



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Level

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THINKING SKILLS

9694/41

Paper 4 Applied Reasoning

May/June 2010

1 hour and 30 minutes

Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

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

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

Write in dark blue or black pen.

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

DO NOT WRITE ON ANY BARCODES

Electronic calculators should be used.

Answer **all** the questions.

Start each question on a new answer sheet.

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

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

This document consists of **10** printed pages and **2** blank pages.



- 1 Study the information below and answer the questions that follow. Show your working.

Three chefs have submitted recipes for different kinds of cakes which are to be sold at a charity fair.

The key differences between the three recipes are the quantities of luxury ingredients required for each cake.

The requirements (in grams) for making one cake using each of the three recipes are given below:

| Ingredient | Mary's recipe | William's recipe | Chris's recipe |
|-------------------|----------------------|-------------------------|-----------------------|
| Raisins | 40g | 10g | 20g |
| Chocolate | 10g | 10g | 40g |
| Ginger | 20g | 30g | 10g |

- The ingredients will be bought from a supplier that offers a special deal, where ingredients **must** be purchased in equal quantities. For instance one could buy 120g of raisins, 120g of chocolate and 120g of ginger.
- The supplier will only sell quantities that are multiples of 10g.
- In order to avoid offending any of the chefs, he decides that he will make some cakes using each recipe. He further decides that the number of the type of cake he will make the least of must be no less than half the number he will make the most of. For instance, he would **not** make 30 of Mary's recipe, 20 of William's recipe and 10 of Chris's recipe, because the number of Chris's cakes is less than half of the number of Mary's.
- He decides to make 60 cakes in total for the fair.

Your answers to the following questions must not contradict any of the above conditions.

- (a) What is the **greatest** number of cakes that the stall organiser could make using any one person's recipe? [2]
- (b) If the stall organiser decides upon making the most cakes possible using William's recipe, show that the total amount of unused ingredients is 450g. [3]
- (c) What is the least number of cakes that the stall organiser could make of any one of the recipes? [1]

The stall organiser is keen to minimise the amount of ingredients that go unused.

- (d) Show that it is possible to produce 60 cakes with less than 50g of unused ingredients. [4]

[Question 2 is printed on the next page]

2 Study the information below and answer the questions that follow. Show your working.

In the Heptathlon, athletes compete against each other in seven events. In each performance times or distances are converted to points scores. The winner is the competitor with the highest total number of points over the seven events.

This is a summary of the results of the eight athletes who took part in the Heptathlon at this year's Floratian National Athletics Championships:

| Name | | 100m Hurdles | High Jump | Shot Put | 200m | Long Jump | Javelin | 800m |
|---------------|---------------|--------------|-----------|----------|--------|-----------|---------|---------|
| Holly Ash | Time/Distance | 15.93s | 1.67m | 10.52m | 27.58s | 4.89m | 33.13m | 2:23.45 |
| | Event Points | 723 | 818 | 564 | 664 | 530 | 536 | 777 |
| | Total Points | 723 | 1541 | 2105 | 2769 | 3299 | 3835 | 4612 |
| Ivy Birch | Time/Distance | 15.02s | 1.64m | 11.31m | 25.92s | 5.20m | 48.07m | 2:17.48 |
| | Event Points | 839 | 783 | 616 | 804 | 614 | 823 | 858 |
| | Total Points | 839 | 1622 | 2238 | 3042 | 3656 | 4479 | 5337 |
| Iris Linden | Time/Distance | 14.98s | 1.58m | 8.59m | 26.19s | 4.83m | 34.36m | 2:25.21 |
| | Event Points | 844 | 712 | 438 | 781 | 514 | 559 | 754 |
| | Total Points | 844 | 1556 | 1994 | 2775 | 3289 | 3848 | 4602 |
| Heather Palm | Time/Distance | 14.29s | 1.70m | 11.52m | 25.81s | 5.49m | 42.37m | 2:25.57 |
| | Event Points | 938 | 855 | 629 | 814 | 697 | 713 | 749 |
| | Total Points | 938 | 1793 | 2422 | 3236 | 3933 | 4646 | 5395 |
| Lily Pine | Time/Distance | 17.61s | 1.46m | 10.09m | 27.07s | 4.80m | 41.40m | 2:32.25 |
| | Event Points | 529 | 577 | 535 | 706 | 506 | 694 | 665 |
| | Total Points | 529 | 1106 | 1641 | 2347 | 2853 | 3547 | 4212 |
| Daisy Rowan | Time/Distance | 15.59s | 1.52m | 11.72m | 26.68s | 5.44m | 30.19m | 2:29.66 |
| | Event Points | 765 | 464 | 643 | 739 | 683 | 480 | 697 |
| | Total Points | 765 | 1229 | 1872 | 2611 | 3294 | 3774 | 4471 |
| Violet Spruce | Time/Distance | 15.54s | 1.64m | 9.84m | 27.27s | 5.15m | 27.07m | 2:22.61 |
| | Event Points | 772 | 783 | 519 | 690 | 601 | 421 | 788 |
| | Total Points | 772 | 1555 | 2074 | 2764 | 3365 | 3786 | 4574 |
| Rose Willow | Time/Distance | 16.01s | 1.55m | 9.46m | 26.47s | 5.25m | 29.55m | 2:29.38 |
| | Event Points | 713 | 678 | 494 | 757 | 628 | 468 | 701 |
| | Total Points | 713 | 1391 | 1885 | 2642 | 3270 | 3738 | 4439 |

