

**BioMedical Admissions Test****4500/11**Wednesday 4<sup>th</sup> November 2015

One hour

\* 6 2 2 8 9 7 1 4 8 1 \*

**SECTION 1                      Aptitude and Skills****Instructions to Candidates**

**Please read this page carefully, but do not open the question paper until you are told that you may do so.**

A separate answer sheet is provided for this section. Please check you have one. You also require a soft pencil and an eraser.

Please complete the answer sheet with your:

- BMAT candidate number
- centre number
- date of birth
- name

Speed as well as accuracy is important in this section. ***Work quickly, or you may not finish the paper.*** There are no penalties for incorrect responses, only points for correct answers, so you should attempt all 35 questions. All questions are worth one mark.

Answer on the sheet provided. All questions ask you to show your choice between options by shading one circle. If you make a mistake, erase thoroughly and try again.

Any rough work should be done on this question paper.

Calculators are NOT permitted.

**Please wait to be told you may begin before turning this page.**

*This paper consists of 24 printed pages and 4 blank pages.*

**BLANK PAGE**

- 1 Five children have had their height measured as part of a pre-school health check. Stuart is taller than Ruth who is taller than Margaret. Tim is shorter than Ruth and taller than Adrian.

Who **must** Adrian be shorter than?

- A Ruth, Margaret and Stuart
  - B Stuart and Margaret, but not necessarily Ruth
  - C Margaret, but not necessarily Stuart or Ruth
  - D Ruth and Stuart, but not necessarily Margaret
  - E Ruth, but not necessarily Stuart or Margaret
- 2 The number of people in the UK with tuberculosis (TB) has nearly doubled over the past 25 years, but for most of us the chances of catching the infection are still relatively small. Three quarters of all infections recorded last year were in people from deprived areas; half were not in employment, and one in ten had at least one social risk factor such as poor housing. In these cases, people's immune systems may not be robust due to health problems or poor diet. TB is also more common in people from countries where it is endemic: about three quarters of those diagnosed in the UK every year were born outside the UK. One of the biggest problems in dealing with the new prevalence of TB is that the current generation of doctors is largely unfamiliar with it so they don't even consider the diagnosis.

Which one of the following could be drawn as a conclusion from the passage?

- A People coming from other countries are more likely to have weaker immune systems.
- B People with a poor diet are likely to live in deprived areas.
- C Younger doctors may not appreciate the seriousness of the illness.
- D The figures of those with TB may have been overestimated.
- E People born in the UK who are relatively affluent are unlikely to catch TB.

- 3** Rainbow Parcels is a parcel delivery company. It has seven delivery vans, each one a different colour. Each van is equipped with a meter which records the total distance travelled by the van since new.

At the end of the last day of each month, the transport manager records the readings on the vans' meters.

The following table shows the readings for the second half of last year:

|                   | July   | August | September | October | November | December |
|-------------------|--------|--------|-----------|---------|----------|----------|
| <b>Red van</b>    | 65 716 | 68 240 | 71 771    | 74 930  | 78 853   | 82 151   |
| <b>Orange van</b> | 61 873 | 64 425 | 67 096    | 70 613  | 73 684   | 76 988   |
| <b>Yellow van</b> | 68 508 | 71 302 | 74 764    | 77 792  | 81 163   | 85 639   |
| <b>Green van</b>  | 62 345 | 64 827 | 68 025    | 71 759  | 75 146   | 78 732   |
| <b>Blue van</b>   | 71 464 | 73 959 | 76 482    | 80 203  | 83 392   | 87 065   |
| <b>Indigo van</b> | 65 908 | 68 623 | 71 660    | 75 058  | 78 229   | 81 793   |
| <b>Violet van</b> | 60 951 | 63 088 | 65 317    | 70 465  | 72 826   | 76 708   |

Which van travelled the greatest distance during the three-month period from September 1st to November 30th last year?

- A** Red van
- B** Orange van
- C** Yellow van
- D** Green van
- E** Blue van
- F** Indigo van
- G** Violet van

- 4 Recent research has found a surprising correlation between how women rate the physical attractiveness of male competitive cyclists and their overall performance in an endurance race, with those competitors rated most attractive finishing ahead of those rated less attractive. It seems that women are sensitive to those physical traits that relate to cycling excellence and unwittingly factor this into how attractive they find a particular participant. Therefore it would follow that attractive male film stars and models are likely to make successful cyclists.

Which one of the following best expresses the flaw in the above passage?

- A The study did not suggest attractiveness alone is sufficient to ensure success.
- B A false impression of sporting excellence has been put forward.
- C The results of this study may not be generalisable to all sports.
- D The study wrongly suggests that cyclists are more attractive than other sportsmen.
- E The findings of this study may not be repeated in the future.

