Paper 9694/21 Critical Thinking

## Key messages

The two biggest problems which caused candidates to lose marks were:

- (1) Not reading the question carefully.
- (2) Not understanding what kind of answer was expected. By far the best way of addressing this difficulty is for candidates and their teachers to study mark schemes for previous series. It seems likely that lack of familiarity with the format and expectations of the exam has prevented some candidates from gaining the grade which their thinking skills deserve.

### **General comments**

The complete range of marks was accessed by significant numbers of candidates in all the questions, with the exception of **3c**, in which very few achieved 4 or 5 out of 5.

More candidates than in recent series did not complete the paper (either through shortage of time or because they found some of the questions too difficult) and thereby missed the opportunity to gain the three easiest marks on the exam (3 out of 5 for **Question 3d**). Any candidate who risks not having time to answer **3d** would be well advised to attempt that question sooner – especially before **3c**.

Many candidates gained no more than 2 or 3 marks in **Questions 1d** and **2d**, partly because they took the sources at face value, even in some cases when they had already explained in their answer to one of the short questions why the source was unreliable. As indicated in the wording of **Questions 1d** and **2d**, marks are available for evaluating the sources.

Candidates who appeared not to understand the nature of an argument lost marks at several points in the exam. In addition to **Question 1c**, which explicitly tested that knowledge, it was relevant to **Questions 1d**, **2d**, **3c** and **3d**. Several candidates declined to come to a judgment in **1d**, **2d**, or **3d**, even though they had been instructed to do so. They apparently thought it better to argue for both sides of the question, without committing themselves to one side or the other, but those three questions actually required them to come to a judgment and defend it: so candidates who did not make a judgment lost marks.

## **Comments on specific questions**

## **Question 1**

Candidates appeared to understand the nature of the topic (alleged ill-treatment of prisoners) and the broad thrust of the sources, although some seemed to have difficulty in understanding what kinds of response to the questions were expected.

(a) (i) Many candidates understood what this question was asking for, and scored 2 marks out of 2 by explaining that the evidence was first-hand, since the former prisoner was alleging that the incident had happened to him, personally. Those who said that the witness had been present in the prison, or had seen the alleged incident, but did not mention that it had happened to him personally, received 1 mark. Some candidates took a different valid approach, and were awarded 1 or 2 marks for explaining that Source B increased the reliability of the claims in Source A by corroborating them. The minority of candidates who (apparently) did not understand the concept of reliability tended to identify parts of the evidence which they considered to be significant: they received 0 marks.

- (ii) A fair number of candidates scored 2 marks out of 2 by suggesting that the former prisoner might have lied or exaggerated in order to gain either revenge or compensation. Those who stated that he has a vested interest, but omitted to state what he was motivated to do scored only 1 mark instead of 2. Some answers were circular or self-contradictory, suggesting that the allegation of abuse might not be true because the former prisoner's resentment at the abuse might have caused him to lie about it: these were not credited.
- (b) The answers which clearly deserved 3 marks out of 3 focused on the reason why the former officer had left the staff of the prison. Some candidates followed that line of thought. If he was dismissed, he might have been defending himself or trying to take revenge, whereas if he resigned in protest against the ill-treatment of prisoners his evidence would be much more reliable. Various answers which were "additional", but not "concerning the former prison officer", were awarded 1 mark. A lot of candidates appeared to have overlooked or misunderstood the word "additional" in this question; they discussed either Source B itself or one of the other sources provided, and were not awarded any marks for this question.
- (c) The point of this question was to test the understanding and application of the technical sense of the term "argument". Strictly speaking, the correct answer was that the source was not an argument, but candidates who interpreted the first sentence as a conclusion and identified the passage as an argument on that basis could also achieve full marks. Many candidates scored 0 for this question, because they used the everyday definition of the word "argument", instead of its technical meaning within Thinking Skills: such candidates tended to say that the source was not an argument because it expressed only one point of view or did not directly respond to accusations or that it was an argument because it was responding to accusations.
- (d) There was a significant number of good answers to this question, most of which made good use of inferential reasoning. Most candidates judged that the State Prisons Department had encouraged abuse of prisoners, either explicitly or by implication. Weaker answers tended to focus on whether abuse occurred, rather than whether it was sanctioned by the Prisons Department. Relatively few candidates made use of Source E, and some of those who did use it misinterpreted the claim that few officers had been disciplined for abusing prisoners as meaning that the abuse had not occurred, rather than that the Prison Department had tolerated it and covered it up.

# **Question 2**

Candidates seemed comfortable with the topic of this question, namely the importance of drinking water.

- (a) Four correct answers were available for this question, and most candidates correctly identified at least one of them, although many answers were considered to be incomplete and were therefore awarded only 1 mark each. Relatively few candidates achieved 4 marks out of 4, by giving two full answers. A range of incorrect answers was offered, including that 10% improvement was not significant.
- (b) Most candidates correctly identified the contradiction between these two sources, namely that Source B claimed that tea or coffee could count towards the intake of water, whereas Source C claimed that people need to compensate for drinking tea or coffee by drinking extra water. Some candidates gave only part of this answer, suggesting that whereas Source B said that tea or coffee could count towards the daily intake of water, Source C said it could not: this was awarded 1 mark. A few candidates identified a difference of emphasis or approach between the two sources, instead of a contradiction: these answers were not credited.
- (c) In order to answer this question, it was necessary to understand the slightly complex structure of the source. Towards the end, the author explains why a journal article promoting the drinking of water was compromised by vested interest. The point of the question was that for several reasons this defect in one article does not invalidate completely the claim that people need to drink "about eight cups of water per day". A good number of candidates understood this, and scored 2 or 3 marks, whereas candidates who did not focus on this point scored 0 or 1. Several candidates mistakenly claimed that the whole of Source D was invalidated by vested interest, rather than only the article referred to in the last two paragraphs. A few candidates misread the question, omitting the crucial word "not" in the claim, and they, too, scored 0. Others seem to have been misled by the adverb "reliably" into thinking this was a question about reliability rather than inference.

