Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

THINKING SKILLS **9694/41**

Paper 4 Applied Reasoning **May/June 2018**

MARK SCHEME

Maximum Mark: 50

Published

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks
1	*1 mark for any of the following:* We do not know if 300 000 is a significant proportion of the total number of users. We do not know the typical number of changes in status from 'in a relationship' to 'single' for any other day, so cannot tell how much higher 300 000 is. Increase could be in line with (or even below) an increase in the total number of users, making the fact that it is a 'record' unremarkable. There may be reasons why people change their status to 'in a relationship' for Valentine's Day and then change it back again afterwards. 'a record' implies that it is only the highest figure to date, in any data set one figure must be the highest and it could be coincidental that that figure occurred on the day after Valentine's day. In order to accept the claims, one must assume that social media users have similar relationship issues to the general population. Most users (of the social media network) could be in countries where Valentine's Day is not celebrated or of minor significance If the year was atypical then it is not valid to make generalisations based upon data from that year. The change in relationships could happen over a period of time but might only be recorded after Valentine's day following a potential reminder to users Data are self-reported therefore unreliable / in order to accept the claims one must assume that 'in a relationship' statuses on social media represent real relationships. There is not evidence to infer that it is 'the pressure put on' that is damaging; it could be something else about concept of Valentine's Day.	**5**

Question	Answer	Marks
2	*1 mark for each element (maximum 4 if MC not identified).* **CA** (Admittedly,) we've had a couple of mild winters recently (, which could be taken as evidence that the world is becoming warmer) **IC** (so) if you wait long enough, you are sure to get a few mild years in a row. **IC** Global warming is just a global summer for a few years. **IC** (Anyway,) there is no evidence that it is caused by humans. **CA** CO_2 levels and global temperatures have been increasing over the last 50 years **IC** (Just because CO_2 levels and global temperatures have been increasing over the last 50 years,) it does not follow that the CO_2 has caused the temperature increase. **IC** I don't think we can look to science for the answer to the world's problems. **IC** Many of those who promote the global warming myth have a vested interest. **MC** There is no scientific proof that global warming is happening and, even if it is, we are not the cause of it.	**6**

Question	Answer	Marks
3	*2 marks for a developed version of any of the following points.* *1 mark for a weak or incomplete version of any of the following points.* *Paragraph 1* The rhetorical trivialisation of the opposing viewpoint 'we've had a couple of mild winters recently' could be considered a straw man. *Paragraph 2* Weak analogy – the author is using our confidence in the passage of the seasons to persuade us that we can be equally confident about the passage of global warming; but this confidence should be much lower *Paragraph 3* Contradiction - Having attempted to establish that global warming is not happening in paragraphs 1 and 2, the author then admits that it might be happening at the start of paragraph 3. Straw man – nobody is suggesting that humans are the only cause of global temperature changes. *Paragraph 4* Inconsistency – paragraph 2 claims that temperature cycles every 30 years but here a 50-year rise is referenced Straw man – correlation is not the only reason cited by climate scientists but is perhaps the easiest to argue against Assumption – that the many other differences between Earth and Mars do not have a bigger influence on temperature than the atmospheric CO_2 concentrations. *Paragraph 5* Contradiction / inconsistent example – the example about cows is as a result of human activity and hence does not illustrate the IC that 'Many scientists say that humans are not the cause of global warming'. Appeal to history – one cannot dismiss all that scientists say now on the basis of an incorrect claim in the past. (Rash) generalisation – one cannot dismiss all scientific opinion because one report contained some falsified data. The linking of the reported falsification with the opposing side is an attempt to discredit the opposition by questioning the character of one of their number rather than by engaging with their arguments and so could be considered *ad hominem*. Contradiction – having cited scientists in support of his stance in the first sentence, the author then claims that we cannot look to science for an answer	**9**

Question	Answer	Marks
3	*Paragraph 6* *Ad hominem* – attempting to discredit the opposing side by questioning their credibility rather than engaging with their arguments. Straw man – the claim that 'tree-huggers just want us all to wear sandals and walk everywhere' is a distortion of the opposing viewpoint. *Paragraph 7* The author has not convincingly established that 'There is no scientific proof that global warming is happening'.	

