



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

THINKING SKILLS

9694/03

Paper 3: Problem Solving and Critical Thinking (Advanced)

June 2007

1 hour and 30 minutes

Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on the Answer Booklet/Paper in the space provided unless this has been done for you.

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.

There are **25** questions on this paper. Answer **all** questions.

For each question there are five possible answers **A, B, C, D** and **E**.

Each question tells you whether to choose **one or two** answers.

Record your choice(s) in the separate Answer Booklet/Paper.

Start each question on a new line.

INFORMATION FOR CANDIDATES

Each question is worth 2 marks. Marks will not be deducted for wrong answers.

This document consists of **27** printed pages and **1** blank page.



- 1 Read the question then record your **two** choices in the separate answer booklet.

In an argument there must be a conclusion, and one or more reasons given to support the conclusion.

From the above definition, which **two** of the following are most obviously **arguments**?

- A** Big business enhances many people's lives. It enables people to take holidays in distant and exciting places. Without big business there would be no vacuum cleaners, microwaves and refrigerators to reduce domestic drudgery.
- B** Economic growth depends on the availability of natural resources that will run out some time. Global economic growth cannot continue indefinitely. In the long term, poorer countries can become richer only if richer countries slow their rate of economic growth.
- C** Some people distrust big business and regard all businessmen as crooks. They think that if a business is making money, someone else must be losing money. This is a misunderstanding of how business works.
- D** When people trade with each other, they create wealth. When specialists produce goods better and cheaper than their customers could make themselves, they create wealth. It is this wealth that has transformed the lives of people in the developed world.
- E** Wherever communism has been tried, populations have remained poor. By contrast, capitalist societies provide relative affluence for their populations. Not everyone acknowledges this fact.

- 2 Read the question then record your **two** choices in the separate answer booklet.

Newspaper journalists have to create arguments from a mass of interviews and information in order to sell papers. This does not necessarily invalidate their writing, but it means we should regard them with care. Whenever we read an article in favour of some political action (“Give dads equal rights in custody battles!”) we should be aware that some raw material (recent evidence, a quote from a celebrity, a court ruling) has been manipulated to fit an argument. This manipulation does not involve reporting anything that is false, but information will necessarily have been left out, and reasons in favour of the conclusion will have been given prime space in the article (often at the beginning). In order to overcome this aspect of journalism ...

Which **two** of the following statements could finish the final sentence and be an appropriate **conclusion** for this argument?

- A one should ignore the beginning of articles in newspapers.
- B one should buy newspapers with differing editorial viewpoints, and consider the total resource of the information which is available in both papers.
- C one should buy newspapers with differing editorial viewpoints, and only consider the information which appears in both papers.
- D one should remember that journalists only dress their articles up as arguments because that is what the public wants. It makes good reading.
- E one should not buy the opinionated papers, even if they are well-written, because it encourages more of the same.

- 3 Read the question then record your **two** choices in the separate answer booklet.

The number of birds migrating to Europe from Africa has declined markedly over the last 30 years. In the U.K. for example, 54% of the 121 long-distance migratory birds studied in recent research had suffered a severe decline or had even become extinct between 1970 and 2000. Whilst a number of explanations for this decline have been put forward, the most convincing is that it is due to the increasing size of the Sahara desert over which birds migrating from Africa have to fly. This means fewer and fewer birds manage to survive the journey. This increasing size of the Sahara desert is a result of global warming. Therefore, migrating birds are likely to account for a very small percentage of the total European bird population in 30 years time.

Which **two** of the following are **assumptions** underlying the above argument?

- A Bird numbers in Europe are in decline.
- B Such a decline in the numbers of migratory birds has never occurred before.
- C The majority of migratory birds that arrive in Europe come from Africa.
- D There are no other explanations for the decline in migrating birds.
- E The effect of global warming on the size of the Sahara desert is likely to be irreversible.

