Cambridge Assessment
Admissions Testing

NAZARBAYEV
UNIVERSITY

Foundation Year Program

Entrance Tests

CRITICAL THINKING & PROBLEM SOLVING

SAMPLE QUESTIONS WITH SOLUTIONS

For

NUFYP SET 2021

V1.0 September 2020

Critical Thinking

1 Vegetarian food can be healthier than a traditional diet. Research has shown that vegetarians are less likely to suffer from heart disease and obesity than meat eaters. Concern has been expressed that vegetarians do not get enough protein in their diet but it has been demonstrated that, by selecting foods carefully, vegetarians are able to amply meet their needs in this respect.

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

A A vegetarian diet can be better for health than a traditional diet.

B Adequate protein is available from a vegetarian diet.

C A traditional diet is very high in protein.

D A balanced diet is more important for health than any particular food.

E Vegetarians are unlikely to suffer from heart disease and obesity.

Solution

What does this argument seem to be trying to get you to accept? It seems to be trying to persuade you that vegetarian food can be healthier than a traditional diet (the first sentence). If you think this is the main conclusion, you should then check whether the rest of the passage gives you reason to believe this. Two reasons are given:

1. Vegetarians are less likely to suffer from heart disease and obesity than meat eaters.

2. A vegetarian diet can contain sufficient protein.

You may not know whether these reasons are true, but if they were true, they would indicate that vegetarian food is healthier in one respect than a diet which includes meat, and that a vegetarian diet does not necessarily have the disadvantage to health (providing insufficient protein) which some may think. So it seems clear that the first sentence of the passage is being offered as a conclusion. **A** is the correct answer.

2 The demand for blood donors is increasing all over the world. In Western countries, in particular, demand has been rising so rapidly that shortages have begun to appear. In all such countries, demand is growing much faster than rates of growth in populations aged 18 to 65 from whom donors are drawn. And, despite a massive research effort to find alternatives, it remains true that in medicine there is no substitute for human blood.

Which one of the following conclusions can be drawn from the passage?

A As the demand for blood has increased, so has the supply fallen.

B The rate of growth of the blood-donor population has been slowing recently.

C The increase in the rate of demand for blood is mainly due to population growth.

D If more blood donors could be found, there would be no need to find a substitute for human blood.

E The problem of the increase in demand for blood shows no sign of disappearing.

Solution

The answer to this question is **E**, because the passage makes it clear that demand for blood is growing, and there is still no substitute available.

A does not follow from the passage, because although it states that supply has not kept pace with demand, it does not state that the supply has fallen.

B does not follow from the passage, because the passage does not give any specific information about the rate of growth of the blood donor population, apart from stating that it has not kept pace with demand.

C does not follow from the passage; it does not make any claims about the general rate of population growth.

D does not follow from the passage, because although it may be true, it is not of direct relevance to the argument.

3 A government study suggested that courses in adult education should be funded by the government with subsidies because they contribute to the economy, raise skills and improve job opportunities. However where an adult education course is purely for leisure there is no case for such funding. Therefore subsidies for courses which are purely for leisure should be abandoned.

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

A Unemployment figures are showing an upward trend.

B Large numbers of adults will attend these courses.

C There are enough teachers for the courses which would be subsidised.

D Adults attending these courses will be able to upgrade their jobs if they pass the examinations.

E Courses which are purely for leisure cannot be economically useful.

Solution

This question asks you to identify what must be assumed in order for the conclusion to be valid. Although options **A**, **B** and **C** may seem plausible, they are of little relevance to the argument. Whilst option **D** might be true, it does not have to be assumed, because the argument is based on the study's evidence of the benefits of adult education. It is **E**, *courses which are purely for leisure cannot be economically useful*, that must be assumed if the argument is to conclude that such courses should not be funded.

4 For the second year running, the Silver Star Prize for art was awarded to a video artist, raising again the big question: What is great art? Many have condemned this year's choice on the grounds that a documentary style video film cannot be considered as creative art at all in the way that, say, painting and sculpture can. The Silver Star jury, however, praised the 'emotional force of the work and its complexity beneath an apparently simple surface'. If they are right in this evaluation then clearly video is as much a medium for great art as any other form of expression.

