Cambridge Assessment Admissions Testing

BioMedical Admissions Test **4500/11**

Wednesday 31 October 2018 **1 hour**

6798138032

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.

This paper is Section 1 of 3. Your supervisor will collect this question paper and answer sheet before giving out Section 2.

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. Questions ask you to show your choice between options by shading a circle. If you make a mistake, erase thoroughly and try again.

You **must** complete the answer sheet within the time limit.

You can use the question paper for rough working or notes, but **no extra paper** is allowed.

Calculators are NOT permitted.

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

This paper consists of 24 printed pages and 8 blank pages.

PV4

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1 Riverside Walk is a popular walking path, 3.2 kilometres long, beside the River Bee. There is a seat situated at each end of the path and also every 400 metres in between. There are two litter bins just next to every seat and one litter bin every 100 metres between each seat and the next.

How many litter bins are there along Riverside Walk?

A 40

B 42

C 45

D 48

E 51

2 In the UK in the 1990s, there was an outbreak of the brain disease vCJD, which was caused by eating beef from cattle infected with the disease BSE. The type of meat thought to be infected was taken out of the food chain in 1989, and cases of vCJD have been declining since 2000. Susceptibility to vCJD is associated with two variants in a gene: M and V. We can inherit three possible combinations: MM, MV and VV. Until last year, all 177 people diagnosed with the disease in the UK had the MM combination. Recently, someone who had the MV combination has died of the disease. In the UK, 38% of people have the MM combination and 51% have the MV combination.

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

A Eleven per cent of people in the UK are not susceptible to vCJD.

B Having one V variant of the gene does not guarantee resistance to vCJD.

C Eating infected beef does not cause vCJD in everyone with the MM combination.

D Around half the UK population is at risk of developing vCJD in the future.

3 Five employees swipe a card every time they enter or leave the office. The times for Thursday are shown in the table below.

	enter	*leave*	*enter*	*leave*	*enter*	*leave*
Phil	07:55	09:15	09:27	11:03	11:42	12:12
Quentin	07:15	09:52	11:23	11:46	11:55	12:30
Rob	08:20	10:17	10:26	11:00	11:38	12:39
Sanna	08:01	09:20	09:35	10:10	10:16	11:50
Theresa	08:03	08:27	08:44	10:02	10:42	12:25

As part of a performance review, the manager observed the activity in the office between 10:00 and 12:00.

Which employee was in the office for the largest total amount of time during this two-hour period?

A Phil

B Quentin

C Rob

D Sanna

E Theresa

4 The UK government has recently announced its plan to cut funding to state nurseries. This would be a terrible mistake as high-quality nursery education is crucial. My child blossomed at a state nursery – we cannot let these places lower their standards, or even close. I was more than happy to move my child to the state nursery from a private nursery when she became eligible. Six months later, I would say that that our experience of her new nursery has been outstanding. For this reason, a professionally run state nursery should sit at the heart of every community and it should not be affected by financial restrictions.

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

A It takes a correlation between a child attending a state nursery and being happy to imply causation.

B It rejects the plan to cut spending only because it was proposed by the government.

C It generalises about the importance of state nurseries based on a single experience.

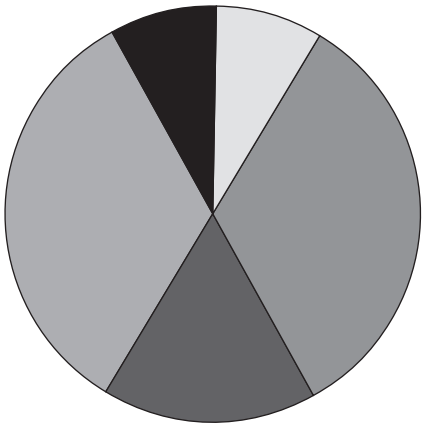
D It supports its argument by appealing to the irrelevant authority of the government.

E It assumes that a cut in funding will lead to the closure of state nurseries.

5 The table shows the average usage, in minutes per day, of five different mobile phone functions, for each of five friends.

mobile phone function	*Amos*	*Bryn*	*Clive*	*Dolly*	*Eshan*
email	20	30	60	20	20
calls	20	10	15	80	40
browser	30	50	30	40	20
apps	40	30	45	80	40
social media	30	50	75	20	20

For which of the friends could the following pie chart, suitably labelled, represent the information given in the table?