(d) Virtually all the candidates understood that most of the sources supported drinking more water, although many rightly pointed out that it was not possible to judge that "most" people needed to drink more water without evidence of how much they already drank. A few candidates gained marks for evaluation of sources or inferential reasoning, but most contented themselves with stating how the sources supported the conclusion and were therefore awarded a maximum of 3 marks out of 6. Most candidates who had questioned the validity of the claims in Source A while answering Question 2a nevertheless accepted those claims in this question. Most candidates who made use of Source C simply described the advice it gave on increasing the intake of water, but some rightly pointed out that this did not explicitly support the claim that most people should drink more, while a few perceptively commented that the origin of the document in the End Tiredness website implied that readers were being encouraged to drink more. Some candidates rejected the whole of Source D, on the basis of their answer to Question 2c, which challenged the reliability of an article mentioned in the source. Some candidates put in a good deal of personal knowledge when constructing their answer but did not make much use of the sources and so received low marks. Others referred to the influence of a source on their conclusion without including the actual information from the source and so did not gain credit even though the work had been done in their heads.

#### **Question 3**

Candidates understood that the argument supplied was challenging accepted ideas about democracy, which many of them appeared to find quite uncomfortable. This choice of topic and approach was fairly typical of the arguments used in **Question 3**, which often tests whether candidates can keep a cool head when discussing a topic on which they may have strong pre-existing opinions.

- (a) Most but by no means all candidates correctly identified the main conclusion of this argument. A variety of wrong answers was offered, and a few candidates attempted to summarise the gist of the passage, instead of identifying its main conclusion. A few candidates offered two answers to this question, one of which was correct.
- (b) Many candidates correctly identified 2 or 3 correct answers to this question, and only a few did not identify any. The last sentence of paragraph 3 was a predictably popular wrong answer: despite being introduced by "so", it is an explanation, supporting the first sentence of the paragraph, and it is the latter which is the intermediate conclusion.
- (c) As in previous series, some candidates did not achieve any marks, because they attempted the wrong task, particularly arguing against the passage, instead of evaluating its reasoning. Others attempted a literary evaluation instead of focusing on weaknesses in the reasoning. Some candidates wasted time attempting to identify and explain strengths in the reasoning, even though the question made it clear that the overall strength should be assessed by identifying "flaws, unstated assumptions and other weaknesses".

Several candidates spotted the weakness in paragraph 2; those who identified it as an assumption or appeal to history achieved 2 marks, while those who knew there was an issue but could not explain exactly what it was were awarded 1 mark. A number of candidates identified the argumentum ad hominem in paragraph 3, but few if any commented that it did not significantly weaken the reasoning, since the author did also address his opponents' arguments. Strictly speaking, an argumentum ad hominem consist of attacking opponents instead of their reasoning, and so when examples occur in the exam in which the author does also address his opponents' reasoning, it is necessary to say so in order to gain the full 2 marks. Several candidates spotted the assumption in paragraph 3 that candidates who make the biggest promises do not keep them. There were several significant weaknesses in paragraph 4, but the only one which was spotted by several candidates was the conflation between "intelligence and education" and "living in cities". Few candidates if any drew attention to the important weakness in this paragraph, the assumption that voting for a government which "gives...peace and stability" does not constitute voting "responsibly" (or words to that effect). Several candidates correctly identified a problem in paragraph 6 as something like an assumption that thousands of demonstrators constitute a majority.

As on previous occasions, marks were not awarded for criticisms of the argument for being one-sided, for lacking statistical support or for failing to identify the sources of evidence. Quite a lot of candidates criticised the argument for being an expression of its (implied) author's opinions, without apparently realising that their reasoning was circular, since their only access to the author's

opinions lay in the argument. In any case, arguments (unlike essays) are intended to make a case for one opinion, rather than expounding a range of views. Many candidates wrongly interpreted the expression "unstated assumption" as meaning "unsupported statement" or "disputable statement". Most of those candidates who correctly identified an assumption did so by countering it, and thereby received 1 mark instead of 2.

As on previous occasions, a range of marks was achieved, with 3 out of 5 being the most common. Some candidates appeared to have difficulty in understanding the wording of the claim they were discussing, and several of them scored 0, because they had not made a coherent comment on the topic. By far the majority chose to challenge, rather than support, the claim. The most popular approach was to identify other tasks as the most important duty of governments, rather than discussing the benefits and drawbacks of suppressing dissent. The specimen answers supplied in the mark scheme show that it was perfectly possible to present concise, persuasive arguments both in support of the claim and to challenge it.

Paper 9694/22 Critical Thinking

## Key messages

Many candidates are still giving a summary of the content of a source before moving on to actually answering the question. This is unnecessary and wastes time.

Candidates need to focus more on the specific question asked and not just present a general evaluation of the relevant source(s). Taking **Q 1(a)** as an example, many candidates evaluated the whole of either Source A or B rather than focussing on the significance of the information about regular inspections for the school's responsibility for the accident. Typically, this meant candidates talking about such things as the reliability of the sources, which was irrelevant and could not be credited.

