READING PASSAGE 1

You should spend about 20 minutes on **Questions 1-13** which are based on Reading Passage 1 below.

The last March of the Emperor Penguins

A

THE emperor penguin is an impossible bird. It breeds in the middle of winter in some of the coldest places on Earth, surviving temperatures as low as -50°C and hurricane-force winds. In March or April, just as the Antarctic winter begins, the birds waddle across the sea ice to their colonies, where they mate. After the egg is laid, the females head back to sea to feed, leaving the males behind to incubate it. By the time the females return in July or August, when the eggs hatch, the males will have spent almost four months huddling together in the bitter cold without eating, losing half of their body weight. This extraordinary lifestyle has made the emperors famous. They have even been held up as role models by evangelical Christians. But these breathtaking birds will soon have to face the one thing they haven't evolved to cope with: warmth. Fast-forward a few decades, and many colonies will be on the road to extinction. Are we witnessing the last march of the emperor penguins?

B

Finding out what's going on with emperor penguins is a huge challenge as almost all of their colonies are exceedingly difficult to get to. In fact, it was only this year that the first global census of the birds was published, based on an automated analysis of satellite images by the British Antarctic Survey. This revealed four previously unknown colonies, bringing the total to 46 (see map), and put the number of adults at 600,000, nearly double earlier estimates. That might sound like good news, but it's impossible to say whether the overall number of birds is rising or falling. "It's simply that we now have a better method to find them-remote sensing," says team member Phil Trathan.

C

By far the most comprehensive insight into the highs and lows of emperor populations comes from just one colony, which happens to be next to the Dumont d'Urville research station on the Adelie coast of Antarctica. "After a snowstorm, they can see how many eggs have got frozen, and how many chicks have died," says biologist Stephanie Jenouvrier of the Woods Hole Oceanographic Institution in Massachusetts, who studies the birds. This relatively small colony of 2500 birds featured in the 2005 blockbuster documentary March of the Penguins.

D

The Dumont d'Urville emperor's have been closely monitored since 1962. During the 1970s and early 80s, the average winter temperature was-14.7°C, compared

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with a more typical-17.3℃. This "warm spell" reduced the extent of winter sea ice by around 11 percent and the penguin population by half. "When sea ice decreased, it caused strong mortality of emperor penguins," says Jenouvrier. Why are emperors so sensitive to changes in sea ice? Well to start with, most never set foot on land. They aren't agile enough to scale the steep rocks and ice precipices that guard most of Antarctica's shoreline. All but two of the 46 colonies are on fast ice-sea ice stuck fast to the shore. So if the sea ice forms late or breaks up early, it won't last for the eight months or so these large birds need to breed and raise chicly.

E

"Early break-up of sea ice can cause catastrophic breeding failure," says Trathan. Emperors live around 20 years, so colonies can survive a few bad breeding seasons, but persistent changes can be disastrous. What's more, emperors moult every year in January or February. The birds would freeze to death if they tried to swim during the 30 or so days it takes to grow new feathers, so they must find ice floes to shelter on that are large enough to survive this period. This may be an even more demanding period in the emperors' lives than the winter, because they have little time to fatten themselves up beforehand. "The adults are reliant on stable sea ice for moulting, and for me, that's the greatest concern," says Gerald Kooyman of Scripps Institution of Oceanography, one of the world's leading emperor penguin biologists. "They don't have any options. They have to moult."

F

Last, but not least, the source of much of the penguins' energy, directly or indirectly, is krill-and krill also depend on sea ice. Young krill shelter and feed under it. "The sea ice is the basis of the Antarctic ecosystem," says Jenouvrier. For now, there is still plenty of sea ice. In fact, the extent of Antarctic sea ice in winter has increased slightly over the last 30 years. This has been caused by stronger winds blowing sea ice further away from the land, with more ice forming in the open water exposed by this movement. The stronger winds are thought to be a consequence of ozone loss, rather than global warming.