A Amos

B Bryn

C Clive

D Dolly

E Eshan

6 When the development of the internet enabled ordinary people to have free, easy access to information, it seemed as though a great breakthrough had been made in empowering people. The subsequent development of social media made it possible for people to share opinions and quickly organise protests against ruling governments. These two technological developments seemed a healthy way forward for democracy. But now social media, which lacks the checks and editing of traditional information sources, enables people to share deliberately false information, which is then accepted as 'truth' by many. Opinions are being manipulated via social media by people with their own motivations to discredit rivals or groups with different opinions, and gain power themselves. Social media has become a vehicle for spreading untruths, and has thereby undermined democracy.

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

A Social media should be regulated to censor the publishing of false information.

B Technological developments have done more harm than good to democracy.

C Democracy has been made weaker by the use of social media.

D Democracy depends on the availability of truthful information.

E Organised protests and direct action are undemocratic.

7 The lift in the hotel I am staying in takes 3 seconds to move between consecutive floors and when it stops at a floor it remains stationary for a minimum of 9 seconds to let people in and out.

A screen inside the lift shows a list of the floors that it has been requested to stop at.

When the lift moves off after stopping at a floor it always stops next at the closest floor on its list. If two floors are equally close in both directions, it continues in the direction in which it was previously travelling.

The door of the lift has just closed after I have entered it at floor 11 and added floor 4 to the list of floors to be stopped at. The other floors currently on the list are floors 1, 6, 15 and 24.

Assuming that no further floors are added to the list, what is the minimum time that will elapse before the lift door opens at floor 4?

A 63 seconds

B 90 seconds

C 99 seconds

D 126 seconds

E 153 seconds

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

Total unpaid work in the UK in 2015 had a value of £1000 billion, equivalent to approximately 55% of Gross Domestic Product (GDP), and women carried out an overall average of 60% more unpaid work than men. The only area where men put in more unpaid work hours than women was in the category of 'non-leisure travel'. While the numbers of men and women are roughly equal, women did more unpaid work than men in every age group, from the 25 and under age category to the 56 and over age category. The figures also revealed that people on lower incomes tended to carry out on average more unpaid work than other income brackets.

average hours of unpaid work done per week in each type of work for men and women, UK 2015

type of work	*female*	*male*
cooking	7.28	3.65
non-leisure travel	5.85	7.21
childcare	4.67	1.89
housework	4.66	2.42
laundry	2.40	0.39
volunteering	0.36	0.20
adult care	0.32	0.23
total	25.54	15.99

average hours of unpaid work done per week in each age category for men and women, UK 2015

age	*female*	*male*
25 and under	12.38	8.07
26 to 35	34.60	17.47
36 to 45	33.26	20.87
46 to 55	26.49	18.27
56 and over	25.56	17.56

average hours of unpaid work done per week by grouped income level, UK 2015

type of work	*low income*	*middle income*	*high income*
cooking	5.93	5.57	4.98
non-leisure travel	5.43	6.75	7.80
housework	3.78	3.65	3.23
childcare	3.74	3.92	2.74
laundry	1.42	1.54	1.22
adult care	0.27	0.22	0.18
volunteering	0.24	0.31	0.21

8 In which age category did women do the most unpaid work relative to men?

A 25 and under

B 26 to 35

C 36 to 45

D 46 to 55

E 56 and over

9 Which of the following can be inferred from the data given?

1 Women spend more than twice as much time doing housework as men.

2 Laundry is the type of unpaid work that men spend the least time on relative to women.

A 1 only

B 2 only

C both 1 and 2

D neither 1 nor 2

10 Which one of the following **cannot** be a plausible explanation why, contrary to the general trend, people on higher incomes tended to spend more time on non-leisure travel?

A People on lower incomes are less likely to own a car, which means that they are less likely to drive their family members around.

B People on lower incomes are more likely to be unemployed or to work part-time, which means that they do not need to commute to work so often.

C People on lower incomes are more likely to use public transport to commute to work, so they spend less time driving.

D The lower income group includes many university students who live on campus and thus spend little time on transport.