## **General comments**

Many candidates did well on **Q 2(a)**, **(b)** and **3(a)**. Candidates seemed to respond with interest to the issues raised by the questions and were able to tackle them effectively. Most candidates seemed to understand that expressing opinions about the issues raised or showing further knowledge was not the focus of the paper and managed to produce answers to **Q 1(d)** and **2(d)** which showed critical thinking skills. A minority of candidates still have a problem with timing, spending far too long on the short answer parts of **Question 1** and subsequently running out of time in **Question 3**.

## Comments on specific questions

### **Question 1**

There was some confusion about the inspections, with many candidates confusing the inspection of the buildings with the school inspection referred to in Source C. There was also some misunderstanding of the relationship between Barset Council and the school, with some candidates blaming the school for not spending money on the buildings when Source E makes it clear that this is a responsibility of the council.

- (a) As noted above, many candidates had the wrong focus on this question. Those who did focus correctly did not usually move beyond the point that it suggested the school had less responsibility for the accident.
- (b) This question produced better answers, with most candidates making the point that an inspection of academic standards did not have direct relevance to the issue of maintenance of buildings. Many went on to suggest that, nevertheless, it could indicate a more widespread lack of concern for student welfare etc.
- (c) This was answered reasonably well, with many candidates seeing the evidence being undermined by Tracey's vested interest against the school. Some candidates assumed that this report was written after the accident as an attempt by the school to discredit Tracey, but there was no evidence for this so it was over-speculative.

(d) Clear conclusions were reached by most candidates, often that negligence by the school was to blame. There was some confusion as to the school's responsibility for maintenance, with many candidates assuming that it was the school's responsibility alone. Very few candidates explored the point that, even if not responsible for formal inspection and maintenance, the school would still had a duty of care to monitor the safety of buildings on a day-to-day basis and act when a structure had become obviously unsafe. This point is reinforced if one believes that Tracey Williams had warned the teachers.

### **Question 2**

- (a) Many candidates scored 3 marks on this question, unlike several past series where many candidates have struggled with **Question 2(a)**. Some candidates took up the point in the first paragraph of Source C, but this was a point about *lack* of concern about food waste, so it could not be credited
- (b) A large number of candidates also gained 3 marks on this question by seeing that information about a side effect is not directly relevant to the effectiveness of an energy source as regards renewability. Some candidates speculated that smell could be an indicator of pollution, but the question focuses purely on the issue of smell as such. Some candidates confused the description of what the smell was like with those things, e.g. plastic being actually burnt in the incinerator.
- (c) Candidates answered this question well, though most got two rather than three explanations. There was effective focus on the information in Source D.
- Candidates showed a good understanding of the concept of a 'green' form of energy generation and were able to use the information in the sources effectively. A reasonable number of candidates noted that Source A was a promotional leaflet and therefore liable to give a biased view of ADs. They also noted that a number of steps in the process seemed to involve conventional forms of energy production and used the information in Source B about lorry movements to reinforce this point. Source C was used somewhat less effectively, with few candidates exploring the implication that using and producing less food was a more effective way forward.

# **Question 3**

- (a) Many candidates correctly identified the conclusion and scored 2 marks.
- (b) This was done less well, with few candidates identifying 3 intermediate conclusions. A number of candidates scored 0 on this question, even though they had correctly identified the conclusion.
- Candidates found it difficult to evaluate the reasoning in this argument; many responses scored 0 and very few scored 4 or 5. A number of candidates did identify the inconsistencies in the reasoning, which tended to be about *difficulties* in choosing, with the conclusion, which suggested any sort of choice was impossible. The passage proved rather too tempting in terms of challenging the points made, with a number of candidates disputing that the range of tinned tomatoes in supermarkets was bewildering. As always, this is not what is required in **3(c)** and no credit could be given for such challenges.
- (d) A surprising number of candidates argued in support of the proposition, but the majority were against, with some good arguments about children understanding the nature of a high-tech, social-media-dominated society better than most adults. Some candidates slightly lost sight of the focus on choices about children's future but most did talk about relevant issues such as career choice.

Paper 9694/23
Critical Thinking

## Key messages

The two biggest problems which caused candidates to lose marks were:

- (1) Not reading the question carefully.
- (2) Not understanding what kind of answer was expected. By far the best way of addressing this difficulty is for candidates and their teachers to study mark schemes for previous series. In particular, candidates should note the difference between the expectations from the command words "identify" and "suggest". It seems likely that lack of familiarity with the format and expectations of the exam has prevented some candidates from gaining the grade which their thinking skills deserve.

## **General comments**

The complete range of marks was accessed by significant numbers of candidates in all the questions.

Candidates who appeared not to understand the nature of an argument lost marks at several points in the exam. In addition to **Question 1b**, which explicitly tested that knowledge, it was relevant to **Questions 1d**, **2d**, **3c** and **3d**. Several candidates declined to come to a judgment in 1d, 2d, or 3d, even though they had been instructed to do so. They apparently thought it better to argue for both sides of the question, without committing themselves to one side or the other, but those three questions actually required them to come to a judgment and defend it: so candidates who did not make a judgment lost marks.

# **Comments on specific questions**

#### **Question 1**

Nearly all candidates seemed to have understood what went on in this case. Some suggested that Mr Brown might have acted out of animosity towards Mr Chan, but this seems unlikely in view of the fact that he did not identify, or even describe, the driver of the lorry.

