

**MARK SCHEME for the May/June 2011 question paper  
for the guidance of teachers**

**9694 THINKING SKILLS**

**9694/22**

Paper 2 (Critical Thinking), maximum raw mark 45

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, which would have considered the acceptability of alternative answers.

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

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

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- 1 (a) How reliable is the information given by the senior air stewardess in Source A? Justify your answer.

As a senior air stewardess she should have the experience and expertise to judge how tired the pilot looks to fly [1]. However, 'looking tired' is a rather vague expression and doesn't mean that the pilot was sleepy or drowsy as such [1]. Moreover there may be an element of bias as we are told that there is tension between cabin and flight crew [1]. On the other hand, this information would be consistent with the idea that Bob Andrews had taken too many pills [1].

Give 1 mark for judgement if followed by a relevant point from above. 1 mark per relevant point from above. Do not allow 'ability to see' on its own.

- (b) How significant would the information in Source D be in an enquiry into Bob Andrews' responsibility for the incident at Banghli Airport? [3]

It would show that there was a danger of drowsiness/lack of concentration when taking these tablets. [1]. We know from Source C that Bob Andrews is taking these tablets [1] and that he had taken an 'extra one' which suggests he may have exceeded the recommended dose [1]. However 'extra one' is too vague to be sure of this [1]. Bob Andrews may not have read the leaflet accompanying the tablets but this would be irresponsible behaviour and not a very good defence for him [2 marks for this point in its entirety]. Give this last point if the 'reverse' is offered i.e. if he had read the leaflet which would mean he was irresponsible to have acted against its advice.

Not significant [1] because the effects may have worn off by the time any enquiry took place [1].

- (c) Suggest one piece of additional information it would be useful to have about this incident. Explain how this would help you make a decision about what happened. [3]

Main areas here would be:

Information about conversations in the cockpit e.g. did the co-pilot offer to do the landing/suggest the captain looked tired etc. This would help by confirming that there was concern about the captain's ability to land successfully. An absence of such conversation would bolster Andrews's position.

More detail about landings at Banghli. Whilst an incident hasn't happened before how close has it come to being a skid? This would help by suggesting that this was 'an accident waiting to happen' and, again would bolster Andrews' position.

More information about the airline/aircraft. Was it old? Does this airline have a lot of incidents like this? Are its planes well-maintained? If there was negative information about the plane or the airline this would again exonerate Andrews.

More information about the dose and / or duration of the drugs e.g. did he habitually take less than the prescribed maximum?

Bob Andrews medical condition after the landing e.g. had drug test revealed high levels of phyllogen?

Passenger announcements – had passengers thought that Andrews sounded drowsy/tired?

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CCTV in the cockpit – if present, did it reveal anything about the demeanour/behaviour of Bob Andrews?

Report from Andrews doctor – did this reveal anything about phyllogen dose? (This would need an explanation to be acceptable – 'report from Andrews doctor' not enough.)

[1 mark for any one of above + up to 2 marks for explanation of usefulness.]

- (d) **How likely is it that Bob Andrews was responsible for the plane skidding on landing at Banghli Airport? Write a short, reasoned argument to support your conclusion, with critical reference to the evidence provided and considering plausible alternative scenarios.** [6]

<b>Level 3</b> 5–6 marks	A strong answer, which provides a reasoned argument including thorough evaluation of the evidence to support an acceptable conclusion in terms of probability and evaluates the plausibility of at least one different possible course of events.
<b>Level 2</b> 3–4 marks	A reasonable answer, which evaluates the evidence, draws an acceptable conclusion in terms of probability and may mention the plausibility of at least one different course of events.
<b>Level 1</b> 1–2 marks	A weak answer, which refers to the evidence, possibly including a simple evaluative comment. The conclusion may be unstated or over-stated.
<b>Level 0</b> 0 marks	No credit-worthy material.

**Indicative content**

Not looking good for Bob Andrews. The e-mail suggests he had taken a pill too many and was gambling on it being O.K. on a short trip *and* good weather. Whilst the airport can be difficult to land in, Source B suggests that pilots regularly do this under these conditions but that it is testing. If Bob was below par then he wouldn't have the level of concentration needed to land in these conditions. The senior stewardess's testimony is at least consistent with this analysis. Source D makes clear the dangers of exceeding the dose and Bob should have clearly seen his doctor rather than gambled on another pill.

