



Cambridge Assessment Admissions Testing

THINKING SKILLS ASSESSMENT (TSA)

Specimen Test explained answers

- 1 Every motorist pays the same amount for road tax, regardless of how much they use the roads: someone who covers as little as 1 000 miles pays the same as someone who covers 20 000. This is unfair. Road tax should be scrapped and the money raised by an increase in the tax on car fuel. Making this change would ensure that those who use the roads more would pay more. This would not only be a fairer system, but could also bring in more revenue.

Which of the following best illustrates the principle underlying the argument above?

- A People should receive free medical treatment only if they cannot afford to pay for it.
- B People who travel to work every day by train should pay a lower fare than those who travel only occasionally.
- C People who earn more than double the average wage should be made to pay much higher charges for dental treatment.
- D Television channels should be paid for by subscription so that only those people who watch them should be made to pay.
- E Telephone charges should be higher for business customers than for domestic customers because they are using the system only to make money.

The argument recommends getting rid of road tax on the grounds that the tax is unfair. The way in which it is unfair is explained in the first sentence, which points out that all motorists pay the same amount, even though some may use the roads much less than others. It suggests replacing road tax with an extra tax on fuel, to ensure that those who use the roads more would pay more. So the principle underlying the argument is that the amount that users pay for a service should be based on the amount of use they make of that service, in that the more they use it, the more they should pay.

The statement that also depends on this principle is **D**. It suggests that instead of a flat-rate licence fee for all television channels, there should be separate subscriptions for each channel, so that viewers will pay only for those channels that they watch.

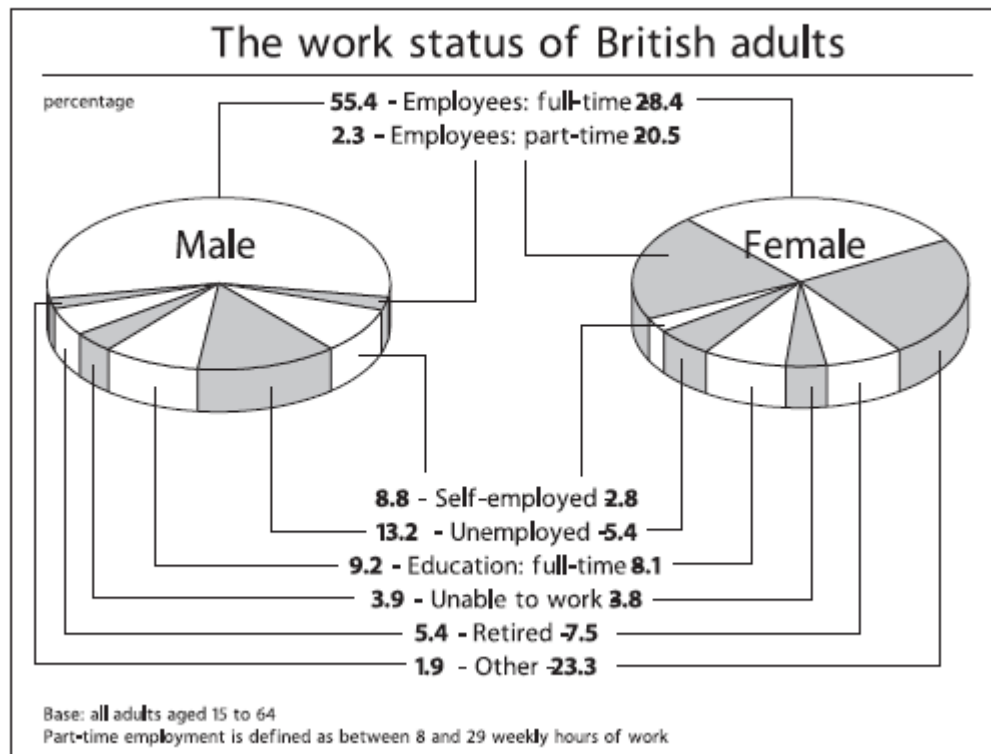
A recommends that only those who cannot afford to pay for a service should be allowed to use it for free, so it is based on the principle of ability to pay, not on the amount of use.

B recommends that people who use a service more often should pay less for each use, so it is based on a principle that contradicts the principle in the argument.

C, like **A**, is based on the principle of ability to pay, as it recommends that higher earners should pay higher charges for dental treatment.

E recommends differential charges for domestic and business use of telephone services on the grounds of the purpose of use (making money for business customers), and not on the amount of use.

2 The chart below shows the employment status of British male and female adults.



A person is employed if they are in full-time or part-time employment or if they are self-employed.

The difference between the percentage of men in employment and women in employment is

- A 8.8
- B 14.8
- C 15.9
- D 27.0
- E 66.5

As the question asks about the difference between employed men and women, only the 'employees: full-time', 'employees: part-time' and 'self-employed' categories are relevant; all other information can be ignored.

Be careful to include 'self-employed'. It is tempting to assume that only the figures above the pie charts relate to employed people, leading to the answer 8.8 (57.7 – 48.9).

The percentage of men in employment is:
 $55.4 \text{ (full-time)} + 2.3 \text{ (part-time)} + 8.8 \text{ (self-employed)} = 66.5$.

The percentage of women in employment is:
 $28.4 \text{ (full-time)} + 20.5 \text{ (part-time)} + 2.8 \text{ (self-employed)} = 51.7$.

The difference between the percentage of men in employment and women in employment is therefore
 $66.5 - 51.7 = 14.8$.

The correct answer is **B**.

- 3 Every year in Britain there are nearly 25 000 car fires, yet it is estimated that only five per cent of motorists travel with a fire extinguisher in their car. If more motorists could be encouraged to carry fire extinguishers then the number of car fires could be considerably reduced.

Which of the following is the best statement of the flaw in the argument above?

- A It ignores the fact that millions of motorists never experience a car fire.
- B It assumes that carrying a fire extinguisher will enable fires to be put out.
- C It implies that the occurrence of car fires is related to the lack of an extinguisher.
- D It overlooks the possibility that fires might not be put out with an extinguisher.
- E It ignores the fact that there are different extinguishers for different kinds of fires.

From the evidence in the first sentence that only five per cent of motorists travel with a fire extinguisher in the car, the argument draws the conclusion that if more motorists carried extinguishers, there would be fewer fires. But this conclusion would follow only if it were true that the presence of an extinguisher in the car could prevent fires from occurring. The argument does not state that this is true, nor is it a reasonable assumption, so the conclusion does not follow from the evidence.

C states the flaw by pointing out the unreasonable assumption that car fires occur because there is no extinguisher in the car.

A does not identify a flaw, because the fact that millions of motorists never experience a car fire is irrelevant to an argument about the way in which the number of fires that occur can be reduced.

Neither **B** nor **D** identifies a flaw, because the conclusion of the argument focuses on reducing the number of fires that occur, and not on the effectiveness of extinguishers when fires have occurred.

E does not identify a flaw, because it is reasonable to assume that the argument is referring to only those extinguishers that are used to put out fires in cars.

- 4 School examination results in England this year reinforce the trend in improving pass rates. There is, however, no other evidence of improvements in school leavers' abilities - such as the data coming from employers or universities. One can reasonably conclude, therefore, that teachers are simply succeeding in coaching their pupils better for examinations than in previous years.

Which one of the following is an underlying assumption of the above argument?

- A School examination results are a reliable indicator of pupils' abilities.
- B The level of difficulty of examinations has not been falling.
- C Employers' expectations of school leavers are unrealistic.
- D Teachers in previous years did not attempt to coach pupils for examinations.
- E Abilities of school pupils vary from year to year.

The argument seeks to explain why examination pass rates are improving even though evidence from employers and universities suggests that there is no improvement in school leavers' abilities. It concludes that the reason why pupils are performing better in examinations is that teachers are coaching them better. In drawing this conclusion, the argument is discounting other possible explanations for rising pass rates.

One possible explanation is that the difficulty of the examinations is falling, so **B** must be assumed by the argument.

A is not assumed by the argument, since the argument presents evidence that pupils' abilities are not improving, even though exam results are.

C is not assumed by the argument, since the argument accepts that what employers say about school leavers is an accurate reflection of the abilities of the school leavers.

D is not a necessary assumption of the argument, since the argument concludes that teachers are getting better at coaching pupils, which allows for the possibility that teachers have attempted to coach pupils in previous years, but with less success.

E is not assumed, since in attributing improvements in pass rates solely to coaching by teachers, the argument is rejecting the idea that variations in the abilities of cohorts of pupils could account for variations in pass rates.

- 5 Some employers operate a three-shift system. This requires that, in any three-week period, an individual worker will have to work, for example, from 6 am to 2 pm in the first week, from 2 pm to 10 pm in the second week, and from 10 pm to 6 am in the third week. It becomes very difficult to establish any kind of routine of eating and drinking under such a system. People working a three-shift system report a severe decline in their appetite, especially during the night-shift when they would normally be asleep. Therefore anyone about to begin working shifts like this can expect to lose weight.

Which one of the following is an underlying assumption of the above argument?

- A All shift workers have to work during the night.
- B Employees tend to dislike working shifts.
- C People who feel less hungry generally eat less food.
- D Shift work often pays better than working days only.
- E Canteen facilities are not always available to the night shift.

The passage first describes a three-shift system of working, then tells us that those working such systems find it difficult to establish a routine of eating and drinking, and report a decline in their appetite. It concludes that anyone who begins to work these shifts can expect to lose weight. In drawing this conclusion simply from the fact that appetite declines, it must be assumed that when appetite declines, people eat less. Thus **C** is an underlying assumption of the argument.

A is too general to be a necessary assumption of the argument. The argument is concerned simply with the effects on those who work a three-shift system that does include night shifts.

