CAMBRIDGE ASSESSMENT

BioMedical Admissions Test

Specimen Section 1 answers

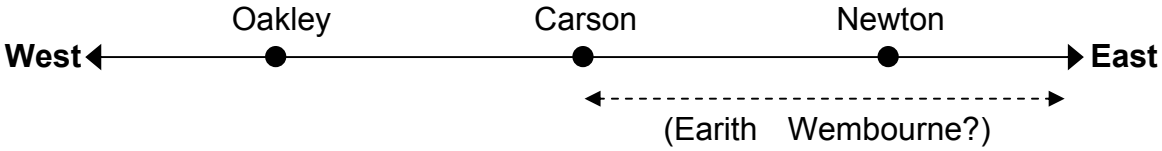
1 In each graph the distance travelled by the car is represented by the area under the line. Some people can spot which areas are roughly equal. But you can work it out:

This gives distances (in metres) of: P = ½ × 20 × 5 = 50
Q = ½ × 15 × 10 = 75
R = 10 × 10 = 100
S = ½ ×20 × 10 = 100

Cars R and S travel the same distance, so the answer is **D**.

(This can also be solved by comparing the average speeds of the cars. If you do it this way, you have to be careful to calculate the average speed over the whole of the ten-second period. For graphs Q, R and S this is simply the speed at the mid-point of the line.)

2 The easiest way to solve this is to sketch the relative positions of the towns.



So Wembourne must be east of Oakley, Carson and Earith, but we don't have any information about its position relative to Newton. So the answer is **C**.

3 This problem can be solved algebraically. If we call the flat rate f and the rate per kilometre k, then:

$$f + 5k = £4.00 \quad \text{and} \quad f + 3k = £3.20$$

So $(f + 5k) - (f + 3k) = £4.00 - £3.20$

$$2k = £0.80$$

$$\underline{k = £0.40}$$

If we substitute this value of k in the equation $f + 5k = £4.00$, we get:

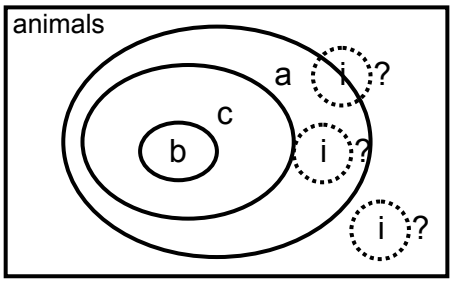
$$f + £2.00 = £4.00$$

$$\underline{f = £2.00}$$

So a journey of 6 km will cost £2.00 + (6 × £0.40) = **£4.40**

4 The important information to note is the sentence immediately below the graph. This is equivalent to statements **B** and **D**.

5 One way of representing this information is to sketch a Venn diagram:



a = arthropods
b = branchiopods
c = crustaceans
i = insects

Using the information given in the question, we can't be sure where the insects belong in relation to the arthropods, so we can't be sure about **B**. We know that no insect is a crustacean, so **D** can't be true. We can see from the Venn diagram above that **A** & **C** must be true.

6 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**.

7 Whilst options **A**, **B** and **C** might be true, they are of little relevance to the argument. The suggested benefit of raising the limit (that less police time would be spent enforcing the speed limit) would be reduced if more drivers drove at over 80 mph and so continued to break the speed limit. The correct answer is **D**.

8 Although options **A**, **B** and **C** may seem plausible, they are of little relevance to the argument. Whilst option **D** might be true, the argument is based on the study's *evidence* of the benefits of adult education, not assumptions. It is **E**, the assumption that courses that are purely for leisure cannot be economically useful, that underlies the argument.

9 One way to find the answer is to calculate the numbers per 10000 separately for men and women. Since we have been told to assume that there are equal proportions of men and women in the population, the answer will be the average of these two numbers. For men the rate will be 35% of 5000, which is 1750. For women the rate will be 25% of 6000,which is 1500. The average of these two numbers is 1625, so the answer is **B**.

10 Since the consultation rate for women is higher than for men, we can eliminate any conditions for which the percentage consultations for women are greater than or equal to those for men.