On the other hand, Source E suggests Banghli may have been going for the shopping rather than developing more essential infrastructure which could include runway maintenance. Along with Source B, another plausible scenario is that this was 'an accident waiting to happen' and that, even if Bob Andrews was under the weather, the responsibility lay with a runway that was not adequate for landing in these conditions due to an airport that had failed to keep up with the increase in traffic.

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2 (a) Can we reliably conclude from Source A that cell division is a normal part of all organisms? Explain your answer.

No it can't be concluded. [1 mark]  
The source strongly implies that such cell division is a normal, inevitable aspect of the life of humans. [1 mark]  
However there could be other living organisms that do not feature cell division as an aspect of their life/it is not relevant to all organisms. [1 mark]  
[max 3]

(b) Look at Source B. With the help of the information in Sources A and E, assess to what extent Source B is incompatible with the idea of biological ageing. [3]

- Incompatible because it suggests that there is a specific appearance of agedness at certain chronological ages.
- Compatible because it is just appearance not other aspects of ageing, e.g. physical fitness.
- Compatible because the diagram could be just a representation of the average degree of ageing at each chronological age. i.e. there will be variation in actual people's appearance.

Accept 'relevant/irrelevant' for 'compatible/incompatible'. [max 3]

(c) 'Some individuals are born with shorter telomere lengths than others.' How useful is this information in assessing whether genetic factors outweigh lifestyle factors in determining biological ageing? [3]

It might suggest that those with the shorter telomere length are going to age more quickly due to having drawn the 'short straw' genetically [1]. However this assumes:

- Healthy lifestyle does not outweigh this genetic disadvantage.
- The amount of shortening when cells divide will be the same as those with longer telomere length.
- We would need evidence as to the relative importance of genetic and lifestyle factors.

[2 marks for any of these points;  
1 mark if unclear/undeveloped]

[max 3]

- (d) Should qualification for a retirement pension be determined by functional rather than chronological age?

Write a short, reasoned argument to support your conclusion, using and evaluating the information provided in Sources A–E.

<b>Level 3</b> 5–6 marks	A strong, reasoned argument, which uses and evaluates all or most of the evidence provided.
<b>Level 2</b> 3–4 marks	A reasonable, simple argument, which uses and/or evaluates evidence.
<b>Level 1</b> 1–2 marks	A weak answer, which makes some reference to evidence but consists of opinion and/or assertion rather than argument <b>or</b> a weak argument, which makes no reference to evidence.
<b>Level 0</b> 0 marks	No credit-worthy material.

It is unlikely that a candidate who only considers the case *for* using functional age could get more than 3 marks. However, given the range of arguments on the 'against' side, it is feasible that an answer that quickly dismissed the functional age argument could get in the higher mark band.

Arguments referring to biological age are relevant, since biological age is a determinant of functional age, although other factors are involved with the latter. A person could have long telomeres but some other disease or disability which reduces his or her functional age.

#### Possible lines of reasoning

At first sight, the proposal to use functional rather than chronological age seems sensible if we see retirement as linked to how old a person is purely and simply. If a person of a chronological age of 50 is actually 60 in terms of the decline in their functionality then it would seem logical for them to retire. Equally the person who at 60 had a functional age of 50 should perhaps continue until they are functionally 60. However, given the effect of environment and lifestyle on biological age (and therefore functional age) as indicated in Sources C and D, this policy could be seen to be rewarding an unhealthy lifestyle and unfair on those who are biologically or functionally young simply because they have been careful to look after their health/body. Source E also suggests that young functional age does not necessarily correlate with greater life expectancy and the latter might be seen to be more relevant to the question of retirement age. The idea that retirement should be linked to functional age could also be questioned. Social welfare systems tend to link it to how many years a worker has contributed to the economy so a pension at say, 60, reflects 40 or so years of work rather than how old the individual is. Source D suggests there may be a natural limit to how biologically young one can be at certain ages and that a life expectancy of 85 is probably about the limit for an average so chronology is ultimately the determinant of age – life expectancy cannot keep rising indefinitely. There may also be a problem of defining 'old' biologically or functionally – what level of declining functionality would it be necessary to reach to be considered ready for retirement? It is likely that in many individuals this could be uneven, so somebody still physically active could be deaf or vice versa.

[max 6]

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3 (a) Using the exact words from the passage as far as possible, identify conclusion in the argument in paragraphs 4 and 5.