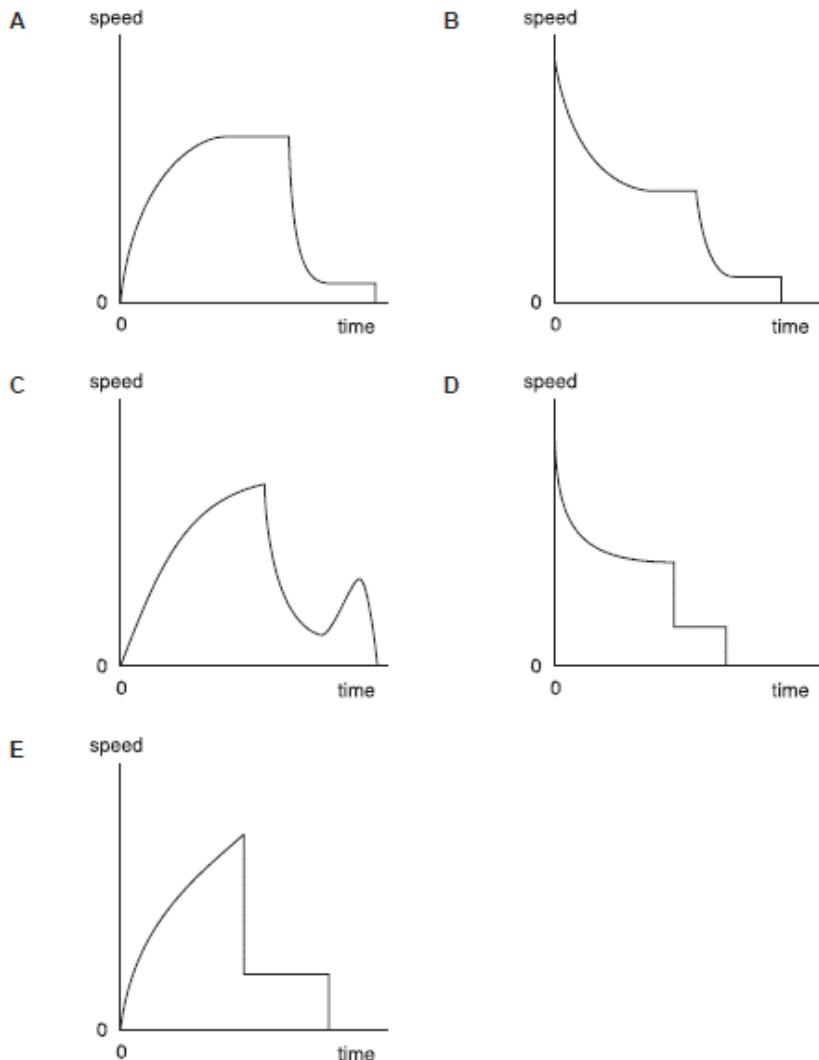
B is not assumed, since no conclusion is drawn about the satisfaction or dissatisfaction of those who work shifts.

D is not assumed, since the argument does not discuss the issue of pay.

E does not have to be assumed by this argument. The suggestion is that appetite declines because the working routine changes from week to week. This could happen whether or not canteen facilities are available for night shift workers.

- 6 When a sky diver leaves the aircraft, he falls faster and faster until he reaches a maximum steady speed known as terminal velocity. He falls at this speed until the parachute opens. The parachute slows him down until a much smaller steady speed is reached. This speed remains constant until the diver touches the ground.

Which of these graphs could show this information?



This question requires you to identify the speed/time graph that matches the detailed description of a sky diver's progress after leaving the aircraft. Reading through the question, we are told that the sky diver accelerates up to a constant speed (terminal velocity), after some time his parachute opens so he slows down to a smaller steady speed, and he remains constant at that speed until he touches the ground and stops.

B and **D** both have the appearance of falling. However, being graphs of speed/time, they represent something that is initially slowing down, not speeding up, and so can be eliminated.

C can be eliminated, because at no point after the parachute opens does the sky diver's speed increase.

E can be eliminated, because it shows an instantaneous change from the maximum steady speed to the much smaller steady speed.

A shows an initial increase in speed that levels off to a maximum steady speed, followed by slowing down to a much smaller steady speed and finally coming to rest. The correct answer is **A**.

- 7 A publisher produces magazines, all of which have a number of pages which is a multiple of 32. Thus, a magazine can have 32, 64, 96..... pages. The front cover is always counted as page 1.

The centre spread of the magazine could have pages numbered

- A 15 and 16.
- B 30 and 31.
- C 50 and 51.
- D 63 and 64.
- E 96 and 97.

Having been told that the front cover of the magazine is always counted as page 1, you can deduce that the number on the right-hand page will be an odd number and the number on the left-hand page of the centre spread must be a multiple of 16 (i.e. half of a multiple of 32).

The total number of pages is an unspecified multiple of 32, so the centre spread could have pages numbered 16 and 17, or 32 and 33, or 48 and 49, etc. **E** is the only option with a multiple of 16 as the left-hand page of the centre spread.

The correct answer is **E**.

- 8 Jonathan is planning to use a 10 acre field to supply winter silage for his cattle and hay for his sheep. He reckons to get 100 bales of hay from each acre. Before cutting the hay he will first cut an acre round the edge of the field as silage - this allows him to manoeuvre his hay making machinery. After making his hay in June he will cut the whole field as second cut silage in August and again as third cut silage in September. His farm manual provides the following information.

	<i>As silage</i>	<i>As hay</i>
<i>First cut</i>	7 bales per acre	100 small bales per acre
<i>Second cut</i>	5 bales per acre	Not applicable
<i>Third cut</i>	4 bales per acre	Not applicable

How many bales of silage will Jonathan have at the end of his harvest?

- A 16
- B 90
- C 97
- D 157
- E 160

To answer this question, you must concentrate on the silage and ignore all the information given regarding the hay.

Only 1 acre of the field is silage at the first cut, producing 7 bales, according to the information in the table provided by the farm manual.

All 10 acres of the field are cut as second-cut silage, producing a total of $10 \times 5 = 50$ bales.

All 10 acres of the field are also cut as third-cut silage, this time producing a total of $10 \times 4 = 40$ bales.

At the end of his harvest, Jonathan will have $7 + 50 + 40 = 97$ bales of silage.

The correct answer is **C**.

- 9 The motor-car, that at first brought such freedom of private travel, has become a monster that is damaging our cities. The motor-car used to be affordable only by the rich, but there are now 21 million cars in this country, and the number is still rising steeply. The huge number of cars in city centres has produced intolerable congestion and pollution. We have reached the stage where the use of private cars must be curbed. Otherwise, we will see a worsening of the current situation, where it is already becoming quicker to walk through a city in the rush hour than to drive through it.

Which of the following best expresses the main conclusion of the argument above?

- A The motor car no longer gives us freedom of travel.
- B Increasing provision of public transport would solve traffic problems in city centres.
- C It is necessary to limit the use of motor cars by private individuals.
- D Pollution and congestion are damaging our city centres.
- E The number of people who can afford to own a motor-car has risen, and is continuing to rise.

In this argument, the word 'must' appears in the fourth sentence. Is this sentence a recommendation that is supported by other statements in the passage? The first sentence claims that the motor-car has become a monster that is damaging our cities, and sentences two and three explain the sense in which the car is a monster, i.e. that the number of cars has hugely increased, causing intolerable pollution and congestion. These claims provide good reasons for stating that something should be done about the problem, but not necessarily for a conclusion that we must curb the use of private cars. The word 'otherwise' in the final sentence implies that if the action recommended in the previous sentence is not done, the problem will get worse. Thus the final sentence gives an additional reason for the conclusion that the use of private cars must be curbed.

We could summarise this argument as follows: the huge increase in the use of private cars has caused intolerable congestion and pollution; unless we limit the use of private cars, this problem will become even worse; therefore we should limit the use of private cars.

C expresses this claim; **A** is not stated in the passage; **B** suggests a solution that is not offered in the passage; **D** and **E** are reasons for the recommendation that is expressed in the main conclusion.

- 10 Only shareholders are eligible to vote on the proposed take-over of the company by a large multi-national. They can either vote for or against, or abstain by not voting at all and the side with the more votes wins. So, if the majority vote in favour, the take-over will be approved. However, less than half of the eligible voters are in favour of the proposal, which means that the take-over will not be approved.

Which of the following is the best statement of the flaw in the above argument?

- A Some of those in favour might change their minds and vote against the take-over.
- B The large multi-national could pull out of the take-over deal, whichever way the vote goes.
- C Some voters may abstain, meaning that one side could win with less than half the votes.
- D No-one can be sure how a ballot will turn out until after the votes have been counted.
- E A majority of votes against the take-over would be enough to stop it being approved.

The argument draws the conclusion (presented in the second part of the last sentence) that the take-over will not be approved. This conclusion is based on two earlier claims; that, if the majority vote in favour, the take-over will be approved, and that less than half of the eligible voters are in favour of the proposal. Thus the argument must be assuming that because less than half of the eligible voters are in favour of the proposal, there will be fewer shareholders voting in favour than voting against the proposal. However, this assumption is at odds with the statement in the second sentence that voters can abstain. If some of those who are not in favour of the proposal choose to abstain, then the number voting in favour could be higher than the number voting against, and thus the take-over could be approved. **C** points this out in a general way, saying that if there are abstentions, one side can win even if less than half of those eligible to vote support it.

A does not identify a flaw because it does not explain why the conclusion does not follow from the reasons, nor does it present a reason for rejecting the conclusion, since if some of those in favour vote against the take-over, this strengthens the conclusion that the take-over will not be approved.

B does not identify a flaw because the conclusion of the argument is not about whether the take-over will actually occur, but about whether the eligible voters will approve it.

D may be seen as an objection to the argument, but it does not precisely say why this conclusion cannot be drawn from the reasons offered, so it does not identify the flaw.

E does not identify a flaw, since it is a correct statement about what is true of elections in general.

- 11 If Widdett and Co do not increase wages then staff morale will continue to drop and productivity will fall. This would lead to smaller profits and could mean the end of the business altogether. Either the company must pay better wages or run the risk of closing down.

Which of the following best expresses the conclusion of this argument?

- A Staff morale has reached dangerously low levels.
- B If wages are not increased the business could close down.
- C The employers will have to accept a fall in productivity.
- D A fall in productivity could mean the end of the business.
- E If wages are improved the company will be saved.

The first two sentences set out the consequences for the firm of not increasing wages: that staff morale will continue to drop and productivity will fall, leading to smaller profits and the possibility of the business coming to an end. The last sentence draws a conclusion about how the company must act in order to avoid these consequences: it must pay better wages or run the risk of closing down. To say that either one must do X, or Y will probably occur is equivalent in meaning to saying that if one does not do X, then Y may occur. **B** expresses this claim, and thus is the correct answer.

A is not the conclusion because the argument does not make this claim. It goes so far as saying that staff morale will continue to drop unless wages are increased, but does not claim that morale is already at dangerously low levels.

C is not the conclusion because the argument implies that productivity may not fall if the company increases wages.

D is not the conclusion. It is one of the reasons for drawing the conclusion.

E is not the conclusion because it goes beyond what the argument claims. The argument is limited to saying that paying better wages is necessary to avoid the risk of closing down, which does not imply that paying better wages will guarantee the survival of the company.

- 12 Lenton Cars hire out cars at a cost of £50.00 per day if the number of miles travelled is less than 80. There is an extra charge of £1.00 for every mile travelled over 80 miles. Dunford Hire charge £60.00 per day for taking the car out and then 50 p for every mile travelled.

For how many miles travelled would the cost of hiring a car be the same for both hire companies?

