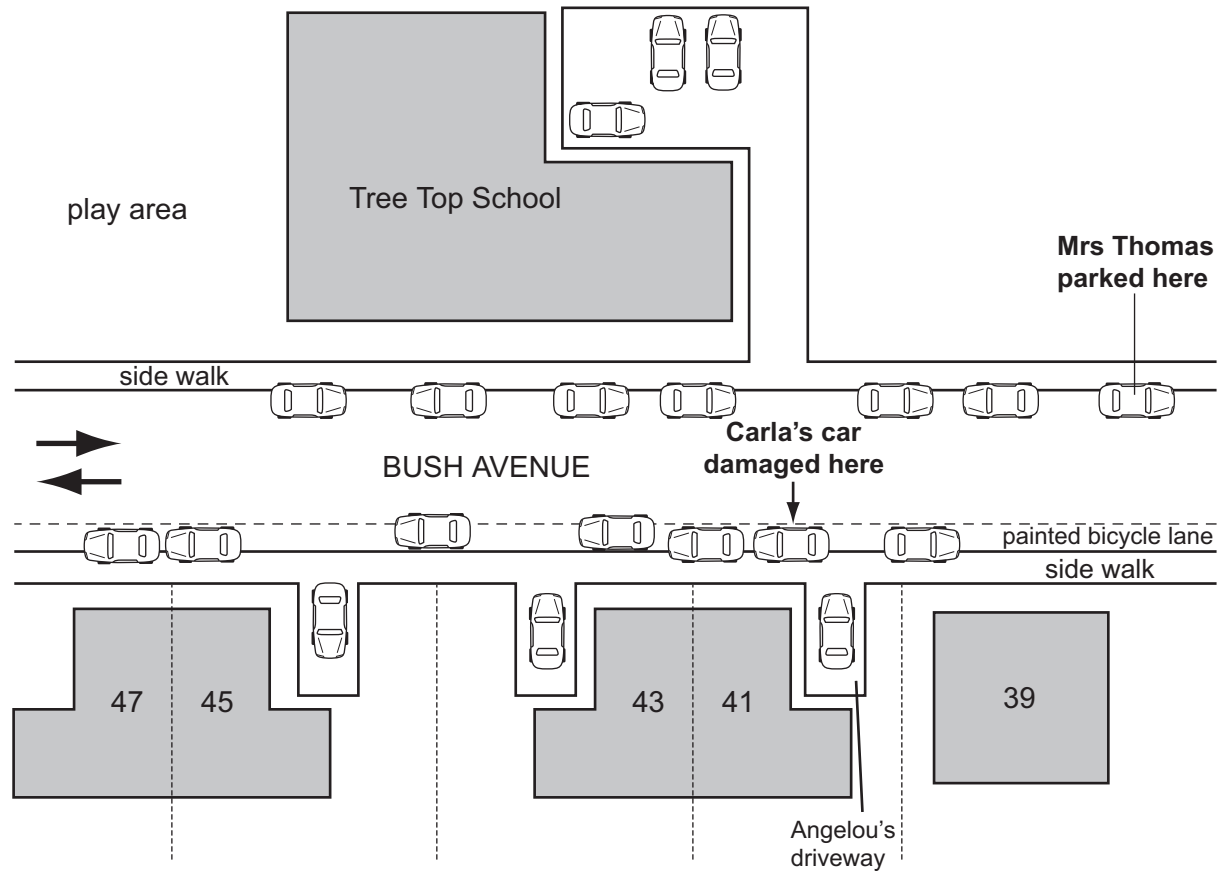
'I was parking here yesterday (see map) and I saw Angelou trying to back his car into his driveway. He was having difficulty and blocking the traffic. As I got to the school gate I saw him get out and give Carla's car a savage kick. I admit her car was in the way a bit, but that's no excuse. It didn't stop him getting into his driveway. And if it was such a big deal, all he had to do was go over and ask her to move it.'

Mrs Friel (parent of child in the school) (15 Dec.):

'Dr Angelou shouted at me once for blocking his drive, and I'd only left the car for a couple of minutes to fetch my daughter. He said if I did it again I'd be sorry.'

Diagram:

Map of Bush Avenue, showing parked cars just after the alleged incident. Reconstructed from witness statements:



- (a) What can be concluded from the position of Carla's car, and some of the other vehicles, as shown on the map? [2]
- (b) Evaluate the relevance and reliability of the evidence provided by Professor Smith, and compare it with the statement by Mrs Friel. [2]
- (c) Comment on the reliability of the statement by Mrs Thomas, taking into consideration Carla's statement. [4]
- (d) How likely is it that Dr Angelou deliberately damaged Carla Tay's car? Construct a short reasoned argument to support your conclusion. Use the evidence provided. [5]

2 Read the following passage and answer the questions that follow.

More and more aspects of our lives are covered by insurance policies. We insure our houses, our cars, our health, our lives – we do this without question. Yet we ought to be using insurance policies as little as possible.

The only beneficiaries of the insurance system, economically, are the insurance brokers. People suffer from occasional disasters and mishaps and, without insurance, individuals would pay the costs themselves. But, if you buy insurance policies, you help to pay the cost of other people's mishaps, and at the same time an army of "middle-men" make a living out of it.

Reliance on insurance creates a vicious circle: as people become used to insuring their goods they naturally become more careless. People are more willing to leave their cars in dangerous areas of a city if they are insured against theft. As insurance becomes more accepted, more people do leave their expensive cars in inappropriate places, and thus more thefts occur. This in turn encourages more people to take out car insurance. What is needed is for people to be more careful and not just accept that mishaps will occur.

However there is still a feeling that insurance serves a purpose in smoothing over life's troubles. This is perhaps true, but it does not necessarily lead to contented lives, because the acceptance of insurance raises our expectations.

We see something similar in the public's attitude to the lateness of trains. In some countries the number of complaints about the lateness of trains has increased over the last 50 years, even though train services have improved. People expect trains to run perfectly on time. In the same way, people expect a life without financial loss. People's expectations have gone up. In the past they were willing to accept the cost of small mishaps but now they want to insure themselves against everything, however trivial. So what has been gained?

- (a) What is the author's main conclusion? [2]
- (b) Identify an unstated assumption in the second paragraph. [2]
- (c) Consider the chain of events which illustrate the vicious circle, described in the three middle sentences of paragraph three. State which of the steps in this reasoning you think is the least convincing and explain why. [2]
- (d) How effective is the analogy relating to trains in the last paragraph? [3]
- (e) Give **one** further argument which either supports or counters the conclusion of the above argument. [3]

3 Study this article and then answer the questions that follow.

In 2002 a corpse found near Las Vegas was identified by fingerprints as Nathaniel Harper, a person who happened to be alive and well. In 1991 an innocent man was convicted, on the basis of fingerprint evidence, of a rape to which another man later confessed. An American lawyer was arrested in connection with the Madrid bombings in 2004 because his fingerprint was supposedly found on a bag in the Spanish capital. After several weeks the fingerprint was matched to a man living in Spain.

Despite such evidence, fingerprint examiners* still say their technique is infallible**. Fingerprint matching is undoubtedly a valuable tool for catching criminals but it suffers from one major disadvantage: nobody knows how often the people who examine fingerprints are wrong. We should acknowledge that there is an error rate and find out what it is.

In science all errors should be understood and quantified, whether they come from the method used, the equipment or human error. The error rates of automated fingerprint recognition systems*** are well understood. From experiments with bank cards and car keys that work by using fingerprint recognition, we know that machines make mistakes and so we can't rely on them. We should be equally cautious about human fingerprint examiners.

Understanding the error rates in the way human experts match fingerprints in legal cases will create problems. Any criminal whose conviction relied heavily on fingerprint evidence is likely to appeal. But that is no reason to ignore the issue. Innocent people are being wrongly convicted.

Ignoring the existence of error also prevents fingerprint analysis being improved. Evidence indicates that fingerprint examiners' decisions are influenced by what they are told before they examine a potential match. Such biases will not be dealt with unless it is acknowledged that they exist.

As more mistakes are exposed and defence lawyers intensify their challenges, it is only a matter of time before judges and juries reject fingerprint evidence. That would be a dreadful waste of a powerful tool. Far better to do some research now so we know how confident we can be about fingerprints.

* Fingerprint examiners: people who examine fingerprints (often for legal cases).

** Infallible here means never giving the wrong identity.

*** Automated fingerprint recognition systems: machines and software which automatically match fingerprints.

(a) For each of the following, say whether or not it can be reliably concluded from the above passage. You **must** give a brief reason to support your answers.