This leaves us with respiratory and musculoskeletal problems to consider. The consultation *rate* for women is 1.2 times that for men. Therefore, if the *percentage* of consultations for men is greater than 1.2 times that for women, we can be confident that the *number* of consultations for men will be greater. A quick inspection of the chart reveals that this is so for both respiratory and musculoskeletal problems, so the answer is **A** and **D**.

11 The first row of the table shows the number of consultations for respiratory diseases. This is different for each column, so you only need to know the correct number of consultations by women for respiratory problems to find the answer. If you had worked out the answer to question 10 in the way described above, you will know that the number of consultations per 10000 for women is 1500. So the answer is **D**. (If you didn't do question 10 in the way described, you would have to work out 25% of 6000.)

12 This question relies on your ability to estimate the percentages represented by the pie charts. Since the whole chart represents 100%, a quarter of a circle represents 25%. The percentage of consultations by men for respiratory problems is 35%, so **A** and **C** can be eliminated, because the segment representing this condition is not larger than a quarter of the whole. The most obvious difference between the remaining pie charts, **B** and **D**, is the size of the segment representing skin conditions. This should represent 15% of the whole, so **B** is the correct answer.

13 The time taken for an impulse to arrive can be calculated using the relationship:

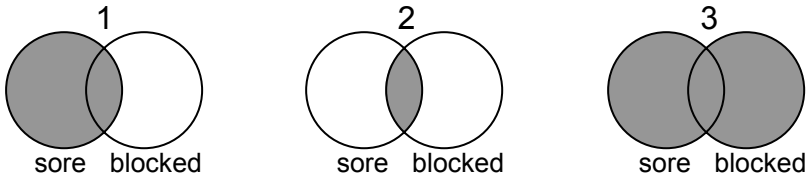
$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

For the slow impulse this gives a time of 40 milliseconds.
For the fast impulse the time is 10 milliseconds.
The difference is 40 – 10 = 30 milliseconds, so the answer is **C**.

14 Many people will be able to solve this problem in their heads by recognising that:

- a sufferer is more likely to suffer from a specific symptom, than to suffer from that symptom *and* another symptom;
- a sufferer is less likely to suffer from a specific symptom, than to suffer from that symptom *or* another symptom.

Diagrammatically, if we represent the probabilities of suffering from each of the two symptoms by overlapping circles, the three statements can be represented by the shaded areas below:



If we place the statements in order of increasing probability, we get 2, 1, 3, so the answer is **C**.

15 One way to solve this problem is to consider how many plates with each of the digits 0 to 9 are needed to make any number from 0 to 650.

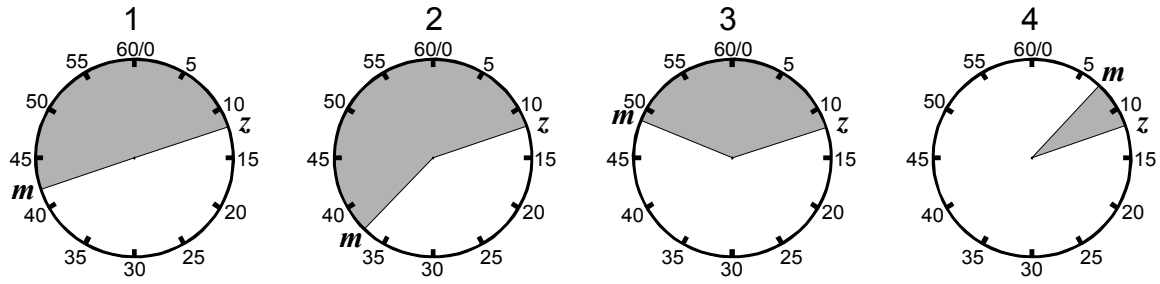
You will need three of each of the digits from 1 to 5, to make numbers such as 111, 222... **(15 plates)**

You won't have to make any three-digit numbers starting with 0, 7, 8 or 9, so only two of each of these are needed. **(8 plates)**

The important thing is to realise that, although you will have to make three-digit numbers starting with 6, you only have to go as far as 650, so you only need two plates with 6 on. (You do not need to make the number 666.) **(2 Plates)**

The total number of plates is 15 + 8 + 2 = 25, so the answer is **A**.

