

## BMAT Free Questions

### Section 1

1. Floods are becoming more regular in Britain in more and more areas. This is making it more difficult for those who live in areas prone to floods to sell their houses. If that wasn't enough, climate change is expected to exacerbate this problem by increasing the risk of floodings. This will, consequently reduce future social mobility.

Which of the following statements are assumptions underlying the above argument?

1. No action will be taken to prevent the flooding of homes in these areas
2. Flooding is caused by climate change
3. People do not move into an area if it's at risk of flooding

- A. 1 and 2 only
- B. 1 and 3 only
- C. 2 and 3 only
- D. None of the above
- E. All of the above

2. High blood pressure in older populations is endemic in developed countries, unlike underdeveloped countries where this problem is not seen due to people maintaining active lifestyles with high levels of physical activities throughout their lives. In addition, the younger population of developed countries suffer from conditions such as diabetes and obesity. This is mainly due to sedentary lifestyles which don't give these people the opportunity to exercise.

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

- A. People in developed countries need to change their lifestyles to live longer
- B. People who don't take exercise suffer diabetes and obesity
- C. People gain little benefit from physical activity if they don't take it when growing old
- D. Lifetime exercise is associated with good lifestyle
- E. Lack of exercise hurt young people more than older people

3. Self-help books claiming to help find happiness generated £10 billion in revenues in 2009. But, if you want to be happy with your life, don't read these books because reading them will give you the opposite effect. A research at a university found that those who have read these kinds of books were more likely to be depressed or anxious than others who haven't read them.

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

- A. Becoming happier in life is unrealistic
- B. People read self-help books because they are anxious and depressed
- C. Some of those who haven't read self-help books may be anxious or depressed
- D. Some of those who are anxious and depressed may never read self-help books

4. There has been some discussion in the past about reducing the size of UK classes in schools. For example, reducing the number of pupils to 20. However, a lot of people argue that this would be expensive and there wouldn't be much improvement to the children's education.

The USA is usually used to back up this argument. In the 1990 California ranked 49 out of 50 among states for children's ability to read between the ages of 9-10. The following 10 years, California spent \$50 billion to reduce class sizes and only went up by 1 rank to 48! The reduction in class sizes means more teachers will be needed. This means that if reducing class sizes takes place in the UK, teachers that are not well qualified will be hired since the rate of applications for a UK teacher's post is 1.2. What matters is not how many students there are in a classroom, but rather if there is a good teacher. Countries where children do well at school recruit highly qualified teachers after they graduate.

Which one of the following is **not** an assumption underlying the above argument?

- A. Candidates whose qualifications aren't as high may not be as good of teachers
- B. It is not justified to spend too much money on improving education
- C. Other states in the US had a similar experience to California's
- D. Highly qualified teachers improve the performance of the children.

5. 61 million prescriptions for antidepressants were made in the UK in 2015, twice the number of descriptions made in 2005. In 2014, there were 1.1 million mental health disability claimants, double the number of people from 1995.

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

- A. Antidepressants could help combat mental illness in the short term, but, in the long term, data show that they are not useful.
- B. Doctors are encouraged to prescribe antidepressants to people regardless of how much they need
- C. Antidepressants clearly don't work to since the number of people taking them has only increased
- D. Statistics about usage of antidepressants don't provide some evidence that these drugs are working in the UK

6. A worrying trend of increased violence amongst young people is on the rise. The best way to reverse this trend is to encourage more young people to take up boxing. Boxing isn't just about aggression, it's about discipline and self-restraint. It also keeps young men occupied during their leisure time. All the places with high crime areas witnessed a reduction in crime rates in this area after a boxing club was set up.

Which of the following identifies a weakness in the above argument?

- A. It makes the assumption that boxers are never aggressive
- B. It ignores the possibility that other activities may also contribute to crime rate
- C. It assumes that young people lack self-restraint and discipline

- D. It ignores the possibility that some people may take up boxing for the sake of its violent nature

7. Should people who have been convicted of a serious crime return to their careers normally after serving a prison sentence? Initially, you may think 'sure why not? All criminals should be rehabilitated into society anyway'. But what if that person is a popular person, such as an actor. Successful professional actors may have hundreds of thousands if not millions of people, especially young people, regarding them as heroes. In this case: giving this popular personality a second chance is not justified: it sends off the impressions that such criminal behaviour is accepted. Therefore, for popular people with a young audience, they should not have a second chance.

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

- A. Young people can't distinguish what's right and wrong
- B. Criminals should usually be allowed to go into employment after a prison sentence
- C. Those who commit crimes must accept the punishments
- D. The rights of the individual are less important than the risk the individual poses on society

8. Animal rights campaigns have been criticizing the use of animals for experiments as morally wrong. Some campaigners, however, use radical tactics to gain the public's attention. Moreover, these campaigners ignore the advancements made in medicine which have many benefits, even on the animals themselves. Some advancements have helped both animals and humans, for example antibiotics. Therefore, these experiments are not morally wrong if the overall animal population derives benefit from experiments done on a small minority of animals.

Which of the following expresses the conclusion of the above passage?

- A. Human rights are more important than animal rights
- B. Animal experimentation benefit animals from the results
- C. There is a clear moral justification for all animal experiments
- D. Only experiments where both animals and human benefit are morally acceptable
- E. The use of experimental in animals in non-medical research is morally wrong

9. Just like cigarettes are labelled with health warnings, so should ready-made meals. This is particularly important since there is a big rise in the number of ready meals being sold in supermarkets and elsewhere. Even though these meals may be quick and easy to use, these emails also contain high levels of salt, fat and other preservative substances. All these elements are no good for long term health.