- 5 There were 15 competitors in the Long Jump event at a recent athletics meeting. In the preliminary competition all the competitors were allowed two attempts, with the better of the two to count in each case. The top three and anyone else within 50 cm of third place qualified to take part in the final later in the day.

The distances recorded in the preliminary competition were as follows:

| Competitor number | First attempt (m) | Second attempt (m) |
|-------------------|-------------------|--------------------|
| 1                 | 5.73              | 6.12               |
| 2                 | 6.88              | 6.54               |
| 3                 | 6.92              | 7.08               |
| 4                 | 7.34              | 7.26               |
| 5                 | 6.53              | 6.71               |
| 6                 | 5.77              | 5.90               |
| 7                 | 6.72              | 7.06               |
| 8                 | 6.58              | 6.42               |
| 9                 | 5.79              | 6.14               |
| 10                | 7.17              | 6.95               |
| 11                | 6.52              | 6.43               |
| 12                | 5.70              | 5.61               |
| 13                | 6.83              | 7.29               |
| 14                | 6.55              | 6.97               |
| 15                | 6.41              | 6.53               |

How many competitors qualified for the final of the Long Jump?

- A 5
- B 6
- C 7
- D 8
- E 9
- F 10

- 6 Agriculture faces its biggest challenge since Neolithic days in the way it adapts – or fails to adapt – to climate change. Africa and southeast Asia will be worst affected. In 20 years' time, their climate will be quite different from their climate today: crop varieties used now will yield dramatically less in the changed conditions. Famine and higher food prices will follow. To avert this disaster, we need to develop worldwide seed banks with detailed catalogues showing the traits of each variety and the resistance they have to heat, soil saturation or drought. Farmers can then begin to trial crops and prepare for the future. Seed banks are not the only answer to impending famine but they are an achievable first step.

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

- A Agriculture is facing its biggest challenge since Neolithic times.
  - B Seed banks will avert famine caused by climate change.
  - C Catalogued seed banks should be created and their contents trialled.
  - D Farmers in Africa and southeast Asia should begin trialling different varieties of crops.
  - E Crops used today will be unable to grow in new climatic conditions later in the century.
- 7 The price of a particular share varies from day to day. On Monday the price of the share was £1. Tuesday's price was 20% higher than Monday's, and Thursday's price was 25% up on Wednesday's price. By the Friday of that week the price had returned to £1.

Helen bought £1 000 worth of this share on Monday and then sold them on Thursday to make a profit of £350.

Paul bought £3 000 worth of this share on Tuesday, but had to sell them the following day.

Assuming that there are negligible costs associated with buying and selling these shares, what was the return on Paul's investment?

- A He made a loss of £1 050.
- B He made a loss of £750.
- C He made a loss of £300.
- D He broke even.
- E He made a profit of £300.
- F He made a profit of £750.
- G He made a profit of £1 050.

**Questions 8–11 refer to the following information:**

According to figures published recently, 44% of criminals leaving prison will reoffend within one year of being released. So if the aim of prison (custodial) sentences is to stop people committing crimes, it really is not working. Short sentences are even worse, with 55% of offenders on short sentences reoffending within a year of leaving prison. And putting kids in prison is least effective of all – 70% of under-18s who receive prison sentences reoffend within 12 months. From a cold look at the statistics, prison does not look like a successful way to reduce crime, especially for young offenders on short-term sentences. So what are the alternatives?

Whilst it is an option only for less serious categories of offence, giving offenders community service orders has been shown to reduce reoffending rates by 6%. This may be seen as a softer option by offenders and by the public, but when people are up in the dock convicted of an indictable offence, they are less likely to end up back in trouble if the judge gives them a community service order rather than a prison sentence.

Another option that works even better is simply not sending someone to prison and giving them a suspended sentence instead. The figures show that people who get a suspended sentence are 9% less likely to reoffend than someone who committed a similar crime but was then sent to prison.

But the most effective way of reducing reoffending is getting offenders to meet their victims. Campaigners for restorative justice programmes, where offenders engage with the impact of their crime and often meet their victims, say it can reduce reoffending by up to 27%. However, a government analysis puts the improvement at a more conservative 14%.

The following studies contain relevant data, adapted from the November 2010 report from the Ministry of Justice, on which the above article was based:

**Study 1**

50 000 former prisoners were tracked for 9 years after being released in 2000, and the number of re-convictions was matched to the time since release. The figures are all cumulative:

| <b>Time elapsed following release</b> | <b>Reoffending rate (%)</b> |
|---------------------------------------|-----------------------------|
| 3 months                              | 20.0                        |
| 6 months                              | 30.8                        |
| 9 months                              | 37.9                        |
| 1 year                                | 44.0                        |
| 2 years                               | 55.0                        |
| 5 years                               | 66.0                        |
| 9 years                               | 72.0                        |