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

A Any work with emotional force and complexity is capable of being great art.
B The decision of the jury to award the prize for a video was the right one.
C No-one can really answer the question: What is great art?
D This year's winning exhibit was deceptively simple.
E Painting and sculpture are the highest forms of creative art.

Solution

The answer is **A**, and the argument follows this pattern:
The jury thought the work had emotional force and complexity. Therefore, (conclusion) if they were right about this, it can count as great art.
This assumes that emotional force and complexity provide a good reason for something to be called great art, which is re-stated in **A**:
Any work with emotional force and complexity is capable of being great art.

B is neither assumed nor stated. The argument would hold even if the jury were wrong, as it has a conditional conclusion *(if* they are right in this evaluation…)

C would not be a welcome assumption at all, in an argument which is trying to give a limited definition of what art is.

D would be implied if the jury was right in its evaluation, but is not assumed.

E Painting and sculpture are cited as examples of accepted art forms, but there is no assumption that they are the highest forms.

5 Some recent films have been very expensive to make, but have not been the big box-office hits that would have justified the expense. At the same time, there have been films made very cheaply which have been received with both huge critical and popular acclaim. Indeed, some directors who have made successful low-budget films have gone on to make unsuccessful but expensive films. It is obvious then that if directors want to make popular films, they should stick to low budgets.

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

A Critics are often wrong in their predictions about the popularity of films.

B The cost of making a film is normally greater than its original budget.

C The cost of a film need not be the factor that determines its popularity.

D The popularity of a film would justify a high level of expense in making it.

E The public does not necessarily know whether a film is expensive or cheap to make.

Solution

The answer is **C**. The argument draws the conclusion that if directors want to make popular films, they should stick to low budgets. The reasoning offered in support of this is that:

(i) some recent films have been very expensive to make, but have not been successful enough to justify the expense;
(ii) there have been films made very cheaply that have been very popular; and
(iii) some directors who have made successful low-budget films have gone on to make unsuccessful but expensive films.

But the conclusion does not follow, because the argument fails to establish a causal link between the cost of making a film and its popularity; it fails to consider high budget films that have been popular and low budget films that have been unpopular. **C** is the statement which best explains this.

A does not describe the flaw, because it simply states something that may be true, but is of little relevance to the argument.

B does not describe the flaw, because the argument does not depend upon a comparison of original and final budgets.

D does not describe the flaw, but states something that may be true but, if anything, contradicts the conclusion of the argument.

E does not describe the flaw, because it simply states something that may be true but is not relied upon by the argument when reaching the conclusion.

6 If people go to a foreign country, they should try to learn at least some of the language of that country because, while it is difficult to pick up a foreign language in a short time, learning just a little of a foreign language helps you to find out more about the country itself and its people's customs. As well as this, it means that you can do things much more easily by being able to ask for directions or just by being able to order what you want at a restaurant, which is much less embarrassing than pointing and arm-waving.

Which one of the following is an expression of the main conclusion in the argument above?

A It is easier to do things in a country if you have learnt the language of that country.

B You will find out more about a country if you learn the language of that country.

C It is difficult to learn a foreign language in a short time.

D When people visit a foreign country, they should try to learn some of the language.

E Speaking a foreign language is easier than having to use sign language.

Solution

The argument starts with the recommendation that if people go to a foreign country, they should try to learn at least some of the language of the country. This is followed by three reasons for acting upon this recommendation. They are:

- Learning a little of a foreign language helps you to find out more about the country itself and its people's customs.
- You can do things (for example, asking for directions or ordering a meal) much more easily.
- Using the language of the country is less embarrassing than pointing and arm-waving.

Thus the conclusion of the argument is the recommendation with which it starts, and this is best expressed in **D**.

A is the second reason for the conclusion. **B** is the first reason for the conclusion. **C** points out a possible objection to the argument, which is then disregarded. **E** is a combination of the second and third reasons.