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

- A. People buy quick meals because they do not know how to healthily cook

- B. People who buy unhealthy meals are unaware of the unhealthy properties of these meals
- C. People who buy ready-made meals do a lot of exercise
- D. People who buy ready-made meals do not care about health hazards

10. One of the key elements of democracy is freedom of speech. But when this is used to fuel hatred of minority groups, another key element, that is tolerance, is lost. In conclusion, even though it is true to say that freedom of speech is desirable, it has to be limited if democracy is to be sustained in the long term.

Which of the following best expresses the conclusion of the passage?

- A. Freedom of speech cannot co-exist with tolerance
- B. It should be illegal to incite hatred of minority groups
- C. Freedom of speech is less important than tolerance of minority group
- D. Freedom of speech in a democracy cannot be unrestrained

11. The government insists that all primary schools spend at least an hour a day on numeracy and literacy work, and that a significant part of the time is spent on whole class teaching. These changes helped raise the standards for literacy and numeracy. This shows that whole class teaching is more beneficial than smaller group work classes.

Which of the following best expresses the flaw in the argument in the passage?

- A. It assumes that the improved standards of students are caused by teaching methods
- B. It ignores all the additional work that teachers do
- C. It assumes that numeracy and literacy were already low
- D. It ignores the benefits of smaller group work classes

12. The UK has been experiencing unusual weather patterns recently: very dry and warm springs but very cold winters. This is the scientific expectation of what should happen if the melting of the Arctic is influencing our weather. Indeed, the Arctic has undergone its most dramatic shrinkage recently. Therefore, the arctic ocean is warming, upsetting the global balance between cold Arctic air and warm tropical air.

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

- A. The only explanation to the UK weather fluctuations is the melting of the Arctic ice
- B. The UK would not be experiencing this unusual weather if the Arctic ice is not melting
- C. The unusual weather in the UK must be causing the melting of the Arctic ice
- D. The melting of the Arctic ice could be causing the unusual weather of the UK

13. Countries with a strong presence of arts and humanities subjects tend to be more democratic and live better lives than those with less interest in arts. Therefore, if we want to live in a more democratic country and have more extravagant lives and a stronger economy we should ask the government to subsidise humanities and arts to help boost the art sector.

Which one of the following illustrates a flaw in the above argument?

- A. There may be other demands on government money
- B. A flourishing arts sector may influence citizens' psychological health
- C. A strong economy may be a precondition for a flourishing arts sector
- D. Some of the arts are not present in all democratic countries

14. Two centuries ago, average women in well-off nations would be expected to give birth to 8.5 children and to die in their mid fifties. A century later, this rate has almost halved to 4.2, and the life expectancy rose to the seventies. Therefore, the changes during childbirth mean that the more children a woman gives, the faster she ages and will likely die early.

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

- A. It assumes that women were never aware of the impact of pregnancies
- B. It is only specific to women in rich nations
- C. It doesn't mention the reduced mortality rates during these time periods
- D. It ignores the other factors that might have improved women's lives

15. Food experts claim that people should have more vegetables and fruits in their diet to reduce people's intake of fat. This, in turn, will help prevent major illnesses. However, it is unlikely that people from low income families can do that since healthier food containing more fruits and vegetables is usually more expensive. Therefore, the government should tax foods containing fat for a healthier nation.

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

- A. A lot of people prefer eating fatty foods more than fruits and vegetables
- B. There is a lot of advertising for fatty food
- C. Smoking rates have declined since the prices of cigarettes increased
- D. Children don't usually like fruits and vegetables

16. The UK announced plans to cut fundings from state nurseries. This would not be a good idea because high-quality nursery education is very important. One mother reports that her child loved their time at nursery and that these places should not lower their standards or close because of funding. This same mother even moved her child from a private nursery to a state nursery. For this reason, a state nursery should be present in each community and should not be affected by funding changes.

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

- A. There needs to be a correlation between children being happy at state nurseries for us to say that state nurseries result in happy children and therefore, should not be shut down
- B. It is against cutting fundings just because it's something the government suggested
- C. There is a generalisation based on a single person's story

D. It assumes that cutting fundings will lead to closing the nurseries

17. Even though morning sickness is still not very well-understood, it still affects around 500,000 in the UK. One of the theories that try to explain this phenomenon is that this is an evolutionary adaptation to prevent the mother eating too much and potentially ingest something dangerous to the baby. In the past, this would help protect the baby during its most vulnerable trimester, the first trimester. The logic is that if the mother eats less then she is less likely to ingest something harmful.

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

1. Symptoms of morning sickness usually decline after the first trimester
2. Pregnant women have strange cravings for different foods
3. Women with morning sickness eat less, and when they eat they eat something simple

- 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

18. The reliability of using fingerprints has often been questioned by scientists despite the fact that this technique has been used for over 100 years. However, the reliability of this technique should not be questioned because fingerprints experts know how to use the technique, and they all agree that this is a reliable method of identifying criminals.

Which one of the following identifies a weakness in the above argument?

- A. Experts don't apply their techniques correctly and not always methodically
- B. Scientists shouldn't judge the use of fingerprinting because they don't know enough about it
- C. Experts opinion does not mean their method is reliable
- D. Even though the technique has been used for a long time, it does not mean it's reliable

19. Some oranges are lemons and all lemons are large.

Which one of the following statements is definitely true?

- A. All lemons are both oranges and large
- B. All oranges are large
- C. All large are oranges
- D. Some oranges are large

20. Not having enough sleep can cause harm to the person in many ways. For example, it can negatively affect the person's attention, alertness, concentration, judgement and problem-solving abilities. Just like many things that deteriorate with age, the ability to sleep is one of these things. Old people have less sleep on average than young people since they have more difficulty falling asleep. This must be the cause of the memory impairment which occurs with old age.

Which of the following identify/identifies a weakness in the above argument?