G

But unlike the Arctic Ocean, where thick sea ice used to survive from year to year, in Antarctica almost all the sea ice melts every year. That means the extent of winter sea ice changes rapidly in response to any change in conditions. This can be seen around the rapidly warming Antarctic Peninsula, where winter sea ice extent is falling 1 or 2 percent each year. Here one small emperor colony, on the Dion Islands, has already died out. When it was discovered in 1948 it was home to 300 adults. By 1999, just 40 remained and 10 years later they were all gone. Though no one knows for sure what caused the colony's demise, it coincided with a decline in the duration of winter sea ice. On the peninsula, populations of the other Antarctic native penguins, the Adelie and chinstrap, are also plummeting, probably

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because of the changing environment and declining krill. Matters haven't been helped by an invasion of non-native gentoo penguins, and other species like the king and macaroni penguins could follow.

H

What's happening on the peninsula today could be happening all around Antarctica in the decades to come. "With a doubling of greenhouse gas concentrations over the next century, we estimate that the extent of Antarctic sea ice would decrease by about one third, says John Turner, a climatologist with the British Antarctic Survey. Earlier this year the emperor penguin was added to the IUCN's Red List for species threatened with extinction in the near future-"near" meaning in a century or two. When Jenouvrier's team used the observations at Dumont d'Urville to predict what will happen as the continent warms, they concluded that the colony is likely to decline by 81 per cent by 2100 and be heading towards extinction.

I

That is in line with a 2010 study by a team including Jenouvrier and David Ainley of the California-based ecological consultants H. T. Harvey and Associates. It predicted that all emperor colonies north of 70 degrees latitude- about 35 percent of the total population-would decline or disappear if the world warms by 2℃, although a few colonies south of 73 degrees might grow a little. This might not sound too bad, but both these studies are based on what increasingly appear to be overly optimistic assumptions. If we continue as we are, the global temperature will climb above 2℃ before 2050, on course to a 5 or 6℃ rise by 2100. "If the earth warms by 5 or 6 degrees, I can't see that there's going to be much sea ice left anywhere on Earth," says Ainley. And if the sea ice vanishes, the emperor penguins will vanish too.

Questions 1-6

Use the information in the passage to match the people (listed **A-E**) with opinions or deeds below.

*Write the appropriate letters **A-E** in boxes **1-6** on your answer sheet.*

NB You may use any letter more than once.

A Stephanie Jenouvrier
B Gerald Kooyman
C Phil Trathan
D David Ainley
E John Turner

1 Penguin breeding is threatened by sea ice melting in advance.
2 About 30% sea ice would disappear in the future.
3 Penguin needs constant sea ice for feather changing.
4 Dead chicks are easy to be counted after a storm.
5 No sea ice left in case global temperature increased certain degrees.

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6 Sea ice provides foundation for Antarctic ecology.

Questions 7-10

Do the following statements agree with the information given in Reading Passage 1?

*In boxes **7-10** on your answer sheet, write*

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

7 It is the female emperor penguin that carried more incubation duty.

8 Evangelical Christian lives a similar lifestyle as penguin.

9 With the advanced satellite photographs, fluctuation of penguin number is easily observed.

10 Strong winds caused by Ozone depletion, blow away the sea ice.

Questions 11-13

Summary

Complete the following summary of the paragraphs of Reading Passage, using **NO MORE THAN TWO WORDS** from the Reading Passage for each answer.

*Write your answers in boxes **11-13** on your answer sheet.*

There are several reasons of why emperor penguins are vulnerable to sea ice transformation. First of all, they are not **11** _____ to walk on steep rocks that all over Antarctica. They wouldn't be able to breed. Next, emperors need to **12** _____ at certain time of year, which protects them from been killed by freezing water. Finally, emperor penguin's food called **13** _____ is also connected to availability of sea ice.

READING PASSAGE 2

You should spend about 20 minutes on **Questions 14-26** which are based on Reading Passage 2 below.

The study of laughter

Humans don't have a monopoly on laughter, says Silvia Cardoso. A behavioral biologist at the State University of Campinas, Brazil, she says it's a primitive reflex common to most animal; even rats laugh. She believes that too little laughter could have serious consequences for our mental, physical and social well-being.