16 The buses pass the stop at the same times every hour, so the situation can be considered to be a continuous 60 minute cycle (as shown on the diagrams below). If the person arrives during the period indicated by the shaded area, the Zipper will be the next bus to come along.



If the person arrives at the stop at random, and the buses pass exactly 30 minutes apart (as in diagram 1) the probability of the Zipper coming along first (shaded area) is the same as the probability of the Metbus coming along first (unshaded area).

If the Metbus passes less than 30 minutes after the Zipper (as in diagram 2) then there is a higher probability that, for a person arriving at random, the Zipper will be the next bus to come along. This difference in bus times can be represented algebraically as $(m - z) < 30$.

However, we also have to consider the situation represented by diagram 4. If the Metbus passes earlier in the hour than the Zipper, then $(m - z)$ will be negative. Although $(m - z) < 30$, the Metbus is the most likely bus to pass first if a person arrives at random. So we have to add the condition that the Metbus will arrive later in the hour than the Zipper: $(m - z) > 0$

If we combine the two, we get: $0 < (m - z) < 30$, so the answer is **D**.

17 Although some might argue that statements **A**, **B**, **C** and **E** are true, they do not present the best statement of the flaw in the argument. Statement **D** is the correct answer because it draws attention to the fact that the argument overlooks the possibility that hard study might be a necessary but not a sufficient condition for success in examinations. (For example, ability and a good night's sleep might also be helpful.)

18 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: 1st = 121; 2nd = 120; 3rd = 118; 4th = 21; 5th = 20. The answer is **B**.

19 This question requires you to extract the relevant information from the passage of text. This is:

- Anne faces the direction of travel:
- Anne ends up sitting diagonally opposite Dee
- The final seating positions of Bo and Cal are not specified.

Both **2** and **3** are possible seating positions, so the answer is **E**.

20 The only evidence offered in this argument is that there has been a rise in global average temperatures in the past 100 years. Therefore, to conclude that there will be an increase in the sea level we must make assumption 1. To conclude that this increase will be annual we must make assumption 2. To conclude that, because of this, the design of coastal defences should be different in future we must make assumption 3. All three assumptions underlie the argument, so the answer is **E**.

21 The average I.Q. on the South side after the Technical Sales Consultant's move is simply the average I.Q. of the remaining five employees.

$$\frac{140 + 145 + 110 + 130 + 120}{5} = 129$$

The answer is **A**.

22 To find how much the average salary on the North side rises, you must first calculate the average salary before the move and subtract this from the average salary after the move.

Average salary before move: $\frac{£147000}{6} = £24500$

Average salary after move: $\frac{£147000 + £35000}{7} = £26000$

Rise in average salary: $£26000 - £24500 = £1500$

The answer is **B**.

23 If all the salaries rise by 5%, the total salary bill can be found by adding 5% to the existing salary bill.

existing total salary bill: $£240000 + £147000 = £387000$

5% of existing salary bill: $\frac{£387000 \times 5}{100} = £19350$

next year's salary bill: $£387000 + £19350 = £406350$

The answer is **C**.

24 To find the answer to this question, you have to determine which point on the graph is the greatest vertical distance below the line of best fit. This is the point corresponding to the person with an IQ of 180. The table shows that the Development Engineer (Job no. **11**) is the only employee with an IQ of 180.

25 One way to tackle this problem is to eliminate the codes that do not conform to the rules stated in the text.

Colours with the same initial letter are not permitted in the same code, so codes **B** and **D**, which both contain green and grey, cannot be correct.

We are told that, in the first attempt to reproduce the code, orange in position 5 was incorrect. This rules out code **A**.

The only code that has not been eliminated is **C**.

26 The correct answer is **B**. Although the trials have revealed a correlation between the consumption of alcoholic drinks and the likelihood of heart disease, it would be unsafe to assume that there is a direct causal link between the two. Other variables might intervene.

Whilst **A** is undoubtedly true, the question refers to *several* trials and *a high level of statistical significance*, so this is unlikely to be the reason why the conclusion is unsafe. **C** might also be true, but for the trials to report high levels of significance they would have to be based on data from a sufficiently large sample of people who were prepared to answer questions about alcohol consumption. **D** cannot be a reason why the argument is unsafe because the conclusion of the argument talks of the benefits of *alcoholic drinks* rather than alcohol itself.