1. Memory impairment may cause worry which leads to lack of sleep
  2. Different people experience different levels of memory loss and lack of sleep
  3. Changes made to the brain with ageing may cause deterioration in memory and sleep patterns
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- A. 1 only
  - B. 2 only
  - C. 3 only
  - D. 1 and 3
  - E. 2 and 3
  - F. 1, 2 and 3

## **Section 2**

1. The nervous and hormonal systems have similar roles in the body and so they are often compared together.

Which of the following statements about the systems are true?

1. The nervous system uses only electrical impulses
  2. Only hormonal system uses chemical signals
  3. Both systems activate target structures
  4. The central nervous system controls parts of the hormonal system
  5. The nervous system produces the fastest responses
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- A. 1, 2 and 3
  - B. 1, 2 and 4
  - C. 1, 2 and 5
  - D. 2, 3 and 4
  - E. 2, 3 and 5
  - F. 3, 4 and 5

2. The atomic number of nickel is 28. The mass numbers of four isotopes of nickel are 59, 60, 61 and 62.

Which of the following statements about nickel isotopes are correct?

1. All nickel isotopes have the same chemical properties
2. The nuclei of all of these isotopes contain 28 protons
3. One of the isotopes contains 62 neutrons in its nucleus

- 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 them

3. Which of the following statements on electromagnetic radiation are/is correct?

1. Cataracts can be caused by ultraviolet radiation
2. Microwaves are the shortest wavelengths compared to all other electromagnetic waves
3. When it comes to identical amplitudes, waves with the largest wavelength transfer the most energy
4. The speed of electromagnetic waves is inversely proportional to the frequency

- A. 1 only
- B. 2 only
- C. 3 only
- D. 4 only
- E. 1 and 2 only
- F. 1 and 3 only
- G. 1 and 4 only
- H. 2 and 3 only
- I. 2 and 4 only
- J. 3 and 4 only

4. A, B, C and z are integers so that  $A < B^2$ ,  $B > C^2$ ,  $C^2 < z^2$  and  $B > D$ .

Which one of the following must be true?

- A.  $A > B$
- B.  $A > C$
- C.  $A < D$
- D.  $C < D$

E.  $B > C$

5. The pH of a mixture of carbohydrates, protein and lipid can be decreased by which enzyme?

1. Carbohydrase
2. Lipase
3. Protease

- A. 1 only
- B. 2 only
- C. 3 only
- D. 1 or 3 only
- E. 1 or 3 only
- F. 2 or 3 only
- G. 1, 2 or 3

6. An electrolysis takes place with inert electrodes. Which of the following statements is correct?

- A. Aqueous potassium sulfate is broken into oxygen at the anode and hydrogen at the cathode
- B. Aqueous calcium bromide is broken into bromine at the anode and calcium at the cathode
- C. Aqueous copper nitrate is broken into nitrogen at the anode and copper at the cathode
- D. Molten sodium chloride is broken into chlorine at the anode and sodium at the cathode
- E. Molten aluminum oxide is broken into aluminium at the anode and hydrogen at the cathode

7. A driver is driving a car at a speed of 30 m/s. The driver decides to brake suddenly because she noticed a hazard ahead. The driver's reaction time is 1.05s. Once she hits the brakes, it takes her 4.95s to come to rest uniformly. What is the total distance the car travelled since the driver decided to hit brakes until she stopped?

- A. 31.5m
- B. 50m
- C. 74.25m
- D. 105.75m

8. A basket contains A red onions, B green onions and C white onions. One onion is taken out and replaced. Another onion is taken out and replaced. Both onions were picked randomly.

What is the probability that the first onion was red and the second green?

- A.  $(A+B)/(A+B+C)^2$
- B.  $AB/(A+B+C)(A+C)$
- C.  $AB/(A+B+C)^2$
- D.  $(A+B)/(A+B+C)$
- E.  $AB/(B+C)(A+C)$

9. Intermediate molecules are used for interneuron signal transmission. Which of the following statements describe this process correctly:

- 1. Diffusion takes place when a signal transmits across a synapse
- 2. Osmosis takes places when a signal transmits across a synapse
- 3. An impulse has to trigger the release of the transmitter molecule
- 4. The transmitter molecule is released after the signal has been transmitted across the synapse

- A. 1 and 2
- B. 1 and 3
- C. 1 and 4
- D. None of the above

10. Which one of the following covalent substances could exist as a giant structure?

- A.  $H_2S$
- B.  $Cl_2O$
- C.  $CF_4$
- D.  $SiCl_4$
- E.  $ICl$
- F.  $SiO_2$

11. Assume g equals  $10m/s^2$ .

A sandbag with a mass of 7.5kg falls from rest. It hits the ground with the speed of 30m/s. Assume air resistance to be negligible.

What height did the sandbag fall from?

- A. 25m
- B. 35m
- C. 45m
- D. 55m
- E. 65m

12. Class 1 in a school took a test and scored 122. Class 2 in the same school took the same test and scored 126. Class 3 in the same school took the same test and scored 140. All scores are mean

scores. The mean for all three scores combined was 130. Class 1 contains twice as many students as Class 2.

Which one of the following statements about the number of students in class 3 is true?