Laughter is a universal phenomenon, and one of the most common things we do. We laugh many times a day, for many different reasons, but rarely think about it, and seldom consciously control it. We know so little about the different kinds and functions of laughter, and our interest really starts there. Why do we do it? What can laughter teach us about our positive emotions and social behavior? There's so

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much we don't know about how the brain contributes to emotion and many scientists think we can get at understanding this by studying laughter.
Only 10 or 20 percent of laughing is a response to humor. Most of the time, it's a message we send to other people, communicating joyful disposition, a willingness to bond and so on. It occupies a special place in social interaction and is a fascinating feature of our biology, with motor, emotional and cognitive components. Scientists study all kinds of emotions and behavior, but few focuses in this most basic ingredient. Laughter gives us a clue that we have powerful systems in our brain which respond to pleasure, happiness and joy. It's also involved in events such as release of fear.
Many professionals have always focused on emotional behavior. Researchers spent many years investigating the neural basis of fear in rats, and came to laughter via that route. It is noticed that when they were alone, in an exposed environment, they were scared and quite uncomfortable. Back in a cage with others, they seemed much happier. It looked as if they played with one another real rough and tumble, and researchers wondered whether they were also laughing. The neurobiologist Jaak Panksepp had shown that juvenile rats make short vocalizations, pitched too high for humans to hear, during rough-and-tumble play. He thinks these are similar to laughter. This made us wonder about the roots of laughter.
We only have to look at the primate closest to humans to see that laughter is clearly not unique to us. This is not too surprising, because humans are only one among many social species and there's no reason why we should have a monopoly on laughter as a social tool. The great apes, such as chimpanzees, do something similar to humans. They open their mouths wide, expose their teeth, retract the corners of their lips, and make loud and repetitive vocalizations in situations that tend to evoke human laughter, like when playing with one another or with humans, or when tickled. Laughter may even have evolved long before primates. We know that dogs at play have strange patterns of exhalation that differ from other sounds made during passive or aggressive confrontation.
But we need to be careful about over-interpreting panting behavior in animals at play. It's nice to think of it as homologous to human laughter, but it could just be something similar but with entirely different purposes and evolutionary advantages. Everything humans do has a function, and laughing is no exception. Its function is surely communication. We need to build social structures in order to live well in our society and evolution has selected laughter as a useful device for promoting social communication. In other words, it must have a survival advantage for the species.
The brain scans are usually done while people are responding to humorous material. Brainwave activity spread from the sensory processing area of the

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occipital lobe, the bit at the back of the brain that processes visual signals, to the brain's frontal lobe. It seems that the frontal lobe is involved in recognizing things as funny. The left side of the frontal lobe analyses the words and structure of jokes while the right side does the intellectual analyses required to "get" jokes. Finally, activity spreads to the motor areas of the brain controlling the physical task of laughing. Researchers also found out that these complex pathways involved in laughter from neurological illness and injury. Sometimes after brain damage, tumors, stroke or brain disorders such as Parkinson's disease, people get "stonefaced" syndrome and can't laugh.

We are sure that laughter should differ between the sexes, particularly the uses to which the sexes put laughter as a social tool. For instance, women smile more than laugh, and are particularly adept at smiling and laughing with men as a kind of "social lubricant". It might even be possible that this has a biological origin, because women don't or can't use their physical size as a threat, which men do, even if unconsciously.

Laughter is believed to be one of the best medicines. For one thing, it's exercise. It activates the cardiovascular system, so heart rate and blood pressure increase, then the arteries dilate, causing blood pressure to fall again. Repeated short, strong contractions of the chest muscles, diaphragm and abdomen increase blood flow into our internal organs, and forced respiration –the ha! ha! –making sure that this blood is well oxygenated. Muscle tension decreases, and indeed we may temporarily lose control of our limbs, as in the expression "weak with laughter". It may also release brain endorphins, reducing sensitivity to pain and boosting endurance and pleasurable sensations. Some studies suggest that laughter affects the immune system by reducing the production of hormones associated with stress, and what when you laugh the immune system produces more T-cells. But no rigorously controlled studies have confirmed these effects. Laughter's social role is definitely important.

