Burlington AC 1

READING PASSAGE 1

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

Glaciers

Glaciers account for approximately ten per cent of the entire Earth's surface, yet they are diminishing at an unprecedented rate. These massive areas of ice form partially or mostly on land, when snow piles up each year and, due to the continual accumulation, becomes compressed. As fresh snow falls, the layers of compressed snow grow until eventually, when they have reached approximately 50 metres in depth, all the layers fuse into one huge mass of solid ice. The sheer weight of the mass forces it to move, and evidence of this movement means that the mass of ice can be designated as a glacier. Glaciers or glacial activity can be found on every continent except Australia.

There are, however, two major categories of glacier, with distinctions between them. Continental glaciers are mostly found at the polar regions of the Earth-large swathes of Greenland and Antarctica are continental glaciers. In fact, almost 98 per cent of Antarctica is covered in ice and in Greenland, the ice covers around 80 per cent of the land. As these glaciers are often much larger in scale than others, they are frequently termed ice sheets, especially if their area is more than 50,000km^2. Ice sheets are characterised by a domed appearance and do not move in a downward direction. Due to their shape, continental glaciers move, rather like a liquid, in all horizontal directions, emanating from the centre of the glacier. They cover everything which may lay in their path, from mountains to valleys and can be extremely destructive.

Alpine glaciers, on the other hand, are typically smaller than continental glaciers and mainly form in mountainous regions. Ideal conditions for these glaciers to form include a high altitude as well as cold enough temperatures for the ice to compact. Alpine glaciers often carve jagged shapes into the sides of mountains as they descend, and unlike continental glaciers, move in a downward direction This is due to the sheer weight of the ice and gravity pushing them down. On occasions, the movement of this type of glacier can create valleys or even increase the depth of existing valleys. As the glaciers move, they push dirt and soil out of their way, so it is not uncommon to find rock debris in the ice, as well as ice crystals, air, and water. Some of the rocks that can be moved by glaciers may be as large as a house.

Glaciers account for approximately 200,000km^2 of Canada's territory, making it one of the most glacially rich countries in the world. One of the most accessible glaciers is the Athabasca Glacier, which can be found in the Canadian Rockies and is a part of the Columbia Ice Field. Although this is a substantial ice field at 230km^2, it is not the largest in the country. The glaciers here, like many others, form U-shaped valleys as they traverse down the mountain sides, and although this may take the glacier around 100,000 years, it is still much quicker than a river creating a V-shaped valley which takes millions of years. The Athabasca Glacier has taken the same route as other glaciers and formed a wide U-shaped valley between two mountains on either side of it. Scientists have shown that this glacier is retreating and has been doing so since about 1840. Around that time, the Athabasca Glacier measured approximately 8km in length, although more recent measurements of the glacier's current length put the figure at about 6km. It is now estimated that the glacier is losing between 10 and 25 metres each year. Unfortunately, it is not only the Athabasca Glacier that scientists are worried about.

Scientists have predicted that by 2100, the Canadian provinces of Alberta and British Columbia will have lost around 70 per cent of their glaciers, and this is a trend that is not only affecting Canada. Glaciers all over the world, including those in the US and the ice sheet in Greenland, are receding at a faster rate than thought 50 years ago. This is mainly due to increasing temperatures as a result of climate change. Because of these higher temperatures, glaciers are unable have calamitous effects. If the loss in Greenland is sustained, this would mean to replenish their ice stocks, as much more ice melts than is formed. This could that by 2100, sea levels will have risen by 67 centimetres. This will lead to 400 million people being at risk of flooding each year. In addition to the sea level rise, the ocean currents will change, leading to more intense coastal storms. These will adversely affect coastal businesses such as fisheries, which could have a devastating effect on the global economy. However, these are not the only problems we face if glaciers continue to melt at their current rate.

Glaciers are made of freshwater and when the glacier melts and the freshwater enters the oceans, it can cause huge changes to the ocean ecosystems. For example, some species of coral rely on salt water to survive, and if freshwater Teplaces the salt water, then it is likely that these corals will be unable to cope with the change and will die out. This would also mean that the freshwater available on land also decreases, resulting in a possible lack of water for some plants and animals.

In order to help combat glacial melting, it is important to look at the ways in which energy sources are produced. An exploration into how alternative energies can be used could open the door to new possibilities. Indeed, fossil fuel usage could be abandoned in favour of more ecologically friendly alternatives, but this might come up against opposition, especially since the trade in fossil fuels is a lucrative business.