- A. Class 3 contains the same number of students as Class 1
- B. Class 3 contains more students than Class 1
- C. Class 3 contains more students than Class 2, but fewer than Class 1
- D. Class 3 contains fewer students than Class 2
- E. Class three contains the same number of students as Class 2

13. These statements are related to the flow of blood through the heart. Which one is correct?

- 1. There a tricuspid valve that prevents the herniation of blood from the aorta back into the left ventricle
- 2. There a bicuspid valve that prevents the herniation of blood from the aorta back into the left ventricle
- 3. The vena cava empties deoxygenated blood into in the left ventricle
- 4. The vena cava empties deoxygenated blood into in the right ventricle

- A. 1 only
- B. 2 only
- C. 3 only
- D. 4 only
- E. 1 and 2 only
- F. 1 and 3 only
- G. 1 and 4 only
- H. 1, 2 and 3 only
- I. 2, 3 and 4 only
- J. 1, 3 and 4 only

14. Which of the following reactions result in one product only?

- A. Ammonia and hydrogen chloride
- B. Ammonia in a concentrated aqueous solution
- C. Combustion of fuel
- D. Copper sulphate and water

15. A plane is moved by different forces. The force of the engine is 100N, but there is air resistance of -80N. The lift from wings has a force of 50N, but the weight of the plane is -40N.

The mass of this plane is 2kg

What are the horizontal and vertical accelerations of the plane?

- A.  $10 \text{ m/s}^2$  to the right;  $5 \text{ m/s}^2$  upwards

- B.  $10 \text{ m/s}^2$  to the right;  $10 \text{ m/s}^2$  upwards
- C.  $10 \text{ m/s}^2$  to the right;  $20 \text{ m/s}^2$  upwards
- D.  $10 \text{ m/s}^2$  to the right; zero upwards
- E. Zero to the right;  $10 \text{ m/s}^2$  upwards

16. Which of the following is the correct full factorisation for the following expression:  
 $20b^2c + 28bc^2 - 4c$ ?

- A.  $4c(5b^2 + 7bc - 1)$
- B.  $4(5b^2c + 7bc^2 - 1c)$
- C.  $5b^2c + 7bc^2 - 1c$
- D.  $5b^2 + 7bc - 1$

17. The hormonal system regulates water content in the blood in humans.

Which of the following happens when the water content is too low?

1. Pituitary gland releases more ADH
2. Pituitary gland releases less ADH
3. There is an increased absorption of glucose in the kidneys
4. There is a decreased absorption of glucose in the kidneys
5. There is an increased water reabsorption in the kidneys
6. There is an decreased water reabsorption in the kidneys

- A. 1 and 2
- B. 3 and 4
- C. 5 and 6
- D. 1 and 3
- E. 1 and 5
- F. 2 and 4
- G. 2 and 6

18. The following reactions take place at room temperature. In a typical reaction, if no bonds are broken, the reaction would be a fast one. Which of the following reactions would be the fastest?

1.  $\text{Cl}^- + \text{Ag}^+ \rightarrow \text{AgCl}$
2.  $\text{OH}^- + \text{CH}_3\text{Br} \rightarrow \text{CH}_3\text{OH} + \text{Br}^-$
3.  $\text{CH}_3 \cdot + \text{CH}_3 \cdot \rightarrow \text{C}_2\text{H}_6$
4.  $\text{OH} \cdot + \text{CH}_3\text{Br} \rightarrow \text{CH}_3\text{OH} + \text{Br} \cdot$

- A. 1 and 2

- B. 1 and 3
- C. 1 and 4
- D. 2 and 3
- E. 2 and 4
- F. 3 and 4

19. Which of the following statements about nuclear energy/radioactivity is/are true/

1. Half-life of a radioactive substance is half the time needed for the half of the substance to decay
2. Nuclear fission is the process that produces light and heat in the sun
3. Nuclear fission emits neutrons that can cause further fission

- 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 them

20. Which of the following is the correct simplification for the expression:  $6 - (5\sqrt{5}) / (3\sqrt{5}) - 2$ ?

- A.  $(-55\sqrt{5}) / 41$
- B.  $(-63 / 41) + 8/41\sqrt{5}$
- C.  $(55\sqrt{5}) / 41$
- D.  $(-63 / 41) + \sqrt{5}/41$

### **Section 3**

**1. You can defeat the most powerful army with modest forms of resistance. However, you can never suppress an idea.**

Explain the reasoning behind this statement. Argue that, on the contrary, any idea can be suppressed with sufficient force. What do you think makes an idea powerful?

**2. Science should stay impartial. It should not be used to push for any agendas.**

Explain what you think the statement means. Argue to the contrary. To what extent do you agree with the statement?

**3. In medicine, the most important rule is that saving the patients' life is always in their best interest.**

Explain the reasoning behind this statement. Argue that it is not necessarily always in the patients' interests to save their lives. To what extent do you agree with the statement?

## **BMAT Free Answers**

### **Section 1**

#### **1. E.**

- Let's start with the first statement. It makes sense that if an action is taken to prevent flooding affecting houses, and if this action proved effective, then there wouldn't be a problem with floodings affecting social mobility. Therefore, the first statement is an assumption.
- The text makes it sound that this problem will be exacerbated by climate change because climate change causes flooding. Therefore, the second statement is also an assumption.
- Finally, from the text we can understand that we will have a social mobility crisis because of the flooding. This assumes that people won't mobilise, move into, areas at risk of flooding. This makes the third statement also true.

#### **2. D.**

- A. The text explores the problem of sedentary lifestyle, but it does not explore the solutions to this problem
- B. The text says that young people with sedentary lifestyles have common conditions such as obesity and diabetes, it does not mean that everyone who doesn't take exercise will have diabetes and obesity
- C. This is similar to the reasoning why the second statement is wrong. Remember correlation does not mean causation
- D. The text explores that sedentary lifestyles are the causes for different health problems. Therefore, naturally, the opposite should be true, which is the point of this statement.
- E. The text says that both age groups are affected by lack of exercise, it does not say which age group is more affected than the other

#### **3. B.**

- A. The argument is about the effect of self-help books not how realistic it is to achieve happiness
- B. The argument of this passage is at the end of the passage itself, which is a common trend you should watch out for. The argument is that those who read self-help books are more likely to be anxious or depressed. However, this statement exposes this argument by saying that some of those who read self-help books are already anxious or depressed
- C. This is a distracting statement. It sounds similar to the second statement in its nature. Moreover, this applies to everything. It is like saying 'some of those who haven't read self-help books are happy'. It is the same distracting logic. Watch out for these kinds of statements
- D. This is similar to the above statement