(i) It is not safe to convict defendants on fingerprint evidence alone. [2]

(ii) Courts should accept scientific evidence only from methods with extremely low error rates. [2]

(b) Identify **two** reasons the author uses in the last three paragraphs, to support his conclusion. [2]

(c) How useful is the example of automated fingerprint recognition for the author's overall conclusion? [2]

(d) 'It would be better to imprison a few innocent people than give the guilty an easy way out of jail.' How effective is this statement as an objection to the argument? [4]

4 Critically evaluate the following argument. You should:

- (a) Show that you have a clear understanding of the argument by identifying its main conclusion and the reasons used to support it. [5]
- (b) Evaluate the argument by identifying any **unstated** assumptions and discussing any weaknesses and flaws. [5]
- (c) Offer **one** further argument which could be used in support of or against the main conclusion. [3]

The Olympic Games no longer celebrate physical greatness so the name of the games should be updated to reflect this change in purpose. We might call them, for example, 'The International Greed and Gloating Games.'

The Olympic Games now celebrate only the might of money. A few rich countries dominate the Olympic Games, winning most of the medals and the glory. Yet it is rich countries that have the worst problems with unfit, obese populations, so they cannot be winning so many medals through being the best at sport. Furthermore, it is impossible to succeed in the Olympic Games without sponsorship from a major international corporation. These are all based in rich countries, so people from poor countries do not have a chance to win medals at the Olympics.

Hosting the Olympic Games provides an opportunity for rich countries to show the rest of the world how big and important they are, by building huge, useless stadiums and monuments. These buildings divert scarce resources from projects such as hospitals or creating jobs for the urban poor. So the Olympic Games can be seen to encourage the senseless and shallow spending of the rich.

The Olympic Games are supposed to create friendship between citizens of different countries. However, people in each country support runners, gymnasts or boxers from their own country, and become more patriotic and proud. So they feel insulted when an athlete from another country beats their athlete, and this leads to misunderstanding, fights and violence. If it is not checked, this national competitiveness could lead to wars rather than friendship.

If the Olympic Games were really about celebrating human physical prowess, there would only be events like running which test the human body to its limits. However, all sorts of idiotic hobbies are included in the Olympic Games. They are even thinking about including darts and fishing as Olympic sports. You may as well have competitive reading events. The Olympics has clearly got nothing to do with sport any more.

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Question 3

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9694/02/J/07

MARK SCHEME for the May/June 2007 question paper

9694 THINKING SKILLS

9694/02

Paper 2 (Critical Reasoning), maximum raw mark 50

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Page 2	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

1 (a) What can be concluded from the position of Carla’s car, and some of the other vehicles, as shown on the map

- The road was heavily congested with parked cars and would have been a reason for annoyance.
- Carla’s car was partially blocking A’s drive and would have made backing in difficult and could have provoked A.
- That it would have been unlikely that a passing car could have caused a single dent in the door of the car.
- Carla could park somewhere else.
- Cars were parked in the bike lane (which is illegal) which might annoy cyclists.

Two points.

[max. 2]

(b) Evaluate the relevance and reliability of the evidence provided by Professor Smith, and compare it with the statement by Mrs Friel.

- Professor S’s evidence is weak; it is speculation / opinion.
- S is likely to be on A’s side because S also gets annoyed by the parking / they are neighbours and may be friends.
- S may know A well enough to make a reliable comment about his character.
- S’s comment about the timing of the event is relevant.
- Mrs F is likely to be biased against A because she dislikes him.
- F’s claim is relevant as a character reference but irrelevant to the specific incident.
- F’s claim about A’s personality contradicts S’s claim.
- F and S agree on A getting annoyed by the parking.

Two points.

[max. 2]

(c) Comment on the reliability of the statement by Mrs Thomas, taking into consideration Carla’s statement.

- Mrs T would have been in a position to see the incident so no reason to suppose she was mistaken.
- T may well have been prejudiced against A, given her comments about him as reported by Carla.
- T may have been biased in favour of C because she is part of the parking problem / because she does not want to annoy an adult who works with her child.
- T doesn’t mention anyone kicking the car until C has told her who she suspects / C and T’s stories do not corroborate / if T had seen A kick the car she would have mentioned it so T does not seem reliable.

One mark for a point. Two marks for a well developed point supported by reference to the evidence.

[max. 4]

Page 3	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

(d) How likely is it that Dr Angelou deliberately damaged Carla Tay’s car? Construct a short reasoned argument to support your conclusion. Use the evidence provided.

Evidence:

- The only witness, T, reported that she saw A kick the car. However, she is an unreliable witness (see 1(c)).
- A had motive; the car was blocking his drive and there was a history of dispute between him and C.
- The direction of the impact is consistent with a kick. It is plausible to suggest A could have lost his temper and kicked the car but this is circumstantial evidence.
- The evidence of dispute about parking means that all the statements are questionable.
- If A had kicked the car at a busy time, while his car was blocking the road and causing traffic it is surprising that there was only one eyewitness.
- It would be surprising if A, given his status etc., would so publicly commit an offence. Therefore not entirely plausible.

Conclusion: the safest conclusion is that there is reasonable doubt that A kicked C’s car, although he had a reason to do so. The possible alternative scenarios (cyclist kicking the car etc.) seem less likely.

Acceptable conclusion:

[1]

And:

- some reference to the evidence, made in support of the conclusion [1]
- reference to the evidence and some evaluative points made in order to support the conclusion [2]
- a reasoned argument developed on the basis of evaluation of points of evidence; possibly some alternative scenarios considered [3]
- sound and well developed argument involving the weighing of evidence and balancing of probabilities; plausible alternative scenario/s taken into consideration [4]

[max. 5]

2 (a) What is the author’s main conclusion?

We ought to be using insurance policies as little as possible. 2 marks.

Accept conclusion with a supporting reason. 2 marks.

We should use insurance less. 1 mark

[2]

(b) Identify an unstated assumption in the second paragraph.

The benefits we receive from insurance do not justify the money we pay.

People who make successful insurance claims do not benefit from insurance / People are able to pay the cost of disasters or mishaps / People pay more in insurance than they gain in pay outs.

Major disasters are infrequent.

Clear statement of assumption: 2 marks

Unclear statement of assumption: 1 mark

[2]

Page 4	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

- (c) Consider the chain of events which illustrate the vicious circle, described in the three middle sentences of paragraph three. State which of the steps in this reasoning you think is the least convincing and explain why.

Step 1: insurance encourages people to park in dangerous places: people do not want to lose the goods inside their car / pay excess / pay increased premiums / be attacked / people love their cars and do not want them stolen / having goods stolen is an unpleasant experience / people with expensive cars would not be in dangerous areas of town / could afford to park somewhere safe.

Step 2: more thefts occur: better alarms or steering locks or security systems prevent thefts.

Step 3: more thefts mean more people take out insurance: people are more likely to react by parking in a safer place / the law requires you to have car insurance so thefts make no difference / if you can't afford insurance it doesn't matter how many thefts occur.

Good reason: 2 marks

Weak reason or statement of disagreement: 1 mark

[2]

- (d) How effective is the analogy relating to trains in the last paragraph?

The analogy is not effective because:

Problems with trains lead to loss of time whereas disasters lead to loss of money and these are too different to compare.

Being late for work is annoying, but losing your home in a hurricane is devastating so it is more reasonable to expect insurance to cover this loss than to expect trains to be perfectly on time.

Trains run to timetables and can be expected to run well; disaster is unpredictable and cannot be predicted so it makes sense to take insurance to cover the possibility.

More people take trains than fifty years ago, so there are likely to be more complaints.

This has little to do with our expectation of a life without mishap.

Complaints about trains have to do with efficiency; someone could improve the train service. Insurance is about protecting ourselves and no one can change the occurrence of mishap and disaster. This is why we take out insurance.

The analogy is effective because:

It shows that it is as unreasonable to expect a life entirely without mishap as to expect trains perfectly on time so our unrealistic expectations cause us problems.

Time is money, so being late and missing an important meeting is like a mishap such as losing your wallet.

An evaluative comment supported by well-developed comparative points: 3 marks

An understanding of a significant difference / similarity between expectations relating to trains / insurance: 2 marks

An understanding that the analogy is relating expectations: 1 mark

[max. 3]

Page 5	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

- (e) Give one further argument which either supports or counters the conclusion of the above argument.