- 4 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

The Olympics should be abandoned because they are elitist. They are simply a chance for the rich of the world to play. Only the richest people in the richest nations are able to win gold medals. Baron Pierre de Coubertin, a French aristocrat who developed the modern Olympic Games, chose to include rich man's sports such as sailing, horse riding and fencing. Talented sportspeople from the masses cannot afford to take part in such events.

A student responds: 'People often complain that the Olympics are elitist but this is a silly complaint. Organised sports are elitist by their very nature. They are about finding the best, allowing the elite athletes to triumph.'

- (i) Which of the following best expresses a **flaw** in the original argument?
- (ii) Which of the following best expresses a **flaw** in the student's response to the argument?
- A** Elitism which only allows the rich to participate is different from elitism which only allows the talented to succeed.
- B** Football is an organised sport, and football is for the masses, so organised sports do not have to be elitist.
- C** The fact that elite athletes have opportunities to succeed does not mean that we should abandon the Olympic games.
- D** The fact that the Olympics includes expensive games does not mean that poor people cannot succeed in the games at all.
- E** Many elite athletes come from wealthy backgrounds rather than poor homes. As poor people do not become athletes, they do not miss competing.

- 5 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

It is pointless for parents, teachers and religious leaders to persist in encouraging people to behave unselfishly. Any introductory textbook on psychology will tell you that altruism (unselfishness) is an illusion. A fundamental principle of psychology is that all human behaviour is motivated by self-interest. From that principle it follows that when people appear to behave unselfishly, they are really being motivated by some hidden form of self-interest. They may want to earn the gratitude of the beneficiaries of their kindness, or to gain power over them; they may hope to win approval from other people, or they may be addicted to the warm inner glow produced by knowing they have done the right thing. The one thing we can be sure of is that - whether they realise it themselves or not - altruism is never the real reason why people perform acts which appear to be unselfish.

What function do the following expressions perform in this passage?

- (i) Altruism is never the real reason why people perform acts which appear to be unselfish.
- (ii) They may be addicted to the warm inner glow produced by knowing they have done the right thing.
- A Example.
- B Counter-argument.
- C Evidence.
- D Intermediate conclusion.
- E Main conclusion.

- 6 Read the question then record your **one** choice in the separate answer booklet.

The weather is dreadful here. It rains on three times as many days as there are rain-free days. Luckily the daily weather forecast is fairly good. Whether the forecast is for rain or for no rain, it is correct on nine occasions out of ten.

Which **one** of the following is the probability that the weather forecast will predict rain tomorrow?

A $\frac{13}{20}$

B $\frac{27}{40}$

C $\frac{3}{4}$

D $\frac{13}{16}$

E $\frac{9}{10}$

- 7 Read the question then record your **two** choices in the separate answer booklet.

Many foods carry an indication of the proportion of the guideline daily intake of various vitamins that is contained in a specified portion. However, the recommended amounts and portion sizes vary from country to country.

I bought my two favourite breakfast cereals in three different countries, and was amused to find the contents were the same, but five of the packets I examined claimed to give 10%, 15%, 20%, 25%, and 30% of the local guideline daily amount of Vitamin C.

