

43-46: Answer these questions according to the passage below.

It is a classic science fiction scenario: An enormous asteroid is discovered racing toward Earth that is sure to trigger a **cataclysmic** extinction upon impact. Courageous scientists have only a year to launch a pre-emptive strike against the space rock – to knock it off course or blow it to bits – with the fate of humankind at stake. Can they stop it? This doomsday scenario is, in all likelihood, one humans alive today will never have to face. Astronomers have mapped the trajectories of more than 33,000 asteroids that make occasional close approaches to Earth, and none pose any risk of impact for at least the next 100 years. Still, scientists understand that disaster can descend with little warning; thousands of asteroids move hidden in the sun's glare, including many rocks large enough to **obliterate** entire cities, and the European Space Agency (ESA) warns that dozens of "planet killer" asteroids – those measuring wider than 0.6 mile (1 kilometre) and capable of triggering a global extinction event – still lurk undiscovered in our solar system. For this reason, space agencies take the doomsday scenario very seriously. And after years of research – including the world's first mission to deflect an actual asteroid in space – the international community's efforts have yielded two viable ways of changing a potentially deadly asteroid's course: hitting it with a high-speed impactor, or pummeling it with nuclear explosives.

43. What is the primary purpose of the international community's research efforts, including the world's first mission to deflect an asteroid in space?

- A) To discover new asteroids in our solar system
- B) To map the trajectories of asteroids making close approaches to Earth
- C) To identify potential space missions
- D) To develop strategies for changing the course of a potentially deadly asteroid
- E) To explore the composition of asteroids

44. According to the passage, ESA expresses concern about the undiscovered "planet killer" asteroids because ----.

- A) they have the potential to bring about a global extinction event
- B) they collide with each other in space more often than scientists think
- C) they are difficult to detect on account of their small size
- D) they are too far from Earth to pose any serious threat
- E) they have irregular trajectories when they are close to Earth's orbit

45. The underlined word 'cataclysmic' in the passage is closest in meaning to ----.

- A) burdensome
- B) extensive
- C) disastrous
- D) genuine
- E) permanent

45 b. The underlined word 'obliterate' in the passage is closest in meaning to ----.

- A) shield
- B) extend
- C) annihilate
- D) reinforce
- E) transmit

46. The author of the passage seems pretty sure that ----.

- A) the two ways scientists have specified to ward off "planet killer" asteroids are 100% safe for humans
- B) hitting potentially dangerous asteroids with nuclear weapons is the best way to obliterate them
- C) the current generation will not experience an impact from a huge asteroid in the next 100 years
- D) thousands of asteroids, some large enough to annihilate entire cities, will one day hit Earth
- E) a huge asteroid hurtling towards Earth is destined to cause catastrophic extinction upon impact

47-50: Answer these questions according to the passage below.

Gene variants inherited from one of our closest extinct relatives, the Denisovans, may make carriers more likely to develop neuropsychiatric disorders such as depression and schizophrenia, a new study suggests. Modern humans are believed to have migrated out of Africa around 60,000 years ago and then interbred with Denisovans in Asia. As a result, traces of Denisovan DNA can be found within the genomes of some people today: About 4% to 6% of modern New Guinean and Bougainville Islander DNA is Denisovan, as well as about 0.2% of mainland Asians and Indigenous American DNA. Now, new research has revealed that modern human populations outside Africa have a variation in a gene called SLC30A9 that was inherited from the Denisovans. This gene codes for a mitochondrial protein called ZnT9 that regulates zinc transport and cellular metabolism. Heat is released during metabolism, so it is possible that the SLC30A9 variant may have been selected for in the past because it helped our ancestors adapt to new, colder environments. However, given that zinc dysregulation has been **implicated** in several neuropsychiatric disorders, such as depression and schizophrenia, nowadays it may be a detrimental trait. The study authors stressed, though, that assumptions about the respective advantages and disadvantages of this variant are "purely speculation" at this stage.

47. It can be concluded from the passage that the exact date at which modern humans migrated out of Africa ----.

- A) can explain why some people are prone to neuropsychiatric disorders
- B) is when they also met Denisovans precisely 60,000 years ago
- C) has a lot to do with when they first contacted Denisovans
- D) remains a mystery as scientists barely have any idea about it
- E) is, in fact, unknown and can only be guessed by scientists

48. According to the passage, the main finding of the new study regarding gene variants inherited from Denisovans shows that ----.