Relevant reason: 1 mark

Development (e.g. R + example, intermediate conclusion): 1 mark

Conclusion (allow IC which would support C in passage): 1 mark

[max. 3]

Example:

We ought to use insurance because it gives us safety and peace of mind. For example, if a hurricane such as Katrina hits, insurance means that we can rebuild our lives. In the meantime, we don't need to worry about what might happen if a hurricane did hit.

- 3 (a) For each of the following, say whether or not it can be reliably concluded from the above passage. You must give a brief reason to support your answer.

- (i) It is not safe to convict defendants on fingerprint evidence alone.

Yes, it can be concluded. We know there are errors.

[2]

- (ii) Courts should accept scientific evidence only from methods with extremely low error rates.

No, it cannot be concluded. The reasoning supports the idea that we should find out what the error rate is and take it into account / Other methods can be used in corroboration / The author thinks this would be a waste of a powerful tool.

[2]

- (b) Identify two reasons the author uses in the last three paragraphs, to support his conclusion.

Criminals appealing against conviction by fingerprint evidence is no reason to ignore the issue.

Innocent people are being wrongly convicted.

Ignoring the existence of error also prevents fingerprint analysis being improved

It is only a matter of time before judges and juries reject fingerprint evidence.

That would be a waste of a powerful tool.

Any two.

[2]

- (c) How useful is the example of automated fingerprint recognition for the author's overall conclusion?

It demonstrates that it is possible to make mistakes with fingerprint recognition and that this error rate causes problems. It is talking about machines not people, so it is not directly transferable, but relevant – people generally make more mistakes than machines / the machine mistakes may be the result of human error anyway. Using this example also allows the author to dismiss the counter argument that acknowledging error would cause problems.

Two valid points.

[2]

Page 6	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

- (d) 'It would be better to imprison a few innocent people than give the guilty an easy way out of jail.' How effective is this statement as an objection to the argument?

Acknowledging error in fingerprint recognition, according to the author, would not give the guilty an easy way out of jail. If we acknowledge, quantify and take account of the error rate, we are less likely to find ourselves in the situation in which courts do not accept fingerprint evidence (because they do not know how (un)reliable it is). Thus this valuable evidence will still help to convict the guilty. The guilty may appeal, relying on the error in fingerprint evidence – but if this has been quantified and taken into account, they will have less of a case than if the error rate were uncertain. So, although a few convictions will be overturned if an error rate is acknowledged, on the author's reasoning, there will be less of an easy way out of jail than if the error rate is ignored. So, even if we accept the statement at face value, it does not weaken the case for acknowledging error in fingerprint recognition.

Three relevant points (these may be separate reasons or include a chain) [one mark each] and an overall conclusion which follows [one mark].

Accept but do not require arguments along the following lines:

It is never acceptable to imprison the innocent. There are many possibilities for convicting the guilty, so few convictions rely solely on fingerprint evidence. This would mean that acknowledging an error rate in fingerprint evidence would not be a get out of jail free card. In any case, we want the guilty to be convicted fairly. So, for all these reasons, we should acknowledge the error rate of fingerprint evidence. The statement expresses a prejudice which should have no impact on moral or scientific reasoning.

[4]

Page 7	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

4 Critically evaluate the following argument. You should :

- (a) Show that you have a clear understanding of the argument by identifying its main conclusion and the reasons used to support it.
- (b) Evaluate the argument by identifying any *unstated* assumptions and discussing any weaknesses and flaws.
- (c) Offer *one* further argument which could be used in support of or against the main conclusion.

Descriptor	Level 3	Level 2	Level 1	Level 0
(a) Analysis [max. 5]	Identifying the main conclusion, all or most of the key reasons, and demonstrating understanding of structure. 5 marks	Identifying the main conclusion and most or all of the key reasons. Identifying all the key reasons and some of the structure but confusing main and intermediate conclusions 3–4 marks	Recognising the general direction of the argument and some of the key reasons. Identifying the conclusion but none of the reasons. 1–2 marks	Summary of the text / parts of the text Not recognising the general direction of the argument 0 marks
(b) Evaluation [max. 5]	Evaluation of strength of argument with critical reference to assumptions, weaknesses and flaws. 4–5 marks	Some evaluative comments referring to assumptions, weaknesses and / or flaws. 2–3 marks	Discussion of or disagreement with the argument. 1 mark	No relevant comments. 0 marks
(c) Further Argument [max 3]	Relevant, developed argument. 3 marks.	One or more relevant, further points. 2 marks	Some further response to the argument. 1 mark	No argument. Statement of disagreement or irrelevant comment. 0 marks

Page 8	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

(a) Analysis

ACCEPT IC8 as MC

- R1 A few rich countries dominate the Olympic Games, winning most of the medals and the glory.
R2 Yet it is rich countries that have the worst problems with unfit, obese populations
IC1 They cannot be winning so many medals through being the best at sport.
R3 Furthermore, it is impossible to succeed in the Olympic Games without sponsorship from a major international corporation.
R4 These are all based in rich countries, so
IC2 people from poor countries do not have a chance to win medals at the Olympics.
IC3 **The Olympic Games now celebrate only the might of money.**
- R5 Hosting the Olympic Games provides an opportunity for rich countries to show the rest of the world how big and important they are, by building huge, useless stadiums and monuments.
R6 These buildings divert scarce resources from projects such as hospitals or creating jobs for the urban poor.
IC4 **So the Olympic Games can be seen to encourage the senseless and shallow spending of the rich.** (This could also be seen as supporting IC3)
- R7 It is not only governments who become inflated with their own national importance at the thought of the Olympic Games.
R8 People in each country support runners, gymnasts or boxers from their own country, and become more patriotic and proud.
IC5 So they feel insulted when an athlete from another country beats their athlete, and this leads to misunderstanding, fights and violence.
R9 If it is not checked this national competitiveness could lead to wars.
IC6 **So the Olympic Games actually create the opposite of friendship based on sport.**
- R10 If the Olympic Games were really about celebrating human physical prowess, there would only be events like running which test the human body to its limits.
R11 However, all sorts of idiotic hobbies are included in the Olympic Games.
R12 They are even thinking about including darts and fishing as Olympic sports.
R13 You may as well have competitive reading events.
IC 7 **The Olympics has clearly got nothing to do with sport any more.**
- IC8 **The Olympic Games no longer celebrate physical greatness**
C **the name of the games should be updated to reflect this change in purpose. (ex)**

Page 9	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

(b) Evaluation

Paragraph 2

Having large numbers of obese, unfit people does not mean that rich countries do not also have the fittest, best athletes. The author generalises from some to all being unfit. So, the rich countries may be winning by having better sportspeople rather than by being rich.

It is overstated to say that it is 'impossible' to win without sponsorship from a major international corporation and there are examples of people who do win without sponsorship.

The argument assumes that corporations based in rich countries will not sponsor people from poor countries. This may not be the case.

The reasoning in this passage supports the idea that being wealthy gives you a better chance. It does not support the IC that the Olympic Games now celebrate **only** the might of money.

Paragraph 3

There is a straw person attack on rich countries' motives for building stadiums. This point is made with emotive language rather than strong reasoning.

It is inconsistent to talk about rich countries having scarce resources.

So it only partly follows that the OG encourages senseless and shallow spending.

Paragraph 4

The text conflates being 'inflated with national importance' and being 'patriotic and proud'.

This passage confuses necessary and sufficient conditions; it may be a necessary condition of international fights / war that people feel proud and patriotic. It is not a sufficient condition.

There is a slippery slope from losing a competition to violence and war. The reasoning moves from the possibility of war to the actuality of the OG creating the opposite of friendship.

Friendship based on sport could include rivalry; the competition does not have to extend outside the sporting arena; people may feel that they have had a shared experience.

Even if the OG create unfriendly rivalry, this does not mean that they no longer celebrate physical greatness.

Paragraph 5

R10 is a bit extreme.

Something about idiotic hobbies being unsupported.

It has to be assumed that these idiotic hobbies are not physically demanding.

It has to be assumed that thinking about including darts and fishing means that darts and fishing will be included.

Using darts and fishing, which are not actually Olympic sports, and are not typical of most Olympic events, to show that the Olympics has nothing to do with sport, doesn't work.

The analogy with competitive reading is weak; even darts and fishing require some physical skill, even if darts players / anglers do not have to be athletes at their physical prime. Darts is also a captivating competition for spectators. Reading is not.

So it has not been shown that the Olympics has nothing to do with sport anymore, just that it includes or may soon include some elements which require less physical prowess than running.

Allow other relevant comments.