Questions 1-8

Do the following statements agree with the information given in Reading Passage 1? In boxes 1-8 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

1. The current rate of glacial reduction is similar to previous rates.
2. Glaciers consist of layers of pressed ice.
3. The scientific classification of glaciers has changed over time.
4. Continental glaciers can only be found in one location.
5. Continental glaciers tend to have a sloping appearance.
6. For alpine glaciers to form, a temperature lower than freezing must occur.
7. Alpine glaciers move differently than ice sheets.
8. The Columbia Ice Field is the biggest example of its kind in Canada.

Questions 9-12

Complete the summary using the list of words, A-1, below.

White the correct letter, A-1, in boxes 9-12 on your answer sheet.

Glacial melting

The Athabasca Glacier in Alberta, Canada, has been retreating at a 9.____________ of between 10 to 25 metres each year, and this is reflected in other glaciers found around the world. It is predicted that around 70 per cent of the 10.____________ of ice in this part of the country will have disappeared by 2100. Due to climate change, sea levels will begin to increase causing catastrophic damage to 11.____________ and coastal areas. Local companies may also be affected by glacial melting. Freshwater entering oceans may cause certain species to become extinct as well as causing 12.____________ animals to face water shortages.

A. speed	B. size	C. riverbanks
D. land	E. height	F. mass
G. cube	H. shorelines	I. water

Question 13

Choose the correct letter, A, B, C or D.

Write the correct letter in box 13 on your answer sheet.

13. In the final paragraph, the writer suggests that

A. governments do not accept that climate change is a serious matter.

B. more environmentally friendly energy sources will replace fossil fuels.

C. methods of energy production should be examined more closely.

D. reducing fossil fuel usage is better than banning it completely.

READING PASSAGE 2

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

Comet Missions

Humans have long been fascinated by the universe around us, but it has only been relatively recently that we have been able to observe it up close. The spacecraft launched by the European Space Agency (ESA) in March 2004 is just one of many missions which travel to comets rather than planets.

Following separate missions run by the former Soviet Union and NASA (the National Aeronautics and Space Administration) in the US, the probe Sakigake the inaugural Japanese spacecraft, was launched in 1985, Considered a success the Sakigake mission took place mainly to showcase the new vehicle as well as to take measurements of magnetic fields. Unlike its twin, Suisei, which was launched months later, Sakigake did not carry any photographic equipment and therefore, did not produce pictorial data. In the same year, the ESA's Giotto was able to make unprecedented observations of a comet during its seven-year mission and was also the first spacecraft to be reactivated for an extended mission. The comet in question was Halley's Comet, which Sakigake had flown past but did not get as close to as Giotto. While these two missions were successful, not all missions to comets are. The CONTOUR probe was intended to fly past two comets in the hope of discovering a third, but its mission was cut short when it failed soon after launching in 2002. NASA, the probe's constructor did not give up, and only three years later they launched Deep Impact. What made this mission different from the others was that it was able to force material off a comet's surface by launching an impactor which collided on the comet's surface, creating a crater approximately 150 metres in diameter. The material was then studied by scientists who wanted to learn more about the substances that comets are composed of. Another spacecraft to make close contact with a comet was the Rosetta, which was the first to successfully orbit a comet.

Rosetta's journey was a remarkable one. Not only did it orbit Comet 67P, but it also launched the probe Philae, which was the first man-made technology to land on any comet, although it bounced three times before coming to rest. Originally set to launch in 2003, Rosetta was delayed due to technical faults of another craft and as a result, a different target comet needed to be chosen. Rosetta was finally launched on the 2nd of March in 2004 from French Guiana. The mission used gravity to help propel it through space and it flew past Earth on three occasions. Perhaps the most dangerous fly-by was when it had to navigate close to Mars in 2007. The solar panels on the craft could not be used because Rosetta was in the shadow of Mars, but this was successfully managed. On its journey, the craft passed a couple of asteroids, of which Rosetta sent back images to Earth. Images of the Steins asteroid in 2008, followed by Lutetia two years later, provided scientists with more data to work with.

In 2011, as Rosetta was making its way through the orbit of Jupiter, there was very little solar energy to power the vehicle, so it was put into hibernation while in deep space. The craft was then reactivated three years later as it neared its target, before finally entering orbit around 67P in August of that year. A few months later, in November 2014, Philae landed on the surface of the cornet and observations began and continued for a few years. Rosetta's mission came to an end in September 2016, when it was sent crashing into the comet, taking images during its descent.

Thanks to the ground-breaking missions of Rosetta and Philae, scientists now have a wealth of information about this type of comet and will be analysing the data for many years to come. In addition to a multitude of images to process, Rosetta witnessed the change in colour and brightness of the comet as it neared the Sun on its orbit. It became apparent that the outer and older surface of 67P was stripped away by the sheer heat of the Sun. This exposed fresh material increased the comet's brightness and made it much bluer than had previously been observed. Scientists were also now aware that the shape of 67P is an unusual one. Through this mission, experts were able to determine that the shape was a result of two independent bodies fusing together into a shape that resembles a duck.