**Study 2**

126 866 convicted criminals were tracked for one year following the end of their sentence, and their reoffending rates were matched to whether they had been given a short custodial sentence (i.e. a prison sentence of less than 12 months) or a non-custodial sentence. (In this study a person was considered to be a reoffender only if he/she had been reconvicted):

|                                             | <b>Non-custodial sentences</b> | <b>Short custodial sentences</b> |
|---------------------------------------------|--------------------------------|----------------------------------|
| Proportion of offenders who reoffended      | 22.0%                          | 55.0%                            |
| Average number of reoffences per reoffender | 2.49                           | 4.11                             |
| Average number of reoffences per offender   | 0.55                           | 2.26                             |
| Number of reoffences                        | 56 181                         | 54 835                           |
| Number of reoffenders                       | 22 577                         | 13 334                           |
| Total number of offenders in cohort         | 102 622                        | 24 244                           |

- 8 Which one of the following statements is a conclusion that can reliably be drawn from the passage?
- A It is a mistake to release offenders from prison after they have served only half of their sentence.
  - B It is a mistake to send offenders to prison when a non-custodial sentence is also appropriate for the crime.
  - C It is a mistake to send young offenders to prison.
  - D It is inevitable that an offender released from serving a prison sentence will reoffend at some point in the future.
  - E When a prison sentence is necessary, it should always be for a minimum period of 12 months.
- 9 In Study 1, how many former prisoners who had not reoffended within a year of release from prison then reoffended within 5 years of release?
- A 2 750
  - B 5 500
  - C 8 550
  - D 11 000
  - E 22 000
  - F 33 000

- 10** Study 2 shows that 55% of offenders released from a short prison sentence reoffended within a year, whilst only 22% of offenders did so having served a non-custodial sentence. Yet the passage claims that giving offenders a community service order instead of a prison sentence “reduces reoffending rates by 6%”.

Which one of the following is the best explanation for the apparent discrepancy between these figures?

- A** Most offences which attract a prison sentence are not eligible for consideration of a non-custodial sentence as an alternative.
  - B** Most offenders given non-custodial sentences are first-time offenders.
  - C** Most offenders given prison sentences are likely to have already served a non-custodial sentence.
  - D** Suspended sentences have not been taken into account.
- 11** A politician argues that, on the basis of the report, more convicted offenders should where appropriate be subjected to restorative justice, such as meeting their victims, instead of being sent to prison, because this will reduce the likelihood of them reoffending.

Which one of the following, if true, most strengthens this argument?

- A** In the study which showed that restorative justice produced a 14% fall in reoffending rates, most of the offenders had also received a prison sentence.
  - B** It is important for society that natural justice is seen to be done and that offenders are being issued with appropriate sentences for their crimes.
  - C** Most victims do not want to meet face-to-face the person who committed a crime against them.
  - D** Sending an offender to prison is a very expensive use of tax-payer's money.
  - E** The study shows that subjecting an offender to restorative justice as well as issuing them with a community service order has the effect of reducing reoffending rates by 20%.
-

- 12** A youth club ran a “complete the puzzle against the clock” competition last Saturday. Teams had to complete a variety of puzzles and were awarded points determined by how long it took them to complete each puzzle:

|                           |            |
|---------------------------|------------|
| Less than 10 minutes      | = 9 points |
| Between 10 and 20 minutes | = 5 points |
| Between 20 and 30 minutes | = 3 points |

Any team failing to complete a puzzle within 30 minutes had 2 points taken off their score.

At the half-way stage of the competition, when all teams had completed four puzzles, the total scores were displayed on a score-board as shown below:

| Team Name  | Score |
|------------|-------|
| Crosswords | 22    |
| Jigsaws    | 21    |
| Rubiks     | 24    |
| Solitaires | 23    |
| Tangrams   | 25    |

One of the teams has been credited with a score which is not possible from four puzzles on the given scoring system.

Which team has a score which has been wrongly calculated (i.e. could not possibly have been scored at this stage)?

- A** Crosswords
- B** Jigsaws
- C** Rubiks
- D** Solitaires
- E** Tangrams

- 13** Should people who have been convicted of serious crimes be able to return to their career after serving a prison sentence? At first sight it seems only fair and just that they should, so that offenders can be rehabilitated into society. But what if that person has a career in a high profile job, such as a professional footballer? Millions of young supporters regard football players as role models and heroes. In this case, the giving of a second chance is not justified: it risks sending a message to young people that such behaviour is acceptable. For high profile people with young fans, there should be no second chance.

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

- A** Young football fans cannot distinguish right from wrong.
  - B** Offenders should in most cases be allowed to obtain employment after a prison sentence.
  - C** Football is unlike other sports in attracting a high proportion of young fans.
  - D** The rights of the individual are less important than risks to society.
  - E** Those convicted of serious crimes must accept the risks posed to their careers.
- 14** An artist has three 100ml tubes of paint: one red, one yellow and one blue.