7 Zoos are entirely unsuitable places for animals. People visit zoos to learn about animal behaviour but the animals they see are likely to be behaving in abnormal and neurotic ways because of the crowded and unnatural conditions in which they are kept. Zoos should be closed down and the money reallocated to the protection of natural habitats.

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

A Humans living in crowded conditions can also become neurotic.

B Schoolchildren can learn an awful lot about animals from visiting zoos.

C Many of the animals kept in zoos would not be capable of surviving in the wild.

D The protection of wildlife habitats is very costly.

E Zoos enable endangered species to survive by breeding them in captivity and then re-introducing them to the wild.

Solution

The argument recommends closing down zoos and reallocating the money saved to the protection of natural habitats on the grounds that zoos are unsuitable places for animals, because the crowded and unnatural conditions cause animals to behave in abnormal and neurotic ways. If **E** is true, then zoos have a valuable function in relation to endangered species, enabling them to breed safely in captivity then be re-introduced to the wild, where they will be able to live in their natural environment. So **E** weakens the argument that all zoos should be closed down because of their unsuitability for animals.

A does not weaken the argument because the fact that living in crowded conditions can make humans neurotic is not a good reason for keeping animals in unnatural and crowded conditions in zoos.

B does not provide a strong reason for retaining zoos, since children who visit zoos may be learning what different animals look like (which they could also learn from books and television), but they are not learning about how animals behave in their natural environment. So **B** does not substantially weaken the argument.

C provides a reason for managing closure of zoos in such a way that those animals which would be unable survive would not be released into the wild. But it does not weaken the argument because it does not provide a good reason for not closing down zoos eventually.

Assuming that it is a good thing to protect habitats, **D** is a good reason for seeking new sources of funding for habitat protection. However, it neither weakens nor strengthens the argument, because the high cost of habitat protection implies neither that habitat protection is too costly to be worth doing, nor that zoos should be closed in order to meet the cost.

8 Amrik cannot afford to buy the Advanced version of the software. The Professional version is even more expensive, so Amrik cannot afford that either.

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

A Amrik does not like foods containing garlic. This pizza contains garlic and anchovies so Amrik will not like it either.

B It is too far for Amrik to walk to the garden centre. The shops are closer so, he will go there instead.

C Amrik cannot sleep at night if he drinks a cup of tea after 9pm, because tea contains caffeine. Coffee contains more caffeine than tea, so Amrik won't drink that after 9pm either.

D Amrik didn't have enough patience to complete the 1000-piece jigsaw he got for his birthday. The Times crossword also requires patience, so he will not complete that either.

E Amrik's hair is shorter, and Callum's hair is longer, than Bill's. So Amrik's hair is shorter than Callum's.

Solution

C is the correct answer. The structure of the original passage, and of response **C**, can be expressed in the following way:

Amrik cannot **X** because **X** is too **Y**.
Z is more **Y**.
So Amrik cannot **Z**.

In the original passage **X** = buy(ing) the Advanced version, **Y** = expensive, **Z** = buy(ing) the Professional version.

In response **C**, **X** = drink(ing) tea after 9pm, **Y** = contains caffeine, **Z** = drink(ing) coffee after 9pm.

In **A**, the structure is: Amrik does not like foods with **X** (garlic). **Y** (pizza) contains **X**, so Amrik does not like **Y**.

In **B**, the structure is: Amrik cannot **X** (walk to the garden centre) because **X** is too **Y** (far), **Z** (walking to the shops) is not too **Y**, so Amrik will do **Z**.

In **D**, the structure is: Amrik had too little **X** (patience) to do **Y** (a jigsaw). **Z** (doing a crossword) requires **X**, so Amrik will not do **Z**.

In **E**, the structure is: **X** (Amrik's hair) is shorter than **Y** (Bill's hair) and **Y** is shorter than **Z** Callum's hair), so **X** is shorter than **Z**.