- A 100
- B 130
- C 140
- D 170
- E 180

This question requires you to devise a procedure in order to solve it.

One possibility would be to calculate the cost of hiring a car from both companies for each of the mileages given as options A, B, C, D and E. However, this could be somewhat time consuming, and it is not necessary to know the total cost, only the mileage for which both companies would charge the same.

A more efficient approach is to appreciate that for 80 miles travelled, there is a difference of £50.00 between the cost of hiring from Lenton Cars and Dunford Hire. This is because Lenton Cars would charge £50.00, whereas Dunford Hire would charge $£60.00 + 80 \times 50\text{p} = £100$. For every further mile travelled, Lenton Cars charges £1.00, whereas Dunford Hire charges 50p, so the difference in the total cost reduces by 50p, until both companies cost the same for 180 miles ($80 + £50.00 \div 50\text{p}$).

The correct answer is **E**.

- 13 The 400 seats in a parliament are divided amongst five political parties. No two parties have the same number of seats, and each has at least 20 seats.

What is the largest number of seats that the third largest party can have?

- A 22
- B 118
- C 119
- D 120
- E 121

Five parties share 400 seats. For the third largest party to have the maximum number of seats, the other parties must have the minimum number, whilst still meeting the other conditions set out in the question. So the fourth and fifth largest parties will have 21 and 20 seats respectively. This leaves 359 seats to be divided between the three largest parties.

For the third largest party to have as many seats as possible, the other two must have only slightly more seats. If we divide the remaining 359 seats as nearly as possible into thirds, we get: $1^{\text{st}} = 120$; $2^{\text{nd}} = 120$; $3^{\text{rd}} = 119$. However, this violates the condition that no two parties have the same number of seats. To avoid this, one of the seats of the third largest party must be transferred to the largest party.

This gives: $1^{\text{st}} = 121$; $2^{\text{nd}} = 120$; $3^{\text{rd}} = 118$; $4^{\text{th}} = 21$; $5^{\text{th}} = 20$.

The correct answer is **B**.

- 14 Tanya has 2 pigs. She estimates the weight of one as being 85 kg and the other as about 72 kg. She has ready access to a cheap source of potatoes but wishes to feed her pigs a 50/50 nutritional mix of potatoes and meal. Two tables from her feed book are reproduced below.

<i>State of pig</i>	<i>Amount of meal to feed each day(for feeding meal alone)</i>
80 kg - bacon weight	2.5 kg
60 kg - 80 kg	2.0 kg
50 kg - 60 kg	1.8 kg
40 kg - 50 kg	1.6 kg
30 kg - 40 kg	1.4 kg
20 kg - 30 kg	1.0 kg
Weaners 8 - 10 weeks	Up to 1.0 kg
Weaners 6 weeks to weaning	250 g - 350 g

<i>Nutritional equivalents to 1 kg of meal</i>	
Carrots	8 kg
Comfrey	5 kg
Grass	5 kg
Kale	7 kg
Potatoes	5 kg
Skim milk	6 litres
Swedes	8 kg
Whey	9 - 10 kg

How much meal should Tanya feed her pigs each day?

- A 2.25 kg
- B 2.50 kg
- C 4.50 kg
- D 11.25 kg
- E 22.50 kg

This question requires the careful selection and use of the relevant information. In particular, the whole of the right-hand table must be ignored, as the question only asks how much meal Tanya should feed her pigs.

One of the pigs has an estimated weight of 85 kg, which would require 2.5 kg of meal if it were to be fed meal only. Similarly, the other pig, with an estimated weight of about 72 kg, would require 2.0 kg of meal. However, Tanya wishes to feed her pigs a nutritional mix that is 50% meal, so the total amount of meal that she should feed her pigs each day is $1.25 \text{ kg} + 1.0 \text{ kg} = 2.25 \text{ kg}$.

Be careful not to be distracted by the right-hand table which could lead you to make the unnecessary and potentially misleading calculation that Tanya needs to feed her pigs $2.25 \times 5 = 11.25 \text{ kg}$ of potatoes each day.

The correct answer is **A**.

- 15 Levels of financing health services in advanced industrial countries have little effect, statistically speaking, on the health of the population. There are countries which spend six times as much per head on health care as Britain, and countries which spend only half as much: their populations end up with more or less the same life expectancy. Therefore arguments about levels of financing Britain's National Health Service are largely irrelevant to the health of the population.

Which of the following is an underlying assumption of the above argument?

- A The cost of Britain's Health Service is disproportionate to its effectiveness.
- B Spending is the most effective way of improving a health service.
- C Advanced industrial countries have failed to improve the health of their population.
- D Governments have a responsibility to organise efficient health care systems.
- E Life expectancy is a reliable measure of the health of the population.

The conclusion of the argument is signalled in the last sentence by the word 'therefore'. It is that arguments about levels of financing the health service are largely irrelevant to the health of the population. Another way of expressing this is that the amount of money put into the health service does not make much difference to the health of the population in the sense that if the level of finance increased, the health of the population would not necessarily improve; and if it decreased, the health of the population would not necessarily deteriorate. To support this, the argument compares Britain's financing of the health service with other countries, some of which spend much more per head, and some much less per head than Britain. It claims that despite these differences, the populations in all countries end up with more or less the same life expectancy. To use life expectancy in order to draw a conclusion about the health of the population, it must be assumed that life expectancy can indicate how healthy the population is. Thus **E** must be assumed.

A is not assumed. A claim that the cost is disproportionate to effectiveness must assume that either Britain's spending on health is at a level which should produce greater effects, or that the effects are greater than one would expect given a relatively low level of spending. Thus **A** assumes that there is a relationship between the amount spent on health and the healthiness of the population, which is what the passage argues against.

B also goes against what is argued in the passage, because the passage argues that spending has little effect on the health of the population. So **B** is not assumed.

C is not an assumption underlying the argument, because the argument draws no conclusion about the actual state of health of any population.

D does not need to be assumed by this argument, because the argument is not concerned with whether governments or private companies should organise health systems.

- 16 Ever since Uranus was discovered in 1781, astronomers have thought there might be more planets to be discovered in the Solar System. Because of small deviations in the orbits of Uranus and Neptune - deviations which would occur if another planet existed - some astronomers think there must be an undiscovered planet - Planet X. But the search for Planet X is futile, because these deviations would occur if the orbits had been wrongly predicted. Since Uranus and Neptune take many decades to circle the sun, astronomers must rely on old data in order to calculate their orbits. If this data is inaccurate, the calculated orbits are wrong. If the calculated orbits are wrong, Uranus and Neptune will deviate from them even if there is no Planet X.

Which of the following is the best statement of the flaw in the argument above?

- A From the fact that the old data is inaccurate, it cannot be inferred that the calculated orbits are wrong.
- B From the fact that the data about the orbits is old it cannot be inferred that it is inaccurate.
- C From the fact that deviations occur which would occur if Planet X existed, it cannot be inferred that Planet X exists.
- D From the fact that the calculated orbits are wrong, it cannot be inferred that Uranus and Neptune will deviate from them.
- E From the fact that Planet X has not been discovered, it cannot be inferred that the search for it is futile.

The first two sentences of the passage explain the context which is the background for the argument. The conclusion of the argument is that the search for Planet X is futile, and immediately a reason is given for this, i.e. that the deviations in the orbits of Uranus and Neptune would occur if the orbits had been wrongly predicted. The argument never actually states that the orbits have been wrongly predicted, but attempts to establish this with the following claims:

- Since Uranus and Neptune take many decades to circle the sun, astronomers must rely on old data in order to calculate their orbits.
- If this data is inaccurate, the calculated orbits are wrong.
- If the calculated orbits are wrong, Uranus and Neptune will deviate from them even if there is no Planet X.

But the most we are told about the data is that it is old and that if it is inaccurate, the orbits that have been calculated will be wrong. The argument must be assuming that because the data is old, it must be inaccurate. But this is an unjustified inference without further evidence. Thus, as **B** states, it cannot be inferred that the calculated orbits are wrong, and the argument cannot establish that there is no reason to think that Planet X exists.

A does not identify a flaw because if it were a fact that the old data is inaccurate, it would be reasonable to conclude that the calculated orbits were wrong.

C does not identify the flaw, because the argument does not conclude that Planet X exists.

D does not identify the flaw, because the argument does not infer that Uranus and Neptune will deviate from the calculated orbits. Instead, it states as fact that if the calculated orbits are wrong, then Uranus and Neptune will deviate from them. In this type of question, we are not trying to identify statements which may be untrue. We are trying to identify the answer that explains why the conclusion does not follow, even if all the reasons are true.

E does not identify the flaw, because the argument does not rely on the fact that Planet X has not been discovered as a reason for concluding that it does not exist.

- 17 According to a recent survey, people believe that about a quarter of the population will become victims of a violent crime in the next year, whereas crime statistics show that it is only about 1 per cent. Furthermore, those with the greatest fear of crime are the least likely to be affected. The elderly are the most fearful, although victims are most likely to be young males. Over the last few years there has been an increase in the number of television programmes which show re-enactments of crimes. Though they are often done with the best of motives, these re-enactments add to people's fears about violent crime by making it look more common than it is. It is time that we stopped making such programmes.

Which of the following, if true, would most weaken the above argument?

- A Crime re-enactments are made to look more realistic than they used to be.
- B Most elderly people are unaware of the statistics of violent crime.
- C Some types of violent crime have declined over the last few years.
- D The elderly are the group least likely to watch crime re-enactments on television.
- E Attempts have been made to ensure that statistics of violent crime are accurate.

The argument concludes that it is time to stop making programmes that show re-enactments of violent crimes. The reason given is that these re-enactments add to people's fears about violent crime by making it look more common than it is. Some support for this reason is offered by evidence from a survey showing that people do indeed think that violent crime is more common than it is, and that the elderly are the most fearful, although they are the least likely to be affected. The argument assumes that if the re-enactments were not shown, people, and particularly the elderly, would be less afraid of being a victim of violent crime. **D** weakens the argument, since if those most afraid of crime do not watch the programmes, then stopping showing re-enactments will have little effect on levels of fear of crime.

A does not weaken the argument that it is time to stop making programmes that contain re-enactments of violent crime, since if these re-enactments are increasingly realistic, this is a good reason for thinking that they may increase people's fear of crime.

B does not weaken the argument, since if elderly people are unaware of the crime statistics, they may be more inclined to form their opinions of the risk of being a victim of violent crime from the sort of television programmes described in the argument.

C does not weaken the argument, because the argument relies on people's perceptions of the amount of violent crime, rather than the actual amount of violent crime.

E does not weaken the argument, since the argument assumes that perceptions of crime are not based on statistics.

