# BioMedical Admissions Test

**Specimen Section 1 answers**

**1** 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.

**2**   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**.

**3**   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 the 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 the road tax with an extra tax on fuel, in order 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 of 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.

**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**   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 it 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.

5

**6**   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 × 50p = £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 ÷ 50p).

The correct answer is **E**.

**7**   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.

|  | As silage | As hay |
|---|---|---|
| First cut | 7 bales per acre | 100 small bales per acre |
| Second cut | 5 bales per acre | Not applicable |
| Third cut | 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 × 5 = 50 bales.

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

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

The correct answer is **C**.

**8**   Gumbey and Sons have decided it is time to modernise their image.  To go with their new steel and glass office building they have decided to change the company name.  A number of acronyms have been shortlisted and, to help choose between them, the company chairman suggests they should choose a name which, when painted vertically from top to bottom on the new glass front door will read the same from inside and out.

Which of the following names should they choose?

A     TIME

B     NONA

C     DOOD

D     MITA

E     WEEM

The important feature of this question is that the new name is to be painted vertically on the new glass front door.

This means that the individual letters can be considered separately and each one must have a vertical line of symmetry in order to appear the same from inside and out.
Of the names suggested, only the letters of MITA all have a vertical line of symmetry.

The correct answer is **D**.

**9**   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.

**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 <u>because</u> 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 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, i.e. 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.)

**12** 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: 1st = 120; 2nd = 120; 3rd = 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: $1^{st} = 121$; $2^{nd} = 120$; $3^{rd} = 118$; $4^{th} = 21$; $5^{th} = 20$. The answer is **B**.

**13** 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:

|  | Gas | Electricity |
|---|---|---|
| 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**.

**14** 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.
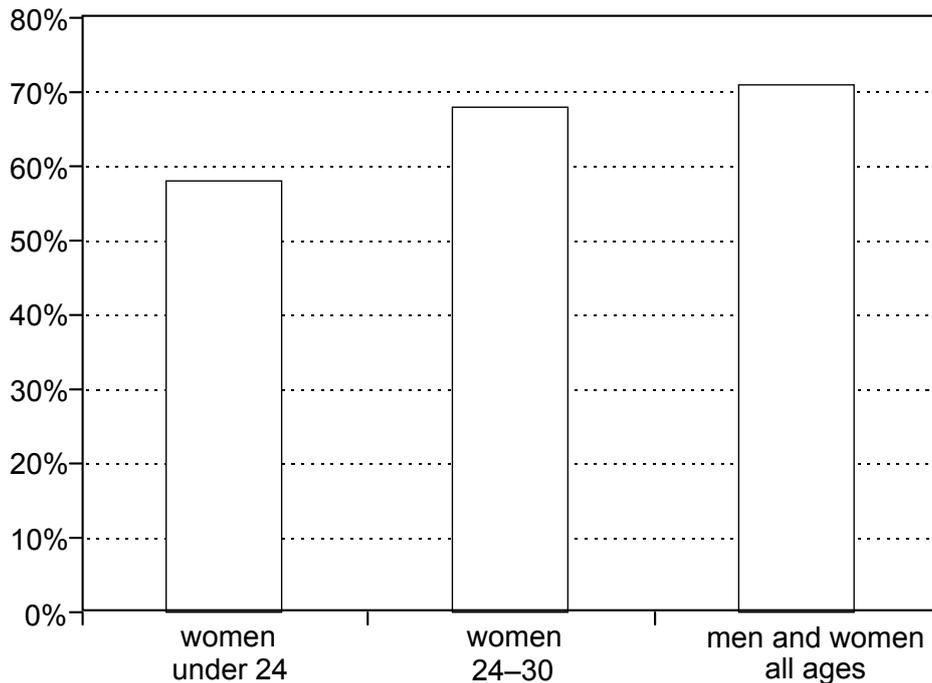


Which of the following statements can be deduced from the information provided?

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 answer is **E**.

**15** 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.

**16** 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.

**17** 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.

**18** 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 futher 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**.

**19** 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 29c each for second class, a total of 5 × 29c = $1.45.

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

**20** The diagram shows a square piece of paper with identical semi-circles cut out half way along three of its edges.
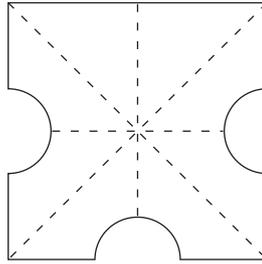
Which of the following is **not** a possible view of the paper after it has been folded along one of the dotted lines?

**A**

**B**

**C**

**D**

**E**
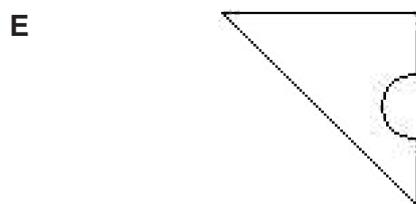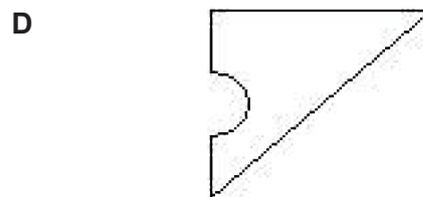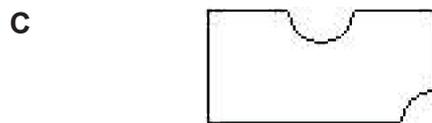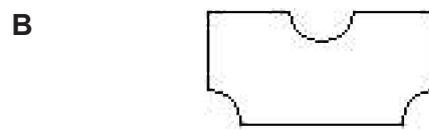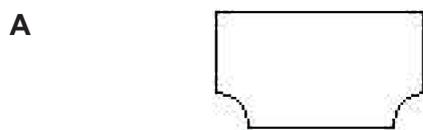
This question requires you to visualise the effect of folding the square of paper in different ways.

**A** is the result of folding along the horizontal dotted line, with the semi-circle from the bottom edge hidden behind the top edge.

**C** is the result of folding along the vertical dotted line, then rotating the paper through 90°.

**D** and **E** both result from folding along one of the diagonal dotted lines, with one of the semi-circles hidden behind the top edge.

**B** is essentially the result of folding along the horizontal dotted line, but with the semi-circle from the bottom edge in front of the top edge. However, the top edge should be visible behind the semi-circle, so **B** is not a possible view.

The correct answer is **B**.

**21** 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.

**22** 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.

**23** 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.

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

| Subject | Male | Female |
|---|---|---|
| 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**.

**25**

```
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 × £2 = £10, and the remaining 3 hours, from 4 pm to 7 pm, will cost 3 × £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**.

**26** Three lighthouses are visible from the promenade at Rivermouth. One flashes every 1½ 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 1½ minutes, 3 minutes, 4½ 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**.

**27** 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.)

**28** 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**.

**29** 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 did their parents,

- 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.

**30** 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.

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

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**.

**31** 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.

**32** 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.
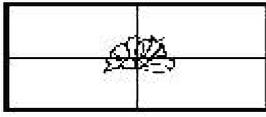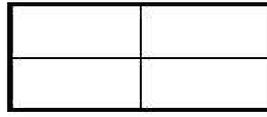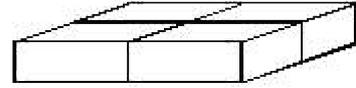
| | | |
|---|---|---|
| top | bottom | side |

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 × 2 cm = 8 cm of string around the books.

The 24 cm of string left over when the parcel contains only one book allows a further 24 ÷ 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**.