**4. B.**

- A. The last sentence of the paragraph makes an assumption that because those countries have highly qualified teachers, their students do well at school. Even though this may not be the case, that is what we can understand from that sentence and the context it came in.
- B. The argument in the text is about the need for highly qualified teachers rather than spending. This may trick you but make sure that you can identify what the argument is before you look into the assumptions. Keeping in mind this argument, the second statement is not relevant to it. This means the second statement is not an assumption underlying the argument.
- C. This is an assumption, because if other states had a different experience to California's, it means that these states have had success improving the ability of children to read by simply reducing the size of the classroom. This would defeat the point of the argument if it was true. Therefore, this is an assumption.
- D. This has the same explanation as the first statement.

**5. D.**

- A. This is a bold claim that 1) is not mentioned in the text 2) there is no data in the text to support that
- B. This may sound like an explanation for the rapidly growing rate of using antidepressants. However, there is no mention of that in the text. Therefore, we cannot conclude that this is the case
- C. This assumes that those who took them never got off them, and it also assumes that the success of antidepressants is dependent on how many people take them. Moreover, whilst, we see the increase in the number of antidepressants, we can't tell the reasons by simply looking at the text and the text doesn't even mention how successful antidepressants are. We are only given numbers, and numbers can be used to make an impression of something, not to draw a conclusion about it
- D. This solves the problem raised in the previous statement. Statistics do indeed make that impression that antidepressants aren't working, but, we can't tell how true that is. Moreover, the statement isn't claiming that this is the case, but rather suggesting it. The suggestion made by the statement is supported by the figures in the text

**6. B.**

- A. This is not really relevant to our argument (see argument below)
- B. The argument here is that boxing is a good way to reduce crime rate because of the reasons given and a boxing club was present in areas that had reduced crime rate. However, correlation does not mean causation. It could be because of other factors that

caused this reduction in crime rate, not just boxing. The argument in this passage fails to recognise these other factors

- C. This is also irrelevant. The bit about self-restraint and discipline is just a distraction. The main argument has nothing to do with that
- D. This does not necessarily mean that if people did that it won't reduce crime rate. People may be less motivated to fight outside the ring if they know they can fight inside the ring. Moreover, this statement cannot be used to strengthen or weaken the argument

**7. D.**

- A. The argument is about all people in general, not just young people. There is a case being made that young people will especially be affected, but if that is the assumption, then it should also apply to adults.
- B. That's not particularly true. Whether or not a criminal returns into employment is dependent on the sort of crime they did, the damage caused etc.
- C. Once again, not very relevant. Even if criminals accepted their punishment, there would still be the question of why don't they deserve a second chance? Plus, the word punishment here is too vague.
- D. The argument of this text is that an individual, the criminal, should have their right of employment taken away from them for the greater good of the criminal's audience if he has an audience. This fits in nicely with the last statement.

**8. D.**

- A. The conclusion has nothing to do with whose rights are more important, it's about the morality of animal experimentation
- B. This may be true in some experiments but not in other, so, based on this text we cannot conclude this statement
- C. This statement is about justifying all animal experiments, whereas the conclusion is about justifying animal experiments that bring benefit to the animal population.
- D. The conclusion of this passage is in the last sentence. We understand from this sentence that it is morally ok to carry out experiments on a minority of the animal population if it's going to help the overall animal population. And given that the purpose of these experiments in the first place is to benefit humans, then, if both humans and animals are to be benefiting from these experiments then they're acceptable.
- E. There is no mention of non-medical research in this text

**9. B.**

- A. This may be the case, however, it explains a possible reason why people may buy ready-made meals. This statement does not argue for the argument of the passage
- B. The argument in this passage is that there should be health warning labels on ready-made meals since they contain potentially harmful substances. Moreover, if

people already knew that it wouldn't matter very much whether or not there are any warnings because they will have already chosen to eat these meals despite knowing the hazards. However, if most people who buy these meals aren't aware of their risks, then a lot of people may change their mind and decide not to buy the meals once they find out about the health hazards attached. To these meals

- C. This is completely irrelevant to the passage. Regardless of how much exercise people do, the risk of these substances in ready-made meals is still there
- D. If this was true, it would weaken the argument, not strengthen it

**10. D.**

- A. On the contrary to this statement, the text explores the way which both these concepts can co-exist together
- B. Whilst you may think that this should be the case, it is not what the text is saying. Therefore, this is not the conclusion of the text
- C. The text does not show any comparison between these two concepts. It is not explored which one is more important than the other
- D. The text explains how there should be limits on freedom of speech in order to protect other aspects of democracy. This means that there should be some strains on freedom of speech, which is what this statement says.

**11. A.**

- A. This directly addresses the point. This paragraph states that bigger size classes are better than smaller size classes for students' performances. By reading the text, we get the gist that the conclusion drawn relies solely on the fact that students in bigger classes do better than those in smaller classes. This is therefore an assumption that teaching methods dependent on different sizes of a class were assumed to be the only cause to improve students' standards.
- B. This isn't relevant since it talks about the additional work that teachers do, which has nothing to do with the main argument
- C. This may be true. Moreover, the argument is about teaching methods, not the standards of students
- D. That might be true, however, from the context of the argument, it is argued that bigger classrooms are more beneficial than smaller ones regardless of the benefits of the smaller ones

**12. D.**

- A. The use of the word 'only' should give you a warning to be careful. From this passage, we cannot tell whether or not the only reason for weather changes is the melting of the Arctic ice.
- B. Once again, we cannot tell if that's true by only reading the passage. This statement assumes that the only reason the UK weather is changing is because the arctic ice is melting. This is not mentioned anywhere in the text. Even if the Arctic stopped melting,

UK weather may keep changing if there are other reasons for the changes that are not the meltage.