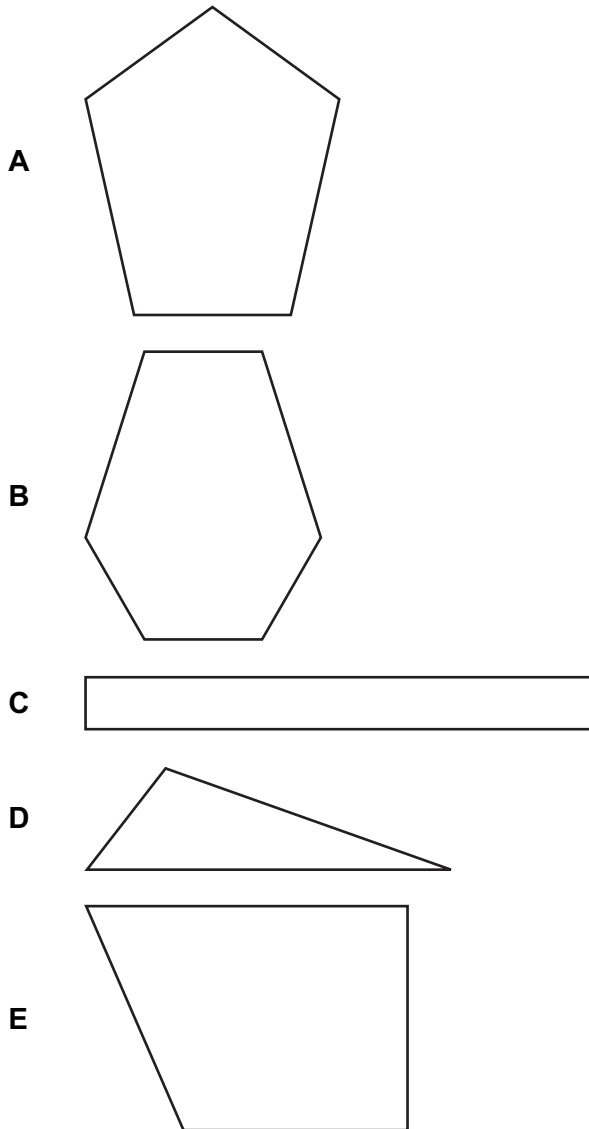
Which **two** of the following could **not** be the proportion given by the remaining packet?

- A 5%
- B 12.5%
- C 17.5%
- D 37.5%
- E 50%

- 8 Read the question then record your **one** choice in the separate answer booklet.

The book 'Flatland' by Edwin A. Abbott is a Victorian parody on social mobility, but it is set in a two-dimensional world, like a flat piece of paper, which is visited by a cube. When the cube passes through Flatland square-on a square appears and then disappears, but various other shapes can be seen if the cube passes through at an angle.

Which **one** of the following shapes could **not** be observed when a cube passes through Flatland?



- 9 Read the question then record your **two** choices in the separate answer booklet.

Not only has the dog chewed off the ends of the tape measure, but some parts of the tape have been stretched. For example, the current measurement from the 30cm mark to 50cm is the same distance as from 60cm to 90cm.

Which **two** of the following measurements will **definitely** give the wrong distance?

- A From the 10 cm mark to the 60 cm mark.
- B From the 20 cm mark to the 40 cm mark.
- C From the 30 cm mark to the 70 cm mark.
- D From the 40 cm mark to the 110 cm mark.
- E From the 50 cm mark to the 80 cm mark.

10 Read the question then record your **one** choice in the separate answer booklet.

In Legalia, law students have to pass an examination to qualify to practise as a lawyer. Students who fail the exam are allowed to take it again the following year, but nobody is allowed to attempt the examination more than four times. All students who fail the examination take every opportunity to try again. The pass rates for first-time takers and re-takers are given in the table below.

	1 st time takers	2 nd time takers	3 rd time takers	4 th time takers
Pass rate %	60	40	25	25

Which **one** of the following is the average number of times that a student takes the examination?

- A 1.28
- B 1.62
- C 1.78
- D 1.82
- E 3.15

- 11 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

The emergence of digital television services has meant a massive increase in the channels available for people to watch. In the analogue era, television was a new source of national unity appropriate to a world in which people were more socially and geographically mobile. People would watch great national events such as general elections and talk about their favourite soap operas. This shared viewing experience reinforced a sense of national identity. Television is now, however, a phenomenon that encourages fragmentation and diversity. With so many different channels to watch, the shared experience is lost and along with it an important source of shared national identity. There is a marked decline in the importance of nation as a source of identity, especially amongst the young. Surveys have shown that the numbers of people aged 18–29 who feel strongly patriotic declined by 10% between 2000 and 2003. The growth of digital television can be seen as a major contributor to this decline in a sense of national identity in the modern world.

- (i) Providing it is true, which one of the following statements would **strengthen** the above argument?
- (ii) Providing it is true, which one of the following statements would most **weaken** the above argument?
- A** A sense of national unity was greater in the days before television was invented.
- B** Big national sporting events are broadcast on several channels.
- C** Many family members watch television separately from each other on different TV sets.
- D** Some soap operas and national events still attract mass national audiences.
- E** Young people watch a greater number of channels than older people.