Mixing equal quantities of red and yellow gives orange, mixing equal quantities of red and blue gives purple, mixing equal quantities of yellow and blue gives green, and mixing equal quantities of red, yellow and blue gives brown.

The design of a small mural needs 30% of brown and 20% of red, as well as 10% of each of blue, yellow, orange, purple and green.

If after painting the mural the artist has 20ml of paint left in the red tube, how much blue paint will be left?

- A** 30 ml
- B** 40 ml
- C** 50 ml
- D** 60 ml
- E** 70 ml

- 15** Despite advances in computer modelling and research on humans, we still understand very little about the human brain and we are unable to treat many neurological conditions and injuries effectively because of this. Human brains work in very similar ways to most primates and it is possible to create lesions in primate brains which mimic the effects of certain human conditions. If we accept that it is ethical to test on primates rather than humans, such research could be done using primates. Through understanding the effects of brain lesions, we may be able to develop treatments and therapies that would benefit humans.

Which one of the following could be drawn as a conclusion from the above passage?

- A** Experimentation on primates should be considered as a means to develop treatments for brain disorders.
- B** Computer modelling will continue to support brain research.
- C** Creating lesions directly to patients' brains may cure some brain disorders.
- D** Primate experimentation is unacceptable under most conditions.
- E** Experimentation on primates will enable us to cure neurological conditions.

- 16** Maisy attends a small rural school with 15 other girls and 10 boys.

Of the girls in the school, three older ones have younger sisters in the school, and two other girls have brothers in the school. Of the boys in the school, two older ones have younger brothers in the school, and two other boys have sisters in the school.

If there are no twins, and no family has more than two children in the school, how many of the children do not have either a brother or a sister in the school?

- A** 7
- B** 8
- C** 11
- D** 12
- E** 14
- F** 16
- G** 17
- H** 19

- 17** The rate of recorded heart attacks among women in the UK could soon start to fall because a new blood test has been developed which provides a more accurate diagnosis of the incidence of heart attacks in women. Researchers believe that heart attacks in women may previously have been under-diagnosed because the 'old' blood test was not sufficiently sensitive. They believe that possibly twice as many women will be found using the new test to have had heart attacks as were found using the old one. With more accurate diagnosis, women can start treatment to reduce the risk of a further attack.

Which one of the following best expresses the flaw in the above argument?

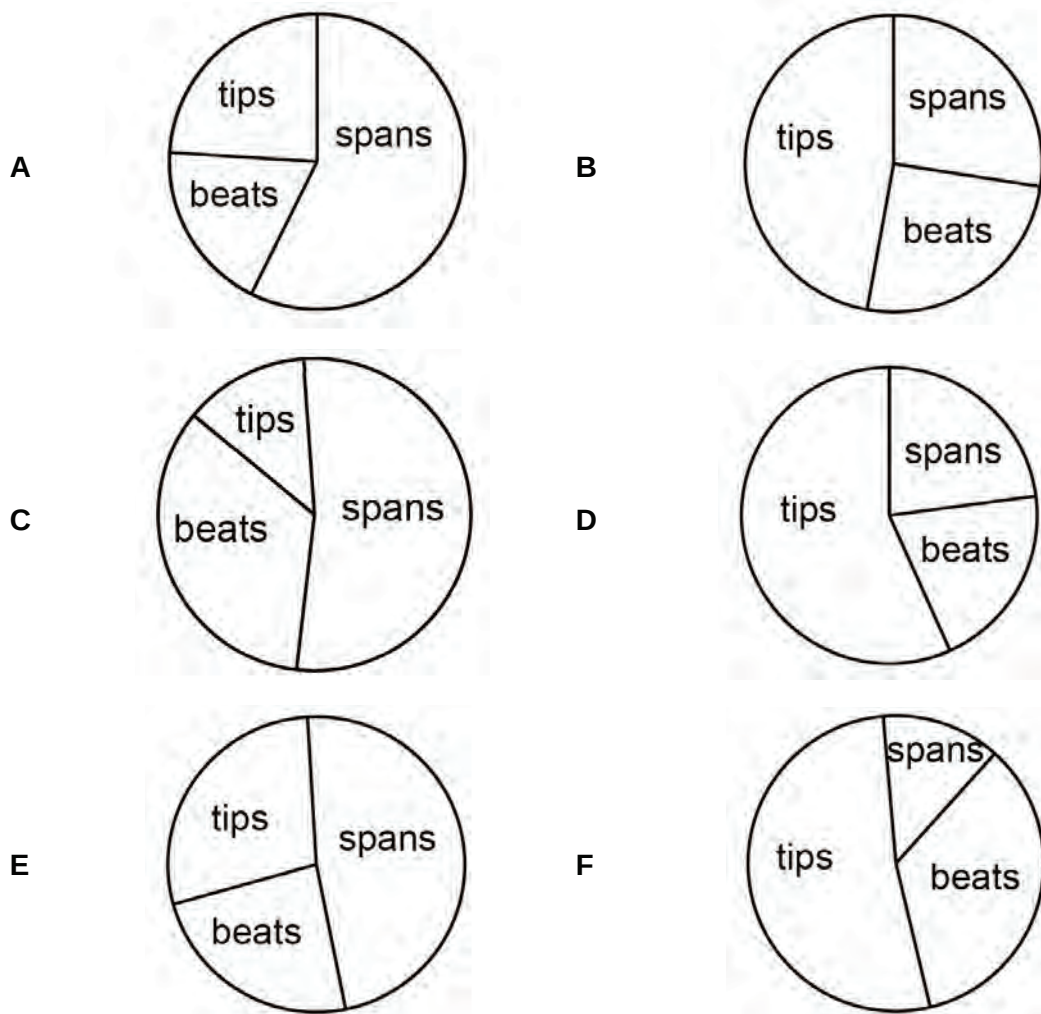
- A** It assumes that the lower number of subsequent heart attacks will not be balanced by the higher recording of first heart attacks.
- B** It assumes that the same new blood test can be used equally well for men as for women.
- C** It assumes that a blood test is the only way of diagnosing when a heart attack has taken place.
- D** It assumes that treatment to prevent subsequent heart attacks is always effective.
- E** It assumes that women are likely to seek medical help more quickly than men.