- C. This statement may sound ue at first. However, the use of the words 'must be' makes the statement too strong and suspicious to be true. Note how the first three options are all around the idea that the only cause for changes in UK weather is the Arctic ice melting. Even though this may be the case, we cannot tell that simply by reading the text.
- D. This solves the problem in 'C' by stating that one explanation for the UK weather changes *can be* the melting of the Arctic, rather than it *must be* that.

**13. C.**

- A. This could make it harder to achieve what the argument wants to be achieved, however, it does not weaken the argument. This statement just outlines a common problem
- B. The argument is about the effect the arts sector has on governments and countries overall, rather than a single individual. Whether or not this statement is true, it does not add anything to the argument
- C. This makes sense since it argues that it may be the case that having a stronger economy is the reason as to why we have a strong arts sector rather than vice versa
- D. That doesn't really matter. Even though you may think this is true, however, the argument here talks about arts in general rather than all arts

**14. D.**

- A. This is not really relevant because the argument is whether or not pregnancy affect women ageing and lifetime, not whether or not women were aware of the effects of pregnancy
- B. When it comes to pregnancy, its biological effects are the same across all women regardless of their socioeconomic status. Therefore, this statement is irrelevant
- C. Once again, that is not a weakness of the text because it does not contribute to the main argument of the text which is the impact of pregnancy on women
- D. This is the one that makes sense the most. The argument of the passage is that women's life expectancy improved because women had fewer pregnancies. However, there may have been a whole set of reasons that the claim is ignoring

**15. C.**

- A. This is irrelevant to the argument since the argument is about taxing fatty food, not people's preferences
- B. This may be true, but, once again it ignores the original point of the passage whether or not the government should tax fatty food, not how much advertising is done for this kind of food
- C. This is a very strong point for the argument. It shows that this pattern of taxing unhealthy products already works. Just like it worked with smoking, there is no reason why it wouldn't work with fatty food

D. This is completely irrelevant to the argument, similarly to the first two statements

**16. C.**

- A. This is a big NO. correlation does not mean causation. Remember that throughout your test
- B. That is also wrong because the text only mentions the government when introducing the decision and there aren't any views offered that are either for or against the government
- C. This makes sense. Just because that mother had great experience with the same nursery, it doesn't mean that this applies to all mothers and it also doesn't mean that all people believe that
- D. Not necessarily. The argument is more focused on lowering the standards of these nurseries if funding was to be cut, not necessarily the closure of these nurseries

**17. E.**

- 1. This makes sense since there is less risk after the first trimester so there is less sickness and bigger appetite meaning women can tolerate what is perhaps harmful food that they cannot tolerate in the first trimester
- 2. This is irrelevant. The argument is about whether there is risk on mothers during the first trimester and is not really relevant to the mothers' cravings
- 3. Eating less and eating something simple are both simple options to avoid the risk of eating something harmful

**18. C.**

- A. Whilst that may seem the answer, what if experts do apply their method correctly? Would that mean the method is reliable?
- B. This statement has many flaws. To start with, it is irrelevant. It also generalises to all scientists and it assumes that they should only be involved in science. In addition, this statement makes the assumption a scientist can only be a scientist and nothing else
- C. This makes most sense since in theory everything may be perfect, but, when it comes to practice, it would be impossible to determine how accurate this method is
- D. This is not necessarily true. It can go either way and so this statement can't be used to either strengthen or weaken this argument

**19. A.**

- A. We know that some oranges are lemons and all lemons are large. Therefore, all lemons are both oranges and large
- B. We know all lemons are large but not necessarily all oranges are large
- C. This has the same reasoning as the previous statement
- D. This could be true, but it can also be wrong. The question needs what is definitely true.

**20. D.**

1. The argument of this passage is that lack of sleep with ageing causes memory impairment. This statement on the other hand states the opposite - memory impairment causes the lack of sleep
2. This is just stating a fact (assuming the statement is correct) and does not address the argument of the text
3. This statement slips off lack of sleep as being the cause of impaired memory. Instead, this statement explains that the cause for memory impairment is the same for lack of sleep: changes made to the brain.

## **Section 2**

### **1. F.**

1. The nervous system can also use chemical secondary messengers
2. If you got the first one, you should get this too. The nervous system can also use chemical signals

### **2. D.**

1. Isotopes have the same atomic number, therefore, they have the same chemical properties since they have the same number of electrons
2. The number of electrons is equal to the number of protons which is equal to the atomic number which is the same for all isotopes
3. 62 is the mass number. The mass number is the number of neutrons and protons together. Therefore, the number of neutrons for nickel isotopes would be 62-atomic number (protons)

### **3. A.**

1. The high frequency of ultraviolet waves carry more energy and cause more damage to the corneas which can cause cataracts
2. Infrared radiation have shorter wavelengths than microwaves
3. Energy increases with frequency. Higher frequency means shorter wavelength. Therefore, larger wavelengths mean less frequency and, thus, less energy
4. The speed of electromagnetic waves is constant in this case

### **4. E.**

- There is not enough information about A in the information given. Therefore, anything that has A can be true or false. As a result, we can ignore the first three options that have A in them
- Since  $C^2 < D^2$  then  $C < D$ . When looking at  $C^2 < D^2$  and  $B > D$  then  $B^2 > D^2$ . Thus, we can deduce that  $B > C > D$
- The last statement agrees with our deduction, but, the penultimate one contradicts it

### **5. F.**

1. Carbohydrase releases sugar which causes no change to the pH
2. Lipase produces glycerol and fatty acids, which are acidic. More acidity means lower pH
3. Protease produces amino acids, this has the same effect as fatty acid. Increasing acidity and decreasing pH

### **6. A.**

- We know the answer cannot be B, C or D since the electrodes used are inert. B, C and D contain metals and for these metals to be deposited the electrodes must be of that metal, not inert.
- Using inert electrodes, this electrolysis will release the products named above. In addition, sodium sulfate solution remains unchanged.