12 Read the question then record your **two** answers in the separate answer booklet.

In an argument there must be a conclusion and one or more reasons given to support the conclusion.

From the above definition which **two** of the following are most obviously **arguments**?

- A** Blood is the medium through which vital nutrients are distributed around the body. There are many different blood types some of which are common, others of which are very rare. In the event of the need for a blood transfusion it is important that people receive the correct blood type.
- B** Given the possible problems of matching blood type when people need a transfusion, people should be required to create their own blood stores in case they need a transfusion in the future. This would also protect them against the possibility of receiving contaminated blood from a donor.
- C** If people do not have sufficient intake of iron in their diet they are in danger of becoming anaemic. Anaemia is a deficiency in the composition of a person's blood. Being anaemic will lead to people feeling tired and listless.
- D** Many people cannot stand the sight of blood. It is not unusual for people to faint if they see somebody bleeding profusely. In choosing students for medical training it would be wise to ensure that they do not suffer from this common phobia about blood.
- E** Supplies of blood for transfusion purposes are in short supply in many parts of the world. In many countries the poor are encouraged to give blood for cash.

- 13 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

Many businessmen choose to travel by plane when they visit a large city. However, they should consider taking the train as an alternative wherever this is possible. Flying is a major source of the carbon dioxide pollution which is causing global warming. Planes pump out eight times more carbon dioxide per passenger mile than trains. A return flight from Kuala Lumpur to London will release as much carbon dioxide as all the heating, light and cooking in the average house for a year. Using trains rather than planes for business travel would make a significant contribution to reducing carbon dioxide pollution. Moreover catching a train is usually a much simpler process than catching a plane and main stations are usually in the centres of big cities. Flying usually means yet another journey of 20–30 miles to get to the city centre.

- (i) Which of the following is an expression of the **intermediate conclusion** in the above argument?
- (ii) Which of the following is the **reason** which supports this intermediate conclusion?
- A Businessmen should take the train as an alternative to flying, where possible.
 - B Planes pump out eight times more carbon dioxide per passenger mile than trains.
 - C Flying usually means that another journey is necessary to get to the city centre.
 - D Main stations are usually in the centres of big cities.
 - E Using trains instead of planes would make a significant contribution to reducing carbon dioxide pollution.

14 Read the question then record your **two** in the separate answer booklet.

Study the following data from a college.

The category "Average IGCSE/O Level Score" refers to the qualifications with which students **enter** the college. The highest possible score is 8.0, and it is unlikely that anyone with a score of less than about 4.5 would take A Level courses.

The categories "% A Level Passes" and "% A Level High Grades" refers respectively to the proportion of students who pass and achieve grade A or B at the end of their course.

Year	Number of candidates	Grades		
		Average IGCSE/O Level Score	% A Level Passes	% A Level High Grades
1998	160	6.1	92%	41%
1999	161	6.2	93%	43%
2000	158	6.1	91%	42%
August 2000: Appointment of new Principal				
2001	162	6.1	90%	36%
2002	205	5.8	86%	32%
2003	282	5.3	79%	28%
2004	304	5.2	77%	24%
2005	306	5.3	78%	21%

Which **two** of the statements below are **conclusions** which follow from the above data?

- A** In 2005, the college achieved the highest number of A Level passes since these records began in 1998.
- B** The new Principal does not consider the achievement of high grades to be a priority for the college.
- C** The new Principal's policy of increasing recruitment to the college has gradually improved the A Level results.
- D** The only way the Principal could increase recruitment to the college was by lowering entry qualifications.
- E** The proportion of very able students in the college is declining steadily.