9 Observations of the brains of adult human subjects before and after periods of intense memory recall (for instance preparing for the exams taken by London taxi drivers testing their knowledge of London) have shown surprising results. When comparisons were made between brain scans taken at the start of their preparations and at the end, it was found that the parts of the brain responsible for memory had actually increased in size. This would seem to suggest that, just like a muscle, the brain increases in size and power the more it is used. People who want to improve their overall IQ (Intelligence Quotient) , therefore, should simply take a very large number of IQ tests!

Which one of the following is the best expression of the flaw in the above argument?

A London taxi drivers are not necessarily representative of the population as a whole.

B It assumes that there is a single part of the brain that is responsible for one's IQ.

C It draws a general conclusion about intelligence from the particular example of memory.

D It does not state how many IQ tests constitute a very large number.

E Brain size is not necessarily dependent on the extent of mental activity undertaken.

Solution

The argument describes a study which compared the brains of adult humans before and after periods of intense memory recall. The argument suggests that because the parts of the brain responsible for memory had increased in size at the end of the task of memorising, the brain must increase in size and power the more it is used. From this it draws the conclusion that those who want to improve their IQ should take a large number of IQ tests.

But the study shows only that tasks of memorising can increase the size of the brain, and that, if such tasks do increase the power of the brain, we can only be certain that it is memory power that is increased. So the general conclusion that assumes that IQ would be improved by taking a large number of IQ tests is not supported by the evidence. **C** is the option which expresses this flaw.

A does not express a flaw because the argument does not say that London taxi drivers were the only people studied. Taxi drivers are mentioned merely as an example.

B does not express a flaw because the argument does not refer to different parts of the brain.

The argument does not say how many IQ tests constitute a large number, but **D** does not express a flaw because this point is not relevant to the way in which the conclusion does not follow from the evidence.

The argument does assume that the increase in brain size is an indication of increase in brain power, but the flaw in the argument lies in the move from 'increase in memory power' to 'increase in general intelligence'. **E** does not identify this flaw.

Problem Solving

1 The following table gives figures for the percentage growth per year of labour productivity per person per year in various countries during three periods.

	Period 1	Period 2	Period 3
Japan	8.5	3.0	3.2
France	5.4	3.0	2.6
United Kingdom	3.6	1.5	2.4
Belgium	3.3	2.8	2.3
Sweden	4.1	1.5	1.8
Denmark	4.3	2.6	1.7
Italy	6.3	3.0	1.6
Netherlands	4.8	2.7	1.6
Germany	4.5	3.1	1.6
United States	2.2	0.0	0.8

Which country's percentage growth per year remained consistently greater than half of its Period 1 level in the following periods?

A Belgium

B Denmark

C France

D Germany

E United Kingdom

Solution

For this question, you need first to be clear what you need to do to find the answer: you must identify which row of the table contains numbers in the 'Period 2' and 'Period 3' columns that are more than half the number in the 'Period 1' column.

By quickly comparing the 'Period 1' and 'Period 2' columns, you can eliminate all but France, Belgium, Denmark, Netherlands and Germany. By comparing 'Period 1' and 'Period 3' you can eliminate all but Belgium. So the correct answer is **A**.

2 Three thermometers are each accurate to within 2 degrees above or below the temperature they actually read. One reads 7°, one reads 9° and one reads 10°.

What is the minimum range in which the true temperature lies?

A 5° – 12°

B 7° – 9°

C 8° – 10°

D 8° – 9°

E 7° – 10°

Solution

The answer is **D**. The method here is to search for the acceptable highest and lowest temperatures for the conditions to be met, realising that the middle value is irrelevant. As one reads 7°, the temperature cannot be above 9° and, as another reads 10°, the temperature cannot be below 8°. This is given by **D**.

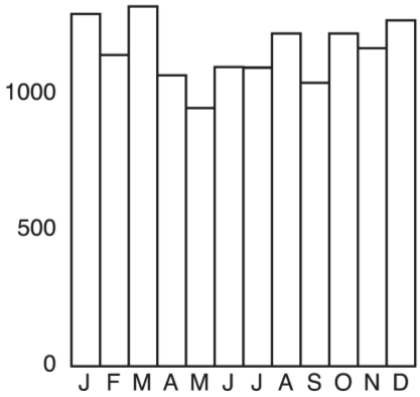
A This is obtained by subtracting 2 from the lowest and adding 2 to the highest.