- The half equations for this electrolysis clarify the answer:
  - Reduction at cathode:  $4\text{H}_2\text{O} + 4\text{e}^- \rightarrow 2\text{H}_2 + 4\text{OH}^-$
  - Oxidation at anode:  $2\text{H}_2\text{O} \rightarrow \text{O}_2 + 4\text{H}^+ + 4\text{e}^-$
  - E doesn't work, try and make half equations for this one!

**7. D.**

- Start by calculating the distance during the reaction time:  $30 \times 1.05 = 31.5\text{m}$
- Then calculate the distance between hitting the brakes and stopping:  $\frac{1}{2}(u+v)t = \frac{1}{2}(30+0)4.95 = 74.25\text{m}$
- Total distance =  $31.5 + 74.25 = 105.75\text{m}$

**8. C.**

- The probability of picking a red first is  $A/(A+B+C)$
- The probability of picking a blue second is  $B/(A+B+C)$
- Multiply both probabilities and you get  $AB/(A+B+C)^2$

**9. B.**

1. This is true
2. It is diffusion, not osmosis. Osmosis only for water molecules
3. An action potential is needed to start the depolarisation wave which causes the release of the neurotransmitter
4. The transmitter molecule is released before the signal has been transmitted across the synapse

**10. F.**

- The rest of the molecule form simple covalent structures, forming weaker forces of attraction

**11. C.**

- Loss of GPE = gain in Ek
- $Mgh = \frac{1}{2}mv^2$
- $gh = \frac{1}{2}v^2$
- $h = \frac{1}{2}(v^2/g)$
- $h = \frac{1}{2}(30^2/10)$
- $h = 45\text{m}$

**12. A.**

- When looking at the options that we have here, we can notice that what the statements are about is basically the relative size of Class 3 to classes 1 and 2. Given the information we have, we should work that out and it will give us our answer
- If n is the number of students in Class 2, then 2n is the number of students in Class 1
- For Class 1, the total of all the scores must be  $122 \times 2n = 244n$

- For Class 2, the total of all scores must be  $126 \times n = 126n$
- For Class 3, assuming there are  $m$  students there, the total of all scores is  $140 \times m = 280m$
- There are two ways to calculating the total score for students in all three classes
  - $244n + 126n + 140m = 370n + 140m$
  - $130(3n + m) = 390n + 130m$
- Both these values equal each other,
  - So  $370n + 140m = 390n + 130m$  can be simplified to  $20n = 10m$  which is further simplified to  $m = 2n$ , which is the same number of students in Class 1
- This is a tricky one, well done if you got to the end!

**13. A.**

1. The aortic valve has three cusps
2. See above
3. The vena cava empties into the right atrium
4. See above

**14. A.**

- A.  $\text{NH}_3(\text{g}) + \text{HCl}(\text{g}) \rightarrow \text{NH}_4\text{Cl}(\text{s})$
- B.  $\text{NH}_3 \cdot \text{H}_2\text{O}(\text{aq}) \rightleftharpoons \text{NH}_3(\text{g}) + \text{H}_2\text{O}(\text{l}),$
- C.  $\text{Fuel} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- D.  $\text{CuSO}_4(\text{s}) + 5\text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s})$

**15. A.**

- First of all, calculate resultant force in each direction:  
 $100 + (-80) = 20\text{N}$  to the right  
 $50 + (-40) = 10\text{N}$  upwards
- $F = ma$   
 $a = F/m$   
 $a = 20/2 = 10\text{m/s}^2$  to the right
- $a = 10/2 = 5\text{m/s}^2$  upwards

**16. A.**

Take out  $4c$  as a common factor

**17. E.**

1. ADH causes water retention in the kidneys which increases water content in the blood. Pituitary gland, therefore, releases more ADH
2. See above
3. Glucose absorption is not affected when it comes to blood water content
4. See above
5. This is in accordance with the first statement. ADH causes more water reabsorption
6. See above

**18. B.**

1. This would be a very fast reaction. These particles are oppositely charged and so they would attract quickly and no bonds need to be broken
2. Bonds need to be broken here, and the attraction between a charged and a neutral molecule is not very strong
3. No bonds need to be broken here and two radicals react together quickly
4. Bonds need to be broken here, and the attraction between a radical molecule and a neutral molecule is not very strong

**19. C.**

1. Half-life of a radioactive substance is the time taken for half of the substance's nuclei to decay
2. Nuclear fusion is the process that produces light and heat in the sun
3. This is why these reactions can get out of hand so quickly!

**20. B.**

- Multiply the top and bottom by  $(3\sqrt{5}) + 2$

### **Section 3**

1. The argument this statement makes is that it is easier to defend a land against invading armies than it is to stop the spread of an ideology. Even if the armies are elite and far superior to the resistance. For example, the Vietnamese resistance managed to drive out US forces after decades of US military campaigns against Vietnam. Even though the US had the most advanced technology and most sophisticated weapons, and the Vietnamese had very old fashioned guns, they still managed to drive the US out. So, it doesn't really matter how powerful the resistance means, as long as it is long term and strategic it will achieve its purpose.

The reason the Vietnamese won in the first place is because they had the morale to continue resisting despite all the hardship. This is the product of powerful ideology that can never die. And that is why even the superior and mighty force of the US military could not stop the Vietnamese resistance to liberate their country.