11 Assuming that the different types of work are valued equally, what was the total value of unpaid work done by women in the UK in 2015?

A £385 billion

B £550 billion

C £615 billion

D £700 billion

E £1120 billion

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12 Any railway customer who has to wait for a train that is delayed by more than 20 minutes is entitled to a refund of $6. Anyone who has to wait for a train that is delayed by more than 10 minutes but less than 20 minutes is entitled to a refund of $4.

The table below shows the scheduled arrival time and the actual arrival time for 10 customers' trains.

customer	*scheduled arrival time*	*actual arrival time*
1	15:43	15:44
2	10:17	10:17
3	06:20	06:44
4	10:01	10:12
5	15:39	15:42
6	17:54	18:02
7	20:47	20:55
8	22:33	22:40
9	15:08	15:29
10	14:58	15:23

All of the customers who were entitled to a refund did receive the refund from the railway company.

How much money did the railway company have to pay out in total to these customers?

A $16

B $18

C $22

D $24

13 While well-intentioned, the campaign to ban tackling in school rugby constitutes an overreaction. Such a ban could lead to unintended negative consequences for the young people involved in the sport, and it must not be implemented. Many parents and others are very concerned about the potential for rugby tackling to cause head and spinal cord injuries. However, the possibility of injury is present in any sport, and the health risks associated with physical inactivity are widely understood. Also, as is the case with boxing or any other contact sport, full-contact rugby enables players to channel aggression in a positive, controlled way. It is surely better to let young people show aggression through rugby than to wait for violent behaviour to happen impulsively.

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

1 It is unfeasible for schools to replace rugby with other activities that can channel aggression in a controlled manner.

2 Aggression is a natural or unavoidable feature of many young people's behaviour.

3 It is impossible to sustain head or spinal cord injuries in other sports played at schools.

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

14 Among a group of 6 children, 2 belong to a football team.

Philip says it is Roger and Qayla.
Qayla says it is Philip and Roger.
Roger says it is Qayla and Sam.
Sam says it is Trista and Roger.
Trista says it is Ursula and Sam.
Ursula refuses to say anything.

Four of the children correctly named one person and lied about the other. One person lied about both. The sixth person, Ursula, said nothing.

Which two children belong to the football team?

A Philip and Qayla

B Philip and Sam

C Philip and Ursula

D Qayla and Ursula

E Roger and Sam

F Roger and Ursula

15 The BBC's codes and guidelines have maintained its reputation for broadcasting news that is representative of different political opinions. These include the political Right's promotion of the freedom and prosperity of business, in contrast to the Left's view that businesses should be regulated to serve everybody's interests. There are no similar requirements for newspapers. The range of views on offer in the press derives largely from the extent of the pluralism of ownership and, in turn, the degree to which owners seek to influence editorial direction. Newspaper ownership in Britain is concentrated in the hands of a few businessmen. Newspapers are rarely profitable, but provide power, influence and easy access to the establishment, which their owners can exploit to secure economic conditions favourable to their businesses. Owners can directly dictate the newspaper's position on a particular issue, and staff can be appointed for, or censored by, the political ethos of the organisation.

Which of the following can be concluded from the above passage?

1 The Right promotes the interests of newspaper owners in Britain.

2 The political opinion presented in the British press is biased in favour of the Right.

A 1 only

B 2 only

C both 1 and 2

D neither 1 nor 2

16 In a paint factory, large and small containers must be filled with paint. Two pumps are available. The fast pump can deliver paint at 12 litres per minute, and the slow pump can deliver paint at 6 litres per minute.

Kadu begins to use one of the pumps to fill a large container and the other pump to fill a small container. He starts filling the containers at the same time, and, when the small container is half full, he swaps each container to the other pump. Both containers become full at the same time.

How much bigger is a large container than a small container?

A 25%

B 50%

C 100%

D 200%

17 It is not unusual for a member of the British Royal Family to serve as an officer in the armed forces, and even, on occasion, to see active service. It happened quite recently when Prince Harry was posted to a war zone, raising questions about the heightened risk that such a high profile target would face, and possibly deflect onto others. At first the prince's location was a well-kept secret, but in due course it became public knowledge, rightly prompting calls in parliament and the media for his recall. If the prince's whereabouts had remained a secret, the level of risk could have been managed. But since his whereabouts were not a secret, risk management was not possible.