- 15 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

With an increasing proportion of their populations aged over 65, developed countries will need to spend more on health care. This is likely to become unsustainable as the numbers of elderly people increase. If expenditure on other essential sectors of the economy such as transport and education is to be maintained, health care will have to be rationed. In deciding the criteria to use in rationing health care, age is likely to figure. Put brutally the elderly have 'had their time'. However, the degree to which illness is self-inflicted may be another factor. A 45-year-old with cancer who is a heavy drinker and smoker might be considered a less deserving case than a 70-year-old with the same condition who has lived a healthy life style. The unavoidable conclusion, however, is that hard choices will have to be made.

- (i) Consider the following statement:

'Illnesses are more likely to develop in older people.'

Which one of the following fairly describes how the statement relates to the above argument?

- A It is an assumption on which the reasoning depends.
 - B It is a challenge to the reasoning.
 - C It is a conclusion that can be drawn from the reasoning.
 - D It is an explanation that supports the reasoning.
 - E It is an unstated intermediate conclusion on which the reasoning depends.
- (ii) Which one of the following could possibly be used as evidence to **strengthen** the reasoning?
- A People are more likely to develop cancer as they get older.
 - B People are very concerned that expenditure on health is maintained.
 - C People have a duty to make difficult decisions when the situation demands it.
 - D People's life expectancy could decrease in the future.
 - E People may come to accept the need for rationing health care on the basis of age.

16 Read the question then record your **two** choices in the separate answer booklet.

In order to study the effect of building ring-roads on the use of cars, a student attempts to estimate how many cars are on the M25 at midday on a typical weekday. (The M25 is the ring-road that encircles Greater London.)

Which **two** items of information taken together would be sufficient to make an **estimate**?

- A** The average time it takes a car to drive around the M25.
- B** The length of the M25.
- C** The minimum time it takes someone to drive around the M25.
- D** The number of cars joining and leaving the M25 between 12 midday and 12.30pm last Thursday.
- E** The number of cars passing a given bridge during the first minute after midday last Tuesday.

17 Read the question then record your **one** choice in the separate answer booklet.

David is attempting to draw up a family tree. He needs to find out when a great-great grandmother's sister named Betty was born. Family records show that her birthday was January 1st in an unknown year, and that she died on December 31st 1870. Records and letters also indicate that she spent 8 years at school, worked for some time as a maid and married at 19. Betty was widowed quickly but married again exactly four years after her first marriage. Three years after this Betty gave birth to a son, Alfred. When Alfred died he was half of Betty's age. She then went on to live for another 10 years.

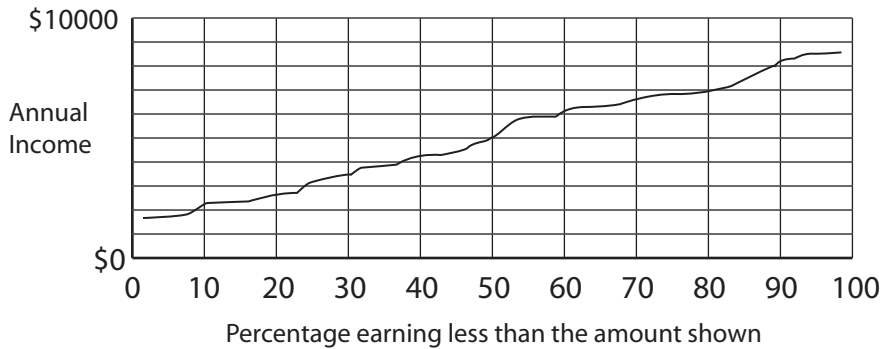
In which year was Betty born?

- A 1798
- B 1808
- C 1812
- D 1816
- E 1826

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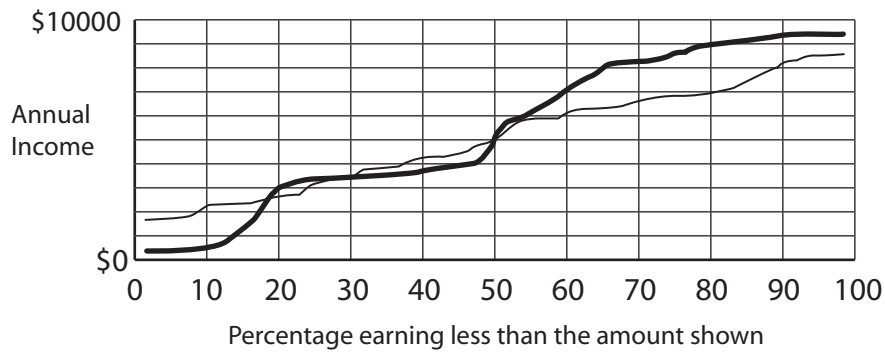
18 Read the question then record your **two** choices in the separate answer booklet.