- (a) Heather Palm took the lead in the first event and remained ahead overall throughout the competition.
- (i) Name the events in which Heather Palm was the top scorer.
- (ii) Name an athlete who was top scorer in at least one of the other events. [1]
- (b) With a highest score of 938 points (100m Hurdles) and a lowest score of 629 points (Shot Put), Heather Palm's scores had a range of 309 points.
- (i) Who had the largest range of scores? [1]
- (ii) Who had the smallest range of scores? [1]
- (c) This is part of the table used to convert performances to points in the High Jump:

| <i>Performance</i> | <i>Points</i> | <i>Performance</i> | <i>Points</i> | <i>Performance</i> | <i>Points</i> |
|--------------------|---------------|--------------------|---------------|--------------------|---------------|
| 1.75m | 916 | 1.60m | 736 | 1.45m | 566 |
| 1.74m | 903 | 1.59m | 724 | 1.44m | 555 |
| 1.73m | 891 | 1.58m | 712 | 1.43m | 544 |
| 1.72m | 879 | 1.57m | 701 | 1.42m | 534 |
| 1.71m | 867 | 1.56m | 689 | 1.41m | 523 |
| 1.70m | 855 | 1.55m | 678 | 1.40m | 512 |
| 1.69m | 842 | 1.54m | 666 | 1.39m | 502 |
| 1.68m | 830 | 1.53m | 655 | 1.38m | 491 |
| 1.67m | 818 | 1.52m | 644 | 1.37m | 481 |
| 1.66m | 806 | 1.51m | 632 | 1.36m | 470 |
| 1.65m | 795 | 1.50m | 621 | 1.35m | 460 |
| 1.64m | 783 | 1.49m | 610 | 1.34m | 449 |
| 1.63m | 771 | 1.48m | 599 | 1.33m | 439 |
| 1.62m | 759 | 1.47m | 588 | 1.32m | 429 |
| 1.61m | 747 | 1.46m | 577 | 1.31m | 419 |

When the results were published, one of the athletes realised that she had been given an incorrect points score in the High Jump, and she lodged an appeal.

- (i) Which athlete appealed? [1]
- (ii) What was her final overall position after the results had been corrected? [2]
- (d) Ivy Birch was disappointed not to be victorious. She blamed her failure on a Long Jump performance that fell considerably short of her personal best.

Based on the evidence in the results summary, suggest the minimum distance in the Long Jump that would have enabled her to win the Heptathlon. [2]

- 3 (a) Analyse the structure of the argument in Document 1, identifying its main conclusion and reasons, as well as any intermediate conclusions and counter-arguments.
- (b) Read Documents 2 and 3. Evaluate the strengths and/or weaknesses, and any underlying assumptions, in Lee's and Tan's reasoning in **Document 3**. You do **not** need to compare Lee's and Tan's arguments, but you **do** need to evaluate each person's argument as a response to the question posed to them. [6]
- (c) Construct your own well-reasoned case arguing for whether you would or would not accept limits to free speech. Your response should:
- refer to Article 19 of the Universal Declaration of Human Rights in Document 4.
 - critically comment on some or all of Documents 1-5.
 - have a clear conclusion. [20]

DOCUMENT 1

Free Speech Absolute

Some people say, in defence of new 'hate laws', that it is important to balance 'freedom of expression' with 'freedom to live without hate' - one freedom cannot be seen to have priority over the other. What rubbish! By introducing these new laws, the assertion of one freedom's priority over the other is exactly what some 'democratic' countries are doing.