Which one of the following commits the same logical flaw as the above argument?

A If the tide is out, the island can be reached. But the tide isn't out, so the island can't be reached.

B If the tide is out the island can be reached. But since the island can't be reached, the tide is not out.

C If the island can be reached, the tide must be out. But since the tide isn't out, the island can't be reached.

D The island can't be reached unless the tide is out. But the island can be reached, so the tide is out.

18 Three-year old Arthur has a junior skittles set. It contains four red skittles, four yellow skittles, three balls and a felt mat. The mat is shown below.

Six of the eight skittles are placed on the spots (there are two extra in the set in case of loss or damage). The balls must then be bowled from behind the line at the other end of the mat.

How many different arrangements of red and yellow skittles are possible on the six circles on the mat?

A 20

B 30

C 35

D 45

E 50

F 70

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

Between 1 January 1960 and 31 December 2015, there were 1104 fatal passenger aircraft crashes for which a definitive cause was known (see Table 1). The crashes included are those which had ten or more passengers on board and which resulted in at least one fatality. Military and private aircraft and helicopters were excluded. Where there were multiple causes, the most prominent cause was recorded. The category of pilot error includes those crashes in which weather or a mechanical fault was a strong contributing factor to the pilot error.

Table 1 *Number of crashes in each category of primary cause, 1960 to 2015*

category	*1960s*	*1970s*	*1980s*	*1990s*	*2000s*	*2010s*	*Total*
pilot error	150	132	111	140	67	40	640
mechanical	52	38	37	36	21	11	195
weather	14	13	11	13	7	5	63
sabotage	12	25	23	19	10	6	95
other	20	30	23	27	7	4	111
total	248	238	205	235	112	66	1104

Table 2 gives a breakdown of fatal accidents and onboard fatalities by phase of flight over the same period.

Table 2 *Fatal crashes and onboard fatalities by phase of flight, 1960 to 2015*

phase of flight	*taxi / parked*	*take-off*	*initial climb*	*climb (flaps up)*	*cruise*	*descent*	*initial approach*	*final approach*	*landing*
fatal crashes	12%	12%	8%	10%	8%	4%	10%	11%	25%
onboard fatalities	0%	16%	14%	13%	16%	4%	12%	13%	12%
exposure*		1%	1%	14%	57%	11%	12%	3%	1%

* Percentage of flight time estimated for a 1.5 hour flight

Since 1997, the average number of airliner crashes per year has shown a steady and persistent decline, thanks to the continuing efforts of international aviation organisations and the stringent safety standards now in place in the aviation industry. Recent figures reveal that 2016 was the second safest year on record. There were 17 fatal crashes, resulting in 325 deaths, down from 560 in 2015. Given that a total of around 3.5 billion air passengers flew during 2016, that's just one death per 10.8 million travellers.

Only one year saw fewer deaths – 2013, with 265. But with 3.05 billion passengers boarding a plane that year, that amounts to a very similar number of deaths per passenger (one per 11.5 million). When one discounts sabotage, 2015 was actually the safest year on record. Two crashes, deliberately caused, accounted for the majority of fatalities that year. So it is easy to see that air travel has never been safer.

19 In which phase of flight are most fatalities caused per crash?

A cruise

B descent

C landing

D take off and initial climb

E taxi

20 What is the average time taken by an aircraft to get from the start of its descent (at cruising altitude) to landing on the runway?

A 14 minutes

B 16 minutes

C 24 minutes

D 27 minutes

E 51 minutes

21 For the most part, the proportions of crashes that were attributable to each category of primary cause have remained broadly constant over the period since 1960.

Which one of the following represents the clearest exception to this observation?

A The proportion of crashes due to pilot error was unusually high in the 1990s.

B The proportion of crashes due to mechanical failure was unusually low in the 2010s.

C The proportion of crashes due to bad weather decreased steadily over the period.

D The proportion of crashes due to sabotage was unusually low in the 1960s.

E The proportion of crashes due to other causes increased steadily over the period.

22 Which one of the following is assumed by the reasoning in the final paragraph?

A Crashes that are deliberately caused are extremely rare.

B Crashes caused by sabotage are not the fault of the airlines.