So the claim, that 'The Olympic Games no longer celebrate physical greatness', has not been supported. If it not the case that the Olympics have changed so much, then the claim that the games should be renamed to reflect this change is also unsupported.

Page 10	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	2

(c) Further argument

Accept arguments focused on IC, 'The Olympic Games no longer celebrate physical greatness.'

Support:

The Olympics has changed with modern times. Modern times value many things as well as brute strength. The mental fight involved in hobbies such as chess is a true test of a skill important to us today. So it is right that the Olympics are no longer simply about physical greatness.

The Olympics is now all about brand awareness. The athletes get huge contracts to wear a certain kind of clothes or trainers, and spend their time advertising these brands. The actual sport is no longer as important as the concept of the Olympics as advertising space, so we can't say they do primarily celebrate physical greatness any more.

Challenge

The Olympics are valuable to many countries around the world as a competition where everyone can test their skill against each other. Even though the events may have changed, the tradition of finding out who is the greatest has stayed the same. So the name should not be changed.

The main events in the Olympics are still very physical events. The marathon, for example, really tests physical greatness, as does wrestling or javelin throwing. So the games do test and celebrate physical greatness.



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level and Advanced Subsidiary Level

THINKING SKILLS

9694/04

Paper 4: Applied Reasoning

June 2007

1 hour and 30 minutes

Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the booklet.

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

Do not use staples, paper clips, highlighters, glue and correction fluid.

DO NOT WRITE ON ANY BARCODES

Electronic Calculators should be used.

Answer **all** the questions.

Start each question on a new answer sheet.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question.

This document consists of **11** printed pages and **1** blank page.



1 Study the following evidence and answer the questions which follow. Show your working.

An Arctic research company needs to decide the best way to provide power for a 100-day expedition. It is considering the purchase of a combination of diesel generators, wind turbines and solar panels. These will provide power for a variety of different appliances, not all of which will need to run all the time.

The purchase costs and power outputs of the different possible products are given below.

Solar Power

Possible products	Cost of purchase (\$)	Maximum power (watts)
Solar A	900	175
Solar B	500	90

You may assume that the solar panels give out their maximum power throughout the 12 daylight hours. You may assume that the length of the day stays the same throughout the expedition (although in reality 12 hours is an average).

Wind Power

Possible products	Cost of purchase (\$)	Average power (watts)
Wind A	750	450
Wind B	550	360

The power output of the wind turbines varies (when it is windless they give nothing, but this is compensated for when it is windy), and therefore they cannot be relied upon for the vital power appliances. However, for the purposes of calculation it can be assumed that the power output is continuous.

Diesel Power

Possible products	Cost of purchase (\$)	Maximum power (watts)
Diesel A	5000	3000
Diesel B	1800	900

The cost of running the generators for an hour is shown in Figure 1.

Power Requirements

The appliances needed for the expedition can be divided into the following categories:

- Vital appliances which need power 24 hours a day: 2100W in total.
- Appliances which need power continuously throughout the 12 hours of daylight (but not during the night): 1000W in total.
- Other appliances which could be used at anytime: these average a total of 1250W throughout the day and night.

Cost Restriction

The company has \$10 000 available to spend on the provision of electricity for the expedition.

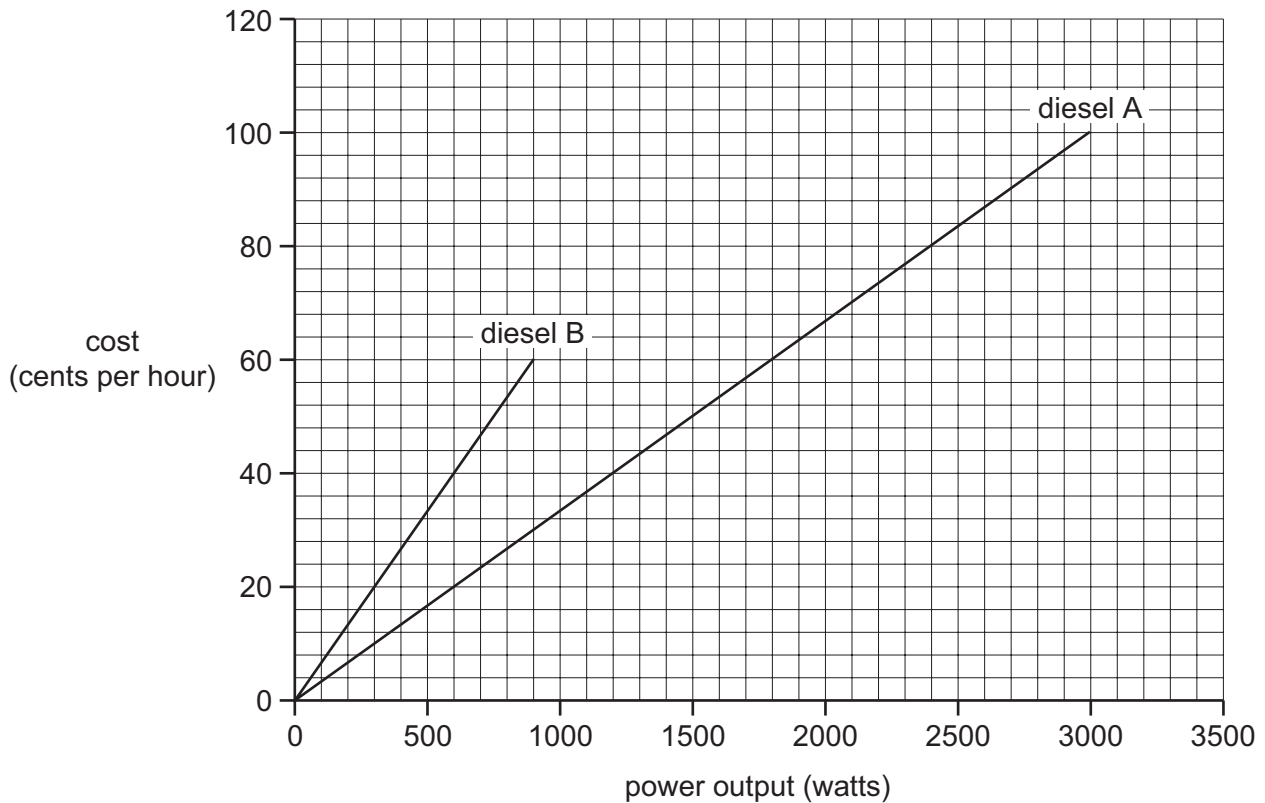


Figure 1

- (a) Calculate how much it would cost to run the 24-hour vital appliances for the entire expedition, using only Diesel B generators. You need to include the cost of purchase and the cost of running the generators. [1]
- (b) Is it possible to produce **all** the necessary power using diesel power only, given the \$10 000 spending limit? Explain your conclusion by showing the costs of purchase and diesel required. [3]
- (c) If solar power was to be used to provide as much of the power requirements as possible, what would be the minimum cost of the provision of the solar power? [2]
- (d) (i) Assuming that the diesel generator(s) run at full power all the time, investigate possible combinations of the power sources. Give **one** example of a combination of power sources which fits the requirements of the expedition, and is within the budget (\$10 000). [2]
- (ii) You should find that your combination produces more than the required total power. With the aid of the graph in Figure 1, calculate the minimum cost to produce exactly the required power if the generators can be run at reduced power to lower diesel costs. [2]

2 Study the following information and answer the questions which follow. Show your working.

A credit union is a financial co-operative owned and controlled by its members. It offers savings and low-interest loans. Each credit union has a 'common bond' which determines who can join it. Examples of a 'common bond' are people working for the same employer or people belonging to the same association.

The Tweakit Credit Union is operated by, and for, employees of Tweakit Engineering. Members save by agreeing to have a certain amount deducted from their monthly salary payment. Each member has a credit union account into which the savings are paid.

Members may also borrow money from the credit union. New members qualify immediately for an introductory loan of up to \$300. To borrow larger sums members must have been saving for at least three months, after which time they can apply for a loan of up to three times their savings balance (for instance a member with \$600 savings may apply for a loan of up to \$1800).

Interest on all loans is charged at 1% per month on the remaining balance of the loan, and is calculated immediately before each repayment.

Information is presented in Tables 1-4.