Nevertheless, it can be argued that when ideologies are being challenged by other ideologies, they are usually weakened, if not suppressed. It is argued that the US has never tried to challenge the communist ideology in Vietnam, which might explain why the US lost. On the other hand, the US did challenge the communist ideology in South Korea by spreading its own capitalist ideology. As a result, we see today that South Korea is a capitalist country. This happened due to the ideological and military support by the US, not just military one.

There are a lot of ideologies that people have all over the world. However, they are not all influential and powerful. In my opinion, there are certain criteria that make an ideology gain popularity. For example, an ideology has to enter the heart of the people. In our example above, the US failed and Vietnamese continued their resistance because they wholeheartedly believed that the US was "the bad guy" and they needed to get rid of it. Another reason that makes an ideology powerful is if the person representing the ideology is skilled enough and knows how to win over the crowd.

Feedback:

There are good points made about ideologies. However, the response is more focused on ideologies rather than ideas, which is what the statement is about. Always make sure that you are answering the question you are asked to answer, not the one you want to be asked.

The choice of US in Vietnam is a good one for exploring how resistance works. Moreover, the example was too detailed. In addition, it is often risky to stick to one example throughout the essay. We recommend using different examples.

It seems that there is more focus on the first part of the statement which concerns 'resistance' than there is about the possibility of suppressing ideas. It is always a good idea to make sure there is a good balance by addressing all elements of the statement equally.

The structuring of the essay, as well as the cohesion of it could be improved in many places. In addition, the ending of the essay could have been better planned.

Grade: 2.5B

2. This statement means that science should only be found in experiments, theories and research papers. Science should not be found on the debating stage, and is not to be manipulated by the different sides of the debate. For example, scientists such as Richard Dawkins or Neil Degross Tyson use science to deny the existence of God. Regardless of whether or not God exists, science should not be used to prove or disprove this existence.

This is because when using science for one's own agenda, it may repel people away from science. So, someone who is very religious and does believe that God exists. When they see science being used to disprove something they strongly believe in, they may have to choose between science and faith. In most cases, if the person does not have a scientific background, they will most likely choose faith and ignore science. This means that they will ignore science even on things they shouldn't do. For example, ignoring health advice etc. This can lead to very unpleasant consequences, all of which could have been prevented if people didn't feel like having to make the choice between science and religion in the first place.

However, when there is a risk to the public that only scientists can see, it is their moral duty to notify the public of that. For example, climate change. It would be unforgivable if scientists decided that alarming the people about climate change is too political and, therefore, they won't do it! Climate change is one of the most political topics out there, despite its scientific nature. It is only right that climate change be politicised to change governments' policies to avoid the catastrophes that can be caused by it.

In conclusion, science is no one's to be used for their own political agendas. This is especially the case when it comes to repelling people away from science, it gives rise to the dangerous aspect of making certain members of the population ignorant of all scientific knowledge. However, if involving science in politics means that there will be undebatable benefit to the general public, science should certainly be used to push for political agendas.

Feedback:

Good use of example, in the opening paragraph.

Examples used included God's existence and climate change, there could have been one more example.

Even though the essay makes good points, most are relevant to the essay, it seemed that the essay was discussing whether scientists should be using science to push for their agendas. The argument was whether science in general should be politicised by anyone, not just scientists. There shouldn't be a problem with naming scientists this way, but, if you do decide to name particular people then be sure that you know what you're talking about. The person marking the essay could be a big fan of these people.

The essay is very well structured. It answers each part of the question in the correct order.

Grade: 4A

3. This statement says that in the medical profession, doctors should always aim to save the life of the patients. The reasoning of this statement is that it is always the patient's wish that their lives be saved. Similarly, it is the doctors' mission to save the lives of their patients. This is seen in the 'Hippocratic Oath' that doctors have to believe in before they start their careers in medicine.

However, this argument makes the assumption that it is always in the patients' best interests to save their lives. Sometimes, respecting the patients' autonomy and will, assuming they are competent, is more important than saving their lives. Take this example, a lady in her 80s is suffering from a long-time illness, incontinent, and everyday in her life adds to the pain. Assuming this lady asked to be euthanised and she is fully competent It would be far more in her best interest to go ahead with euthanasia than to try and make the lady live for a few more months or years a life that she simply does not want to live.

In addition, this argument is consequentialist. In modern day medical practice, the means are just as important as the consequences. Take this hypothetical scenario, you're operating on a patient and you're almost done. In the last stages of your operation three more patients are brought into the theatre. If you don't operate on them straight away they will die. However, if you do decide to save their lives by giving them your full attention, the first patient will die. In this case, even though you will be saving more lives if you help out the three new patients, but, a doctor should stick to treating the original patient. The fact that the three people will die is tragic but it is not in the surgeon's control. Moreover, leaving the first patient will cause his death which means the doctor has caused the death of this person. This goes against 'do no harm' and the patient's best interests. This outlines that the means are just as important as the outcomes which is something the argument ignores.

I agree with this statement most of the time because I think it achieves one of the main pillars of medical ethics, 'do no harm'. This means it is always a doctor's duty to try all means to save the lives of his/her patients. However, when this duty clashes with other pillars of medical ethics such as 'autonomy', I disagree with the statement as I think that the patient's autonomy should be respected, even if it meant not saving the patient's life.

Feedback:

This essay is detailed and clear when it comes to explaining points of view. However, it can be simplified in places. For example, there is too much information in the third paragraph. Even though the third paragraph has a good point about the means being just as important as the outcomes, the paragraph is too long and can be simplified to make the same point.

Despite the examples given in this essay, there is still room for more examples and specificity. At places, the essay is too general and is not always as specific as it should be.

Overall, this essay is philosophically solid and deep and makes a lot of good points. However, there needs to be more examples and specific points.

Grade: 3.5A