The Government's definition of poverty is 'those people living on below 60% of median income'. The following graph shows the current distribution of income:

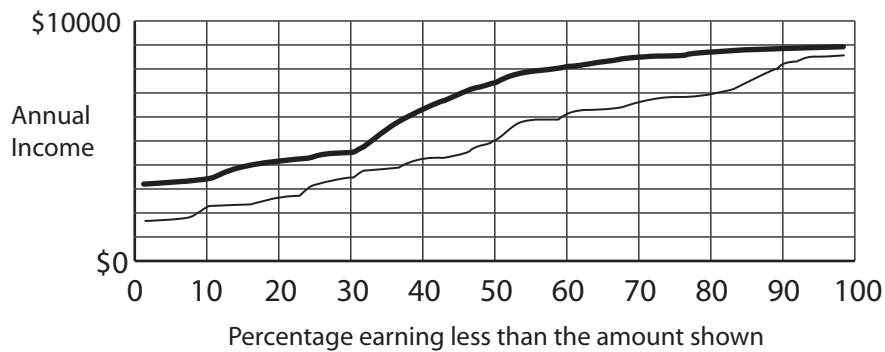


Which **two** of the following bold graphs show a possible changed distribution that would result in a reduction in poverty under the Government's definition?

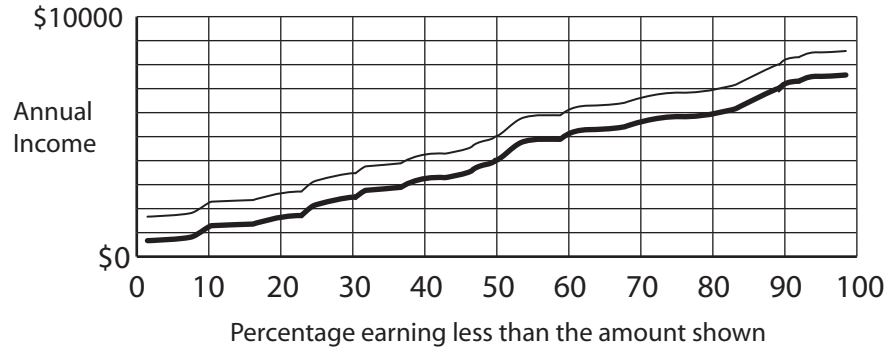
A



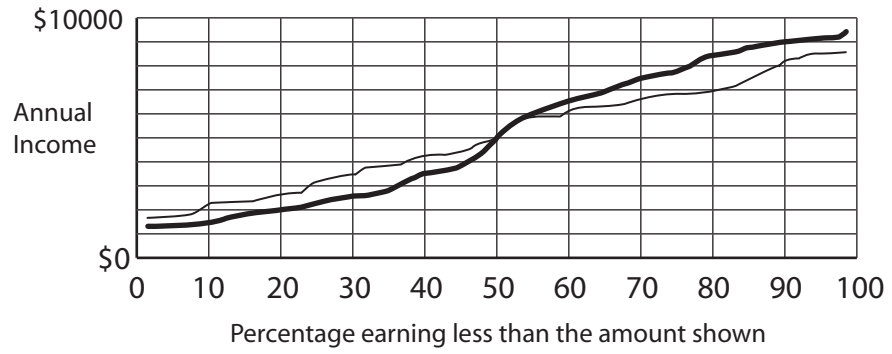
B



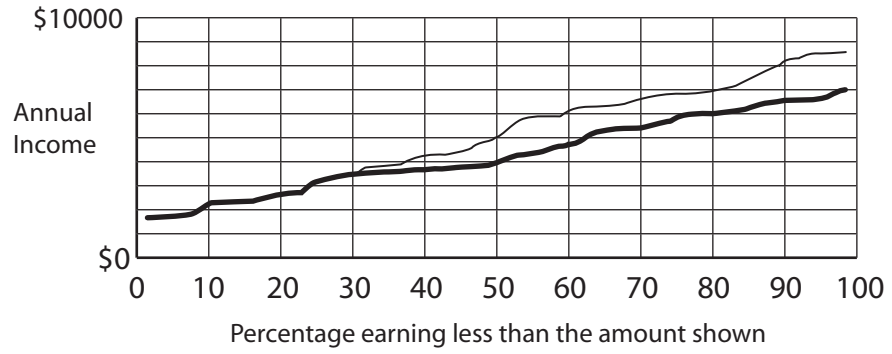
C



D



E



- 19 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

Telephone calls from hotels are charged in various ways. In one hotel in Iceland, the rates were charged by the minute, and the rate was either normal or peak depending upon the time of day at the start time of the call.

I made various calls and the charges were:

66Kr, 55Kr, 40Kr, 105Kr, and 63Kr.

All the calls lasted for less than an hour

(i) What must the lower rate be?

- A 2Kr
- B 3Kr
- C 5Kr
- D 7Kr
- E 11Kr

(ii) What must the higher rate be?

- A 3Kr
- B 5Kr
- C 7Kr
- D 11Kr
- E 21Kr

- 20 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

Nadia ran 7 races. In each race, there were 20 competitors. She won only one race. The mean value of her finishing positions was exactly 4. The median value of her finishing positions was 5.

(i) What was the best position in which she could have finished in her worst race(s)?

- A 5th
- B 6th
- C 7th
- D 8th
- E 9th

(ii) What was the worst position in which she could have finished in her worst race(s)?

- A 6th
- B 8th
- C 10th
- D 16th
- E 18th

21 Read the question then record your **two** choices in the separate answer booklet.

In an argument there must be a conclusion, and one or more reasons given to support the conclusion.

From the above definition, which **two** of the following are most obviously **arguments**?

- A** Adults around the world increasingly fear out-of-control teenagers. This is to do with youth culture, violent video games, parents out working ignoring their children, and teenagers under constant pressure. Children must be treated like children.
- B** Many people are concerned about older mothers having babies. Although ageing mothers may bring some problems, the current concern is exaggerated. Societies tend to accept that older men make good fathers. Furthermore, older mothers tend to be better educated, financially well off, and more comfortable with themselves than younger mothers, all of which are good for their babies.