- (a)** Alice has made monthly payments of \$110 since she joined the credit union 4 months ago. She would like to borrow \$2700. Assume she continues to make the same monthly payments.
- (i)** How many more payments must be credited to her share account before she can borrow \$2700? [1]
- (ii)** How many months will it then take for the loan to be repaid? [1]
- (b)** Ben has made 5 payments of \$150 per month towards repaying a loan of \$2400.
- (i)** How much of his 5th payment was credited to his savings account? [3]
- (ii)** Following a pay rise, Ben has decided to increase his payments to \$200 per month. He does this after he has made his 5th payment. How much sooner will he pay off the loan than originally expected? [2]
- (c)** The introductory loan example in Table 3 claims that if a loan of \$300 is repaid at \$50 per month then the total interest is \$12.80 and \$87.20 is paid into the savings account. Using other information given, show that these figures are correct. [3]

LOAN REPAYMENT GUIDE – MONTHLY LOAN REPAYMENTS (\$100 TO \$1600)

Amount of Monthly Payment (\$)	150	1	2	3	4	5	5	6	7	8	9	10	10	11	12	13	14
	125	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	100	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20
	90	2	3	5	6	7	9	10	12	13	14	16	17	19	20	21	23
	80	2	4	5	7	8	10	11	13	15	16	18	19	21	22	24	25
	70	2	4	6	8	9	11	13	15	17	18	20	22	24			
	60	2	5	7	9	11	13	15	17	19	21	23					
	50	3	5	8	10	13	15	18	20	23							
	45	3	6	9	12	14	17	20	23								
	40	4	7	11	13	16	19	22									
	35	4	8	11	15	18	22										
	30	5	9	13	17	21											
	25	5	10	15	20												
	20	6	13	19													
	15	9	17														
	10	13															
	5																
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	

AMOUNT OF LOAN (\$)

Table 1

LOAN REPAYMENT GUIDE – MONTHLY LOAN REPAYMENTS (\$1700 TO \$3200)

Amount of Monthly Payment (\$)	220	10	11	11	11	12	13	13	14	14	15	15	16	16	17	18	18
	210	11	11	12	12	13	13	14	14	15	15	16	17	17	18	18	19
	200	11	12	12	13	13	14	14	15	16	16	17	18	18	19	19	20
	190	12	12	13	14	14	15	16	16	17	18	18	18	19	20	20	21
	180	12	13	14	14	15	15	16	17	17	18	19	19	20	21	22	22
	170	13	14	14	15	15	16	17	18	18	19	20	21	21	22	23	24
	160	14	15	15	16	16	17	18	19	20	20	21	22	23	23	24	25
	150	15	15	16	17	18	18	19	20	21	22	23	23	24	25	26	27
	140	16	17	17	18	19	20	21	21	22	23	24	25	26	27	28	29
	130	17	18	19	19	20	21	22	23	24	25	26	27	28	29	30	31
	120	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	110	20	21	22	23	24	25	26	27	28	30	31	32	33	34	35	
	100	22	23	24	25	26	28	29	30	31	33	34	35				
	90	24	25	27	28	29	31	32	33	35							
	80	27	29	30	31	33	34	36									
	70	31	33	34													
	60	36															
	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	

AMOUNT OF LOAN (\$)

Table 2

Notes on Tables 1 and 2:

- Find the amount of loan you wish to apply for along the bottom of the chart.
- Find the amount of your monthly payroll deduction along the left of the chart.
- The box at which these two lines meet is the number of payments required to repay the loan.
e.g. \$2500 loan at \$170 per month would take 18 months to repay.
- The monthly deduction is your full deduction including loan repayment, interest due and addition to your savings.
- 80% of your total deduction goes towards repaying your loan each month.
The remaining 20% of your payment will pay the interest due with the remaining amount going into your savings account.

Introductory Loan Example	
Introductory Loan of \$300 repaid at \$50 per month would take 8 months to repay.	
Loan Repaid	\$300.00
Interest Paid	\$12.80
Savings	\$87.20
Total	\$400.00 (8 payments of \$50)
The total interest would be \$12.80 and the member would now have savings of \$87.20 with the credit union.	

Table 3

Standard Loan Example	
Member with \$350 savings is issued a loan of \$1000 at \$60.00 per month. Repayment period 21 months:	
Loan Repaid	\$1000.00
Interest Paid	\$109.20
Savings	\$150.80
Total	\$1260.00 (21 payments of \$60.00)
The total interest would be \$109.20 and the member would have added \$150.80 to their savings of \$350.00 leaving a new savings balance of \$500.80.	

Table 4

3 Study the following evidence and answer the questions below.

Definition: **Sustainable development** (SD) is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

At the heart of ongoing debates on sustainable development is the issue of the possibility of living better while consuming less.

(a) Read Document 1 and provide a brief analysis of the argument presented by Miss B. [6]

(b) Give a critical evaluation of Miss B's reasoning. You will need to justify your assessment clearly by identifying strengths and weaknesses and any unstated assumptions in Document 1. [8]

'Sustainable development is incompatible with real human development.'

(c) Construct an argument **either** for **or** against the above statement by critically referring to Documents (1) – (5) and introducing your own ideas in support of your case. [16]

DOCUMENT 1**Sustainable Development: A Deception?**

Many environmentalists claim that sustainable development initiatives, such as agroforestry¹ and extractivism², are better than large-scale development projects installed in the Amazon by the Brazilian Government and large multinational corporations. They argue that large-scale projects such as dams and mines which destroy the Amazon's natural resources and environment (upon which peasants depend) are implemented by authoritarian means and do not give work to most of the Amazon's poor peasants. They claim that sustainable developments can offer the peasants more opportunities and control over their own development, because they are sustainable, local and small-scale. However, these environmentalists are mistaken.

It is wrong and deceptive of environmentalists to base their arguments for environmental preservation solely on the social needs of the poor in the Amazon. By confusing the two issues of environmental and social needs, environmentalists in fact help keep these people poor. These issues must be separated if peasants and workers in the Amazon are to enjoy better lives.

Although mega-projects do destroy huge tracts of the forest and can be inefficient, the attitude towards development expressed by their construction is progressive. The most important factor for the development of the Amazon is the human being. Human beings have transformed the forest and manipulated the economy for tens of thousands of years for their needs. The Amazon itself, as a natural phenomenon, does not have any development needs. It spontaneously evolves and is devoid of any plans or opinions. It is, therefore, up to us to explore how best the Amazon can serve human needs.

Today, unlike previous periods of mankind's occupation of the Amazon, we have the capacity to more fully exploit it to serve our needs. As we research its potential we have discovered how it can supply huge amounts of hydroelectric power and minerals and that it is a source of biodiversity and genetic wealth which could be used for drugs and the manufacture of food stuffs. All that is lacking is the application of technological knowledge.

Thus, large development programmes in the Amazon are an attempt to promote real human development by expanding and exploiting such discoveries. But sustainable development threatens to stall the massive benefits. It is driven by the belief that the forest itself is our main resource of development and that we must therefore preserve it at all costs. The environmentalists' notion of 'natural capital' presents the forest as a static natural resource: a resource which has to be exploited through methods which are in harmony with its ecology and which allows it to be a renewable resource if it is to serve the economic needs of its inhabitants. Small-scale and local development initiatives such as agroforestry and extractivism therefore promote a precautionary and anti-experimental approach to human intervention in the Amazon and can only result in poverty for the majority of the Amazon's inhabitants.

Miss B

¹ agriculture within the forest

² cultivating and harvesting forest produce

DOCUMENT 2

Needs or Wants?

Philosophers from Plato onwards have discussed the relevance of human needs to conceptions of 'good life' and the role of self-discipline. Like the radical environmentalists, the ancient Stoics aspired to a simple life in harmony with nature. They thought our failure to achieve this was due to a mismatch between our subjective desires and objective needs.

However, the modern economics textbook, generally, does not focus on the word 'need', choosing instead to cast its arguments in terms of wants, tastes or consumer preferences. Anderton, for example, introduces the question of human needs on the first page of his undergraduate textbook on economics: - 'Human needs are infinite... [But] no-one would choose to live at the basic human need if he [sic] could enjoy a higher standard of living. This is because human wants are infinite.' The idea that human wants can never be satisfied underlies the whole of consumer society. Increasing consumption is seen as synonymous with an improved standard of living.

But there has been growing criticism of modern society which argues that there is something unsavoury about recent patterns of consumption. Erich Fromm identified two main psychological premises on which the modern economic system is built:

- the aim of life is happiness, that is maximum pleasure, defined as the satisfaction of any desire or subjective need a person may feel (radical hedonism);
- egotism, selfishness and greed (which the system needs to generate in order to function) lead to harmony and peace.