Today's children may be heading for a whole lot of social ills because their play and leisure time is so isolated and they lose out on lots of chances for laughter. When children stare at computer screens, rather than laughing with each other, this is at odds with what's natural for them. Natural social behavior in children is playful behavior, and in such situations laughter indicates that make-believe aggression is just fun, not for real, and this is an important way in which children from positive emotional bonds, gain new social skills and generally start to move from childhood to adulthood. Parents need to be very careful to ensure that their children play in groups, with both peers and adult, and laugh more.

Questions 14-15

Which of the following claims and arguments are presented in the passage above?

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Choose **TWO** letters from **A-E**

A All animals share the phenomenon of laughter.
B Laughter can influence both adult and child health.
C Laughter is not unique to humans.
D Human mental, physical and social well-being are closely related.
E Laughter teaches us how to behave.

Questions 16-20

Do the following statements agree with the claims of the writer in Reading Passage 2?

On your answer sheet please write

YES if the statement agrees with the writer
NO if the statement contradicts with the writer
NOT GIVEN if there is no information about this in the passage.

16 Laughter is one of the most common expressions shared by all humans.
17 There are complicated systems in the human brain that take the responsibility of our emotions as happiness and fear.
18 Communication is the only purpose of laughter.
19 Reduced blood pressure would lead to a stimulated cardiovascular system.
20 With the mass production of T-cells from the laughter, stress hormones would be deducted from the immune system.

Questions 21-26

Complete the summary below.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

Emotional behavior takes academic concerns. For years scientists have been examining the origin of **21** _____ and laughter that comes from the same route as rats. Within an open environment, they have been noticed to be **22** _____ when they are alone, and happier when they are back with others. Jaak Panksepp even found that rats make **23** _____ when they are in a chaotic state. It is well understand that humans are not the only living species that laughs and laughter may have developed long before **24** _____. Despite such facts, we need to pay attention when we explain various animal behavior, as they may express with differed **25** _____ and **26** _____.

READING PASSAGE 3

You should spend about 20 minutes on **Questions 27-40** which are based on Reading Passage 3 below.

Roller Coaster

A

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600 years ago, roller coaster pioneers never would have imagined the advancements that have been made to create the roller coasters of today. The tallest and fastest roller coaster in the world is the Kingda Ka, a coaster in New Jersey that launches its passengers from zero to 128 miles per hour in 3.5 seconds. It then heaves its riders skyward at a 90-degree angle (straight up) until it reaches a height of 456 feet, over one and a half football fields, above the ground, before dropping another 418 feet. With that said, roller coasters are about more than just speed and height, they are about the creativity of the designers that build them, each coaster having its own unique way of producing intense thrills at a lesser risk than the average car ride. Roller coasters have evolved drastically over the years, from their primitive beginnings as Russian ice slides, to the metal monsters of today. Their combination of creativity and structural elements make them one of the purest forms of architecture.

B

At first glance, a roller coaster is something like a passenger train. It consists of a series of connected cars that move on tracks. But unlike a passenger train, a roller coaster has no engine or power source of its own. For most of the ride, the train is moved by gravity and momentum. To build up this momentum, you need to get the train to the top of the first hill or give it a powerful launch. The traditional lifting mechanism is a long length of chain running up the hill under the track. The chain is fastened in a loop, which is wound around a gear at the top of the hill and another one at the bottom of the hill. The gear at the bottom of the hill is turned by a simple motor. This turns the chain loop so that it continually moves up the hill like a long conveyer belt. The coaster cars grip onto the chain with several chain dogs, sturdy hinged hooks. When the train rolls to the bottom of the hill, the dogs catches onto the chain links. Once the chain dog is hooked, the chain simply pulls the train to the top of the hill. At the summit, the chain dog is released and the train starts its descent down the hill.