- 18 The island Republic of Outlandia has three banks, Barkers, Floyds and National. During a particular day Barkers customers have written cheques worth three million Lira to Floyds customers and cheques worth four million Lira to National customers. Floyds customers have written cheques worth four million Lira to Barkers customers and cheques worth five million Lira to National customers. National customers have written cheques worth three million Lira to Barkers customers and cheques worth two million Lira to Floyds customers.

The banks could settle all the debts to each other that arise because of these cheques by:

- A Floyds Bank paying one million Lira to Barkers Bank and Barkers Bank paying one million Lira to National Bank.
- B Floyds Bank paying three million Lira to National Bank.
- C Floyds Bank paying four million Lira to National Bank.
- D Barkers Bank paying one million Lira to National Bank.
- E Barkers Bank paying four million Lira to National Bank.

The most efficient way of approaching this question is to investigate the overall effect of making all of the payments described, as follows:

Barkers would pay Floyds three million Lira and National four million Lira, and would receive four million Lira from Floyds and three million Lira from National. Payments and receipts would cancel each other out.

Floyds would pay Barkers four million Lira and National five million Lira, and would receive three million Lira from Barkers and two million Lira from National. The payments would be four million Lira greater than the receipts.

National would pay Barkers three million Lira and Floyds two million Lira, and would receive four million Lira from Barkers and five million Lira from Floyds. The receipts would be four million Lira greater than the payments.

All the debts could therefore be settled by Floyds Bank paying four million Lira to National Bank.

The correct answer is **C**.

- 19 In an effort to monitor my fuel bills last winter I recorded the readings on the gas and electricity meters on the first of each month as follows:

	<i>Gas</i>	<i>Electricity</i>
1st October	2842	5368
1st November	3029	5874
1st December	3281	6355
1st January	3473	6891
1st February	3668	7506
1st March	3914	8052
1st April	4082	8511

During which month did I use the most gas?

- A November
- B December
- C January
- D February
- E March

The column of electricity meter readings must be ignored, because the question only concerns the amount of gas used.

A significant amount of time can be saved by observing that only between 1st November and 1st December and between 1st February and 1st March do consecutive readings differ by more than 200. This means that only two calculations are required, rather than six, as follows:

Gas used during November = $3281 - 3029 = 252$ units.

Gas used during February = $3914 - 3668 = 246$ units.

The correct answer is **A**.

- 20 On the M53 is a sign 'Warrington 20'. Just over half a mile further on is another sign 'Warrington 19'. This is not really surprising, since the distances are rounded to the nearest whole number of miles e.g. numbers of 4.5 and over but less than 5 become 5, numbers of 4 and over but less than 4.5 become 4. Half a mile further along the road is a sign showing 'Warrington 18'.

The distance to Warrington must now be between

- A 17.5 miles and 17.6 miles
- B 17.6 miles and 18.0 miles
- C 18.0 miles and 18.2 miles
- D 18.2 miles and 18.4 miles
- E 18.4 miles and 18.5 miles

For the first sign to show 'Warrington 20', the actual distance must be at least 19.5 miles.

If the distance from the first sign to the third sign (which shows 'Warrington 18') was exactly one mile, then the actual distance would be at least 18.5 miles, which should be rounded up to 19 miles.

However, the distance between the first and third signs is just over one mile, so the distance to Warrington from the sign showing 'Warrington 18' must be just less than 18.5 miles.

The correct answer is **E**.

- 21 Many modern zoos have abandoned the idea of showing large numbers of animals in favour of programmes of conservation illustrated by a few examples of endangered species. However, the only way for a zoo to attract the public is to have lots of interesting animals, whether endangered or not - the sort that everybody flocks to see. Unless zoos attract the public, they are not likely to be profitable.

Which one of the following conclusions is best supported by the passage above?

- A Endangered animals do not attract the public.
- B Zoos which have lots of interesting animals make a profit.
- C Public interest in conservation programmes and endangered species is very limited.
- D Zoos which concentrate on conservation and a few endangered species are unlikely to make a profit.
- E Popular zoos are the only ones that can afford programmes of conservation.

In the final two sentences of the passage we are told that if zoos do not have lots of interesting animals they will not attract the public, and that zoos which do not attract the public will not be profitable. It follows that any zoo which does not have lots of interesting animals will not be profitable. The first sentence describes modern zoos that have abandoned the idea of showing large numbers of animals in favour of programmes of conservation illustrated by a few examples of endangered species. Since we have concluded that zoos without lots of interesting animals will not be profitable, and since the zoos which concentrate on conservation will not have lots of animals, we can conclude that such zoos are not likely to make a profit. This is expressed in **D**.

A is not supported by the passage, because the passage says that having lots of interesting animals is necessary to attract the public, and it does not say that endangered animals are not interesting.

B does not follow from the passage. The passage implies that if a zoo does not have lots of interesting animals it will not make a profit, but this does not imply that if a zoo does have lots of interesting animals it will definitely make a profit.

C cannot be drawn as a conclusion from the passage. Although people may not be attracted by zoos that concentrate on the conservation of endangered species, they may nevertheless be interested in television programmes about endangered species, or in contributing to organisations such as the World Wildlife Fund.

E is not supported by the passage, because it goes further than the evidence given. The passage asserts that many modern zoos are engaging in conservation programmes, so clearly they can afford to do so, perhaps from sources of funding other than profits from public attendance.

- 22 Organic farming of animals and crops improves the environment through a reduced use of chemical fertilisers and pesticides but this does not go far enough. It would be preferable to have a totally vegetarian agriculture. Ninety per cent of the vegetable matter fed to farm animals passes straight through with its calorific content intact. By eating vegetables directly, rather than feeding them to animals, substantially less land would have to be farmed. The remaining land could be returned to its historical state - mixed deciduous woodland, which is what the countryside needs most of all.

Which of the following best expresses the main conclusion of the above argument?

- A Organic farming enhances the environment.
- B It would be preferable to have a totally vegetarian agriculture.
- C A totally vegetarian agriculture would reduce the need for pesticides.
- D There would be a need for less land under cultivation if we ate vegetables directly.
- E Land could be returned to mixed deciduous woodland.

The passage concerns the effect on the environment of using land to grow vegetable matter that is fed to animals. We are told that if we did not feed vegetables to animals, and thus ate only vegetables, less land would need to be farmed in order to feed the human population. This would allow land to be returned to mixed deciduous woodland, which is what the countryside needs. The conclusion drawn is that it would be preferable to have a totally vegetarian agriculture, as stated in **B**.

Although the argument states that organic farming improves the environment, **A** is not the conclusion, because the argument goes on to say that organic farming does not go far enough.

If less land would have to be farmed in a totally vegetarian agriculture, then possibly fewer pesticides would need to be used. But the argument does not make this point, so **C** is not the conclusion.

D and **E** are both reasons for the conclusion.

- 23 In the 1960s the drug cardiokind, after the usual period of carefully monitored clinical trials, was declared by its manufacturers to be unusually safe and very effective in lowering cholesterol levels in the blood. The World Health Organisation carried out exactly the same kind of trial on the drug but for a much longer period than the usual five years. The results in 1980 showed that the mortality rate from all causes for those on cardiokind was 25 per cent higher than for those who, though similar in other respects, had not taken the drug.

Which of the following is a conclusion that can be drawn from the above passage?

- A The five-year trial period may not be sufficient for all drugs.
- B Taking cardiokind reduces life expectancy by 25 per cent.
- C Cardiokind is less effective at reducing cholesterol levels than was at first thought.
- D After the original trials, the manufacturers concealed the side-effects of cardiokind
- E The monitoring programme instigated by the World Health Organisation was carried out efficiently

The passage relates to two trials carried out on the drug cardiokind, the first by the manufacturers of the drug and the second by the World Health Organisation. The first trial reported that the drug was safe and effective; the second lasted much longer than the usual five years and found that taking the drug was associated with a 25 per cent higher mortality rate. This suggests that taking cardiokind for a period longer than five years may put one at risk of earlier death. Thus we can conclude that for some drugs, a five-year monitoring period may not be sufficient to reveal adverse effects of taking the drug. This is expressed in **A**.

B does not follow, because the figure of 25 per cent refers to an increase in mortality rate, which is not the same as a decrease in life expectancy. We only know that more died amongst those who took the drug, not that those who died had their life expectancy curtailed by a quarter.

We cannot conclude **C** because we do not know the causes of the deaths of those who were taking cardiokind. If the drug were responsible for their deaths, this may have been because of side-effects rather than because of its failure to reduce cholesterol levels.

D cannot be drawn as a conclusion, because any side-effects of the drug may not have been evident during the five years that it was monitored by the manufacturers.

It is reasonable to assume that the World Health Organisation was efficient, but this cannot be concluded from the fact that their trial produced a result different from that of the manufacturers. So **E** is not supported by the passage.

24 My mother still makes tea with the old saying:

"one spoon per person and one for the pot".

We used to buy a packet of tea every week but since grandmother came to live with us we have to buy two packets every fifth week and one otherwise.

How many people were at home before grandmother arrived?

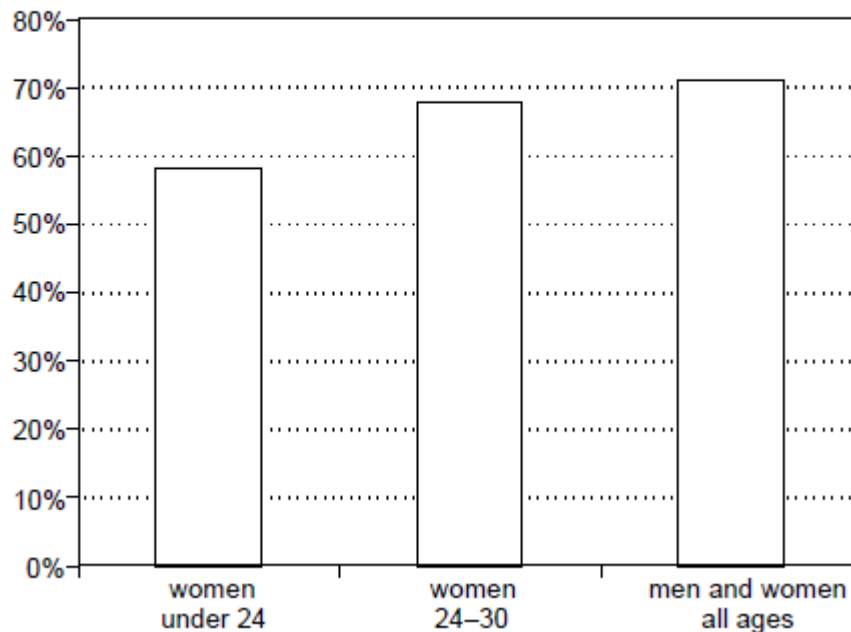
- A 4
- B 5
- C 6
- D 9
- E 11

The family now uses six packets of tea in the same time they previously used five packets. From this, you should deduce that adding one more spoonful of tea every time since grandmother's arrival has increased the amount of tea used by 20%.