Fromm admits this kind of radical hedonism has been practised throughout history, most particularly by the richest populations. But he points out that ancient philosophers in China, India, the Near East and Europe did not subscribe to such a theory of well-being. All the great teachers and philosophers concerned with humankind's overall well-being drew a distinction between 'needs (desires)' which are only 'subjectively felt' and whose satisfaction leads to momentary pleasure, and 'objectively valid needs' which are rooted in human nature and whose satisfaction promotes human growth. The theory that certain universal motivations underlie human behaviour appears to allow us to distinguish between what is consumed in the consumer society and what contributes to human well-being.

DOCUMENT 3**Enlightened Self-interest**

In 1973, I proposed a twin strategy to deal with the growing damage to our life support systems. These were 'do ecology' for developing countries and 'don't ecology' for industrialised countries.

The following examples illustrate this.

The tsunami of December 26th 2004 miraculously changed the outlook of people along coastal Tamil Nadu. Villages adjoining thick mangrove forests were saved from the fury of the tsunami, because of the speed-breaker role played by the mangroves. In the nearby villages where mangroves had been destroyed either for fuel wood or aquaculture ponds, several hundred fishermen died. Now local people refer to mangroves as 'life-savers'. What we could not achieve in 15 years by arguing that mangroves would serve as a bio-shield in the event of sea-level rise was achieved in a day. The same tsunami brought home to farmers near the shoreline the importance of conserving local varieties of rice. Several thousand hectares of rice fields along the coast got inundated with sea-water and several varieties perished. Conservation of local biodiversity got a shot in the arm and now every farmer wishes to maintain a gene bank (i.e. on-farm conservation) and a seed bank.

A second example relates to the revitalisation of the conservation traditions of tribal communities in the Eastern Ghats region. Fifty years ago the tribal communities in the Koraput region of Orissa were familiar with more than 1000 varieties of rice, but at the turn of the century this figure had come down drastically. It became clear that the only way tribal families would once again start conserving agrobiodiversity would be by creating an economic stake in the conservation. A dynamic programme of participatory conservation and breeding coupled with agronomic improvement soon led to a big spurt in the production of Kalajeera, an aromatic local variety, which is snapped up by the market almost as soon as it is harvested. The same has started happening in Kerala with medicinal rices like Navara, used in traditional ayurvedic practice, and with under-utilised millets in the Kolli Hills region of Tamil Nadu.

In short, 'do ecology' is triggered either by an ecological disaster or an economic opportunity. Preaching does not help. Enlightened self-interest, however, motivates people and leads to harmony with nature. Developing countries with pervasive poverty should spread a 'do ecology' methodology which can confer tangible ecological and economical benefits. The industrialised countries with high standards of living should engage in 'don't ecology' (i.e. regulate and restrict carbon emissions and unsustainable consumption of natural resources).

Mr S

DOCUMENT 4

Dilemmas for Sustainable Development

Ethical shoppers have a lot to worry about, from whether farm workers are receiving above-minimum wages, to concerns about their soaps threatening the habitat of the orang-utan, and whether their tofu is contributing to the cutting of another chunk of the Amazon forest. To reassure consumers that familiar household brands use materials that can be produced sustainably, retailers are joining sustainable business programmes for sourcing palm oil, soya beans, cotton, sugar cocoa and tea. These aim to supply food or fibres without harming the environment, and in the case of palm oil and soya beans means no clearing of virgin forests for plantations in Malaysia, Indonesia or Brazil.

Sustainable commodity programmes look for the most environment friendly methods of farming, such as reducing the use of fertilizers and pesticides, efficient use of water and implementing modern farm techniques that can boost crop yield, including genetically modified crops of cotton and soya beans. Says Mr Jason Clay, vice-president for agriculture at the Worldwide Fund for Nature: 'Our results show a two-year payback of our programmes if they are followed.' The programmes are broadly representative of producers and consumers, with salmon sustainable initiatives including 55% of farmed salmon suppliers and 25% of retailers. The cotton programme has 12% of the world's largest retailers of cotton, including Gap and IKEA, and the sugar pact has 10% of industrial users of sugar cane including Coca-Cola.

However the impact of bio-fuels on crops such as palm oil and soya beans, used for making bio-diesel, has complicated sustainable development. Mr Jan Kees, from Unilever, says: 'If we include the increase in palm oil demand from biofuels the palm market would double much sooner than 20 years, and we would struggle to meet that demand from our sustainable programmes.' There is now a move to talk to the European Union (EU) about its target for bio-fuels. 'It sets these targets for alternative fuels, which will lead to a sharp increase in palm oil production for bio-diesel, and that is not compatible with sustainable development, which the EU is also very keen to support.'

Kevin M

DOCUMENT 5**Problems: Forest Conversion**

During the last two decades of the twentieth century, more than 300 million hectares of tropical forests – an area larger than the size of India – have been cleared for plantations (including palm oil and soya), agriculture, mining, or urban development. Over the next 25 years, a further 250-300 million hectares of tropical forests are likely to be lost in this way.

Among the most important factors behind forest conversion are: the fact that forests are not valued for the long-term benefits they provide, and that conversion often costs very little money. Of rising concern is the conversion of forests to palm oil and soya plantations. Because the palm oil industry generates valuable foreign exchange earnings and employment opportunities for tropical producer countries, it is the fastest expanding crop in the tropics. The growing demand for animal feed – and finally for meat – drives the production of soya bean. Soya oil is the world's most consumed vegetable oil, having a 25% market share. The driving forces behind its expansion in South America are exports to Europe and China.

The conversion of forests to other land uses carries with it severe environmental and social costs arising from forest clearing, and disregard for the rights and interests of local communities. Large-scale oil palm and soya plantations are primarily planted as monoculture plantations offering considerable economic benefits. They have a significant negative impact on biodiversity because forest clearance wipes out diverse natural vegetation and the wide variety of habitats for wildlife. As forests and their natural functions are removed from the landscape, problems such as soil erosion or pollution of fresh water from pesticides used in the growing of crops then arise.

Plantations of oil palm have caused huge destruction in parts of Asia – especially tropical lowland rainforests, biologically the richest of the world's terrestrial ecosystems, in Indonesia and Malaysia. The demand for soya is expected to increase by 60% in the next 20 years. This could lead to the loss of an additional 16 million hectares of savannah and 6 million hectares of tropical forests in South America. This will pose a major threat to some of the world's most important remaining forests and fresh water ecosystems, affecting the livelihoods of forest-dependent people and the survival of endangered species such as elephants, rhinos, tigers and great apes.

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MARK SCHEME for the May/June 2007 question paper

9694 THINKING SKILLS

9694/04

Paper 4 (Applied Reasoning), maximum raw mark 50

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Page 2	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

In the following mark-scheme, *italic text* will be used for necessary constituents of an answer. Normal text is used for explanatory notes/guidance.

- 1 (a) Diesel B: 2100W needed. This requires 3 generators. 60c + 60c + 20c per hour: \$33.60 per day = \$3360 for the trial. Purchase cost = (3 × \$1800) = \$5400. Total = \$8760.
This answer only will be accepted. No working needed.

- (b) *One mark for each of the three cases that need to be considered. Neither the purchase costs nor the running costs need to be shown to win the mark, but the number of generators and the correct conclusion must be shown for each case.*

[all the necessary power : 2100 W + 1000 W + 1250 W = 4350 W]

(i) 2 Diesel A's. \$5000 × 2 = \$10 000, so no money for fuel. *Not possible.*

(ii) 5 Diesel B's. \$1800 × 5 = \$9 000, so not enough money for fuel. *Not possible.*

(iii) 1 Diesel A and 2 Diesel B's. \$5000 + \$3600 = \$8 600, so not enough money for fuel. *Not possible.*

- (c) *There are two possible solutions, either of which can gain full marks . One mark given for calculations involving Solar B's only rather than Solar A's, OR if calculations for both A's and B's are shown but no clear recommendation is given as to which is better.*

SOLUTION 1: [Remaining power: 3100W for vitals + 2500W for freelance (2500W during 12 hours of day gives 1250W average over the 24 hours period) = 5600W in total]

32 solar A's = \$28 800 – *two marks.*

63 solar B's = \$31 500 – *one mark.*

SOLUTION 2: [remaining power: 3100 W + 1250W (instead of 2500W) required for freelance appliances = 4350W needed in total]

25 solar A's = \$22 500 – *two marks.*

49 solar B's = \$24 500 – *one mark.*

- (d) (i) *One mark if candidates consider a combination of all three power sources – diesel, wind and solar – irrespective of whether it fits within the budget.*

One mark if candidates consider a combination of power sources which fits within the budget – irrespective of whether it fulfils the requirements of the different appliances.