- Only a few candidates referred to evidence which would have been relevant to factors like reputation or ability to see, which were the intended focus of this question. Many suggested additional evidence (such as a recording from a CCTV camera) which would have confirmed or contradicted Mr Brown's evidence, rather than specifically affecting its reliability: answers of this kind were credited. Reference to evidence which had been supplied (such as Source C or D) was not credited, because it is not "further". Evidence which would have been counterfactual, rather than "further", was also not credited: answers of this kind included if Mr Brown had misread the name of the company, or if he had made a note of the registration number of the lorry. A significant minority of candidates did not address issues of reliability, but quoted or paraphrased parts of the evidence supplied which they considered to be important: answers of this kind were not credited.
- (b) Some candidates correctly identified Source C as an argument, and supported their judgment either by correctly identifying the conclusion and supporting reasons (gaining 2 marks out of 2) or by using a generic description of an argument as consisting of a conclusion supported by reasons (which scored 1 mark). However, quite a lot of candidates appeared to interpret the word "argument" in its everyday sense, rather than in the specialised meaning used in Critical Thinking, claiming for example that Source C was an argument because it disagreed with Sources A and B, or because someone else might disagree with it. These answers scored 0 marks. A few of those

who did appear to understand the specialised meaning of the word judged incorrectly that Source C was not an argument, and they also scored 0.

- (c) Many candidates correctly identified one of the two key points, namely that Mr Lopez had a motive to lie in order to support his friend, and a fair number also gave the other key point, namely that he was not present at the alleged incident and therefore had no ability to see what had happened. In order to gain the third mark, it was necessary to explain one of the points more fully, and fewer candidates achieved this.
- (d) Surprisingly, most candidates who came to a conclusion judged that Mr Chan was innocent, on the basis of Sources C and E, even though there was no reason to view Source A with suspicion, Source C was tainted by Mr Chan's vested interest to defend himself against the allegations in order to keep his job and Source E was an admission that the company did not have enough proof of Mr Chan's guilt rather than reflecting a genuine belief in his innocence. Instead of identifying an alternative in order to reject it, some candidates argued in favour of two conclusions, without making it clear which they favoured; as usual, the question asked for a judgment and candidates who did not offer one lost marks. Some attempts at identifying an alternative conclusion consisted simply of the opposite of the chosen conclusion, without any explanation as to how the accusation could have come about: these were not credited. There was some good use of evaluation of sources. A few candidates exceeded the requirements for full marks in this question.

#### **Question 2**

The concept of a placebo may have been unfamiliar to most candidates, although it was explained in the first line of Source A.

- Quite a lot of candidates correctly judged that the support for the claim was weak, because 1 in 10 does not constitute "most", but not many of them explained that this was because the claim was based on a very broad definition of "placebo", which was inconsistent with the definition offered in Source A.
- (b) A fair number of candidates gave at least one valid answer to this question, although some answers were quite vague or incomplete and thereby scored only 1 mark rather than 2. The second answers offered by some candidates were the converse of their first answer, and therefore achieved no additional marks. Many answers including that the immune systems of children were more or less developed than that of adults were judged to be too speculative to be credited. Another approach which was not credited was to suggest that the ingredients of placebos might have beneficial physical effects on children, which is inconsistent with the concept of a placebo. A few candidates attempted to find answers to this question in Source E: they may have misunderstood the significance of the command word "suggest".
- (c) Relatively few candidates spotted the inconsistency in Source A, and some of those who did identify it omitted to explain it, thereby scoring 1 mark rather than 2. A lot of candidates claimed incorrectly that the reference to "the cost of placebo treatments" in the final sentence of Source C was inconsistent with the assertion that placebos "are based on deception": they may have misread or misinterpreted the question as meaning that the contradiction was located in Source C. Another popular wrong answer was the explanation in Source A that placebos work on the basis of "the patient's expectation of a cure", but that is not inconsistent with the explanation that the use of placebos is based on deception.
- (d) Most candidates did what was expected in response to this question, namely made a judgment and supported it by reference to the sources, but a few used only their own ideas, without making explicit use of the sources, which reduced the mark available to them. The best answers made relevant use of inferential reasoning. Opinions varied widely between candidates, many accepting and many rejecting the use of placebos, and many taking a more or less coherent intermediate position. A few of the intermediate opinions gained a second mark, for a 'nuanced conclusion'. Some candidates misinterpreted the reference to side effects in Source D, claiming the existence of side effects as a disadvantage of placebos, whereas the point being made in the research study was that people experienced the effects, good and bad, which they had been told to expect.

### **Question 3**

Unsurprisingly, candidates had little sympathy for the views expressed in the passage. The choice of topic and approach were fairly typical of the arguments used in **Question 3**, which often tests whether candidates can keep a cool head when discussing a topic on which they may have strong pre-existing opinions.

- (a) By far the most popular answer was the final sentence of paragraph 1; although that is often the location of the main conclusion of arguments in **Question 3**, it was not so on this occasion. Some candidates correctly identified the main conclusion, and a few chose other wrong answers.
- (b) Most candidates correctly identified 2 or 3 correct answers to this question.
- (c) More candidates than in previous series attempted the correct task and achieved some marks, including several who made a number of correct observations and scored 5 out of 5; a few even exceeded the requirements for full marks. However, some candidates still argued against the passage, instead of evaluating its reasoning, or attempted a literary evaluation instead of focusing on weaknesses in the reasoning. Some candidates wasted time attempting to identify and explain strengths in the reasoning, even though the question made it clear that the overall strength should be assessed by identifying "flaws, unstated assumptions and other weaknesses". Many candidates misinterpreted the expression "unstated assumption" to mean "unsupported statement" or "disputable statement", but a fair number used the term correctly. Some of those candidates who correctly identified an assumption did so by countering it, and thereby received 1 mark instead of 2.