C Sabotage does not make air travel less safe.

D Safety should not be judged on numbers of crashes and fatalities.

E We have no need to be concerned about sabotage.

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23 I use a 4-digit PIN with my bank cards. Each digit can be any digit between 1 and 9. I have set the code so that:

- the first and second digits are consecutive (subtracting the first from the second digit gives 1).
- the third and fourth digits are consecutive (subtracting the third from the fourth digit gives 1).
- the first and fourth digits add together to give the same value as the second and third digits multiplied together.

What is the last (fourth) digit of my PIN?

A 2

B 3

C 4

D 5

E 6

F 7

G 8

H 9

24 Domestic cats are popular pets worldwide, and have the potential to significantly affect prey species in both rural and urban areas. Several studies have shown that cats living on the outskirts of urban areas and those living in rural areas bring home more prey, and a greater variety of prey, than cats living in more urbanised environments. However, not all studies have found detrimental effects of cat predation on wildlife. A study in Canberra, Australia, found that domestic cats caught and killed so-called 'invasive' species of rodents and birds – those that are non-native to the ecosystem and whose presence causes or is likely to cause harm. Thus, keeping domestic cats should be encouraged as it has a positive effect on native wildlife.

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

A It assumes that keeping domestic cats serves no other purpose than to have a positive effect on native wildlife.

B It assumes that because numbers of invasive species decreased in an area with domestic cats, the presence of domestic cats caused this decrease.

C It assumes that the Canberra study was representative of the general environmental effects of keeping domestic cats.

D It assumes that we should keep domestic cats only if doing so would have a positive effect on native wildlife.

25 Simone has won $200 in a competition and she decides to share the money between five different charities that she supports. No charity will receive more than $100 and each charity will receive a whole number of dollars. Each one of the charities will receive a different amount and at least $10. Simone will give the second highest amount of money to a local charity STARS.

What is the least amount that Simone might give to STARS?

A $25

B $27

C $28

D $30

E $31

26 It is known that one of the factors that can promote better health in infants is the good health of the mother. What is less well-known is that there are real dangers presented by bottle-feeding, a practice that has become very popular in developing countries. Firstly, formula milk lacks the protective properties (antibodies, enzymes, long chain fatty acids and hormones) of breast milk. Secondly, there is the danger of contamination in situations where hygiene is poorly understood or difficult to achieve. Thirdly, formula milk may be over-diluted as a way of saving on cost.

Companies selling formula milk have led aggressive advertising campaigns to promote bottle-feeding; as a result, many governments in the developing world have introduced limits on or banned such marketing. More action is urgently needed throughout the developing world if we are to help women and avoid infant ill health and mortality. One estimate put the number of infant deaths in the developing world caused by bottle-feeding at 13% of all deaths.

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

A Breastfeeding is most common in the developed world among better-educated women.

B Women in developing countries often choose bottle-feeding as it is easier to combine with returning to work.

C Campaigns to limit the commercial promotion of bottle-feeding are becoming more widespread.

D Breastfeeding has health benefits for the mother as well as for the child.

27 The prices of pizzas at Paul's are shown in the following table.

type of pizza	*cost*
basic vegetarian	$5
basic ham	$6
Paul's special	$8
extra toppings	$2 each

Paul decided to have a promotion with two special discounts available on the total cost of pizzas, including any toppings:

- buy one pizza, get any other one for half price
- buy any four pizzas, get another one free

Paul had intended that the discount would apply to the cheapest pizza in each case, but forgot to include this wording on the promotional material. He therefore had to allow customers to decide which pizzas would have the discount applied.

Seven friends ordered the following pizzas:

	type	*number of extra toppings*
India	vegetarian	none
James	ham	one
Keira	ham	none
Lance	ham	one
Maddie	Paul's special	two
Nellie	vegetarian	two
Olly	Paul's special	one

What was the least possible cost of their pizza order?