Solutions need to show the number of different power sources, and an attempt to calculate the cost.

Solutions fulfilling all the criteria:

One diesel A: \$5000 + \$2400 for fuel (\$7400) = 3000W continually

One solar A: \$900 = 175W

Two wind A's: \$1500 = 900W

Total = \$9800

One diesel A: \$5000 + \$2400 for fuel (\$7400) = 3000W continually

Two solar B's: \$1000 = 180W

One wind A & one wind B: \$1300 = 810W

Total = \$9700

Page 3	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

- (ii) The marks are only available to candidates who have produced a correct solution to (d)(i). Two marks are to be awarded for calculating the new reduced cost. If candidates do not manage this, one mark is available for calculating how much extra power was produced.

Referring to the two correct solution given above (for (d)(i)):

The \$9800 solution:

	24 vital	Day vital	Freelance
Diesel	2100	900	450
Solar		100	37.5
wind			900

The 137.5W over on the freelance power units allows for the diesel generators to run a less than full speed: $137.5W \text{ less} = 4.58c \times 2400 = \text{roughly } \110 . So *the new reduced cost would be \$9690*.

The \$9700 solution:

	24 vital	Day vital	Freelance
Diesel	2100	900	450
Solar		100	40
wind			810

The 50W over on the freelance power units allows for the diesel generators to run a less than full speed: $50W \text{ less} = 1.67c \times 2400 = \text{roughly } \40 . So *the new reduced cost would be \$9660*.

Page 4	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

2 (a) (i) 5 payments – award 1 mark.

Alice needs to have \$900 savings before she can borrow \$2700, so she must save at least a further \$460.

(ii) 31 months – award 1 mark.
See the loan repayment guide.

(b) (i) \$10.80 – award 3 marks.

\$120 (80% of \$150) goes towards paying the loan each month. The balance of the loan after 4 payments = $\$2400 - 4 \times \$120 = \$1920$. The interest on this balance is \$19.20, so the amount credited to his share account is $\$30 - \19.20 .

If answer is wrong, award 1 mark for appreciation that the balance is being reduced by \$120 each month and/or 1 mark for an attempt to subtract a calculated interest from \$30.

(ii) 3 months – award 2 marks.

If answer is wrong, award 1 mark for either of the following points:

To repay \$1800 at \$200 per month takes 12 months.

The total repayment period is now 17 months (5 + 12). (The original period was 20 months).

(c) Award 3 marks for convincing working leading to both figures,

e.g. First month's interest is \$3.00 (1% of \$300).

First month's payment reduces the loan balance by \$40 (80% of \$50) to \$260 so second month's interest is \$2.60. Continuing in this way the total interest is 8 sums decreasing successively by \$0.40.

$$\$3.00 + \$2.60 + \$2.20 + \$1.80 + \$1.40 + \$1.00 + \$0.60 + \$0.20 = \$12.80.$$

$$\text{The amount saved must be } \$400 - \$300 - \$12.80 = \$87.20$$

If 3 marks cannot be awarded:

- Award 2 marks for demonstrating that the interest decreases by \$0.40 per month [e.g. by showing $\$3 + \$2.60 + \$2.20 + \$1.80 + \dots$]
- Award 1 mark for recognition that the interest will decrease by the same amount every month.
- Award 1 mark for recognition that once the total interest has been calculated the savings will be $\$400 - \$300 - \text{interest}$ or that savings will increase by the same amount every month except the last month when there will be an extra \$20 because only \$20 is required to pay off the balance of the loan.

Page 5	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

3 (a) Marks are to be awarded according to the following table:

<i>Marks</i>	<i>Minimum requirements</i>
4–6	<i>Identification of the main reasons and conclusions. Top end if the key intermediate conclusion is expressed. Candidates who do not identify the main conclusion cannot score more than 4 marks.</i>
2–3	<i>Identification of three well-expressed analytical points</i>
1	<i>General gist of the argument.</i>

Analytical points:

The main conclusion comes in the closing lines: Sustainable developments which (comprise of/depend on/introduce) small scale and local development initiatives promote a precautionary and anti-experimental approach to human intervention in the Amazon and can only result in poverty for its inhabitants. Equivalent paraphrase should be acceptable.

The basic structure can be outlined as follows:

The introductory context/target is a counter-argument (preliminary argument):- Environmentalists argue that sustainable development initiatives such as agroforestry and extractivism are better than large-scale development projects in the Amazon on the basis that they offer more opportunities, employment and autonomy for the locals.

Reasoning:

- 1 It is wrong and deceptive of environmentalists (or environmentalists are mistaken/wrong) to (base their arguments solely on...) confuse social problems with environmental preservation, as this, in fact only helps keep the peoples of the Amazon poor.
- 2 Even if mega-projects are environmentally destructive and inefficient (counter-argument) their construction is significant, since they express a progressive attitude, and that is all about the development of the human race. By contrast the Amazon as a natural phenomenon has no such needs.
- 3 (I.C) The Amazon therefore exists to serve the human being's needs today or we (should/must/ought to) explore how best the Amazon can serve human needs.

This is the main thrust of the argument, to which all the premises relate and from which the other premises follow:

- 4 We have the capability/technological advantage today of discovering and exploiting the vast potential resources the Amazon holds.
 - 5 IC -Large developmental projects can (are an attempt to) exploit and expand these discoveries.
 - 6 But sustainable development threatens such expansion. This is reinforced by the introduction of a counter argument – their theory of 'natural capital' and implementation of alternative methods (for economic sustenance).
- C Therefore their methods (such as agroforestry and extractivism) promote a precautionary, anti-experimental approach to human intervention in the Amazon (resulting in/leading to) poverty for the majority.

Page 6	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

(b) Marks are to be awarded according to the following table:

Marks	Minimum requirements
6–8	Comment on 3+ strengths/weaknesses. Top end responses will comment on the lack of conceptual clarity. Thinking Skills language used.
4–5	Limited evaluation of two strengths/weaknesses.
1–3	Identification of one or two strengths/weaknesses.

In general, a candidate will be awarded two marks for each well-expressed strength/weakness (up to a maximum of 8), and one mark for a poorly-expressed strength/weakness (up to a maximum of 4).

Evaluative points:

The main strength of the argument lies in the claim that advocates of sustainable development are keeping the peoples of the Amazon from potential betterment, or in poverty, by implementing small scale, low-tech developments as better/more satisfactory alternatives to large-scale development. The charges levelled at them imply that in actual fact they are not genuinely concerned about the locals' welfare but are preoccupied with ideological standpoints that ultimately will be to the national detriment. The most significant counter-claim is that environmentalists are anti-experimental, which raises alarm bells, if we accept that research/experiment and discovery are prime factors in man's development.

Candidates would have to assess the validity of the reasoning, which cover a series of related issues and determine whether the conclusion is overdrawn:-

- Within the body of her reasoning Miss B would have to provide evidence to support a number of implicit and explicit assumptions that make the argument work: that exploitation of nature is truly desirable, or that the methods used by sustainable development are ineffectual, or do not lead to economic well-being or are the sole factors for resulting poverty.
- There is at the heart of the argument core definitional concepts which are problematic: e.g. human development – what is and what is not a 'real human development', or whether they convey different things to different peoples and cultures. Another ambiguous definitional concept 'poverty' – differing in degrees or kinds? Sustainable poverty or unsustainable poverty? It could be shown that the unambiguous use of terms such as development, progress and poverty compromise the validity of even good reasoning at various points of the argument.
- The process of the argument entails a clash of ideological principles and positions which are implicitly or explicitly alluded to in the text, which either strengthen or weaken the conclusion. If Miss B is restricting her definition to a purely Western mechanistic concept of economic progress and technological development then the conclusion can be stated to be 'overdrawn'.

There are a number of flaws and assumptions in the passage which also point to the argument as weighing overall on the weak side, and offers the candidate much opportunity to demonstrate the skills of identifying reasoning errors:-

- The first paragraph of the counter-argument is, in effect, a weak straw man ploy to knock down the environmentalist's argument. In focusing the argument the anthropocentric dimension (for benefit of human beings) is by-passed with an implicit assumption that the argument is purely ecocentric and must be treated as such.
- Miss B moves along an ad hominem trail of discrediting and dismissing the environmentalist argument, by attacking 'attitudes' without dealing with the substance.