Quite a lot of candidates were unhappy about paragraph 1, but only a few succeeded in identifying any of the specific flaws or weaknesses mentioned in the mark scheme. Several candidates criticised the analogy in paragraph 2 on the grounds that war and space exploration are different things: although there is a valid criticism which can be made of the analogy (and some candidates identified it correctly), comparing different things is what analogies do, and so the criticism that the entities were simply different was not credited. Some candidates spotted the assumption in the third sentence of paragraph 2. Several candidates criticised the final clause of paragraph 2 for being a generalisation, but the generalisation was neither "rash" nor "sweeping", and therefore not flawed. A number of candidates correctly pointed out that the reasoning was seriously weakened by an assumption in paragraph 3, that the economic benefits of war are not outweighed by the "costs". Several candidates identified one or other of the important assumptions in paragraph 4, namely that there are no other ways of developing the admirable moral qualities mentioned and that these qualities are not outweighed by the bad qualities developed by war. The argumentum ad hominem in paragraph 5 was correctly identified by a fair number of candidates. Most criticisms of the argument for restricting the options were not credited, because the claim that (for example) war solves problems of unemployment neither states nor implies that there are no other ways of solving these problems.

As on previous occasions, marks were not awarded for criticisms of the argument for being one-sided, for lacking statistical support or for failing to identify the sources of evidence. Quite a lot of candidates criticised the argument for being an expression of its (implied) author's opinions, without apparently realising that their reasoning was circular, since their only access to the author's opinions lay in the argument. In any case, arguments (unlike essays) are intended to make a case for one opinion, rather than expounding a range of views. Several candidates attacked the implied author of the passage for various perceived flaws in his character and attitudes.

(d) As on previous occasions, a range of marks was achieved. Unsurprisingly, most candidates chose to support the claim. Most candidates interpreted the expression "live at peace" in a rather broader way than avoiding war, which was unexpected but acceptable. A few candidates lost marks by responding to the passage, instead of presenting a new argument.

Paper 9694/31
Problem Analysis and Solution

## Key messages

Candidates must take particular care when addressing questions that require a **complete** list of values – many offered examples, or did not consider the cases systematically, and hence left their lists incomplete.

#### **General comments**

The paper required candidates to carefully apply a collection of overlapping rules and restrictions. The vast majority of candidates attempted all questions, showing a basic grasp of all the different situations. More candidates than in previous series showed orderly working, which allows for the award of partial credit.

Many candidates offered clear diagrammatic evidence of the more open-ended answers to **Questions 1** and **3**. Time constraints and the dangers of leaving working on the Question Paper may have prevented candidates from earning some of the marks in **Question 4**.

### **Comments on specific questions**

## **Question 1**

Success at this question depended on careful application of the collection of rules and definitions beneath the diagram. Candidates were allowed to use the question paper for working (and were very likely to have needed to in **(c)** and **(d)**) but were expected to use the grid references for their answers. A small number of candidates spent time unnecessarily drawing diagrams of the restaurant: these were awarded full marks if they encoded the correct information unambiguously.

- (a) Most candidates managed to identify which regulation was infringed by the placing of tables at A2 and B2.
- (b) Very few candidates tackled this question correctly. A common wrong answer was 2. Some gave descriptive answers (such as 'they cannot be close to the walls, so must occupy places like C2, C3, and C4'); and a number offered a description of the references for a variety of tables of 6 which could be fitted into the space at the same time.
- (c) A substantial number of candidates achieved this correctly, the most common solution being the placing of three tables of 4 in Row B (B2/3, B5/6, B8/9) and three below these, mirroring them, in Row F. Many of those who attempted less systematic solutions violated the rule requiring a clear route to the entrance and access squares.
- (d) A number of candidates found a way of placing of tables which allowed 26 customers to be seated without infringing the rules. Those who did not manage this tended to place tables of 6 too close to the wall (e.g. in Row B), or gave solutions in which the routes to the exits were not clear. A number of candidates offered solutions which experimented with how the customers were arranged around the table, or with how the tables were connected.

### Question 2

This question required candidates to master pairings of different three-letter codes, and to identify special cases within these.

- (a) This question introduced the first term ('mutation') and about half the candidates were able to identify how many of these were possible. The most popular erroneous answer was '27', derived from the product of the three variables, rather than their sum.
- (b) Candidates seemed to struggle with this question. There were only 6 codons with the building block *leu* in the table, and four of these involved a single change of letter.
- (c) Candidates were expected to appreciate that the most common number of silent mutations was three, and then to search for the special cases. Few candidates completed this satisfactorily. The most common error was to include the codon itself in the list of silent mutations e.g. UAU and UAC are the only two codons which yield *tyr*.
- (d) This question was successfully completed by most candidates, who used the example, adapting the sequence where necessary.
- (e) This final question required candidates to demonstrate their understanding of the three concepts introduced (mutation, silent mutation and watermarks), and to find building blocks which were unusually limited. This proved to be challenging, and the correct pair was found by very few candidates.