27 If we consider each of the statements in turn:

A There are 30 students. Of these, 21 study French (70% of 30) and 12 study German (40%of 30), so there must be an overlap of at least three students who study both. **A** must be true.
B 12 students study German. So the maximum number that can study French *and* German is 12. **B** must be true.
C 21 students study French, so 9 students do not. Since students can study up to three languages, some or all of these 9 students are free to study German. **C** need not be true.

The answer is **A** & **B**.

28 Of the options available, **A**, **B** and **C** tend to misrepresent or contradict the argument, whilst **D** is not relevant. **E** is the correct answer because the argument begins and concludes by discussing the effect of financing health services on the *health* of the population, but compares the effects of spending only in terms of *life expectancy*. So the argument assumes that life expectancy is a reliable measure of the health of the population.

29 If, for the sake of simplicity, we start with an allowance of £100 and reduce this by 20%, we are left with £80. If we then reduce this £80 by 25% we are left with £60. We now need to know what percentage of £60 we need to add to return the allowance to £100. Clearly we need to add £40, which is two thirds of £60. Expressed as a fraction this is 66.6666...%. To the nearest whole number this gives **67%**.

30 One way of solving this problem is to look at each option in turn and work out if it can be true.
A This could be Lee seeing Jay and Kay coming out of Goodstuf.
B This could be Jay seeing Kay and Lee.
C This could be Lee seeing Jay and Kay on a weekday.
D Only Jay shops at Goodstuff on a weekend, so this cannot be true.
E This could be Jay seeing Kay and Lee coming out of Stockup.

The answer is **D**.

31 We start with 2400 patients. Of these, 1440 (60%) are female. Of these, 432 (30%) are less than 50 years old. Of these, **22** (1 in 20, to the nearest whole number) would be likely to cancel. So the answer is **C**.

32 Although options **A**, **B** and **C** may seem plausible, the authors do not draw firm conclusions about the relative levels of harm caused by smoking cannabis and smoking tobacco. Indeed, the article states that it is difficult to dissect out the individual risks. However, the article does state that 'most users of cannabis also smoke tobacco' and, since it is also stated that both are known to produce harmful effects, we can safely conclude that option **D** is accurate.

33 Options **A**, **B** and **C** are all mentioned by the authors as problems associated with smoking cannabis. However, these and other pieces of evidence are used to support the authors' primary assertion that the harmful effects of smoking cannabis represent a major public health hazard. The answer is **D**.

34 If we consider each of the statements in turn:

1 The article begins stating that a relatively large number of people smoke cannabis – an estimated 3.2 million. It seems unlikely that the number of cannabis smokers would contribute to the difficulty in determining the damage caused by smoking cannabis.

2 The article cites the changing potency of cannabis as one of the reasons for the lack of epidemiological evidence of cardiopulmonary harm. It seems likely that this *does* contribute to the difficulty in determining the damage caused by smoking cannabis.

3 The appearance of the effects from cannabis at a younger age would make it easier to determine the damage caused by smoking cannabis, not more difficult.

1 & 3 do not contribute to the difficulty in determining what damage to the heart and lungs is caused by smoking cannabis, so the answer is **B**.

35 The percentage of 14-15 year-old boys who have tried cannabis rose from 19% to 29% in the two years from 1999 to 2001, an increase of 10% of all 14-15 year-old boys. If the same 10% rise occurs in the two years from 2001 to 2003, and again from 2003 to 2005, then the percentage of the population of 14-15 year-old boys who have tried cannabis in 1995 will be 29% + 10% + 10% = <u>49%</u>.

The percentage of 14-15 year-old girls rose from 18% to 25% in the two years from 1999 to 2001, an increase of 7% of all 14-15 year-old boys. If the same 7% rise occurs in the two years from 2001 to 2003, and again from 2003 to 2005, then the percentage of the population of 14-15 year-old girls who have tried cannabis in 1995 will be 25% + 7% + 7% = <u>39%</u>.

If we assume that there are roughly equal numbers of boys and girls in the population, the percentage of all young people aged 14-15 who have tried cannabis will be approximately equal to the mean of the percentages for boys and girls. The mean of 49% and 39% is 44%, so the answer is **C**.