C

Roller coasters have a long, fascinating history. The direct ancestors of roller coasters were monumental ice slides – long, steep wooden slides covered in ice, some as high as 70 feet – that were popular in Russia in the 16th and 17th centuries. Riders shot down the slope in sleds made out of wood or blocks of ice, crash-landing in a sand pile. Coaster historians diverge on the exact evolution of these ice slides into actual rolling carts. The most widespread account is that a few entrepreneurial Frenchmen imported the ice slide idea to France. The warmer climate of France tended to melt the ice, so the French started building waxed slides instead, eventually adding wheels to the sleds. In 1817, the Russes a Belleville (Russian Mountains of Belleville) became the first roller coaster where the train was

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attached to the track (in this case, the train axle fit into a carved groove). The French continued to expand on this idea, coming up with more complex track layouts, with multiple cars and all sorts of twists and turns.

D

In comparison to the world's first roller coaster, there is perhaps an even greater debate over what was America's first true coaster. Many will say that it is Pennsylvania's own Maunch Chunk-Summit Hill and Switch Back Railroad. The Maunch Chunk Summit Hill and Switch Back Railroad was originally America's second railroad, and considered by many to be the greatest coaster of all time. Located in the Lehigh valley, it was originally used to transport coal from the top of Mount Pisgah to the bottom of Mount Jefferson, until Josiah White, a mining entrepreneur, had the idea of turning it into a part-time thrill ride. Because of its immediate popularity, it soon became strictly a passenger train. A steam engine would haul passengers to the top of the mountain, before letting them coast back down, with speeds rumored to reach 100 miles per hour! The reason that it was called a switch back railroad, a switch back track was located at the top – where the steam engine would let the riders coast back down. This type of track featured a dead end where the steam engine would detach its cars, allowing riders to coast down backwards. The railway went through a couple of minor track changes and name changes over the years, but managed to last from 1829 to 1937, over 100 years.

E

The coaster craze in America was just starting to build. The creation of the Switch Back Railway, by La Marcus Thompson, gave roller coasters national attention. Originally built at New York's Coney Island in 1884, Switch Back Railways began popping up all over the country. The popularity of these rides may puzzle the modern-day thrill seeker, due to the mild ride they gave in comparison to the modern-day roller coaster. Guests would pay a nickel to wait in line up to five hours just to go down a pair of side-by-side tracks with gradual hills that vehicles coasted down at a top speed around six miles per hour. Regardless, Switchback Railways were very popular, and sparked many people, including Thompson, to design coasters that were bigger and better.

F

The 1910s and 1920s were probably the best decade that the roller coaster has ever seen. The new wave of technology, such as the "unstop wheels", an arrangement that kept a coaster's wheels to its tracks by resisted high gravitational forces, showed coasters a realm of possibilities that has never been seen before. In 1919, North America alone had about 1,500 roller coasters, a number that was rising rampantly. Then, the Great Depression gave a crushing blow to amusement parks all over America. As bad as it was, amusement parks had an optimistic look

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on the future in the late 1930s. But, in 1942 roller coasters could already feel the effects of World War Two, as they were forced into a shadow of neglect. Most, nearly all of America's roller coasters were shut down. To this very day, the number of roller coaster in America is just a very tiny fraction of the amount of roller coasters in the 1920s.