### **Question 3**

This question involved experimenting with diagrams which represented the flow of cars merging on a highway. Success at the question depended on the mastery of one key rule, regarding the timing of the cars as they merged: modelled as 'a second of delay after the car has moved into its new lane'. Many candidates clearly struggled with the process of modelling the reality (of continuous, integrated movement) into jerky discrete jumps.

- (a) Most candidates could see that 5 'moves' were needed, and gave the answer 5 seconds.
- (b) This question was answered correctly by very few candidates. The question asked for the list of **all** cars that could be the last to pass. Some candidates just gave an example of which could be the last car, usually car 9. Others gave the answer '7, 8 and 9', which did not account for all the possible exit pathways.
- (c) This question asked candidates to demonstrate their understanding of the model, and the timing of the delay that accompanied cars changing lane. Most candidates offered at least one appropriate diagram; but many did not gain three marks due to an incorrect representation of the second of delay (showing the delay before the car moved, or not showing a delay at all), or because their diagrams did not explain why 5 seconds was needed.
- (d) This question was rarely answered correctly most candidates were able to offer a possible ordering of the cars past the camera, but few offered correct placing of the one-second delays.
- (e) Success at this question depended upon an appreciation that cars could move lanes simultaneously, and that this allowed for fewer delays in total: the shortest total time being achieved by synchronised lane moves for all the middle lane cars, and all the right hand lane cars. A few candidates offered a feasible exit list, with gaps, but most did not.
- (f) Without a strategy for part (e), this question was not really accessible. A very small number of candidates offered correct answers.
- (g) This final question offered an algorithm for the merging cars, and a number of candidates applied this successfully (obtaining the right order), but very few managed to include the correct placing for the gaps.

### **Question 4**

This question required candidates to navigate the scoring mechanism for eight competitors in a tournament – the overlapping algorithms and conditional regulations enabling a final ranking to be made. This required a thorough assessment of how the rules applied, the tracking of their application, choices of how to complete the task efficiently, and the continuous checking of the results.

- (a) Both these questions required candidates to scan the 39 individual data entries in the table for simple patterns. Most candidates managed this correctly.
- (b) (i) This question tested candidates' ability to apply the points and awards mechanism both being needed to attain the score. Most candidates managed this; the most common error was to omit the 12 points for finishing first.
  - (ii) As in (a), this required candidates to scan all 39 individual data entries in the table, striking out those who had won. Most candidates accomplished this correctly.
- (c) This question required an experimental approach, or a consideration of the inverses of the operations that led to a total score of 64. This was answered fairly well; those who did not gain full marks tended to leave working which was sufficiently clear to gain some partial credit.
- (d) (i) Success at this question depended upon careful calculation of Ben's scores, and the identification of which contributed the least most candidates accomplished this successfully.
  - (ii) This followed on from the calculations necessary for (d)(i) and most candidates achieved full marks on both parts.
  - (iii) This was question was answered well by only a few candidates. In particular, many candidates offered a list with no supporting calculations, and hence scored 4 marks or 0 marks (most often the latter). It is possible that candidates were pressed by time constraints, and some may have left their calculations on their Question Paper but it was not strategically advisable for candidates to leave an unsupported ordered list of letters. Those who left some working almost always gained partial credit.



Paper 9694/32
Problem Analysis and Solution

## **Key Messages**

As is stated on the cover of the Question Paper, it is very important that candidates show their working. Evidence of Problem Solving skills is rewarded, even where the final answer is not correct; and evidence is often needed to support correct answers.

### **General Comments**

Most candidates attempted all questions. Since the questions are set in simplified but real world scenarios, many should have noticed when the answers they gave were implausible, or inconsistent with the other figures in the data. Totals were often omitted when explicitly requested by the question.

# **Comments on Specific Questions**

#### **Question 1**

This question considered the optimum allocation of time for a contestant, and how it changes with revised rules for a competition. Candidates should ensure that their answers address the questions directly, rather than, say, giving the allocation of points when the time is asked for. Arithmetic using time was sometimes very poorly handled.

- (a) Almost all candidates correctly calculated the overall total; a few only gave the total in one round.
- **(b)** Some candidates missed the important aspect that the contestants were required to make choices, without which there was no problem to solve.
- (c) Most candidates found an appropriate allocation of time. It is important to give the final answer as well as the working.
- (d) This called for the best score, so candidates would be well advised to use a more sophisticated strategy than to find a possible score and hope it was optimal. Better responses applied a systematic approach, seeing what time was left after the shorter times were used up and then searching through the remaining options.
- (e) Candidates needed to establish the threshold for a score which would change the strategy. Care with strict inequalities was essential. Partial credit was available for observing the scoring rate; checking that there was some possible set was needed for full marks, but it was not sufficient merely to say it must be more than 2, so 3.

### Question 2

This question considered a scenario where there is data about an event which has already happened, and considers what can be deduced from some information about it, and some assumptions, which may be shown to be wrong in light of further information. Better responses appreciated that further information does not change the data, merely what is known about it. It is necessary to use the model given and not postulate a more realistic and more complex scenario. Although the context was about estimating crime rates, candidates were not expected or required to do any statistics.