The only two consecutive numbers that differ by 20% are 5 and 6, so, bearing in mind 'one for the pot', there are now 5 people at home and there were 4 before grandmother arrived.

The correct answer is **A**.

- 25 The graph below shows the percentage of young women intending to vote at the next election compared with the figure for all ages of men and women.



Which of the following statements can be deduced from the information provided?

- 1 Women are more likely to vote as they get older.
- 2 Women are less likely to vote than men.
- 3 Women are less likely to vote than at the last election.

- A 1 and 2 only
B 2 and 3 only
C 1 and 3 only
D all of them
E none of them

This problem is best approached by considering each of the options (1 to 3) in turn.

- 1 We only have information for women under 24 and aged 24–30. It would be unwise to assume that the difference in voting intentions between these two groups is part of a general trend for women to be more likely to vote as they get older.
- 2 In the absence of information about the voting intentions of women over 30, we can't compare the voting intentions of women and men.
- 3 We have no information about voting intentions at the last election.

None of the statements can be deduced from the information provided, so the correct answer is **E**.

- 26 It is 4.30 pm and Jane, Jean and June have just arrived together at the Ritzy cinema. Jane wants to see 'The Rock', but Jean is determined to see 'Mission Impossible' and June would rather see 'Empire Records', so they decide to split up.

RITZY CINEMA GRAND PARADE HIGH STREET GRANCHESTER
From the creators of <i>"Dumb and Dumber"</i> Woody Harrelson Randy Quaid Bill Murray KINGPIN (12) Daily 12.00 3.30 5.50 8.10 (120 minutes)
Jim Carrey is THE CABLE GUY (12) Daily 12.50, 3.30, 5.50, 8.10 (120 minutes)
Expect the impossible! Tom Cruise MISSION IMPOSSIBLE (PG) Daily 12.30, 3.00, 5.30, 8.10 (110 minutes)
Sean Connery Nicholas Cage THE ROCK (15) Daily 1.50, 4.50, 7.50 (135 minutes)
EMPIRE RECORDS (12) Daily 2.50, 5.40, 8.20 (90 minutes)

What is the earliest possible time that Jane, Jean and June can arrange to meet together after their films?

- A 6.45
- B 7.05
- C 7.10
- D 7.20
- E 8.20

All the information given about 'Kingpin' and 'The Cable Guy' must be ignored, because none of the girls are going to see either of them. For each of the other three films, only the first performance time after 4.30 and the running time of the film are relevant.

Avoid making the mistake of adding the length of the longest film, 2 hours 15 minutes (135 minutes), to 4.30, which would produce 6.45 as the answer. Also, do not assume that each performance time is the same as the finishing time of the previous performance, which would produce 8.20 as the answer (the starting time of the last performance of 'Empire Records'). [continues on next page]

You should work out at what time each of the films will finish by adding the running time to the starting time. The latest of these finishing times is the earliest they can arrange to meet together after their films.

Jane's film, 'The Rock', begins at 4.50 and finishes 2 hours 15 minutes (135 minutes) later at 7.05.

Jean's film, 'Mission Impossible', begins at 5.30 and finishes 1 hour 50 minutes (110 minutes) later at 7.20.

June's film, 'Empire Records', begins at 5.40 and finishes 1 hour 30 minutes (90 minutes) later at 7.10.

The earliest time they can meet together after their films is therefore 7.20.

The correct answer is **D**.

27 The treatment of unauthorised immigrants by many countries is often cruel and lacking in compassion. Even refugees from war-torn or famine-stricken regions can find themselves imprisoned on arrival or deported back to the place they have fled. It is a terrible decision to have to take, but if we make an exception to the law for one person, we ought to make the same exception for everyone. If some illegal entrants were allowed to stay, others would have to be treated equally, and no country - especially one that is already overpopulated - could physically accommodate the numbers that would then follow. The regulations have to be enforced rigidly, even if this means turning away people in great need.

Which of the following best illustrates the principle underlying the argument above?

- A Because of fire regulations, the number of people attending the concert will have to be strictly limited.
- B Growing urban traffic congestion means that in the future the numbers of cars entering some city centres will have to be restricted.
- C All shop-lifters must be prosecuted because if one is let off others would rightly expect the same leniency.
- D There is no one rule that can be applied for all prisoners seeking parole: every case is different and should be decided on its merits.
- E If there are not enough hospital places for all those who need them, the most urgent ones must be treated first even if others have waited a long time.

The argument concludes that the regulations on unauthorised immigration must be rigidly enforced, irrespective of the effects on those turned away. This is based on the principle that if we make an exception for one, we should treat all others in the same way, together with the claim that if we allowed all unauthorised immigrants to stay, the country could not accommodate the numbers. **C** applies the same principle to the treatment of shop-lifters, claiming that we should prosecute all of them, because letting one off would require letting off all shop-lifters.

A does not rely on the principle of treating everyone equally. It sets out the consequences of fire regulations which will result in some people being excluded whilst others attend the concert.

B suggests restrictions which will affect some, but probably not all, motorists, so it does not rely on the principle of equal treatment.

D recommends making decisions on the basis of the merits of individual cases, which is what the passage argues against.

E recommends decisions based on greatest need, which is at odds with the principle in the passage.

28 In this Senior Management post we need someone who can keep a cool head in a crisis and react quickly to events. The applicant says he suffers from a phobia about flying, and panics especially when an aircraft is landing and that therefore he would prefer not to travel abroad on business if it could be avoided. He is obviously a very nervous type of person who would clearly go to pieces and panic in an emergency and fail to provide the leadership qualities necessary for the job. Therefore this person is not a suitable candidate for the post.

Which of the following is the best statement of the flaw in the argument above?

- A It assumes phobias are not treatable or capable of being eliminated.
- B It assumes that the person appointed to the job will need to travel abroad.
- C It assumes that a specific phobia indicates a general tendency to panic.
- D It assumes that people who stay cool in a crisis will be good leaders.
- E It fails to take into account other qualities the person might have for the post.

The argument's conclusion is that the person is not a suitable candidate, based on the fact that the person appointed needs to keep a cool head in a crisis, and that the candidate has said that he panics when an aircraft is landing because he has a phobia about flying. The argument takes the candidate's statement as evidence that he will go to pieces and panic in an emergency. But this cannot be concluded simply from the fact that the person tends to panic in a very specific situation due to a phobia. Thus, as stated in **C**, the argument must be making the unwarranted assumption that a specific phobia indicates a general tendency to panic.

The argument does not have to assume **A**, because the conclusion concerns the suitability of the candidate as he is now, i.e. as a sufferer from a phobia.

B does not identify the flaw, because the argument does not claim that the candidate is unsuitable on the grounds of his unwillingness to travel abroad.

The argument assumes that staying cool in a crisis is necessary in order to be a good leader, but it does not have to assume that all those who stay cool in a crisis will be good leaders, so **D** does not identify a flaw.

The argument does not consider all the qualities necessary for the post, but **E** does not identify a flaw because the argument is simply trying to establish that the candidate should be rejected because he lacks one necessary quality.

- 29 If you want to earn a good salary these days, you have to gain considerable experience of working abroad. Since I've always wanted to earn a huge salary, it's obvious that I'm going to have to leave this country for some period of time.

Which of the following most closely parallels the reasoning used in the argument above?

- A If I had more time to spend on this project, I know that it would be very successful. I've been told that I'm not going to be given enough time, so the project isn't going to succeed.
- B Sam knew that if he wanted to write a film script, he'd have to learn the special techniques needed for such scripts. He has enrolled on a course to learn how to write them, so he'll soon be writing his first script.
- C If the Foreign Secretary can bring the two sides together for talks, there's a good chance for peace. Peace is something that both sides want, so he'll be talking to both sides soon.
- D If the doctor thinks that you should be allowed out of bed for a short while, then you must be recovering well from your operation. You have recovered much quicker than she thought you would have, so you'll be out of bed a lot from now on.
- E Annie says that if she really wants to win the London Marathon race, she'll have to train very hard every day. She told me that she is determined to win the London Marathon, so that means she'll be working hard on her training programme every day from now on.

We can summarise the structure of the initial argument as follows:

If one wants to achieve X, one must do Y.

I want to achieve X, so I must do what is necessary for Y.

(X = earning a good salary, Y = working abroad, 'what is necessary for Y' = leaving the country)

The argument which is closest to this structure is **E**, in which X = wanting to win the London Marathon, and Y = training very hard every day.

A has a different structure: If X then Y. X will not happen, so Y will not happen.

(X = spending more time on the project, Y = being very successful.)

B has the structure: If one wants to do X, one has to do Y. Sam is doing Y, so he will do X.

(X = writing a film script, Y = learning the special techniques.)

C has the structure: If X can be done, then Y. Both sides want Y, so X will be done.

(X = bringing the two sides together, Y = there's a good chance of achieving peace.)

D has the structure: If X, then Y must be happening. Y is happening, so X.

(X = doctor allowing you out of bed, Y = recovering well from the operation.)

- 30 The table shows the numbers of male and female students studying a selection of subjects at a college.

<i>Subject</i>	<i>Male</i>	<i>Female</i>
Biology	24	41
Geography	26	32
German	3	12
Mathematics	104	61
Music	6	10
Sociology	18	67

In which other subject was the balance of male and female students closest to that for Music?

- A Biology
- B Geography
- C German
- D Mathematics
- E Sociology

This is a question that does not require precise calculations. You should observe that the number of male students studying Music is just over half the number of female students.

The only other subject for which the number of male students is close to half the number of female students is Biology. The number of male students studying Biology is just over half the number of female students, similar to the balance of male and female students studying Music.

The correct answer is **A**.

31 The following table provides details of the postage rates for different weights of packages.

Weight not over	First Class	Second Class
60 g	25 c	19 c
100 g	38 c	29 c
150 g	47 c	36 c
200 g	57 c	43 c
250 g	67 c	52 c
300 g	77 c	61 c
350 g	88 c	70 c
400 g	\$1.00	79 c
450 g	\$1.13	89 c

Weight not over	First Class	Second Class
500 g	\$1.25	98 c
600 g	\$1.55	\$1.20
700 g	\$1.90	\$1.40
750 g	\$2.05	\$1.45
800 g	\$2.15	Not Admissible over 750 g
900 g	\$2.35	
1000 g	\$2.50	
Each extra 250 g or part thereof 65 c		

In my capacity as Secretary of the Black Knight Chess Club I am about to send minutes of the last meeting to each of the eight other members of the Committee.