We should promote biofuels as the way forward. [2]

We should promote biofuels as the way forward – it is either that or the end of civilisation as we know it. [1]

[max 2]

(b) Using the exact words from the passage as far as possible, identify three reasons used to support the main conclusion [3]

- [So] There is an environmentally friendly way of producing biofuel.
- We should not reject an excellent solution to the dwindling supply of fossil fuels just because of the objections of a few environmental extremists.
- If we do not promote biofuels it will be the end of civilisation as we know it.
- (With biofuels) we can look forward to ever-growing peace and prosperity.
- Big oil companies think this is (biofuels are) the direction we should go in.
- Big oil companies should know what they are talking about.
- Tropical rain forest is not threatened

Also accept for a maximum of 2 marks

- (Biofuel) is seen as a solution to the decline in the supply of fossil fuels.
- (Biofuel) offers a green solution to the planets energy needs.
- It is derived from a renewable resource.
- It could also in theory be carbon neutral.

Only award 3 marks if the candidate has chosen reasons from the first list.

[max 3]

(c) Evaluate the reasoning in the argument. In your answer you should consider any strengths, weaknesses, flaws and unstated assumptions. [5]

Use the grid below. Refer to indicative content below.

<b>Level 3</b> 4–5 marks	Evaluation of strength of argument with critical reference to strength/weakness, including some of: flaws, support given by reasons to intermediate conclusions, use of evidence, inconsistency, analogies, assumptions.
<b>Level 2</b> 2–3 marks	Relevant extended counter-argument (3 marks). Specific counter-assertions/agreements (2 marks). Single point of evaluation <b>only</b> (2 or 3 marks).
<b>Level 1</b> 1 mark	Discussion of the topic without specific reference to the passage <b>or</b> general counter-assertion/agreement <b>or</b> weak attempt at evaluation.
<b>Level 0</b> 0 marks	No relevant comments. Summary/paraphrase of passage.

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### Indicative content

#### Assumptions

There are no other ways in which biofuels are environmentally unfriendly.

The plants grown in non-tropical conditions can produce biofuel in enough quantity to cater for demand.

The plants grown in non-tropical conditions can produce biofuel that is commercially viable.

No environmentally important natural vegetation other than rainforest is replaced by these other plants/there is no other environmentally important natural vegetation apart from tropical rainforest.

Going around in a horse and cart/the end of civilisation as we know it is a bad thing.

#### Flaws

Restricting the options between biofuels or fossil fuels as a solution to energy problems.

Straw man in representing opponents of biofuels as necessarily opposed to cars and other forms of advanced technology.

Exaggerated conclusion – from rejection of biofuels to end of civilisation as we know it. The rejection of biofuels is not a sufficient condition for this.

Confusion of necessary with sufficient condition – catering for fuel needs is only a necessary condition for future prosperity and progress.

#### Other weaknesses

Rhetorical language – “environmental extremists”.

No reasoning given to link opposition to biofuels to a ‘deep green’ extremist position.

Relevance of big oil companies’ expertise – do they know what they are talking about when it comes to how ‘green’ a fuel is?

Neutrality of big oil companies’ position – they may be backing the simplest, most profitable alternative to fossil fuels rather than a ‘green’ alternative.

#### Other lines of argument.

Candidates could approach this from the angle of exploring whether the dilemma outlined at the beginning of the passage has been fully resolved and put forward counter arguments as to why it hasn't been. Reward accordingly.

Do not reward candidates who talk about lack of evidence as this is not a weakness in the reasoning.

[max 5]



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- (d) 'We cannot both tackle global warming and increase our progress and prosperity.'  
Write your own short argument to support or challenge this claim.

Use the grid below. Refer to indicative content below.

<b>Level 3</b> 4–5 marks	Developed, coherent argument. Reasons strongly support conclusion. Development may include intermediate conclusion or apt examples. Simply structured argument 4 marks. Effective use of IC 5 marks.
<b>Level 2</b> 2–3 marks	A simple argument. One reason + conclusion 2 marks. Two or more separate reasons + conclusion 3 marks.
<b>Level 1</b> 1 mark	Some relevant comment.
<b>Level 0</b> 0 marks	No relevant comment.

Maximum Level 2 if conclusion is clearly implied but not stated, or wrong conclusion supported.

**Indicative content**

**For**

Maintaining the level of material consumption does seem incompatible with reduced energy use. Therefore, our current lifestyle will be unsustainable if we wish to tackle global warming. Therefore we will need to lower our expectations as to progress and prosperity if we are to save the planet from increased global warming.

**Against**

Green forms of energy such as solar, wind and wave power will enable us to maintain current levels of production without contributing to global warming. Therefore there is no need to reduce levels of prosperity and progress merely a need to transfer to these green forms of energy as soon as possible.

[max 5]