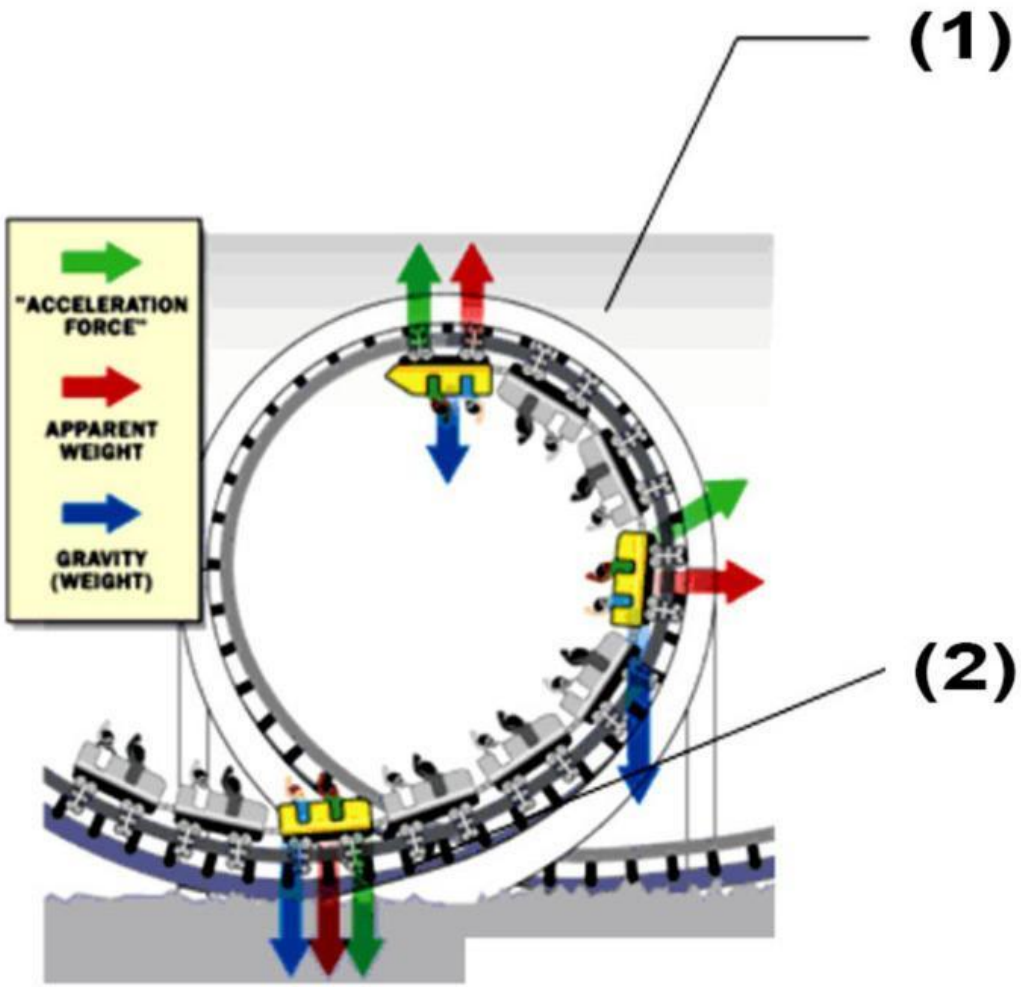
Questions 27-30

Answer the questions below.

A diagram that explains the mechanism and working principles of roller coaster.

Choose **NO MORE THAN TWO WORDS AND/OR A NUMBER** from the passage for each answer.

Traditional lifting mechanism



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(1) Traditional roller coaster's lifting force depends on a long time of **27** _____ for climbing up, which is connected firmly to a **28** _____ **shape track**
(2) there are both 29 _____ **on the top and** underneath the hill and it is powered by a **30** _____ when it takes a turn.

Questions 31-36

Summary

Complete the following summary of the paragraphs of Reading Passage, using **NO MORE THAN TWO WORDS** from the Reading Passage for each answer.

*Write your answers in boxes **31-35** on your answer sheet.*

The first roller coaster was perhaps originated from Russia which is wrapped up by **31** _____, which was introduced into France, and it was modified to **32** _____, because temperature there would **33** _____ the ice. This time **34** _____were installed on the board.

In America, the first roller coaster was said to appear in Pennsylvania, it was actually a railroad which was designed to send **35** _____ between two mountains. Josiah White turned it into a thrill ride, it was also called switch back track and a **36** _____ there allowed riders to slide downward back again.

Questions 37-40

Do the following statements agree with the information given in Reading Passage 3?

In boxes 37-40 on your answer sheet, write

YES if the statement is true
NO if the statement is false
NOT GIVEN if the information is not given in the passage

37 The most exiting roller coaster in the world is in New Jersey.

38 French added more innovation on Russian ice slide including both cars and tracks.

39 Switch Back Railways began to gain popularity since its first construction in New York.

40 The Great Depression affected amusement parks yet did not shake the significant role of US roller coasters in the world.

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