The weight of each envelope, including its contents, is 70 g. Three of the members are new to the committee and I intend to include with their minutes a copy of our constitution, which weighs 40 g.

What will be the cost of sending these items second class?

- A \$1.40
- B \$1.82
- C \$2.53
- D \$2.89
- E \$3.31

This question requires the careful selection and use of the relevant information. In particular, you must ignore the 'First Class' columns in the table as you are asked about sending the items second class.

First of all, you must be aware that there will be eight separate packages. Do not be tempted to calculate the total weight of all the contents as 680 g, which, as a single package, would cost \$1.40 for second class.

The packages to be sent to five of the committee members weigh 70 g each. This is over 60 g but not over 100 g, so they will cost 29 c each for second class, a total of $5 \times 29 \text{ c} = \1.45 .

The packages to be sent to the three new committee members weigh $70 \text{ g} + 40 \text{ g} = 110 \text{ g}$ each. This is over 100 g but not over 150 g, so they will cost 36 c each second class, a total of $3 \times 36 \text{ c} = \1.08 .

The total cost of sending all eight items second class will therefore be $\$1.45 + \$1.08 = \$2.53$.

The correct answer is **C**.

- 32 Three lighthouses are visible from the promenade at Rivermouth. One flashes every $1\frac{1}{2}$ minutes, another flashes every 2 minutes, and the third flashes every 50 seconds.

All three have just flashed at the same time.

How long will it be before they all flash at the same time again?

- A 6.0 minutes
- B 7.5 minutes
- C 10.0 minutes
- D 30.0 minutes
- E 150.0 minutes

The most efficient approach to this question is to establish how often two of the lighthouses will flash together, then compare this with the third one.

Starting from the time when they have all flashed together, the first one will flash again after $1\frac{1}{2}$ minutes, 3 minutes, $4\frac{1}{2}$ minutes, 6 minutes etc. and the second one will flash again after 2 minutes, 4 minutes, 6 minutes etc. Clearly, these two will flash at the same time every 6 minutes.

The third lighthouse will flash again after 50 seconds, 1 minute 40 seconds, 2 minutes 30 seconds, 3 minutes 20 seconds, 4 minutes 10 seconds, 5 minutes 00 seconds etc., which means that it only flashes a whole number of minutes later than the starting time every 5 minutes.

The smallest time interval that is a multiple of both 6 minutes and 5 minutes is 30 minutes, which is therefore how long before all three lighthouses flash at the same time again.

The correct answer is **D**.

- 33 There is a great concern about the threat to natural woodland in the world, especially the rain forests of tropical areas such as South America. People are often urged to re-cycle paper in order to save trees. However, the type of wood used for paper is softwood which is grown as a renewable crop in areas where there is no remaining natural woodland. Producing paper from these trees does not harm the natural environment any more than does the production of bread from wheat.

Which one of the following is a conclusion which can be drawn from the above passage?

- A Re-cycling paper will not contribute directly to saving the world's natural woodland.
- B There is no point in re-cycling paper for environmental reasons.
- C There is no need to be concerned about a threat to the world's natural woodland.
- D The environment is not threatened by the cultivation of softwood forests.
- E There is no need to reduce the amount of paper being used in the modern world.

The passage says that paper is produced from softwood grown as a renewable crop in areas without natural woodland. So no natural woodland is destroyed in order to produce paper, and thus we can conclude that re-cycling paper will not have an effect on attempts to save natural woodland. So **A** is the conclusion that can be drawn from the passage.

B does not follow from the passage, because the passage is concerned mainly with growing trees for paper. But the wood has to undergo a production process, which may have greater effects on the environment than would the process of re-cycling paper.

C does not follow because there may be potential threats to woodland other than paper production, for example, clearance of forests to make space for crop growing.

D cannot be drawn as a conclusion. The passage says that the production of paper is no more harmful to the environment than the production of bread from wheat, but since both involve industrial processes, there may be effects on the environment, and if the scale of paper production were greatly increased, the effects could be threatening.

E cannot be concluded because there may be reasons other than the desire to preserve natural woodland for using less paper, e.g. reducing the scale of industrial production of paper.

- 34 Peat is organic matter which develops in wetland areas. It is the ideal growing medium for plants, and there is a tremendous demand for it from gardeners, both amateur and professional. But only three per cent of the earth's land surface is covered in peatland, and continued harvesting of peat will endanger these unique wetland habitats. Peat harvesting should be stopped immediately and gardeners should be encouraged to use an alternative.

Which of the following best expresses the main conclusion of the argument above?

- A Only three per cent of the land on our planet is covered in peatland.
- B Taking too much peat will destroy the unique wetland areas in which it develops.
- C Peat cannot develop except in wetland areas.
- D No more peat should be extracted and a different growing medium for plants should be promoted.
- E Peat is a very popular growing medium used by amateur gardeners and professional growers.

The word 'should' in the last sentence indicates that a recommendation is being made. In the rest of the passage there are reasons as to why this recommendation should be followed. They are that peat is an ideal growing medium, and in great demand; that peatland covers only three percent of the earth's land surface; that peat develops in wetland areas that are unique habitats which will be endangered by continuing peat harvesting. Thus the main conclusion is that peat harvesting should be stopped immediately and gardeners should be encouraged to use an alternative. This is expressed in **D**.

A, **B** and **E** are reasons for the conclusion. It is not explicitly stated that peat cannot develop in areas other than wetland, but **C** is related to the first sentence of the passage, which is one of the reasons.

- 35 What causes the periods of strong and widespread stormy weather that Earth sometimes suffers? The answer is sunspots. Periodically, the sun develops relatively cool dark areas known as sunspots. Scientists have found that periods of high sunspot activity coincide with the stormy periods on Earth.

Which of the following is the best statement of the flaw in the argument above?

- A It disputes the fact that storms are the result of low-pressure systems in the Earth's atmosphere.
- B It ignores the influence of periods of low sunspot activity on Earth's weather systems.
- C It assumes that because two events coincide, one is the cause of the other.
- D It overlooks the fact that there is always a storm somewhere on Earth.
- E It ignores the fact that there are stormy periods in some areas but not in others while there is sunspot activity.

The argument concludes that what causes periods of strong and widespread stormy weather on Earth is sunspots, i.e. the cool dark areas that develop on the sun from time to time. The only reason given for this conclusion is that scientists have found that periods of high sunspot activity coincide with the stormy periods on Earth. However, the fact that two things happen at the same time is not sufficient evidence to conclude that one causes the other. So the argument must be making the unwarranted assumption that because two events occur at the same time, one causes the other. This is pointed out in **C**.

A does not describe the flaw, because the argument does not dispute the fact that storms result from low-pressure systems. The argument is concerned not just with normal storms, but with periods of unusually strong and widespread stormy weather. If it were true that sunspots cause these periods, it is possible that they could do so by causing unusually strong and widespread low-pressure systems.

B does not identify a flaw, because the argument does not need to discuss the result of low sunspot activity in order to draw a conclusion about the effect of high sunspot activity.

D does not identify a flaw, because the argument is not discussing what causes normal storm activity on Earth.

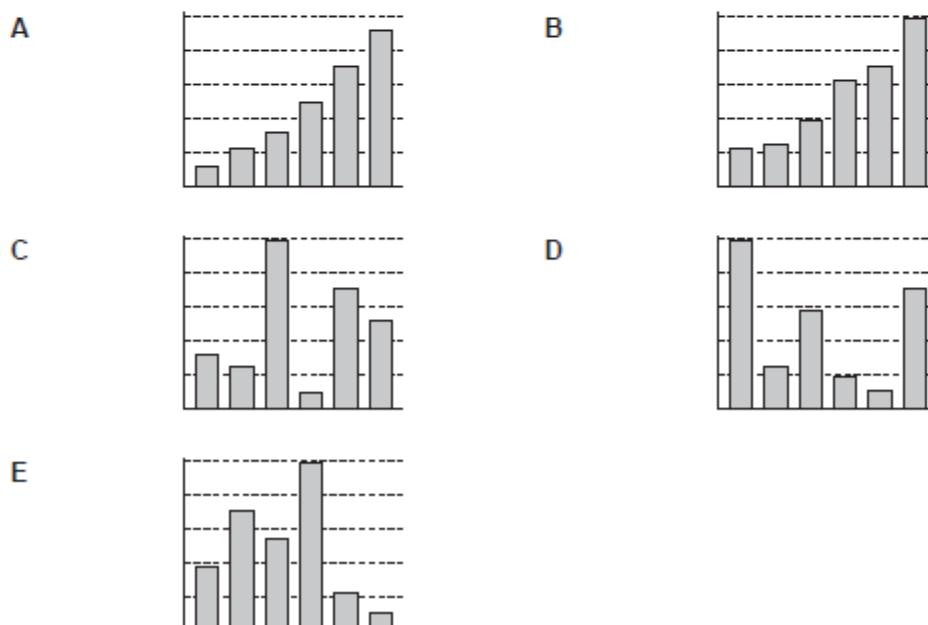
E does not identify a flaw, because the phrase 'strong and widespread stormy weather' does not imply that during such periods there will be no areas on Earth where the weather is not stormy.

- 36 The table shows the number of hours of sunshine at UK centres on a spring day. These are to be plotted on a series of bar charts by Tracey, the trainee meteorologist.

	<i>Bognor</i>	<i>Ventnor</i>	<i>Bangor</i>	<i>Tenby</i>	<i>Ryde</i>	<i>Tiree</i>
<i>Sunshine</i>	5	7	9.7	2.2	3.3	1

Unfortunately, Tracey has not quite got to grips with her computer. Not only does she omit the legend showing which resort is which, she also makes inputting errors in some charts and enters the data in different order to that presented in the table in all of them. Despite this she does produce one chart which is numerically representative of the situation.

Which one is it?



This question requires you to compare the heights of the bars in the bar charts with the figures given in the table for hours of sunshine, independently of the order in which they are presented.

You should observe that in each of the bar charts, the second highest bar, representing 7 hours of sunshine, is exactly the same height. You can conclude from this that the scale of each of the charts is the same, with one unit on the y-axis (i.e. from one dotted line to the next) representing 2 hours of sunshine.

You may find it difficult to decide whether some of the bars are exactly the correct height, for instance the bar in **C** that is supposed to be 2.2. However, a number of the bars are clearly incorrect.

For instance:

The bar that should be 9.7 in **A** is no more than about 9.0.

The bar that should be 5 in **B** is greater than 6.

The bar that should be 3.3 in **D** is less than 2.

The bar that should be 3.3 in **E** is almost 4.

The bars in **C** are, from left to right, 3.3, 2.2, 9.7, 1, 7 and 5. The correct answer is **C**.