- A) Denisovan DNA is absent in modern human populations outside Africa
- B) the SLC30A9 gene variant inherited from Denisovans is linked to zinc dysregulation
- C) carriers of Denisovan gene variants are less likely to develop neuropsychiatric disorders
- D) Denisovan DNA makes up a significant portion of the genomes of modern New Guineans
- E) the SLC30A9 gene variant was not found in modern human populations

49. Which of the following is true about Denisovan DNA according to the passage?

- A) It is the highest among people from modern New Guinea and Bougainville Island.
- B) It is spread throughout the world, with at least 0.2% of the entire population carrying the DNA.
- C) Some people, such as mainland Asians, have no traces of it in their genomes.
- D) Approximately 2% to 4% of African populations have it in their genomes.
- E) The study did not investigate the presence of it in Native American populations.

50. The passage suggests that the gene variant in question ----.

- A) may have been selected for due to its association with depression and schizophrenia
- B) may have been preferred for its detrimental effects on neuropsychiatric health
- C) has been applauded for its role in preventing zinc dysregulation
- D) may have helped ancestors acclimatize to colder environments
- E) ended up in some humans for its positive impact on mental health

50b. It can be concluded from the passage that ----.

- A) we have yet to discover more before we can reach conclusive evidence as to the new gene variant
- B) the pros and cons of the new variant are far from speculation at this stage
- C) our ancestors developed neuropsychiatric disorders such as schizophrenia more than we do
- D) ancestors acclimatized to colder environments much later than assumed
- E) the positive impacts of the new variant on mental health outweigh the negative ones

68-71: For these questions, choose the best rephrased form of the given sentence

68. The world's nations are taking more concrete steps to tackle climate change than ever before, but they are still very far from making the sweeping changes needed to keep global temperatures at relatively safe levels.

- A) While nations worldwide are increasingly taking concrete actions to combat climate change, they are still a considerable distance away from enacting the comprehensive changes necessary to ensure that global temperatures remain within relatively safe bounds.
- B) Although there is a growing commitment among some nations to address climate change through tangible measures, they are still significantly distant from making the transformative changes required to maintain global temperatures at levels considered relatively safe
- C) Though countries around the globe are implementing more tangible measures to address climate change than in the past, they remain significantly distant from implementing the extensive changes required to maintain global temperatures at reasonably safe levels.
- D) Despite the ever-increasing efforts of nations to confront climate change with concrete actions, they remain far from implementing the extensive changes needed to ensure that global temperatures stay within what is thought a relatively safe range.
- E) While nations are increasingly taking concrete measures to address climate change, the significant gap persists in implementing the transformative changes necessary to keep global temperatures within what is considered a relatively safe range.

69. Although many ultra-processed foods, such as soda, candy, and frozen meals, can satisfy cravings for sweet, fatty, salty foods, emerging research suggests these items are particularly bad for the brain, with mood and cognition taking a hit.

- A) While ultra-processed foods like soda, candy, and frozen meals will certainly fulfil cravings for sweet, fatty, and salty flavours, recent research indicates that these products can have detrimental effects on the brain, impacting mood and cognition.
- B) It is possible for numerous ultra-processed foods, including soda, candy, and frozen meals, to satisfy cravings for sweet, fatty, and salty tastes, but recent research suggests that these items have particularly negative effects on the brain, causing a decline in mood and cognition.
- C) Despite their ability to satisfy cravings for sweet, fatty, and salty flavours, ultra-processed foods like soda, candy, and frozen meals are increasingly related to detrimental effects on the brain, suggesting that mood and cognition may suffer as a result.
- D) Ultra-processed foods such as soda, candy, and frozen meals can provide satisfaction for cravings of sweet, fatty, and salty preferences; however, emerging research points to their adverse impact on the brain, affecting mood and cognition.
- E) Ultra-processed foods offering the gratification of sweet, fatty, and salty cravings are increasingly recognized for their potential harm to the brain, as suggested by recent research indicating a negative impact on mood and cognition.

70. Scientists have found that sharks have a positive impact on the marine carbon cycle by eating herbivorous fish or restricting the areas where they live, and this limits their prey's ability to eat marine vegetation, which is crucial for carbon absorption.