Page 7	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

- The inconsistency of her position is reflected when Miss B uses the anthropocentric principle herself to bolster her own argument i.e. putting man at the centre (3rd para). She also contradicts her earlier premise of rejecting that correlation exists between environment and social well-being (2nd para), by using this correlation to argue for large-scale development (para 4 & 5).
- The counter-assertion that mega projects do destroy the forest (3rd para) and affirmation of an overriding principle of progress creates the decision-making dilemma; yet the choice of the human being's need over preserving nature are made without weighing the pros and the cons or considering other options. This makes the intermediate conclusion rest on an absolute/arbitrary principle rather than on sound rationale (more able candidates may point out that there is no sufficient Difference Principle to back the choice; alternatively candidates may consider whether the principle has been stretched too far).
- There is an assumption of sufficient dissimilarity in the analogy in the 3rd para, which contrasts the human being with nature, that would show it to be blotched. In effect the Amazon is treated as an inanimate object, whereas it could be argued both human and the Amazon are biological contingent living things, with biological needs (candidates may use ascriptions of pathetic fallacy which attribute a sensitive spirit to nature – e.g. as the poet Wordsworth does).
- Other analysis of flaws may point to bias, jumping to conclusions, slippery slope, to count against the conclusion. A serious failure is the absence of reasoning/evidence for labelling advocates of sustainable development “wrong deceptive and disingenuous”. “Precautionary and anti-experimental” are value judgments that do not merit the sweeping accusation of wrongdoing, unless backed by examples of supporting evidence. Further, in the context of the reasoning, they fall down since para 5 acquiesces to a genuine but mistaken belief on the part of environmentalists.

Candidates may work some of the flaws identified above as assumptions. Other assumptions are:

- Assumes that only the empirical sciences such as science and technology contribute to progressiveness in human development, whereas history of mankind shows civilisation is undergirded by countless philosophical and ethical theories, developed over time by various research disciplines, which all guide progress and social development and contribute to personal well-being as well as to infra-structure.
- Assumes the inhabitants of the Amazon are gullible or being duped, whereas the environmentalists would have negotiated involvement with them.
- Assumes that the inhabitants would want the concept of economic progress expressed in the argument, whereas they may want to preserve a different eco-friendly lifestyle.
- Assumes that, in the past, human beings would not have been able to exploit environment ; whereas they may have been ‘unwilling’ i.e., may have held belief-based understanding of nature and its functions which made them willing to be at harmony with nature.
- Assumes environmentalists are the only people who raise objections to large-scale developments whereas there may be others (and for different reasons), such as politicians, religious parties, humanitarians and animal rights groups.
- Assumes that aggregates within nature are insufficient to meet humans’ needs unless there is forced interference.

The above examples are not exhaustive.

Page 8	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

(c) Marks are to be awarded according to the following table:

Marks	Minimum requirements
12–16	Clear conclusion expressed. A range of reasons/evidence evaluated from different documents (3+). For the top end, contrary reasoning should be dismissed, and the argument coherently assembled.
6–11	Conclusion is clear. One or two evaluative points made about the documents. Other documents are used uncritically. Some irrelevant reasoning.
1–5	Candidate does not consider the precise conclusion but a broadly related theme. Only one or two references to the documents, and these are uncritical.

Candidates will be marked on the following three components of their response:

selection and synthesis:

- choosing relevant and useful material – evidence, opinion, argument etc. – from the documents.

critical reasoning:

- assessing the strength of available evidence;
- evaluating the claims and arguments in the selected materials;
- challenging or supporting claims made in the documents with ideas and arguments of their own;
- drawing or justifying their own inferences;

synthesis:

- integrating the material in the documents with their own ideas and arguments to produce a coherent case.

Credit will be given for judicious use of the resources in the documents. Candidates' understanding/definition of what constitutes 'real' human development is crucial to their argument. Doc. 2 should help them to take a position. Factual data/statistics within documents could also be interpreted to support their take or to form counter-arguments.

Credit will be given for assessment and interpretation of evidence. E.g. Doc 4 highlights how problematic, in practice, a program of sustainable development can be. The miniscule statistical data may be interpreted by knowledgeable candidates to assess how it is being received. Doc 2 raises the fundamental debate: is it a realistic concept? On a different level, Doc 3 shows nature giving man a helping hand! – what are the implications for the theory of nature in Doc 1 para 3. And even more significantly for a theory of human development/evolution as rational beings? Or from the perspectives afforded by Doc 2, do Doc 3 and 4 enable one to draw the inference that promoting better satisfaction of living conditions in poor countries necessarily requires a reduction in the satisfaction level of richer countries?

Credit will be given for the critical analysis and evaluation that candidates apply to the sources. E.g. how objective is document (5)? Are the projections for the next 25 years reasonable or coloured by their own vested interests? It can be argued that the underlying motives of doers of "do ecology" in Doc. 3 are no different from those in "well-off" countries (i.e. self-interest) ; or that "don't ecology" doers do not have corresponding punitive lessons from mother nature to convince them they should regulate their carbon emissions. On the other hand they are triggered by massive economic opportunities which are reasons why they shouldn't cut back on 'destructive' activities.

Credit will be given for the inferences candidates draw from other sources and from other examples of observations they bring to the debate. What is rated as a good argument, whether for or against the compatibility of sustainable development, will be one which shows that the candidate has fully appreciated the dilemma/s focused in the question, selected relevant material from all the sources, showed consistency in interpretations, have anticipated challenges and argued convincingly with supporting reasons. Ideological or belief- based standpoints can be credited only if they are adequately/validly supported.

Page 9	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9694	04

Doc 2 prompts the candidate to give critical depth to the concept of sustainable development i.e. theoretical rationale/underlying motives for human behaviour. To obtain higher mark bands, a candidate should consider counter-arguments and objections to their own positions. They could draw/synthesise relevantly from cross curricular knowledge gained from other subjects they may be studying, e.g. history, philosophy, economics, religious studies, sociology or scientific disciplines.

Content of Further Argument:-

Most arguments may utilise current debates on climate change, ecological concerns, facts relating to poverty, global trends etc or to argue for or against sustainable development. The topic of environment, nature and man's relationship to it, may predominate/figure significantly in the responses, forming sub-arguments/intermediate conclusions in the process. More able students could construct arguments with theoretical basis. Debates/discussion on science and religion, ethical principles, understanding of needs theory, talk of 'nature' and the 'natural' may figure relevantly in these higher-critical arguments for or against sustainable development. For example, some who are in favour, may argue that nature is a force/principle that orders the way things are or the opposite; or that all things within nature (including animal lives) are of intrinsic value in themselves and worthy of moral respect. They may argue that when nature is reduced to mechanistic 'brute' impersonal realm of what is there, only people matter, but perhaps it is also why more often than not human conduct in the present day end up on the wrong side of the line, and therefore the need now for redress. They may treat the subject of nature as a standard for ethics and morality, which guides welfare economics, adjudicate needs fairly and thus facilitate a 'just' world; or argue that the concept of nature as an impersonal force that matters is irrational, or talk of 'natural' is irrelevant to moral decisions, and draw the implications thereof for their argument.

Candidates may use Eastern philosophy which emphasise harmony between man and nature as embracing total reality of existence, to counter Western trends of thought that devise barriers between impersonal nature and personal human being. On the other hand they may argue that nature is 'naturally' and rationally the field of human endeavour and the most radical interference with nature can be justified if it serves man's interest; that only technological advancement would continue to solve the new problems that arise for the human race because of the depletion of resources (e.g. suggest space exploration and discovery of habitable resource-rich places), and therefore demonstrates that sustainable development, in the nature of it, does not sit easily with the concept of human progress etc. Perceptive students of ancient history may point out that ancient stoic and platonic philosophy treated 'natural' as the 'rational' and such people as postmodernists, environmentalists etc. are beginning to return to this understanding of rationalism (discarded by the Enlightenment) and argue against or for the wisdom/merits of doing so.

All such sub-arguments/reasoning where employed, should relevantly relate and support the main argument for or against the compatibility of sustainable development with real human development. Very able candidates, with prior grasp of the topic, may offer more complex arguments; they may want to be more specific about what they consider to be 'sustainable' sustainable development, and indicate that the emphasis should be on sustainable sufficiency, as against sustainable efficiency, in order for it to be compatible with true well-being or true human development.

Responses that draw on personal experience and local/national factors should show a measure of objectivity and be made in the context demanded by the question, which calls up wider dimensions.

No marks are reserved for the quality of the written English. It is the quality of the critical thinking and reasoning alone which is under assessment, and provided the candidate has made his/her thought processes sufficiently clear to be understood, full credit will be given.