- (a) Most candidates calculated the correct total; it is prudent not only to give the correct figures but also to add them up, and to avoid errors by noticing, for example, that there are only 5 positive integers strictly less than 6.
- (b) Candidates needed to note that all the reports from the first to the last journalist must have been by different people, not just that three of them had been mentioned by name. As it was stated that all were doing exactly the same on each say, doubting this was not creditworthy; using it was essential.
- (c) Many candidates answered a wide range of questions that had not been asked, such as the deductions of each named journalist working separately. Some assumed that the numbering starting from #1 indicated that there must be at least one each day.
- (d) Many candidates gave answers which were not consistent with their answers to (c), and a few offered a maximum less than their minimum.
- (e) The fact that this added no new information relevant to the number of crimes (nor of journalists) was seldom articulated.
- Very few candidates noticed that the only slack was on Tuesday and correctly identified the limiting cases, although this required no more than adding (5 1 = 4) to 5 and subtracting 4 from 7.
- (g) This provided new information in that it contradicts the earlier assumption that the minimum was 5.

#### **Question 3**

This question required care with details. Better responses used the fact that the earlier parts of the questions were of little interest in themselves, but offered a basis for producing a general approach to make the later parts easier.

A diagram was provided, which should have removed any possible doubt about what was meant by being in the queue or being served. Candidates should check that their interpretation is consistent with any example given.

- (a) This was a straightforward introduction, but several unusually creative incorrect answers were seen.
- (b) The time to the end of the service of the fifth customer was usually correctly determined, but some candidates either had the wrong starting time or counted from zero.
- (c) There were several correct responses. Some candidates included those being served in the queue.
- (d) Many candidates used long and inefficient methods considering each customer, rather than establishing what happened every 10 minutes. A few attempted to use algebra but without the correct starting point, or they omitted to include appropriate rounding.
- (e) Some candidates spent time calculating details which were not needed. Some tried tackle the queue that had built up, and when that was clear repeat the process on the backlog; none managed to use this method successfully.

- (f) (i) Some candidates did not make use of the limitation on possible answers imposed by using 30-minute intervals. A few correctly observed that a second server could clear the queue starting at 13:00, but did not notice that there would still be more arriving than the first server could handle.
  - (ii) Since 30 seconds was the smallest unit of time used in the question, candidates could have realised that answers such as 47 seconds were incorrect. Very few candidates realised that it was the person about to be served when the second server arrived who would have waited longest, rather than the person arriving at that time (and so joining the longest queue).

## **Question 4**

Many candidates could have scored more marks if they had shown their working in this question.

- (a) Almost all candidates correctly extracted the relevant information and deduced the full list.
- **(b)** The data extraction and calculation was done by almost all candidates, with only the occasional slip.
- (c) Most candidates found some but not all of the years, often missing the latest result, from 2014, which was not on the same table as the others. Many included years before the trophy was created (in 1990).
- (d) (i) Better responses ensured that their justification was based on the data and not simply a repetition of the rules.
  - (ii) There were many unsupported answers to this part.
- (e) Although there were a few arithmetic slips, most candidates found the only case with a match 41–17 apart and subtracted 17 from the earlier year.

Paper 9694/33
Problem Analysis and Solution

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- (d) (i) Better responses ensured that their justification was based on the data and not simply a repetition of the rules.
  - (ii) There were many unsupported answers to this part.
- (e) Although there were a few arithmetic slips, most candidates found the only case with a match 41–17 apart and subtracted 17 from the earlier year.

Paper 9694/41
Applied Reasoning

## Key messages

- The first question in this paper tested the candidates' ability to evaluate the validity and reliability of conclusions drawn from an online survey.
- In Question 2 candidates had the opportunity to display their ability to analyse the structure of a reasoned argument.
- In Question 3 candidates only gained marks if they identified weaknesses in the reasoning within the document.
- Question 4 allowed candidates to use a full range of critical reasoning skills in order to construct a reasoned argument using information from the documents.

## **General comments**

There was little evidence of candidates running out of time on this paper. There was some evidence that more candidates were writing answers whose length better reflected the mark allocation – responses to **Question 1**, worth 5 marks, should be considerably shorter than those to **Question 4**, worth 30 marks. The handwriting of some candidates was so poor that it was sometimes difficult to award marks because of uncertainty about what the candidate had written.

The standard of candidates varied, and there was evidence that many candidates had been taught some of the language of reasoning and were familiar with the format of the paper.

## **Comments on specific questions**

### **Question 1**

This question appeared to be relatively accessible to most candidates; even candidates who did not seem well prepared often achieved 2 marks and full marks were awarded occasionally. Very few candidates wasted time criticising the source of the information. The most common correct answer referred to respondents lying about their age but all other points on the mark scheme were seen. The rarest correct response was that the respondents were self-selecting.

## **Question 2**

Candidates who had been prepared for the examination found getting 3 or 4 marks in this question relatively straightforward. The MC was harder to identify than is often the case and so full marks were rarely awarded. As always, some candidates did not understand what was required of the task and attempted to paraphrase, summarise or criticise the argument. Often candidates came close to achieving a mark but wrote more than the single argument element required; for example, many candidates quoted a counter-assertion and the corresponding response. Despite the rubric's not mentioning reasons, several candidates included reasons in their analysis, to no further credit. Successful candidates identified parts of the text, copied them out and labelled them as MC, IC or CA.

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### **Question 3**

It was relatively straightforward to achieve some evaluative marks and well-prepared candidates often scored 4 or more. Some of the points on offer were harder to spot or express well and so it was rare to award more than 5 marks. Marks were most often awarded for questioning the significance of the 10% figure and identifying the false dichotomy in paragraph 2, and the identification of the *ad hominem*, slippery slope, weak analogy and appeal to pity in later paragraphs. Some evaluative points, such as the shift in meaning of the word 'fair', passed all candidates unnoticed. Many candidates simply stated a series of counter assertions to the claims made in the document and received no credit. It was clear that a large number of candidates had no idea what is meant by the word 'assumption'. As ever, a small number of candidates attempted to critique the literary style of the author.