A $41.00

B $42.50

C $43.00

D $43.50

E $46.00

28 A study of routine health screening programmes found no consistent evidence that they improved health or reduced death rates and concluded that 'while we cannot be certain that general health checks lead to benefit, we know that all medical interventions can lead to harm'. Possible harms include overtreatment due to false positive results. In routine screening for breast cancer, for example, tumours may be detected leading to major surgery when those tumours may never – if left alone – have developed into anything harmful. Furthermore, people who are better off or healthier are more likely to participate in routine screening, so the screening may not reach those who need it most. This is not to imply that the individual components of health checks are ineffective or to discount the value of targeted screening programmes in geographical areas where levels of disease are more prevalent.

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

A Being better off enables people to lead healthier lifestyles.

B The value of universal screening programmes has been underestimated.

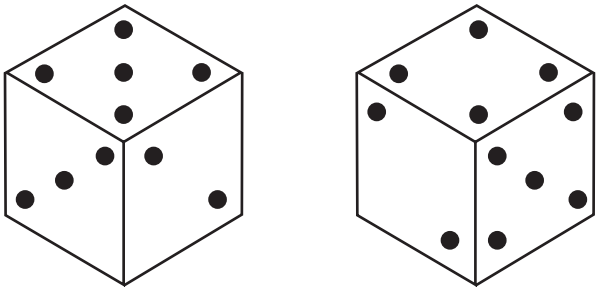
C People who participate in breast cancer screening are not informed of the risk of 'false positives'.

D Targeted screening programmes would be more effective than universal programmes.

29 Most board games that require two dice are supplied with two identical dice, both having 1 to 6 spots on their faces, with the spots on opposite faces adding up to 7.

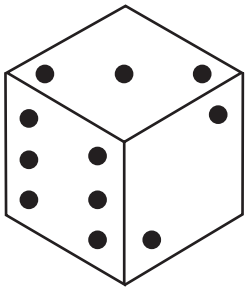
The two dice supplied with one of my board games are different. One has 0 to 5 spots on its faces, with the spots on opposite faces adding up to 5, while the other one has 2 to 7 spots on its faces, with the spots on opposite faces adding up to 9.

This is a view of both dice together.

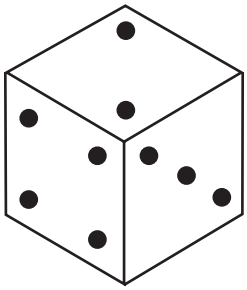


Which one of the following could be another view of one of the dice?

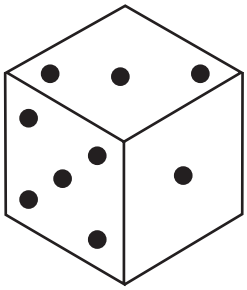
A



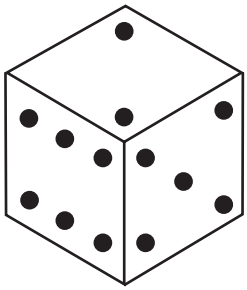
B



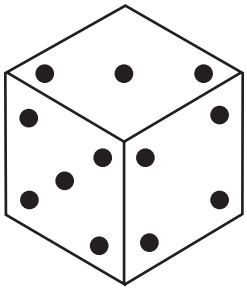
C



D



E



30 Biofuels are an energy source derived mainly from plants and widely thought to offer a better alternative to petroleum and other fossil fuels. In particular, when biofuels are burned to generate electricity or power a car, they produce lower emissions of carbon dioxide, the gas largely responsible for human-caused climate change. Concerns do exist about other consequences of switching to biofuels. For instance, using biofuels to meet the energy needs of even a few industrialised nations would likely require converting large amounts of forest and land now utilised for growing food to the production of crops only suitable for manufacturing biofuels. Such land use change could harm biodiversity and also reduce food availability for some of the world's poorest people. Yet the planet-wide threat posed by climate change is so significant that a transition from fossil fuels to biofuels must be pursued.

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

1 Longer growing seasons and other likely impacts of climate change will lead to increased food harvests in some areas.

2 Technology exists to manufacture biofuels cheaply and efficiently from waste products associated with existing food production arrangements.

A 1 only

B 2 only

C both 1 and 2

D neither 1 nor 2

31 Bruno was awarded 48 marks out of 80 for his coursework project. The maximum mark available for each of the four sections: research, design, construction and evaluation, was 20. The marks for all sections were expressed in whole numbers.

The smallest difference between the marks awarded to any two of Bruno's sections was 2. This was between design and construction, which were his two best sections. The largest difference was 11, between design and evaluation.