- 37 The roller coaster at Blue Top Towers Park runs continuously from 10.00 am to 6.00 pm during the week and from 9.00 am to 7.00 pm at weekends.

Each ride lasts for 3 minutes.

It can take up to 5 minutes to unload and reload between rides at busy periods, but even when the park is quiet there is a 2 minute gap between the end of one ride and the beginning of the next.

What is the maximum number of rides there can be in one day?

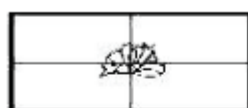
- A 60
- B 75
- C 96
- D 120
- E 200

To answer this question successfully, you must appreciate that for the number of rides in one day to be the maximum, the park must be open for as long as possible and the gap between the end of one ride and the beginning of the next must be as short as possible. You need, therefore, to calculate the number of rides that take place between 9:00 am and 7:00 pm (at a weekend) with a 2-minute gap between the end of each ride and the beginning of the next.

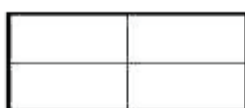
The minimum time from the beginning of one ride to the beginning of the next one is 3 minutes + 2 minutes = 5 minutes, so the maximum number of rides per hour is $60 \div 5 = 12$. From 9:00 am to 7:00 pm is 10 hours, so at the weekend there could be as many as $10 \times 12 = 120$ rides in one day.

The correct answer is **D**.

- 38 A 150 cm length of string is tied around a book measuring 30 cm x 20 cm x 2 cm as shown in the diagram. After knotting and tying a bow, 24 cm of string was left over.



top



bottom



side

A second piece of string, also 150 cm long, is used to tie up a parcel of several copies of the book stacked back cover to front cover. A bow similar to that on the first parcel is tied and then no string is left over.

How many copies of the book are there in the second parcel?

- A 3
- B 4
- C 8
- D 12
- E 15

You do not need to know that the lengths of string are 150 cm, or that the books are 30 cm long and 20 cm wide, only that these figures are the same for both parcels and the bows are similar.

The only difference between the two parcels is the thickness. You should appreciate from the diagrams that every additional book adds 2 cm to the parcel's thickness, requiring an extra $4 \times 2 \text{ cm} = 8 \text{ cm}$ of string around the books.

The 24 cm of string left over when the parcel contains only one book allows a further $24 \div 8 = 3$ copies of the book to be added to the parcel. There are therefore 4 copies of the book in the second parcel.

The correct answer is **B**.

- 39 A painting in our local museum has just been shown, by using X-rays, to be recent and thus not the work of an old master as previously thought. This has caused its value to drop from millions to almost nothing. Yet no art experts were able to detect that it was not 'the real thing'. This means that the value of a painting is determined by who painted it rather than any intrinsic artistic merit.

Which of the following, if true, would most strengthen the above argument?

- A The works of some forgers of art now sell for very large amounts of money.
- B Many old masters changed their style during their career.
- C In controlled tests, art experts have been shown to be very good at identifying the painters of works they have not seen before.
- D Until its true origin was discovered, the painting in our museum was widely regarded as a masterpiece.
- E The works of the old masters fetch higher prices than modern paintings.

The conclusion of the argument is that the value of a painting is determined by who painted it rather than any intrinsic artistic merit. This general claim is supported by the example of one painting which, when it was thought to be the work of an old master, was worth millions, but, now that it has been proved to have been painted recently, is worth almost nothing. If it is true, as **D** states, that the painting was regarded as a masterpiece when its true origin was unknown, it is likely that people thought highly of it simply because they thought it was painted by a famous and much admired painter. Thus **D** strengthens the argument.

A claims that paintings by forgers can sell for large amounts of money. Because **A** does not say whether the purchasers of these paintings know that they are forgeries, we cannot know whether they are prepared to pay a high price because they believe that the painting was by a famous artist. So **A** does not strengthen the conclusion that the value of a painting is determined by who painted it.

B may explain why it is not always easy for experts to determine whether or not a painting is by an old master, but this is irrelevant to the claim that it is not the intrinsic merit that determines the value of a painting.

C, if true, suggests that art experts are often identifying intrinsic merit in a painting when they attribute paintings to particular artists without having been told who the painter was. So **C** does not strengthen the argument.

E does not strengthen the argument, because it does not say why the works of old masters are valued more highly than modern paintings. It may be because of who painted them or it may be due to greater intrinsic merit.

- 40 Calves farmed for veal are reared in extremely cruel conditions and have a short and miserable life. Other meats are available, such as lamb, and meat eaters who are concerned about cruelty to animals should avoid veal and consume one of these alternatives.

Which one of the following is an underlying assumption of the above argument?

- A Animals should be allowed to live as long as possible before being eaten.
- B Calves should not be reared for consumption of their meat.
- C The methods used to rear other animals for meat are not equally cruel.
- D Animals have a right to be treated humanely.
- E Meat eaters who are concerned with cruelty to animals do not eat veal.

The passage recommends that meat eaters who are concerned about cruelty to animals should eat meats other than veal. Two reasons are given for this: that calves farmed for veal are reared in extremely cruel conditions and have short and miserable lives; and that other meats are available. If the production of these other meats were just as cruel as the production of veal, the recommendation would not be supported. So the argument must assume what is stated in **C**.

The argument does not have to assume **A**. Its conclusion focuses upon the cruelty of the rearing of calves for meat, rather than the shortness of the lives of veal calves.

B and **D** are not assumed, since the recommendation is addressed only to those who are concerned about cruelty to animals. It does not draw a conclusion that rearing calves in the conditions described is wrong, or that it infringes animals' rights.

E is not an assumption. The argument concludes that those concerned about cruelty to animals should not eat veal, so it must be assuming that some of them do eat veal.

- 41 Modern industrialised countries use far greater quantities per head of metals, water, petroleum, coal, and wood-products than developing countries, much of it being imported from the developing countries. This is the natural consequence of the higher general standard of living in present-day industrialised countries. Even assuming that the population of developing countries remains fixed at present levels, it follows that, if the standard of living in these countries is to reach those of present-day industrialised countries, a considerable increase in production and hence considerably higher consumption of resources will be unavoidable.

Which of the following, if true, would most weaken the above argument?

- A The population of developing countries is likely to increase substantially over the next decade.
- B Many of the resources needed for industrial production are increasingly expensive to produce.
- C New technological developments in industrial processes are likely to reduce the need for high consumption of resources.
- D The population of modern industrialised countries is increasing at a much slower rate than that of developing countries.
- E The gap between the standard of living in modern industrialised countries and that in developing countries has increased in the last twenty years.

The argument attributes the higher use of natural resources in industrialised countries to the higher standard of living in these countries as compared with developing countries. It draws the conclusion that if the standard of living in developing countries is to rise to that of modern industrialised countries, then even with no increase in population in developing countries there would be much higher consumption of the Earth's resources. However, if new technologies in industrial processes reduce the need for high consumption of resources, it may be possible for the standard of living in developing countries to rise without a huge increase in the use of Earth's resources.

Thus **C**, if true, weakens the argument.

A does not weaken the argument, because if the population of developing countries rises substantially, it will be even more unlikely that standards of living can rise in those countries without a considerable increase in consumption of resources.

B does not weaken the argument, because the argument concerns the level of consumption of resources, and not the cost of making those resources available for industrial use.

D does not weaken the argument, because an increase in the population of all countries is likely to increase demand for natural resources.

E identifies a factor which could make it even more costly in natural resources to bring the standard of living in developing countries up to that of industrialised countries, namely the increasing gap in standards of living between the two. Thus **E**, if true, strengthens the argument.

- 42 A cutlery drawer is divided into compartments. The 'knife' compartment contains six gold knives and six silver knives. The 'fork' compartment contains six gold forks and six silver forks.

What are the least numbers of knives and forks that must be removed from the drawer in the dark to guarantee having a gold knife and matching fork?

- A Three knives and three forks
- B Six knives and six forks
- C Seven knives and one fork
- D Seven knives and six forks
- E Seven knives and seven forks

To answer this question, you need to consider the worst-case scenario. Be aware that the question specifies a **gold** knife and a matching fork, not just a matching pair.

It is possible that the first six knives and the first six forks removed from the drawer could be all the silver ones, leaving only gold knives and forks in the drawer. A seventh knife and a seventh fork are therefore required to **guarantee** having a gold knife and a matching fork.

The correct answer is **E**.

43

WHEELERS CYCLES
Bicycles for Hire
8 am - 8 pm Daily
Hourly Rate
8 am - 4 pm : £2 per hour
4 pm - 8 pm : £1 per hour
All Day Hire : £15
Refundable Deposit : £10

How much will it cost me to hire a bicycle from Wheelers Cycles from 11 am for eight hours?

- A £ 13
- B £ 15
- C £ 16
- D £ 20
- E £ 23

The deposit of £10 is not part of the cost because it is refundable, so must be ignored.

You may think that all-day hire is likely to be cheaper than paying for exactly 8 hours (and, indeed, is £1 cheaper than 8 hours at £2 per hour), but you need to calculate how much 8 hours from 11 am will cost, in order to make the comparison.

The first 5 hours, from 11 am to 4 pm will cost $5 \times £2 = £10$, and the remaining 3 hours, from 4 pm to 7 pm, will cost $3 \times £1 = £3$. The cost of £13 for 8 hours from 11 am is therefore less than the cost of all-day hire.

The correct answer is **A**.

44 Sally is helping her father dig worms for fishing.

"That's exactly enough," he says as she places a worm in his tin.

"How many do you need?" she enquires.

"I use 4 worms on my hook and reckon on having to replace an average of one of these each time I cast. I cast 12 times an hour. Today I will fish 5 pools spending an hour at the first 4 and an hour and a half at the fifth. I always discard the worms on my hook when walking between pools."

How many worms are in the tin?

- A 66
- B 69
- C 81
- D 86
- E 264

In this question you need to make use of all the information given.

Sally's father will spend either an hour or an hour and a half at each of the pools, so you must determine how many worms he expects to use in one hour and how many he expects to use in an hour and a half.

He always discards the worms on his hook when walking between pools, so be careful not to make the mistake of calculating how many worms he would use if he fished continuously for $5\frac{1}{2}$ hours (which would be 69).

In one hour he casts 12 times, using 4 worms for the first cast and (on average) 1 new one for each of the other 11, a total of 15.

In an hour and a half he casts $1\frac{1}{2} \times 12 = 18$ times, using 4 worms for the first cast and (on average) 1 new one for each of the other 17, a total of 21.

The total number of worms he expects to use today, and therefore the number in the tin, is $4 \times 15 + 21 = 81$.

The correct answer is **C**.