- C** Ordinary people have their own ideas about how the world works and these ideas are often quite different from scientific ideas about how the world works. Effective popular scientists start with everyday ideas and move readers towards scientific ideas. Yet they often end up confirming readers' existing ideas rather than explaining the scientific ideas that show how readers' everyday ideas are wrong.
- D** We know for certain that speed cameras are only there to make money not to save lives. They target mothers taking their children to school and businessmen, taking advantage of people struggling to keep the economy going on our congested highways. Police traffic patrols have virtually disappeared and dangerous and inconsiderate driving has increased.
- E** Why do some people pay real money to acquire virtual objects, money or characters to use in online computer games? This defeats the point of games like Everquest because the whole idea is that everybody starts out with nothing and has equal opportunity to progress and to acquire money and status. Paying real money to alter your game status wrecks the equality.

22 Read the question then record your **two** choices in the separate answer booklet.

A bereaved mother is leading a campaign for tighter regulation of the Internet, following the revelation that the man who murdered her daughter had a history of viewing violent websites. "How many more tragic and preventable cases of this kind are needed before the Government admits how much harm is done by these sites", she asked, "and takes action to put those responsible for them out of harm's way? My daughter was a beautiful, innocent young girl, with her whole life ahead of her. She had already spent a year working as a volunteer in famine relief, and wanted to dedicate the rest of her life to helping people and making the world a better place. We were so proud of her, but now the lives of her family and friends have been devastated. Tough new laws must be introduced without delay, in order to put such sites out of business, and my petition to the Government asking for such laws has been signed by nearly a million people who share my concerns."