**18** In the sport of Wingball there are three types of goal, as follows:

- a span, which scores 8 points
- a beat, which scores 5 points
- a tip, which scores 2 points

The Eagles scored a total of 720 points last season in the National Wingball League, setting a new record for the number of points scored in a season. Their 42 spans and 36 beats were also new records, but they fell just short of claiming the record for the most tips in a season.

Which one of the following pie charts shows how many of the 720 points scored by the Eagles last season were from spans, how many were from beats and how many were from tips?



**Questions 19–22 refer to the following information:**

Sugary drink consumption is linked to weight gain and a host of obesity-related diseases including type II diabetes, coronary heart disease and some cancers. Sugary drinks contain ‘empty calories’ – 330ml of sugary drink typically provides 35g, or nine lumps, of sugar but no other nutritional value. Because liquid calories do not make us feel full, we do not compensate by eating fewer calories from solid food.

Soft drinks are the largest single source of sugar for teenagers and children aged 4–10 years. According to National Diet and Nutrition Survey data (2008–2012), soft drinks contribute to 30% of sugar intake for teenagers, 17% for children aged 4–10 years and 12% for children 1.5–3 years. In part due to the high consumption of sugary drinks, “teenagers consume 50% more sugar on average than is currently recommended.”

Two options for using taxation to reduce the consumption of sugary drinks are:

- A “volume tax”, which is proportional to the volume of the drink.
- A “sales tax”, which is a proportional to the price of the drink.

According to the British Soft Drinks Association, approximately 5 727 million litres of sugary drinks were consumed in 2011.

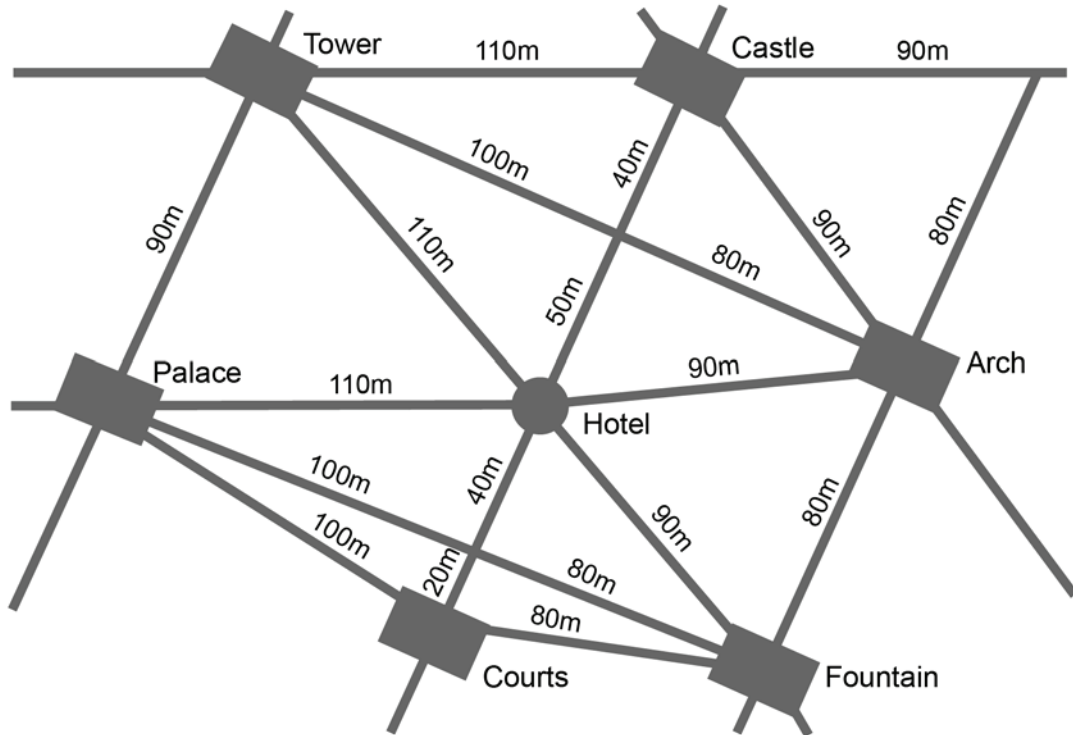
There is evidence that a tax on consumption can have progressive health benefits, as poorer people suffer disproportionately from diet-related illnesses. Research on tobacco and alcohol, for instance, has shown that a tax leads to a decrease in consumption. The revenue from the duty can be used to fund programmes that have a significant impact on children from low income households, such as free and high quality school meals.