- A) Researchers have discovered that sharks play a beneficial role in the marine carbon cycle by either consuming herbivorous fish or constraining the regions in which they reside, which, in turn, restricts the ability of their prey to consume marine vegetation, which is essential for carbon absorption.
- B) The recent discovery that sharks contribute positively to the marine carbon cycle by either consuming herbivorous fish or confining the areas in which they dwell is important due to their crucial role in carbon absorption by limiting the ability of prey to consume marine vegetation.
- C) Scientists have found that sharks play a beneficial role in the marine carbon cycle by either consuming herbivorous fish or restricting their habitat is significant, and this is because sharks, by limiting their prey's capacity to consume marine vegetation, are crucial contributors to carbon absorption.
- D) The discovery that sharks contribute positively to the marine carbon cycle through either consuming herbivorous fish or restricting their habitat is noteworthy, which is why sharks play a crucial role in carbon absorption by limiting their prey's ability to consume marine vegetation.
- E) What researchers have discovered recently is that sharks have a positive impact on the marine carbon cycle by eating herbivorous fish or restricting the areas where they live, and this limits their prey's ability to eat marine vegetation, which is crucial for carbon absorption.

71. Even though your stomach has a hormonal system for telling your brain when it is empty, this is often augmented by the learned association between times of day and feeling hungry.

- A) Despite the hormonal system in your stomach telling the brain when it is empty, this command is often enhanced by the link between times of day and feeling hungry.
- B) In spite of the hormonal signals from the stomach indicating emptiness to the brain, this directive is frequently amplified by the connection between specific times of the day and the sensation of hunger.
- C) Even with the stomach's hormonal signals notifying the brain of emptiness, this communication is often intensified by the association between certain times of the day and the experience of hunger.
- D) Your stomach possesses a hormonal system to signal emptiness to your brain, but this is frequently enhanced by the learned connection between specific times of the day and the sensation of hunger.
- E) Although the hormonal system in your stomach communicates when it is empty to the brain, this message is frequently heightened by the established connection between specific times of the day and the sensation of hunger.

72-75: For these questions, choose the best option to complete the missing part of the passage.

72. Napoleon Bonaparte first gained fame when he helped France wrest an unlikely victory against the Austrians in Italy in 1796, earning him the nickname the "Little Corporal." --- Hailed as a national hero, he seized political power over France in a 1799 coup. As emperor, he attempted to expand France's reach across the world. Napoleon had charisma and huge ambitions. But throughout his life and career, Napoleon was ridiculed for his short stature. His own soldiers gave him several pet names, most of which started with "le petit" ("the little").

- A) It would take a disastrous Russian campaign and a coalition among his rivals, to bring him down.
- B) He was deposed in 1814 and spent nine months in exile on the Italian island of Elba.
- C) His military prowess led to even more victories, all characterized by daring, even foolhardy, strategies.
- D) During his life, Napoleon was described as both slight and impressive, short and average.
- E) Regardless of his actual height, Napoleon inspired the theory that short men attempt to make up for their height with daring deeds.

73. You sit down to dinner with a rumbling stomach and finish the meal in record time – but then, half an hour after clearing your plate, you suddenly feel uncomfortably full, as if your tummy could pop. --- But exactly how long does it take for your brain to register that you are full? It does, indeed, take on average 20 minutes for your body to send signals to your brain to indicate that you have had enough to eat. However, the exact duration of the lag between when you eat and when you feel full depends on a multitude of factors, including the type of food you are eating and your typical eating habits.

- A) There is a time gap between when you have eaten enough to satisfy your hunger and when the brain actually realizes that you are full.
- B) The time it takes for the body to generate satiety signals and send them to your brain also depends on the type of food you are eating.
- C) Certain medical conditions, such as hypothyroidism and diabetes, can disrupt satiety signals by slowing down the passage of food through the stomach.
- D) Foods high in fibre, such as fruits, vegetables and whole grains, tend to promote satiety.
- E) People say there is a lag between taking your first bite and satisfying your hunger, and the general belief is that it lasts around 20 minutes.

74. True history of the teddy bear begins in the American wilderness. In November 1902, President Theodore Roosevelt embarked on a hunting trip in Mississippi with one main goal: to bag a black bear. As the tale goes, after Roosevelt had scoured the brush for several days without so much as spotting one, some of his hunting companions corralled an injured old bear and tied it to a willow tree. ---- Horrified, the president refused, saying it would be unseemly unsporting for a man of honour to kill this vulnerable creature. He ordered the decrepit bear to be euthanized, and this odd show of mercy quickly became news.