We should never enter into debates about what is 'free speech' and what is 'hate speech'. It used to be that freedom of speech and expression took priority over all other freedoms, because the United Nations (UN) Charter of Human Rights enshrined it in Article 19, a long time before any 'hate laws' were introduced. However, freedom of expression has increasingly been seen as an unsustainable concept, in need of revision. Many countries have given 'hate laws' precedence over the right to 'free speech'. To deny free speech, on the grounds that certain speech makes people uncomfortable, is not protecting freedom; it is denying some people one of their basic human rights.

Governments are actually seeking fascist control over people. Some countries have laws stating that speech which has "the possibility to create contempt or ill will" is not judged to be 'freedom of expression', and is punishable by law. The UN charter states that every free citizen is entitled to have freedom of opinion and expression without interference. But the law in these countries says that if what you say is upsetting someone else, they have the right not only to silence you, but to punish you as well. Can it be right that the laws of 'democratic' governments trample all over the entitlement to free speech enshrined in the UN Charter for Human Rights?

When people write politically incorrect statements in those countries which have forfeited the right to unabridged free speech, they get accused of 'hate speech'. They are then paraded and convicted in ridiculous show trials, in which even the mildest statements are treated as having "the possibility to create contempt or ill-will". This is why it is so very important that we insist on unabridged freedom of expression.

Some people say that anyone who takes this viewpoint is promoting hate. This is not true – they do not promote hate, but promote the ideals that are integral to our preservation; and in the eyes of our fascist leaders, that is hate. The real haters are the people who hate freedom, for the first freedom all tyrants attack is the freedom of thought and expression. Tyrants fear 'free speech' as it is the number one threat to those in power who seek to oppress the individual. Many people are in favour of free speech and freedom of expression; that is why when governments start to decide what is 'freedom of expression', and what is "the possibility to create contempt", in order to suit their own political agenda, we should resist. As soon as any person or group starts to dictate what counts as 'free speech', and what counts as 'hate speech', the true concept of free speech is destroyed.

DOCUMENT 2

Two Thinkers on Free Speech

John Milton (1608 – 1674)

In *Areopagitica*, arguing for freedom of the press, wrote¹:

When God endowed the first man, Adam, with reason, he gave him freedom to choose; for to be able to exercise reasoning is to be able to make a choice. Otherwise Adam would have been a mere robot. We ourselves do not appreciate obedience being forced on us. God allowed Adam to be tested to make right choices, so that he would earn his right to be rewarded and praised.

Do you think you can remove vice by removing the matter of vice? You may take from a covetous man all his treasure, but he has yet one jewel left: you cannot deprive him of his covetousness².

Suppose we would expel wrongdoing by suppression – we would suppress virtue as well.

We should not doubt the strength of Truth by resorting to restrictions and regulations (of the press) in order to suppress what we perceive as error. Let Truth and Falsehood grapple; who ever knew Truth defeated in a free and open encounter?

And if some people are spreading error as truth there is still no reason why we should not hear them out, debate and examine the matter thoroughly in open and free conference. If we try to silence them because we fear they are voicing new and dangerous opinions, even before we give them a proper hearing, it may turn out that they may have been right, and we in our zeal for right have wronged them.

Give me the liberty to know, to utter, and to argue freely according to conscience, above all liberties.

(Note: Although Milton believed free speech to be a basic human right, he would not extend it to the Roman Catholics whom he believed wanted England to be governed by the Pope, and thus sacrifice its national independence.)

John Stuart Mill (1806 - 1873)

In *On Liberty* he stated that even if only one person has a different opinion to the rest of the world, the rest of the world has no right to silence that one person, just as that one person has no right to silence the rest of the world.

However, Mill also placed an exception to free speech which is known as the Harm Principle. This provides that the only reason why free speech should be curbed by an external authority is to prevent harm or violation of rights to others. An example of this principle in action occurred in 1919, when a US Supreme court judge ruled that the right to free speech does not include the right to falsely shout “fire!” in a crowded theatre.

¹ Paraphrase of *Areopagitica*

² “Covetousness” - a greedy form of envy

DOCUMENT 3

Question: Should 'free speech' include 'hate' speeches?

Lee: No. Hate speech can incite people to acts of violence and hatred. Pornographic expressions and speeches can lead to rape, and degradation of women, and abuse of children. Speeches by extreme political and religious groups can lead to hate crimes, and threaten civil order.

If we include hate speeches in free speech we will end up forfeiting democracy, since right wing extremists, fundamentalists and terrorists will get the upper hand and decide how people should live their lives. We already have seen how such groups can wreak havoc in society, like the Ku Klux Klan in the USA, the IRA in Ireland, and the Taliban in Afghanistan.

Allowing hate speech would mean allowing the sinister propaganda of those who could threaten freedom in society. Even Milton, who advocated free speech, made an exception: he would not extend freedom of speech and expression to the Roman Catholics, whom he believed were opposed to England's political freedom.