Question	Answer	Marks
4	**'We should be worried about global climate change.'** ***Specimen Level 4 Answers*** *Support (802 words)* It is true that climate varies naturally over time and that some of this variation comes in cycles, but it is misleading of the author of Doc 1 to refer to this variation using the innocuous-sounding term 'seasons'. Some of these variations are large. Indeed, Doc 1 itself hints at the potential for ice ages to recur. The graph in Doc 4 demonstrates the phenomenon of temperature variation and is consistent with D1 to a certain extent. The centre-portion of the graph, despite its non-linear x-axis, illustrates temperature fluctuations over a 4000-year period. The vertical axis implies minor fluctuations during this period but the period during which the Vikings colonised Greenland shows that what is now covered with an ice-sheet was once, perhaps, a green and fertile land. Thus, the implications of normal global temperature cycles can be large. Furthermore, the graph shows a worrying low around 14 000 years ago, which, presumably, represents the ice age hinted at by Doc 1. Moreover, the magnitude of change predicted in the opposite direction at the distal end of the graph is way beyond the normal fluctuations in the intervening 4000 years. Therefore, global temperature changes matter and will have significant effects. Given that most of us do not understand all the scientific evidence then whether we believe that climate change is caused by humans is largely a question of credibility. Those who deny that climate change has a human cause, such as the author of Doc 1, tend to lack expertise and often have a vested interest to dissuade people from changing their behaviour. Many climate change deniers are politicians with links to oil companies, oil-producing nations or car manufacturers. The clear bias displayed in the rhetorical language of Doc 1 is in contrast to the much more restrained approach of Doc 3 – a speech that, even in encouraging its audience to be more outspoken, is still less emotional than Doc 1. By contrast, the expertise of those who say that humans are the cause of climate change is high. Doc 2 cites two professors from different universities and the speaker of Doc 3 is unlikely to have been invited to speak at a scientific society without impressive credentials – indeed he is described as 'renowned'. That he is a professor in physics might be seen by some as not a direct recommendation to speak on climate issues but science at university level is likely to be much more inter-disciplinary than it is at school so his expertise, one must assume, is high. Moreover, a scientist's reputation rests upon the veracity of their claims. For this reason, scientists are reluctant in the extreme, as discussed in Doc 3, to make claims that might be interpreted as false. The IPCC cited in Doc 2 is likely to have more ability to perceive the facts about climate change than any climate-change denier or denying organisation. Ultimately, the credibility of those who say that global warming is real and humans are the cause is much higher than those who don't.	**30**

Question	Answer	Marks
4	Of course, it is possible that the correlation between increased temperature and carbon dioxide levels does not reflect a causal link. Correlation does not imply causation. This point is mentioned by Doc 1 and illustrated by the correlation between pirates and global temperature in Doc 5. However, if the correlation is well-established and if there is a clear scientific explanation for how CO_2 causes increased temperature (which, presumably, there is or so many scientists would not support it), then the burden of proof is on the deniers to find evidence that CO_2 does not cause global warming. Although there is no information in the documents about CO_2 levels over time and the extent to which these are caused by human activity, enough professional scientists have said this is the case for us to take the link seriously. The fact that this has not been addressed is an omission that weakens Doc 1's argument. Doc 1 makes the point that 'if you wait long enough, you are bound to get a run of a few mild years in a row'. Indeed, there is some data in the table in Doc 4 that shows a run of recent years in which CO_2 increased but temperature did not. However, as Doc 1 is clearly aware, if you wait long enough you will get anomalies that apparently back up your point of view. Such statistical snapshots do not counter mountains of evidence that temperatures are rising, this is caused by CO_2, the high levels of which are, in turn, cause by human activity. There is a lot of evidence that global warming is a big problem and that it is our problem. Those who support this view have by far the greater credibility. Therefore, we should be worried about climate change. *Challenge (726 words)* The Earth's climate varies naturally over time and some of this variation comes in cycles. Although one can tell from the tone of Doc 1 that the author is clearly biased, it makes this point well with some relevant short and long-term examples. Some of these variations are large – indeed Doc 1 itself hints at the potential for ice ages to recur. All of the examples quoted in Doc 1 are corroborated by the graph in Doc 4, thus strengthening the points made by Doc 1. The graph in Doc 4 demonstrates the phenomenon of temperature variation over time and is consistent with the recent fluctuations alluded to in Doc 1. The centre-portion of the graph, despite its non-linear x-axis, illustrates temperature fluctuations over a 4000-year period. Furthermore, the graph shows an extreme low around 14 000 years ago, which, presumably, represents the ice age mentioned by Doc 1. Thus, there have, at least for 14 000 years, been small and large, long term and short term variations in global temperature. Therefore, global temperature change is natural and not necessarily the result of current human activities. Of course, it is possible that human activities 14 000 years ago caused the steep rise in temperature but this seems unlikely.	