### **Question 4**

The majority of candidates found the topic very accessible and were hence able to produce coherent arguments, usually challenging the given conclusion. The majority of candidates secured between 7 and 14 marks, on the strength of their having presented an argument towards a conclusion supported by reasons largely lifted from the documents. Only a minority of candidates gained more than half of the available marks. It was good to see a small number of candidates attempt to structure their arguments using strands of reasoning and intermediate conclusions, and only a very few did not state a conclusion for their argument.

Although candidates appeared to understand the topic well, few were able to offer reasons of their own beyond those mentioned in the documents – although many were able to introduce examples of their own to illustrate or support points raised in the documents. Marks awarded for the skills of Quality of Argument and Treatment of Counter Positions were rarely Level 4. With respect to the use of documents themselves, well-prepared candidates attempted to combine or evaluate sources, but these remained in the minority. It was good that few candidates simply described the contribution made by each document to the debate. Almost all candidates used the documents to support their case, but few made any evaluative comments about the documents or the points they were using. Some Centres seem to have acted upon advice, given in previous reports, that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

Paper 9694/42
Applied Reasoning

# Key messages

- The first question in this paper tested the candidates' ability to evaluate a decision based on statistical data.
- In Question 2 candidates had the opportunity to display their ability to analyse the structure of a reasoned argument.
- In **Question 3** candidates only gained marks if they identified weaknesses in the reasoning within the document.
- Question 4 allowed candidates to use a full range of critical reasoning skills in order to construct a reasoned argument using information from the documents.

## **General comments**

It was good that there were fewer candidates writing answers whose length does not reflect the mark allocation. However, a minority of candidates are still writing too much for **Question 1**, worth 5 marks, leaving them little time to devote to **Question 4**, worth 30 marks.

The standard of candidates varied but there was evidence that many candidates had been well prepared. Indeed, some candidates answered **Question 4** first, attempting to ensure that the most creditworthy question was not rushed. While there are merits to this strategy, it is often useful to tackle **Questions 2** and **3** before **Question 4** in order to develop a deeper understanding of the topic, and the structure and shortcomings of Document 1.

# Comments on specific questions

#### **Question 1**

This question appeared to be more challenging than some other question 1s and it was relatively rare to award more than 2 marks. The candidates were given a national average incidence of breast cancer and were expected to compare this with the incidence in a single building. A fairly simple calculation showed that the building incidence was higher than the national average, but almost no candidates attempted the calculation. An understanding of the relationship between the two incidences underpinned several of the marking points and so, without this calculation, some of the marking points were hard to access. As ever, some candidates wasted time on criticising the source of the information. A small number did not understand the task and attempted to explain how the statistics supported the decision to vacate the building.

## **Question 2**

The majority of candidates knew what was expected and attempted an analysis of the argument, which is a clear indication that many Centres had been preparing candidates well for the examination. Few candidates provided a non-creditworthy summary or gist. A small minority still seemed unaware that quoting from the text is the required way to answer this question. The question differentiated well between candidates, usually rewarding the well-prepared. The full range of marks was seen and all elements were correctly identified by some candidates.

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### **Question 3**

Again, it was good that most candidates attempted to evaluate the reasoning, but many are still listing a series of counter-arguments to points raised in the passage. Those candidates who did attempt to apply their evaluation skills were often able to gain some marks relatively easily. Well-prepared candidates, who made up almost half the cohort, tended to score between three and five marks. Candidates who achieved higher marks were in a minority, but were more than in some previous series. Common weaknesses identified by a number of candidates were any of the weak analogies, generalising from a single School and the contradiction between paragraph 3 and the rest of the argument. Fewer spotted that the options given in the hypothetical example were falsely dichotomous or that the stance of some politicians was portrayed as a straw man. It was noticeable that a number of candidates were able to spot some of the many assumptions more easily than in previous series, suggesting that many had been well prepared in this regard.

#### **Question 4**

The majority of candidates found the topic accessible and were hence able to produce coherent arguments, either for a voting age of 21 or in favour of it being lower. It was rare for an answer to advocate an initial voting age of higher than 21. The majority of candidates secured between 8 and 15 marks, on the strength of their having presented an argument towards a conclusion supported by reasons largely lifted from the documents. However, a number of candidates gained more than half of the available marks. It was good to see some candidates attempt to structure their arguments using strands of reasoning and intermediate conclusions, and only a very few did not state the conclusion of their argument. In order to get high marks for the Structure and Quality skills, arguments had to address why the target age was a better choice than a higher age, a lower age and not using age as a criterion at all.

Although candidates appeared to understand the topic well, few were able to offer reasons of their own beyond those mentioned in the documents. This meant that marks awarded for the skills of Quality of Argument and Treatment of Counter Positions were rarely Level 4. With respect to the use of documents themselves, well-prepared candidates attempted to combine or evaluate sources, but these remained in the minority. A smaller number than in some previous series simply described the contribution made by each document to the debate, which was good. Centres seem to have acted upon advice, given in previous reports, that what is likely to get high marks is a persuasive argument with a clear structure that is supported by thoughtful, particularly critical, use of the documents and that thoughtfully considers relevant alternative viewpoints.

Paper 9694/43
Applied Reasoning

# Key messages

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