- A) Here, they said, was Roosevelt's opportunity to slay one and declare victory.
- B) President's companions were hesitant to offer the animal to him at first.
- C) It took a few hours of fierce struggle to restrain the bear, as in a bad condition as it was.
- D) Roosevelt, they said, was developing an obsession with hunting wild bears.
- E) The way hunting was done did not really matter for anyone as there weren't any action groups.

75. Sleep apnoea involves lapses in breathing during sleep. ---- Now, Giovanni Traverso at the Massachusetts Institute of Technology and his colleagues have developed an ingestible electronic device that may allow home assessment of sleep apnoea. The device, roughly the size of a vitamin supplement, contains an accelerometer that measures breathing and heart rate by detecting vibrations in the gut. It also has a medical-implant radio to transmit this information to an external computer. By the information it sends, the software can tell whether a person has sleep apnoea or not.

- A) An electronic pill that can measure your breathing and heartrate might be able to diagnose sleep apnoea or detect opioid over doses.
- B) Diagnosis usually involves an overnight stay in hospital for monitoring vital signs, including breathing and heart rate.
- C) The team tested the smart pill in 10 people who were already booked in at the West Virginia University Medicine Sleep Evaluation Center.
- D) The researchers think the pill can also be given to opioid users to detect if they stop breathing due to an overdose.
- E) The pill is typically excreted within a day, which could limit its utility in detecting overdoses among opioid users .

76-80: For these questions, choose the irrelevant sentence in the passage.

76. (I) Depression is the most common mental health condition globally, and is especially prevalent in adolescents. **(II)** In the US, for instance, an estimated 1 in 5 teenagers met the criteria for major depressive disorder in 2021. **(III)** However, not everyone experiences depression in the same way, so the results may not capture all the biological markers that indicate the condition. **(IV)** On the other hand, diagnosing and treating the condition is difficult due to a lack of objective measures for it. **(V)** Now, a new blood test could help identify teenagers who are more susceptible to depression, and lead to earlier interventions.

- A) I B) II C) III D) IV E) V

77. (I) On 24 December 1923, an event that would go on to mark Christmas in Washington DC every year took place for the first time. **(II)** An enormous tree was erected in front of the United States of America's most famous building. **(III)** Not only was it the first time a Christmas tree had been put up outside the White House, rather than just being indoors, it was the first to be decorated with electric lights. **(IV)** A large crowd gathered to witness the inaugural lighting of the tree which would be performed by the then President Calvin Coolidge, who hit the button and began a tradition that would endure through numerous presidents into the modern day. **(V)** Donated by Middlebury College in Vermont, President Coolidge's home state, the fir tree stood in its glory at 48 feet high.

- A) I B) II C) III D) IV E) V

78. (I) Sending supplies to a future Martian colony by spacecraft would be expensive, which makes producing materials with Mars's natural resources an appealing option. **(II)** However, the Red Planet doesn't have the same wealth of elements as Earth does. **(III)** It still might be easier to design materials on Earth and send them to Mars. **(IV)** To get around this shortage of minerals, researchers at the University of Science and Technology in China have developed a fully automated robot. **(V)** The machine used a laser to analyse the chemical make-up of five Martian meteorites and found six elements in significant quantities, which could be used in the future to produce materials on Mars.

- A) I B) II C) III D) IV E) V

79. (I) Bonobos often form friendly alliances with other bonobos in separate social groups – the first time this has been seen in non-human primates. (II) Many animals – including various mammals and birds – cooperate, but they seem to do so only with those within their close social circle, or in-group. (III) This is in line with humans, but in stark contrast to chimpanzees, which frequently kill chimps in other groups. (IV) The findings challenge the idea that humans evolved from ancestral apes that were innately violent, says Martin Surbeck at Harvard University. (V) "This potential to form collaborative links between different groups is not uniquely human and it might have occurred earlier than we thought," he says.
- A) I B) II C) III D) IV E) V

80. (I) For many people, climate science brings to mind satellite observations, temperature records or the analysis of ice cores. (II) Asking indigenous people about the changes they are witnessing helps us to understand what matters to them and what issues require attention. (III) But there is plenty more data besides that as can be seen among indigenous communities that have long lived close to the land – and have traditionally depended on deep knowledge of their environments to survive – and often hold their own records and recollections. (IV) These can include extraordinary details about alterations in weather patterns, changes in vegetation or unfamiliar behaviour of animals that have emerged under their watch. (V) Today, anthropologists and climate researchers working for Western institutions are increasingly turning to indigenous people to ask what they have observed about the world around them.
- A) I B) II C) III D) IV E) V