- 19** How many lumps of sugar would a 2-litre bottle of sugary drink typically be equivalent to?
- A** 18
- B** 27
- C** 54
- D** 70
- E** 105
- 20** If the tax resulted in teenagers consuming only one third as much sugar from sugary drinks, how would their sugar intake compare to the recommended level?
- A** It would be 50% below the recommended level.
- B** It would be 20% below the recommended level.
- C** It would be 20% above the recommended level.
- D** It would be 30% above the recommended level.
- E** It would be 40% above the recommended level.

- 21** If a volume tax of 20p per litre resulted in a 10% reduction in sales of sugary drinks compared to 2011, what would be the total amount of revenue from the tax (to the nearest million pounds)?
- A** £478 million
  - B** £573 million
  - C** £1 031 million
  - D** £1 145 million
  - E** £1 260 million
  - F** £4 132 million
  - G** £5 154 million
- 22** Which one of the following, if true, would most weaken the argument for introducing a sales tax on sugary drinks rather than a volume tax?
- A** When products are subject to a sales tax, retailers are known to reduce their purchase price in order to be competitive.
  - B** Most food products are taxed by means of a volume tax.
  - C** Sugary drinks have not increased in price as much as other, healthier, options over the past 10 years.
  - D** The description of sugary drinks does not include all types of drink that contain high quantities of sugar.
  - E** The money raised from the tax on sugary drinks will be used for initiatives to improve the quality of school meals provided to children.
-

- 23 The street map below shows the locations of a hotel and six visitor attractions, together with walking distances shown in metres (m).

A tourist stayed in the hotel and had time to visit only five of the attractions by taking the shortest route.



Starting from and finishing at the hotel, his route was total of 530 m. Which one of the six attractions did he **not** visit?

- A Arch
- B Castle
- C Courts
- D Fountain
- E Palace
- F Tower

- 24** Although many schools have banned the sale of energy drinks filled with sugar and caffeine on the school site, this policy may backfire on those schools and on the results their students achieve in public examinations. Caffeine has been shown to improve focus, which could benefit students both in their studies before an examination and during the examination itself. Recent trials have also shown that caffeine can boost the effectiveness of short-term memory, which could help students to recall key information.

Which of the following statements taken together weaken the above argument?

- 1** Caffeine has been shown to reduce quality and duration of sleep.
- 2** Caffeine withdrawal symptoms can include headaches.
- 3** Sleep deprivation can cause lack of focus and poor memory.
- 4** Any negative effects of moderate caffeine consumption are limited.
- 5** Memory is an important factor in examination success.

- A** 1 and 2
- B** 1 and 3
- C** 2 and 4
- D** 3 and 5

- 25** My 6-digit passcode for internet banking consists of six different digits.

The second digit is 8.

When the passcode is written as three 2-digit numbers, the three numbers add up to 80.

When it is written as two 3-digit numbers, the two numbers add up to 800.

What is the last digit of my passcode?

- A** 1
- B** 2
- C** 3
- D** 4
- E** 6
- F** 7
- G** 9

- 26** Despite years of butter and saturated fats being given a bad press, it has recently emerged that studies in the 1980s that highlighted the dangers of eating too much of these fats were based on a misleading data set. Consequently, the guidance based on these studies to reduce the intake of saturated fats cannot be justified. These studies suggested that a high intake of saturated fat was associated with an increased risk of coronary heart disease and to counter this they should only make up 10% of our diet. Now that this research has been discredited, we can once again enjoy the tastes our grandparents enjoyed without risking our health.

Which one of the following is an assumption made by the above argument?