Question	Answer	Marks
4	Most of us do not understand all the scientific evidence so we must rely on those who do. The author of document 3 is clearly biased in favour of a human cause for global warming but even he (or she) admits disagreement between scientists. This scientific disagreement is corroborated by documents 2 and 1. Indeed, within Doc 2 there are differences of scientific opinion between professors at different universities about the extent and consequences of global warming. We only have 5 documents to consider so it is very likely that other scientific evidence exists, beyond that in Doc 4 (see below), that contradicts that presented by the documents for consideration. Of course, there does seem to be a correlation between increased temperature and carbon dioxide levels, as shown in the lower graph in Doc 5. However, we all know that correlation does not imply causation. This point is mentioned by Doc 1 and illustrated by the correlation between pirates and global temperature in Doc 5. This graph is not intended to be taken seriously but illustrates the danger of inferring too much from correlations. Interestingly, the graphs in Doc 5 contain no information about time. It is unclear whether these data correlate with time. My suspicion is that the pirate graph represents a change over a period of a few hundred years. However, the apparent CO_2/temperature correlation could be data generated over a matter of hours in a laboratory and could, therefore, bear little relation to the temperature of a whole planet with dynamic weather systems. In fact, let us consider the only data about time we have: the table and graph in Doc 4. The table shows a rise in CO_2 levels without a corresponding rise in temperature. This directly contradicts the lower graph in Doc 5 and, although only representing a time frame of 7 years, at least refers to time which the lower graph in Doc 5 does not. As the great claim by some is that the world is getting warmer, time is an important consideration. The upper graph in Doc 4 does refer to time but, as mentioned earlier, does not support a warming globe or a human cause. The apparent rise at the distal end of the graph is based on speculation. Thus, we can infer less from graphical correlations between CO_2 levels and temperature than some like to think. There is evidence that global warming is occurring, but Doc 1 states that there is evidence that it is not. There is evidence that CO_2 causes global warming but there is evidence in Doc 4, and elsewhere, that it does not. Hence the case that the world is warming dangerously and it is our fault has not been proven. Worrying is likely to distract us from going about our business and take up valuable time and effort. We should not be distracted from such things unless there is a very strong case so to do. It follows then that, until such times as global warming, and our responsibility for it, is confirmed, we should be not worried about climate change.	

Level	Structure	Max 8	Quality of argument	Max 8	Use of documents	Max 8	Treatment of counter positions	Max 6
4	Precise conclusion and accomplished argument structure with consistent use of intermediate conclusions. Likely to include at least two of the following: strands of reasoning suppositional reasoning analogy evidence examples Argument is structured so the thought process is made clear. Uses vocabulary of reasoning appropriately and effectively to support argument.	7–8	Cogent and convincing reasoning which answers the question which was asked. Subtle thinking about the issue. Use of relevant own ideas and ideas from documents. Very few significant gaps or flaws.	7–8	Perceptive, relevant and accurate use of documents to support reasoning. References 3+ documents. Sustained and confident evaluation of documents to support reasoning. (Two or more valid **evaluative** references to documents). Able to combine information from two or more documents and draw a precise inference.	7–8	Consideration of key counter arguments and effective response to these. Use of own ideas in response to counter arguments not mentioned in the documents. Use of valid critical tools to respond to counter arguments. Effective use of appropriate terminology.	5–6
3	Clear conclusion that is more than 'I agree'. Clear argument structure, which may be simple and precise or attempt complexity with some success. Appropriate use of intermediate conclusions. Use of other argument elements to support reasoning. Generally makes thinking clear. Appropriate use of vocabulary of reasoning.	5–6	Effective and persuasive reasoning which answers the question which was asked. (Although there may be some irrelevance or reliance on dubious assumptions.) Use of own ideas and ideas from documents. Few significant gaps or flaws.	5–6	Relevant and accurate use of documents which supports reasoning. References 3+ documents. Some evaluation **and** comparison of documents to support reasoning. Inference drawn from at least 1 document.	5–6	Consideration of key counter arguments and effective response to these. Response uses own ideas or is developed from documents. Some use of appropriate terminology.	3–4

Level	Structure	Max 8	Quality of argument	Max 8	Use of documents	Max 8	Treatment of counter positions	Max 6
2	Conclusion stated but may be 'I agree'. Sufficient clarity for meaning to be clear throughout. Structure may be easy to follow but brief or a longer argument which has a less clear structure. Uses reasons. Some appropriate use of vocabulary of reasoning.	3–4	A reasoned stance which attempts to answer the question which was asked. Some support for the conclusion. (Although there may be considerable irrelevance or reliance on dubious assumptions.) Some thinking/own ideas about the issue. Use of rhetorical questions and emotive language. Some significant gaps or flaws.	3–4	Some relevant use of documents to support reasoning, but some documents used indiscriminately. Some comparison of documents **or** some critical evaluation of documents **or** reasoned inference drawn from document.	3–4	Inclusion of counter argument or counter assertion. Response is direct but weak or taken entirely from documents.	2
1	Attempt to construct an argument. Unclear conclusion, multiple conclusions or no conclusion. Disjointed, incoherent reasoning. Use of examples in place of reasoning. Possibly a discourse or a rant. Reasons presented with no logical connection. Documents considered sequentially. Substantial irrelevant material.	1–2	Attempt to answer the general thrust of the question. Attempt to support their view. Excessive use of rhetorical questions and emotive language. Ideas which are contradictory.	1–2	Some, perhaps implicit, use of documents. No attempt at critical evaluation. No comparison of documents.	1–2	Inclusion of counter argument or counter assertion. Response is direct but ineffective.	1