Much of the data collected came from measurements made by Philae on the surface of 67P. This was collected before Philae malfunctioned and stopped communicating after only around three days in position. Evidence of water vapour was discovered, and although this was exciting, scientists ruled out the possibility that water on Earth derived from these sources on comets. This was due to the different chemical compounds found in the vapour when compared with water on our planet. However, the mission also uncovered traces of one of the simplest amino acids, which is also found in many organisms on Earth. This tends to suggest that comets may have played a role in providing our planet with the raw materials for life.

The discovery of molecular oxygen, found in abundance on our planet, in the gas surrounding 67P was probably the biggest revelation of the mission. It was Initially thought that the oxygen had lain dormant under the frozen surface of the comet, but a recent study suggests that it is actually being produced by the comet itself. Although there is no evidence to suggest that life exists on 67P this theory argues that oxygen can be produced without some form of life being present.

There are bound to be countless more discoveries to come after the Rosetta and Philae missions, with the quest for answers as to the make-up of comets and the part they played in creating life on Earth certain to keep scientists at work for a long time to come. With each successful and even unsuccessful - mission, scientists edge ever closer to finding the truth.

Questions 14-18

Look at the following facts (Questions 14-18) and the list of spacecrafts below.

Match each fact with the spacecraft it is associated with, A-E.

Write the correct letter, A-E, for Questions 14-18.

NB You may use any letter more than once.

Write the correct letter in boxes 14-18 on your answer sheet.

14. This spacecraft is noted for being reactivated.
15. An object was fired at a comet by this spacecraft.
16. This was a particular country's first spacecraft.
17. This mission ended in failure.
18. This spacecraft could not return images.

Spacecraft
A. Sakigake
B. Suisei
C. Giotto
D. CONTOUR
E. Deep Impact

Questions 19-22

Complete the notes below.

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

Write your answers in boxes 19-22 on your answer sheet.

Rosetta 19.____________ into space, March 2004

Mars Fly-by, February 2007

Steins Fly-by, 2008

20.____________ Fly-by, 2010

• Put into 21.____________ hibernation, June 2011

Philae arrives at Comet 67P, 22.____________ 2014

• Mission end, September 2016

Questions 23-26

Complete each sentence with the correct ending, A-F, below.

Write the correct letter, A-F, in boxes 23-26 on your answer sheet.

23. The exposure of new material on the surface of the comet
24. Shortly after landing on 67P, the probe Philae
25. The discovery of water vapour
26. The detection of a common Earth gas

A. did not send back any useful data.
B. was not a surprise to scientists.
C. lost contact with teams on Earth.
D. was a direct result of heat from the Sun.
E. does not indicate the presence of life elsewhere.
F. is unlikely to have any connection to Earth.

READING PASSAGE 3

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

The Romans of Watling Street

A. A relatively nondescript, grassy bank in Northamptonshire hides one of the greatest feats of engineering seen in Britain. This 2.5km stretch of land once formed a section of the great 444km-long Watling Street, the best known of the four key roads in Roman Britain. Excavations have shown that this section of road dates from around 43 AD and therefore is of huge archaeological importance. As a result of this, Historic England granted it status as a listed, and therefore protected, monument in 2013. What archaeologists can see here is fairly rare, as other sections of the road have been built on, while others have been lost forever.

B. Although Watling Street is notable because of the Romans, the basic framework for the road network was in use before the Romans came to Britain. The Celts, and indeed pre-Celts, of ancient Britain used some sections of the road. However, what we understand by 'road' is, in meaning. far from what ancient Britons took it to mean. In those times, a road was most likely a grassy track, or possibly even a dirt path. It is undoubtedly possible that some Celtic sections of the track had their origins back in prehistoric times, and there is evidence to suggest that the Celts used the same routes as their ancestors.

C. The Romans are credited with bringing much to Britain after their invasion around 43 AD, from effectively-built cities, such as London and York, to sanitation. Possibly one of their greatest legacies, however, was the vast network of roads they constructed. The new inhabitants of the country improved upon the grassy tracks that had previously been transporting people and paved them. The roads were paved with gravel, thereby demonstrating some resemblance to the techniques we use today. It has been estimated that 3,200km of roads were created during the time the Romans occupied Britain (until approximately 410 AD). Watling Street, though, was one of the most important routes for the Romans, because it connected their arrival point in the south-east to the major cities they were constructing. At some points along the route, Watling Street was approximately ten metres wide, while other roads were more commonly seven metres wide.