B takes the lowest reading and goes to 2 above it.

C takes the highest reading and goes to 2 below it.

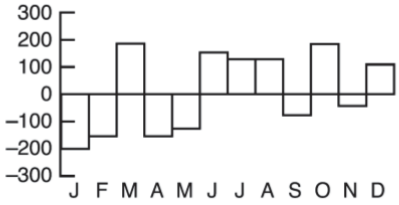
E takes the range to be from the lowest reading to the highest reading.

3 The graph below shows a person's bank balance at the end of each month in a year.



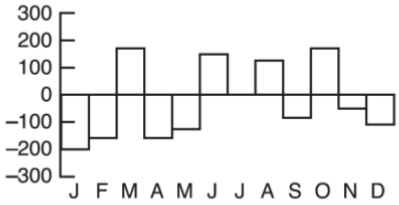
Which one of the following graphs could show the actual change in the bank balance each month?

A

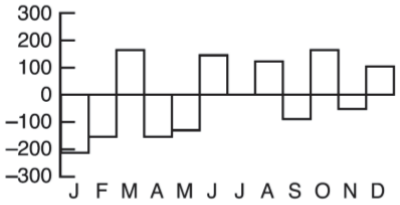


B

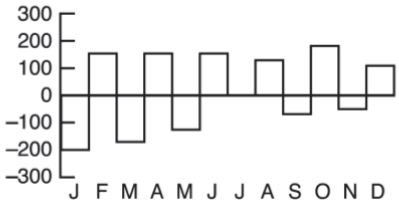
C



D



E



Solution

To solve this problem, you must first be clear about how the two types of graph represent the same information. The main graph shows the balance at the end of each month; the graphs in the options show us the change in the balance during each month. So, for example, the bar for February in the options represents the difference between the bars for January and February in the main graph.

In the main graph, the balance goes down between the end of January and the end of February, so the bar for February in the options should be negative. A comparison of the options shows that this is true only for options **A**, **C** and **D**, so options **B** and **E** can be excluded. By comparing the values for each month in this way, you should find that the correct option is **D**.

4 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.

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

A 22

B 118

C 119

D 120

E 121

Solution

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**.

5 While travelling in another country and not understanding the currency, I offered a red note for an item marked '135K'. I was given, in change, three green coins and one blue coin. Later, for a newspaper marked '33K', I offered a handful of coins and the vendor took four green and one blue. There are only these three denominations of money available; the smallest is marked '1K' and each higher denomination is a whole number multiple of the lower denominations.

How many green coins are worth one red note?

A 8

B 20

C 29

D 160

E 167

Solution

If the blue is the smallest, it is worth 1k. For the newspaper, then, the 33k is made up of 1k blue plus 32k divided by 4 green, so each green is worth 8k.

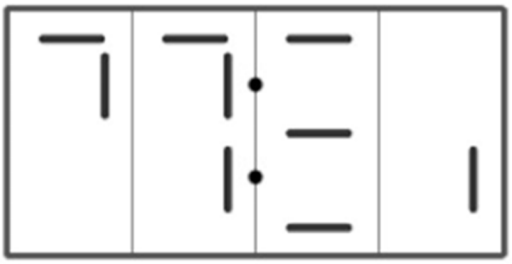
We can now use this information to work out how many Ks one red note is worth: 135K + 3 x 8 (green coins) + 1k (1 blue) = 160k.

So, one red note is worth 160k. One green coin is worth 8k. On red note is worth 20 green coins.

It's possible, of course, that the green is the smallest, but if this is so, it is worth 1k and the blue would be worth 29k (33 – 4). The red note would then be worth 135 + 3 + 29 = 167k. This is not a multiple of 29, however, and the question states that each higher denomination is a multiple of the lower denominations.

The answer is **B**.

6 A woman has to get up for work at seven o`clock in the morning. She wakes up and looks over at her digital clock. Unfortunately, the batteries are low and the figures on the display, showing hours and minutes, aren`t showing up properly. All she can see is the display below.