This shows that free speech is an ideal and can never be achieved in real life.

Tan: Yes. It is incorrect to say that there is a necessary link between speech acts and physical acts. It is likely that people who commit hate crimes will read hate speeches, and people who commit sex crimes are likely to watch pornography; but not necessarily the other way round. Just because people view pornography or read hate speeches does not mean they are therefore incited to commit anything they otherwise would not do.

If we allow governments to regulate free speech, in order to stop 'hate speech', we will soon have state tyranny forbidding freedom of speech and censorship of any expression which is opposed to the policies of the ruling body.

We should allow 'bad' views to be voiced rather than suppress them. Exposing pornography, hate speeches and ideological extremisms in public increases the likelihood that they will be discredited and defeated, rather than strengthened through persecution. This is Milton's argument from "Areopagitica" – that truth will combat error.

If he made an exception of the Roman Catholic minorities in his day, it was because they were against democracy and wanted the Pope's rule extended to England. Free speech is essential for the practice of democracy.

DOCUMENT 4

*Articles from the Universal Declaration of Human Rights.
(Ratified at the United Nations on 10 December 1948.)*

Article 18.

Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance.

Article 19.

Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.

Excerpts from a press release from General UN Headquarters on Thursday, February 9th, 2006. The context is an interview with the Secretary General about a controversy following the publication of 12 editorial cartoons about the Prophet Mohammed in a Danish newspaper, which caused widespread protests throughout the Muslim world.

SECRETARY-GENERAL URGES RESPONSIBILITY IN CARTOON ISSUE

At a press encounter this morning, the Secretary-General was asked about the recent publication of caricatures of the Prophet Mohammed, and, while he underlined his support for freedom of speech, he also pointed to the need to exercise responsibility and judgment. "Quite honestly," he said, "I cannot understand why any editor will publish cartoons at this time, which inflames and pours oil on the fire."

At the same time, he reiterated that innocent civilians should not be attacked, and stressed that "violence must be condemned as unacceptable."

Asked whether the Secretary-General condemns the publication of the cartoons, the Spokesman said that the Secretary-General is a great believer in free speech and freedom of expression, which are enshrined in the Universal Declaration of Human Rights. Yet he noted that respect for religion is also protected in that Declaration, and that the two need not cancel each other out.

The Secretary-General, he noted, had reaffirmed his support for free speech while questioning why anyone would republish the caricatures at this delicate time.

The Spokesman said that the issue underscores the need for greater dialogue among people so that these misunderstandings do not occur.

DOCUMENT 5

A List of 36 Independent Countries

2009 Edition

| Country | Political Rights | Civil Liberties |
|--------------------------|-------------------------|------------------------|
| Afghanistan | 5 | 6▼ |
| Albania | 3 | 3 |
| Angola | 6 | 5 |
| Australia | 1 | 1 |
| Brunei | 6 | 5 |
| Bulgaria | 2▼ | 2 |
| Burma | 7 | 7 |
| Canada | 1 | 1 |
| Central African Republic | 5 | 5 |
| China | 7 | 6 |
| Colombia | 3 | 4▼ |
| Cuba | 7 | 6▲ |
| Egypt | 6 | 5 |
| India | 2 | 3 |
| Iran | 6 | 6 |
| Japan | 1 | 2 |
| Jordan | 5 | 5▼ |
| Kenya | 4 | 3 |
| Libya | 7 | 7 |
| Malaysia | 4 | 4 |
| Mongolia | 2 | 2 |
| Morocco | 5 | 4 |
| New Zealand | 1 | 1 |
| Qatar | 6 | 5 |
| Russia | 6 | 5 |
| Saudi Arabia | 7 | 6 |
| Singapore | 5 | 4 |
| South Africa | 2 | 2 |
| South Korea | 1 | 2 |
| Sri Lanka | 4 | 4 |
| Taiwan | 2 | 1 |
| Thailand | 5▲ | 4 |
| United Arab Emirates | 6 | 5 |
| United States | 1 | 1 |
| Venezuela | 4 | 4 |
| Zimbabwe | 7 | 6 |

Political Rights cover: free and fair electoral process; political pluralism; political participation; functioning of government.

Civil liberties cover: freedom of expression & belief; associational and organizational rights; rule of law; personal and individual rights.

Ratings for political rights and civil liberties: On a scale of 1-7, 1 represents the most free and 7 the least free. The ratings reflect an overall judgment based on survey results. Arrows up ▲ or down ▼ indicate a positive or negative change in political rights, civil liberties, or status since the last survey.

(Statistics gathered from a survey by Freedom House [USA].)

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