D. The construction of Roman roads in Britain tended to echo techniques used on the continent and elements of this work can still be seen in modern construction methods. A central carriageway was built on raised earth and this was made with the best materials available. Occasionally, on either side of the raised road, small ditches were dug in order for rainfall to collect- this ensured that the road remained as dry as possible. The Romans also made room for pedestrians and animals to walk off the main road, on paths of their own. Generally, the roads consisted of larger stones at the bottom to which was then added smaller, lighter material to fill gaps and create a more even surface. In addition to improving track routes, sometimes the roads were straightened to make it easier to transport goods and people from one location to another. Far from simply constructing the roads, the Romans continued to maintain their important road network, but it fell into disrepair soon after the Romans left Britain.

E. It seems clear why the roads were built as they were - the connection of various parts of the country in order to help the invasion attempt, and this was successful. The roads were mainly used for military purposes, such as transporting personnel and supplies. However, although this was most likely the main use, the construction of the road network allowed commerce and trade to take place more readily. In addition to roads, the Romans built sturdier crossings over rivers by replacing unstable wooden bridges at key vantage points.

F. Watling Street remained an essential route after the Romans had left, and its name most likely derives from an Anglo-Saxon tribe who occupied the region after the Romans. The Wæclingas were an influential tribe in the Anglo-Saxon period of British history, and their name has been loosely connected with that of Watling Street. St Albans, one of the key points on the route, was known by its ancient name Wæclingacaester, which also came from the tribe. The tribe was reported to have continued the maintenance of some of the network, but the majority of it soon disappeared.

G. The Romans left a lasting legacy on the roadmap of Britain, and much of it can still be seen today. Many of the country's major motorways follow the same routes as those used by the Romans, and some of the smaller, connecting roads are still in use, albeit maintained to modern standards. As archaeological excavations continue, scientists and experts alike can only wonder at the level of engineering knowledge the Romans possessed when they came to Britain.

Questions 27-30

Reading Passage 3 has seven paragraphs, A-G.

Choose the correct heading for paragraphs B-E from the list of headings below.

Write the correct number, i-vii, in boxes 27-30 on your answer sheet

27. Paragraph B

28. Paragraph C

29. Paragraph D

30. Paragraph E

List of Headings

i. The function of roads for the Romans
ii. Improvements on a system
iii. Why the Romans came to Britain
iv. Current conservation efforts
v. Streets and roads in older times
vi. Impacts on local communities
vii. The make-up of Roman roads

Questions 31-36

Choose the correct letter, A, B, C or D.

Write the correct letter in boxes 31-36 on your answer sheet.

31. According to the writer, the Northamptonshire stretch of Watling Street

A. is liable for future industrial development.
B. is typical of other roads across the country.
C. is only a small portion of the network.
D. is the greatest archaeological discovery in Britain.

32. Ancient uses of the word 'road'

A. differ greatly in comparison to the present use.
B. only referred to paths longer than 400km.
C. were how Celts described the paths of their ancestors.
D. included a wide range of types of path.

33. In the construction of Roman roads, larger rocks were

A. placed at the side for people to walk
B. deemed too heavy to use.
C. covered by smaller ones.
D. stacked in a ditch.

34. The writer says that after the Romans left Britain,

A. the majority of roads were largely maintained.
B. trade routes were then improved.
C. the Anglo-Saxons further developed the roads.
D. the roads themselves began to deteriorate.

35. The Wæclingas tribe in Britain

A. were of Roman origin.
B. gave their name to a town.
C. were the most important family in Britain.
D. settled in the region before the Celts.

36. According to the final paragraph, modern roads

A. are of a similar standard to Roman roads.
B. should be excavated.
C. often stick to Roman directions.
D. serve a vastly different purpose.

Questions 37-40

Complete each sentence with the correct ending, A-F, below.

Write the correct letter, A-F, in boxes 37-40 on your answer sheet.

37. Rainwater was not a problem because the Romans managed to

38. The methods of building roads in Roman times were to

39. The main reason why roads were built was to

40. Some Roman roads today are likely to

A. connect the farthest places in England.
B. copy from other, nearby countries.
C. construct ditches at the side of roads to collect it.
D. be examined for further archaeological evidence.
E. be saved to be used in later constructions.
F. move army officers and equipment from place to place.

Answers – Burlington AC 1

1. FALSE
2. TRUE
3. NOT GIVEN
4. FALSE
5. TRUE
6. NOT GIVEN
7. TRUE
8. FALSE
9. A
10. F
11. H
12. D
13. C
14. C
15. E
16. A
17. D
18. A
19. launched
20. Lutetia
21. deep space
22. August
23. D
24. C
25. F
26. E
27. v
28. ii
29. vii
30. i
31. C
32. A
33. C
34. D
35. B
36. C
37. C
38. B
39. F
40. D