Which **two** of the following comments identify **flaws** in the mother's argument?

- A Governments are very limited in what they can do to shut websites down.
- B The victim may not have been as beautiful and innocent as her mother claims.
- C Closing websites would contravene people's right of freedom of expression.
- D The fact that the murderer watched violent websites does not show that the images caused him to commit the assault and murder.
- E The fact that a lot of people signed a petition does not show that the proposal is right.

- 23 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

Litter has become such a problem in many cities because those responsible for it go unpunished. Most cities deal with it by spending millions on street-cleaners. With this facility publicly in place, many otherwise law-abiding people happily drop their rubbish on the streets. In extreme cases – railway stations, for example – it has been decided to entirely replace litter bins with a small army of cleaners. This is a defeatist attitude to the problem. If such a response were taken in response to parking (employing an army of "parkers" to drive people's cars to appropriate parking spaces) instead of penalties, the problem would soon escalate. And we would accept such a solution as we accept the attitude to litter, trying to ignore the injustice of forcing taxpayers to pay for a few people's laziness. As with the solution to the parking problem, the solution to litter would be costly in the short run, but beneficial in the long run. A forensic team which sampled litter from across the city and used standard fingerprint technology to follow up repeat offenders and force them to do community service would soon make people alert to where they should be putting their litter.

- (i) Which one of the following statements, if true, **weakens** the argument?
- (ii) Which one of the following statements is an **unstated assumption** of the author's reasoning?
- A** Railway stations are cleared of litter bins because of the threat of bombs, not because of too much litter.
- B** It would not be possible to identify people whose fingerprints are not stored in police records.
- C** Litter is a permanent problem, whereas cars that are parked inappropriately are (normally) moved after a time.
- D** It is not feasible to educate people to be more responsible for litter.
- E** The threat of possible punishment for dropping litter would have an effect on people's habits.

24 Read the question then record your **one** choice in the separate answer booklet.

Two students read in a newspaper that a senior minister in the Government had admitted having an adulterous relationship with his secretary, who had sold the story to another newspaper. Opposition Members of Parliament were urging the minister to resign, but he claimed that the relationship was a private matter between himself, the secretary and his wife and had nothing to do with his political role. The newspaper report agreed that the minister should resign, pointing out that a few years previously, when he was in Opposition, he had helped to bring down the previous Government by constantly attacking the personal morality of some of its members.

Lucy commented, "The fact that members of the Opposition are probably just as bad does not excuse his actions. Two wrongs don't make a right. I agree that he ought to resign." Alfred replied, "Newspapers should not report such matters. They lower respect for people in authority and encourage weak-willed people to follow their example. Adultery destroys the fabric of society and should therefore be punished severely".

Which **one** of the following statements is correct?

- A Lucy restates the newspaper's argument, but Alfred has missed the point of the report.
- B Lucy and Alfred both agree with the newspaper's argument.
- C Lucy and Alfred have offered different lines of reasoning from the newspaper.
- D Lucy and Alfred have both understood the point of the report, but disagree with it.
- E Lucy disagrees with the newspaper's argument, but Alfred has missed the point of the report.

- 25 Read the question then in the separate answer booklet record **both** your choice for part (i) **and** your choice for part (ii).

Many argue that football is boring because so few goals are scored. However, it is precisely because so few goals are scored in football that the game is exciting. Because so few goals are scored, a single goal can win the match. The crowd becomes hopeful and excited at every goal-scoring opportunity.

What is the function of these elements in the structure of the argument?

(i) 'a single goal can win the match.'

- A Assumption.
- B Counter argument.
- C Intermediate conclusion.
- D Main conclusion.
- E Background information.

(ii) 'The crowd becomes hopeful and excited at every goal-scoring opportunity.'

- A Assumption.
- B Counter argument.
- C Intermediate conclusion.
- D Main conclusion.
- E Background information.