- A** It is possible to enjoy saturated fat in a balanced diet.
  - B** Coronary heart disease is caused by a range of factors and dietary risks.
  - C** Other, more robust studies have not subsequently suggested a risk to health from saturated fat.
  - D** People follow public health advice and limit their saturated fat intake.
  - E** It is possible to conduct long-term studies that can be used to draw meaningful conclusions about health.
- 27** A survey of primary school children showed that between 55% and 65% owned a laptop computer, between 70% and 80% owned a mobile phone and fewer than 5% owned neither of these items.

What percentage of the children owned both a laptop computer and a mobile phone?

- A** between 15% and 30%
- B** between 25% and 45%
- C** between 25% and 50%
- D** between 30% and 45%
- E** between 30% and 50%

- 28** It has been shown that most people are either 'Night Owls', who describe themselves as naturally more active and alert in the evening, or 'Morning Larks', who wake early and become less alert once daylight decreases. These patterns are linked to changes in the levels of the hormone melatonin (which is associated with feelings of sleepiness). Those who follow a 'Morning Lark' pattern show high levels of melatonin early in the evening and low levels by the early morning, with the opposite being true in 'Night Owls' with higher levels of melatonin still present in the morning after waking. Therefore employers should allow for flexible working hours to accommodate people's sleep patterns

Which one of the following, if true, most weakens the above argument?

- A** Melatonin levels rise and fall as a result of 'Owl' or 'Lark' behaviour.
- B** Melatonin tablets have been used to treat jet-lag by adjusting the sleep-wake cycle.
- C** Changing patterns of shift-work have a negative effect on health.
- D** The amount that we sleep usually changes throughout our lifespan.
- E** Analysis of changes in body temperature have shown that shift workers' bodies take a long time to adjust to changes in routines.

- 29** I want to decorate one of the rooms in my house by painting the four walls.

The room is rectangular, measuring 5m by 4m, and is 2.5m high. There is a door in one of the narrower walls, measuring 1m wide by 2m high. There is also a window in the opposite wall to the door, measuring 2m wide by 1.5m high. I do not intend to paint the door or the window.

I want to use two different colours, one colour on the two opposing narrower walls and the other colour on the two opposing wider walls.

Each colour of paint is available from a high-quality manufacturer at £15 per tin or from a budget manufacturer at £11 per tin. To get a good finish, I need to put two coats of paint on the wall if I am using the high quality paint but three coats if I am using the budget paint. Tins of paint will cover a wall area of 15 square metres in a single coat whichever manufacturer I use.

I do not have to use the same quality of paint for the two different colours.

How much do I need to spend on paint in order to achieve a good finish on all four walls without buying any more paint than I have to?

- |              |               |
|--------------|---------------|
| <b>A</b> £85 | <b>E</b> £99  |
| <b>B</b> £88 | <b>F</b> £100 |
| <b>C</b> £90 | <b>G</b> £104 |
| <b>D</b> £93 | <b>H</b> £105 |

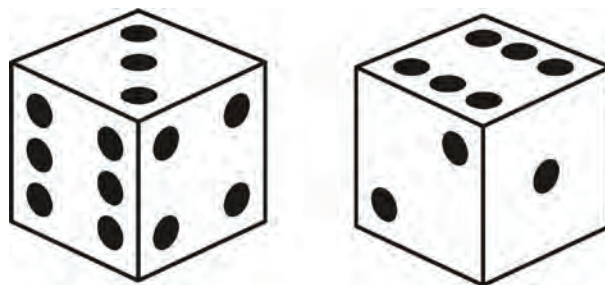
- 30** Accident and Emergency (A&E) units have too many patients and not enough permanent staff to treat them. Working in A&E is not attractive to doctors: the environment is frenzied and the working hours are unsociable. For these reasons, newly qualified doctors tend to choose other specialisms. With too few permanent staff, hospitals are spending extremely large sums of money on temporary staff from agencies. One solution is to pay higher wages to permanent A&E doctors to provide an incentive to choose that specialism. The cost to the health service would be no greater – and could be less – as there would be no need to pay agency staff. We should make A&E more attractive to newly qualified doctors by providing financial incentives.

Which one of the following, if true, most strengthens the above argument?

- A** Financial reward is not the most important motivator for doctors.
  - B** The fast pace of A&E work is too demanding for some doctors.
  - C** Campaigns to reduce the number of people using A&E services have been effective.
  - D** Some doctors choose to work for agencies in A&E to supplement their salaries.
  - E** Permanent staff can provide a better standard of care than temporary staff.
- 31** There are a total of 7 spots on each pair of opposite faces on a conventional die.

I have two unconventional dice. They both have faces with 1, 2, 3, 4, 5 and 6 spots, but none of the opposite pairs on either die have a total of 7 spots and all six pairs have a different total.

These are two views of **one** of my dice:



What numbers are opposite 1 and 6 on the **other** die?