It is light outside, so she cannot be more than twelve hours late.

What is the greatest amount of time that she could be late waking up?

A 1h 39min

B 1h 59min

C 2h 25min

D 2h 35 min

E 2h 59min

Solution

You are told that the time cannot be more than twelve hours later than seven o'clock in the morning, so you can know that the first digit must be 0 (as it has the top element showing).

The visible elements of the other digits allow for the possibility that the time is the latest it can be before the first digit changes to 1. That would be at 10:00 so this means that the time could be as late as 09:59.

The woman could therefore be up to 2 h 59 min late waking up.

The correct answer is **E**.

7 The table below shows the cumulative percentage of salt consumption in England in 2019.

	Percentage distribution of estimated salt intake (g/day)	
	Men	Women
3 g or less	1	3
6 g or less	11	30
9 g or less	44	73
12 g or less	68	93
15 g or less	92	99
18 g or less	96	100

Assuming equal numbers of men and women in the population, what percentage of all people consumed above the recommended level of 6g per day? (Give your answer to the nearest 1%)

A 20%

B 59%

C 70%

D 80%

E 89%

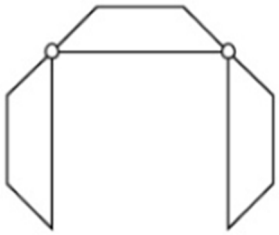
Solution

The only information given in the table that is relevant to this question is that 11% of the men and 30% of the women consume no more than the recommended level of 6 g of salt per day.

If you assume, as you are told to, that there are equal numbers of men and women in the population, then, on average, 89 + 70 = 159 out of every 200 people consumed above the recommended level. This is 79.5%, or 80% to the nearest 1%.

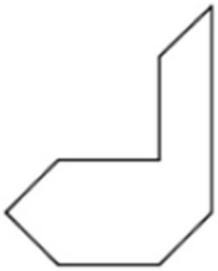
The correct answer is **D**.

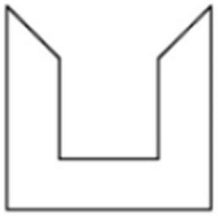
8 The diagram below shows a rather unusual conference table which may take up a range of configurations. The three pieces are hinged together at the points shown by the circles:

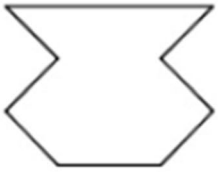


Which of the following shapes could **NOT** be made from this table?

A 

B 

C 

D 

E 

Solution

In this question you need to visualise the effect of rotating the pieces of the table around the hinges.

A can be achieved by rotating the right piece 45° clockwise and the left piece 45° anticlockwise.

B can be achieved by rotating the right piece 180° anticlockwise and the left piece 90° anticlockwise.

C can be achieved by rotating the right piece 180° anticlockwise and the left piece 180° clockwise.

E can be achieved by rotating the right piece 90° clockwise and the left piece 45° anticlockwise.

D would require either the right piece to be rotated 90° clockwise or the left piece to be rotated 90° anticlockwise and the other piece to be detached from its hinge before it could be put in place.

So, the correct answer is **D**.

9 To take part in the Lottery, entrants must select six different numbers between 1 and 49 inclusive.

My mother asked me to buy a Lottery ticket for her. She said “Choose any six numbers you like, but make sure that each one is a multiple of 3, or contains a 3, or 6 or 9.”

How many numbers can I choose from?

A 15

B 16

C 22

D 25

E 31

Solution

There are a number of ways that this question can be approached, including the following:

There are 16 multiples of 3 in the numbers 1 – 49.
There are 10 numbers 30 – 39, but these include 30, 33, 36, and 39, which are multiples of 3 as well.
Also available are 13, 16, 19, 23, 26, 29, 43, 46 and 49.

There are therefore 16 + 10 – 4 + 9 = 31 numbers available to choose from.

The correct answer is **E**.

The Nazarbayev University Foundation Year Program entrance test was developed in collaboration with Cambridge Assessment Admissions Testing, part of the University of Cambridge (2020-2021).