How many marks was Bruno's research section awarded?

A 10

B 11

C 12

D 13

E 14

F 15

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

All proteins are composed entirely of amino acids. Determining the amino acid mixture that is most desirable in a protein food is an issue of debate. Part of the difficulty in determining our need for individual amino acids involves the interconversion of amino acids that is constantly taking place in our body. Researchers simplify amino acid recommendations by dividing the twenty amino acids into three basic categories: dispensable, indispensable, and conditionally indispensable. The five dispensable amino acids are those that our bodies are able to make under all circumstances; the nine indispensable amino acids can never be made by our body and must be consumed through diet; the six conditionally indispensable amino acids can be made by our body under many circumstances but, under other circumstances, cannot be made in a sufficiently reliable way to meet our needs.

Our bodies can take some amino acids and convert them into others, for example phenylalanine into tyrosine and methionine into cysteine. However, these conversions rely on the presence of other molecules, and the ability of our bodies to create and transform amino acids can (as with the examples cited) change at different stages of life and in different states of health.

The protein content of human breast milk falls from 2.5% immediately after giving birth to 1% eight weeks after birth, but the amino acid mix of the protein content remains the same and has always been regarded as the ideal for infants. For older humans, however, protein quality is provided through a variety of foods, which makes it more difficult to determine the most desirable mixture of amino acids. One proposal for a desirable mixture of amino acids for adults is the mixture found in a hen's egg, based on a recommended daily protein intake of 0.8 g per kilogram of body weight.

Table 1 shows the number of milligrams of each amino acid per gram of protein consumed for human milk and a hen's egg.

Table 1

amino acid	*human milk*	*hen's egg*
Try	17	4
His	21	*
Cys+Met	33	13
Thr	44	19
Iso	55	42
Val	55	47
Lys	69	37
Phe+Tyr	94	48
Leu	96	55

An alternative proposal, presented in Table 2, recommends levels for daily amino acid intake based upon a person's age, sex and body weight (in mg / kg of body weight per day).

Table 2

age/sex	*His*	*Iso*	*Leu*	*Lys*	*Cys +Met*	*Phe +Tyr*	*Thr*	*Try*	*Val*
0 to 6 months	36	88	156	107	59	135	73	28	87
7 to 12 months	32	43	93	89	43	84	49	13	58
1 to 3 years	21	28	63	58	28	54	32	8	37
4 to 8 years	16	22	49	46	22	41	24	6	28
9 to 13 years male	17	22	49	46	22	41	24	6	28
9 to 13 years female	15	21	47	43	21	38	22	6	27
14 to 18 years male	15	21	47	43	21	38	22	6	27
14 to 18 years female	14	19	44	40	19	35	21	5	24
19+ years	14	19	42	38	19	33	20	5	24

* not established

Abbreviations: His – histidine, Iso – isoleucine, Leu – leucine, Lys – lysine, Cys+Met – total of cysteine and methionine, Phe+Tyr – total of phenylalanine and tyrosine, Thr – threonine, Try – Tryptophan, Val – valine.

32 Based on the information provided, which of the following can be inferred as being 'conditionally indispensable' amino acids?

A histidine

B cysteine and phenylalanine

C phenylalanine, tyrosine, cysteine and methionine

D tyrosine and cysteine

E histidine, methionine and tyrosine

F phenylalanine and methionine

33 How much more tryptophan would be recommended for a 20-year-old man weighing 70 kg by the proposed daily desired intake from Table 2 compared to Table 1?

A 1 mg

B 126 mg

C 196 mg

D 336 mg

E 591 mg

34 The average newborn baby consumes 560 g of breast milk a day, while the average 8-week-old baby consumes 700 g a day. What is the ratio of the average consumption of isoleucine per day between the average newborn and the average 8-week-old?

A 2 : 1

B 4 : 5

C 5 : 2

D 5 : 3

E 5 : 4

F 5 : 8

35 The requirement for histidine (based on a hen's egg) has not been quantified beyond infancy, but an estimate has been extrapolated from the ratio of threonine requirements between infants and adults. Which one of the following would be this estimate?

A 8 mg

B 9 mg

C 10 mg

D 11 mg

E 12 mg

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