- 45 The company has been making large losses for some time. If it continues to make such large losses, a sizeable number of the workforce will lose their jobs. Unfortunately, the town's economy will suffer considerably if many of the employees are made redundant. So if the company continues to operate with such losses, the economy of the town will be badly affected.

Which of the following most closely parallels the reasoning used in the above argument?

- A If we do not pay nurses more, many of them will go and work in private hospitals. So there will be fewer of them to provide care in our public hospitals. Therefore, if we want to maintain high standards of nursing care in our public hospitals, we must pay nurses more.
- B If this hot weather continues, the number of families taking foreign holidays will continue to fall. A number of travel companies will go out of business if fewer people book foreign holidays. Therefore, if this hot weather continues, we can expect many bargain holidays from travel companies.
- C If everyone was prepared to pay more taxes, we could afford to raise the level of pensions. If old people were given increased pensions, they could spend more on food and heating. So if we want old people to lead much happier and healthier lives, we must be prepared to pay higher taxes.
- D If house prices continue to fall, then more people will buy houses. The prices will then stop declining if more people are buying. So the fall in house prices must soon come to an end.
- E If the present drought does not end soon, water will have to be rationed in many areas. Once water rationing is brought in, people are going to complain about having to pay high water charges. So unless we get some rain soon, we are going to soon find people complaining about their water bills.

The argument in the passage has the following structure:

If X, then Y. If Y, then Z. So if X, then Z.

(X = the company continues to make large losses, Y = the workforce will lose their jobs, Z = the town's economy will suffer.)

E has the same structure as the argument in the passage. In **E**, X = the drought does not end soon, Y = water will have to be rationed, Z = people will complain about paying higher water charges.

A has a different structure: If not X then Y, if Y then Z, so if W then we should X. (X = pay nurses more, Y = nurses will work in private hospitals, Z = fewer nurses in public hospitals, W = we want to maintain high standards of nursing care in public hospitals.)

B has the structure: If X then Y, if Y then Z, so if X then W. (X = hot weather continues, Y = fewer people take foreign holidays, Z = travel companies go out of business, W = we can expect bargain holidays from travel companies.)

C has the structure: If X then Y, if Y then Z, so if W then we should be X. (X = prepared to pay higher taxes, Y = could raise the level of pensions, Z = pensioners spend more on food and heating, W = pensioners lead happier and healthier lives.)

D has the structure: If X then Y, if Y then Z, so soon not X. (X = house prices continue to fall, Y = more people will buy houses, Z = the prices will stop declining.)

- 46 There has been a decline in the rate of many of the illnesses of old age. For example, arthritis, dementia, and strokes are all declining year by year. The causes of this decline include such medical advances as beta-blockers to control high blood pressure and the fitting of hip replacements. There is, however, another factor. The present generation of 60- and 70- year-olds had much better nutrition as children than did their parents. Good nutrition in childhood is important in laying the foundations of good health in adulthood. Since improvements in nutrition have continued over the past sixty years, we can expect that many of the illnesses of old age will continue to decline.

Which one of the following best expresses the main conclusion of the above argument?

- A We can expect that improvements in nutrition will continue.
- B The rate of many of the illnesses of old age has declined.
- C Medical advances have significantly reduced the rate of diseases of old age.
- D The fall in the rate of many of the illnesses associated with old age will continue.
- E Improvements in nutrition have been very important in maintaining good health in old age.

The first part of the argument mentions some of the factors, i.e. medical advances, which are contributory causes of the decline in the incidence of illnesses of old age. It tells us that there is another important factor, and gives the following reasons:

- the present generation of 60- and 70-year-olds had much better nutrition as children than their parents did,
- good nutrition in childhood is important in laying the foundations of good health in adulthood,
- improvements in nutrition have continued over the past sixty years.

These, taken together, support the conclusion that we can expect that many of the illnesses of old age will continue to decline. **D** expresses this conclusion.

A is not stated in the argument, **B** is a sentence that introduces the topic of the argument, **C** is a partial explanation as to why the diseases of old age have declined, **E** is an unstated assumption that follows from the reasons and also gives support to the conclusion.

47 Many people claim that they have been abducted by aliens. But, however real the experience might have seemed, it is the product of dreaming caused by sleep paralysis. In such sleep, the dreamer might hear strange noises, see flashing lights or stars, and sense shaking and juddering. Some dreamers also feel that they are being turned in their beds. All of these experiences match those of people reporting supposed abduction by aliens. This type of sleep phenomenon is fairly common, being experienced by three out of ten people. In that sleep paralysis explains the sensations reported by everyone who claims to have been abducted by aliens, we can conclude that aliens have not come to Earth and abducted people.

Which of the following is an underlying assumption of the argument above?

- A Abduction by aliens is much rarer than people think.
- B Dreaming about being abducted by aliens is unusual.
- C Those who believe they have been abducted by aliens always report it
- D People who are abducted by aliens rarely remember the experience.
- E People who dream of being abducted by aliens will always remember their dream.

The argument concludes that aliens have not come to Earth and abducted people. To support this conclusion, it offers an alternative explanation for the experiences reported by those who believe they have been abducted by aliens. It describes what happens in sleep paralysis, and says that the sensations it induces match the experiences of everyone who claims to have been abducted by aliens. We can identify the second sentence as an intermediate conclusion that sleep paralysis is the correct explanation for the reported experiences. In order to conclude from this that no-one has been abducted by aliens, it must be assumed that those who have reported abduction by aliens are the only people who believe that this has happened to them. Thus **C** is the response which states the underlying assumption.

A is not assumed, since the argument states that abduction by aliens has never happened.

B is not an assumption, because the argument states that many people claim to have been abducted by aliens.

D is not assumed because the argument concludes that there are no people who have been abducted by aliens.

E is not a necessary assumption. The purpose of the argument is to give the correct explanation as to why people believe they have been abducted by aliens. People who dream without remembering the dream do not have a belief that they have been abducted by aliens, so the possibility of there being such people does not affect the argument.

- 48 Janet's mother has sent her to the greengrocer to buy oranges. Janet's mother knows the oranges were 12p each yesterday and gave Janet the exact money to buy a certain number. When Janet gets there she finds there is a special offer: if you buy 8 or more, the price of all oranges bought is reduced by 2p each. She finds she can now buy 2 more oranges than her mother thought with the money given.

How many can she buy?

- A 8
- B 10
- C 12
- D 18
- E 20

The starting point in the search for the answer to this question is to appreciate that Janet has been given a multiple of 12p by her mother and she has used the whole of this to buy at least 8 oranges at 10p.

The smallest multiple of 12p greater than 80p that is also a multiple of 10p is 120p. With 120p she would have bought 10 oranges at 12p, but she can buy 12 at 10p.

The correct answer is **C**.

- 49 The town of Stowchester is served by five DIY stores all of which sell the same range of products at slightly different prices. To make matters worse, four of the five run loyalty incentive schemes with special saver cards. Under these schemes a discount is gained in the form of vouchers for every £100 spent.

The trading terms of the stores are summarised below.

<i>Make It</i>	No loyalty scheme but promises the cheapest prices. Items cost on average 5 % less than Saw Sharp.
<i>Saw Sharp</i>	£5 voucher for every £100 spent.
<i>Nuts'n Bolts</i>	£6 voucher for every £100 spent but prices 5 % dearer than <i>Make It</i> .
<i>Trowel Trader</i>	£10 voucher for every £100 spent but prices 5 % dearer than <i>Saw Sharp</i> .
<i>Plumb It</i>	£10 voucher for every £100 spent but prices 10 % dearer than <i>Make It</i> .

Which store offers the best "long run" value for money?

- A Make It
- B Saw Sharp
- C Nuts'n Bolts
- D Trowel Trader
- E Plumb It

To answer this question you need to compare the effective cost of the same products from each of the five stores. To allow for manageable calculations without a calculator, it is recommended that you consider products that cost £100 at 'Saw Sharp'. Note that the cost of these products at 'Nuts'n Bolts' would not, in reality, be quite enough to qualify for the £6 voucher, but products costing £100.25 at 'Saw Sharp' that would cost £100 at 'Nuts'n Bolts' would make calculations much more awkward and only add approximately 25p to each of the effective costs calculated below.

At 'Make It' the cost would be £95, 5% less than the £100 cost at 'Saw Sharp'.

At 'Saw Sharp' the £5 voucher reduces the effective cost to £95.

At 'Nuts'n Bolts' the cost would be £99.75, 5% more than the £95 cost at 'Make It', effectively reduced to £93.75 by the £6 voucher.

At 'Trowel Trader' the cost would be £105, 5% more than the £100 cost at 'Saw Sharp', effectively reduced to £95 by the £10 voucher.

At 'Plumb It' the cost would be £104.50, 10% more than the £95 cost at 'Make It', effectively reduced to £94.50 by the £10 voucher.

'Nuts'n Bolts' therefore offers the best 'long run' value for money.

The correct answer is **C**.

- 50 I live alone, but today I have invited friends to dinner. I want everything to be ready to serve at 1 pm. I have made a checklist of everything I need to do before then, together with timings, as follows:

Prepare meat	10 mins
Cook meat (hot oven)	2 hours
Carve meat	5 mins
Prepare vegetables (potatoes, carrots, broccoli)	20 mins
Boil water for vegetables	5 mins
Boil vegetables	15 mins
Prepare gravy (using juice from meat after it has been cooked)	5 mins
Prepare bread dough	20 mins
Bake bread (medium heat oven)	1 hour
Set table	15 mins

My gas cooker consists of one oven and a four-ring hob. I want to serve the dinner as soon as possible after the meat has finished cooking.

What is the latest possible time I can begin my preparations?

- A 7.55 am
- B 9.15 am
- C 9.20 am
- D 9.30 am
- E 9.50 am

To answer this question successfully, you need to appreciate that the meat and the bread cannot be in the oven at the same time (because they require different temperatures). In total, the oven will be in use for 2 hours (meat) and 1 hour (bread) = 3 hours.

The dinner is to be served as soon as possible after the meat has finished cooking, so the bread must be baked first. The meat can be prepared while the bread is in the oven. There is a four-ring hob, so the vegetables can all be boiled at the same time, and all the tasks involving the vegetables can be carried out while the oven is in use. There is also plenty of spare time during this period to set the table.

It will take 20 minutes to prepare the bread dough before it is put into the oven, and after the meat is removed from the oven it will take 5 minutes to carve the meat and a further 5 minutes to prepare the gravy.

The minimum time required to prepare dinner is therefore 20 minutes (bread dough preparation) + 3 hours (oven time) + 5 minutes (carving meat) + 5 minutes (gravy preparation) = 3 hours 30 minutes, so to be ready to serve at 1 pm, preparations must begin no later than 9.30 am.

The correct answer is **D**.

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