- A** 2 is opposite 1; 3 is opposite 6
- B** 2 is opposite 1; 4 is opposite 6
- C** 4 is opposite 1; 2 is opposite 6
- D** 4 is opposite 1; 3 is opposite 6
- E** 5 is opposite 1; 2 is opposite 6
- F** 5 is opposite 1; 3 is opposite 6
- G** 5 is opposite 1; 4 is opposite 6

**BLANK PAGE**

**Questions 32–35 refer to the following information:**

Cruelty to animals is a criminal offence in the UK. Investigations by the Royal Society for the Prevention of Cruelty to Animals (RSPCA) lead to many offenders coming before the courts under the Animal Welfare Act, 2006. The success rate for prosecutions is high. Punishments include fines, community service, disqualification from keeping animals and prison.

The RSPCA Prosecutions Department published the following figures in its 2013 Report:

**Animal cruelty offences and prosecutions nationally (England and Wales)**

|                                                   | <b>2013</b> | <b>2012</b> | <b>2011</b> |
|---------------------------------------------------|-------------|-------------|-------------|
| Defendants convicted                              | 1 371       | 1 552       | 1 342       |
| Prosecution success rate *                        | 97.9%       | 97.9%       | 98.1%       |
| Prison sentences imposed on individuals           | 88          | 86          | 74          |
| Suspended prison sentences imposed on individuals | 220         | 178         | 140         |
| Disqualification orders imposed **                | 1 161       | 1 265       | 1 100       |

\*Total defendants convicted as a percentage of defendants whose cases were tried in court, but excluding cases where the charges were dropped by the RSPCA.

\*\*A disqualification order can be imposed as a penalty in its own right, or it can be additional to any other penalty imposed.

**ANIMAL CRUELTY WORST IN THE NORTH (*The Times* newspaper)**

There were more cases of animal cruelty in the north of England in 2013 than anywhere else in England and Wales, according to the RSPCA figures. The charity's 2013 annual prosecutions report revealed that 126 people were convicted for animal cruelty offences in one northern county alone (West Yorkshire).

Across England and Wales as a whole, the number of people convicted fell 11.7%, from 1 552 in 2012 to 1 371 in 2013, but in the north of England the number rose 6.6%, to 566 in 2013 compared with 531 the previous year.

Mike Hogg, the RSPCA's regional manager, said: "The figures are usually the highest in the north of England, and it's impossible to say for certain why that is." In the north, the RSPCA investigated 1 763 more complaints in 2013 than in 2012. Last year it rescued a total of more than 17 500 dogs and re-homed 55 323 animals.

**Reader's comment**

It is quite wrong to infer from the RSPCA's findings that northerners are more often cruel to animals than southerners, as your article implies. The fact that there were more complaints made to the RSPCA in the north, and therefore more convictions, could simply show that northerners are more concerned about animals than people living further south.

- 32** Which of the following claims is/are supported by the RSPCA data for the three years 2011 to 2013 (inclusive)?
- 1** More than 4 300 people were tried for animal welfare offences over the three years.
  - 2** Of the defendants tried in 2012 for animal welfare offences, over 30 were acquitted.
  - 3** Over two thirds of prison sentences handed out for animal welfare offences over the period were suspended.
- A** 1 only
- B** 2 only
- C** 3 only
- D** 1 and 2 only
- E** 1 and 3 only
- F** 2 and 3 only
- G** 1, 2, and 3
- H** None of the claims

- 33** Suppose that convictions in the north of England had fallen in line with the overall trend for England and Wales.

What would have been the total number of people convicted for animal cruelty offences in 2013 in England and Wales?

- A** 1 087
- B** 1 274
- C** 1 309
- D** 1 336
- E** 1 490
- F** 1 654

**34** Based on the RSPCA figures, which of the following inferences is/are fully supported?

- 1** The highest increase for any region in England and Wales in animal welfare convictions between 2012 and 2013 was in West Yorkshire.
- 2** The increase in convictions for animal cruelty offences in West Yorkshire was at least 6.6% higher in 2013 than in 2012.
- 3** In 2013, two fifths of all convictions for animal cruelty offences in England and Wales occurred in the north of England.

- A** 1 only
- B** 2 only
- C** 3 only
- D** 1 and 2 only
- E** 1 and 3 only
- F** 2 and 3 only
- G** 1, 2, and 3

**35** Which one of the following items of additional information, if true, would most weaken the argument presented in the reader's comment on *The Times* article?

- A** Out of those members of the public who make complaints to the RSPCA, more complaints per person are made in the north than in the rest of the country.
- B** A higher proportion of complaints result in conviction in the north of England than in other regions of England and Wales.
- C** The proportion of domestic animals per household is higher in the north than in the rest of the country.
- D** Out of those animals re-homed by the RSPCA, a higher proportion are dogs in the north of England than in the rest of the country.
- E** There is a higher proportion of domestic animals that are classed as 'working animals' in some regions of the country than in others.

---

**END OF TEST**

**BLANK PAGE**

**BLANK PAGE**