

SECTION 4 Questions 31–40

Complete the notes below.

Write **ONE WORD ONLY** for each answer.

History of Fireworks in Europe

13th–16th centuries

- Fireworks were introduced from China.
- Their use was mainly to do with:
 - war
 - 31 (in plays and festivals)

17th century

- Various features of 32 were shown in fireworks displays.
- Scientists were interested in using ideas from fireworks displays:
 - to make human 33 possible
 - to show the formation of 34
- **London:**
 - Scientists were distrustful at first
 - Later, they investigated 35 uses of fireworks (e.g. for sailors)
- **St Petersburg:**
 - Fireworks were seen as a method of 36 for people
- **Paris:**
 - Displays emphasised the power of the 37
 - Scientists aimed to provide 38

18th century

- Italian fireworks specialists became influential.
- Servandoni's fireworks display followed the same pattern as an 39
- The appeal of fireworks extended to the middle classes.
- Some displays demonstrated new scientific discoveries such as 40

READING

READING PASSAGE 1

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

The Hidden Histories of Exploration Exhibition

- A We have all heard tales of lone, heroic explorers, but what about the local individuals who guided and protected European explorers in many different parts of the globe? Or the go-betweens – including interpreters and traders – who translated the needs and demands of explorers into a language that locals could understand? Such questions have received surprisingly little attention in standard histories, where European explorers are usually the heroes, sometimes the villains. *The Hidden Histories of Exploration* exhibition at Britain's Royal Geographical Society in London sets out to present an alternative view, in which exploration is a fundamentally collective experience of work, involving many different people. Many of the most famous examples of explorers said to have been 'lone travellers' – say, Mungo Park or David Livingstone in Africa – were anything but 'alone' on their travels. They depended on local support of various kinds – for food, shelter, protection, information, guidance and solace – as well as on other resources from elsewhere.
- B The Royal Geographical Society (RGS) seeks to record this story in its Hidden Histories project, using its astonishingly rich collections. The storage of geographical information was one of the main rationales for the foundation of the RGS in 1830, and the Society's collections now contain more than two million individual items, including books, manuscripts, maps, photographs, art-works, artefacts and film – a rich storehouse of material reflecting the wide geographical extent of British interest across the globe. In addition to their remarkable scope and range, these collections contain a striking visual record of exploration: the impulse to collect the world is reflected in a large and diverse image archive. For the researcher, this archive can yield many surprises: materials gathered for one purpose – say, maps relating to an international boundary dispute or photographs taken on a scientific expedition – may today be put to quite different uses.
- C In their published narratives, European explorers rarely portrayed themselves as vulnerable or dependent on others, despite the fact that without this support they were quite literally lost. Archival research confirms that Europeans were not merely dependent on the work of porters, soldiers, translators, cooks, pilots, guides, hunters and collectors: they also relied on local expertise. Such assistance was essential in identifying potential dangers – poisonous species, unpredictable rivers, uncharted territories – which could mean the difference between life and death. The assistants themselves were

usually in a strong bargaining position. In the Amazon, for example, access to entire regions would depend on the willingness of local crew members and other assistants to enter areas inhabited by relatively powerful Amerindian groups. In an account of his journey across South America, published in 1836, William Smyth thus complained of frequent 'desertion' by his helpers: 'without them it was impossible to get on'.

- D Those providing local support and information to explorers were themselves often not 'locals'. For example, the history of African exploration in the nineteenth century is dominated by the use of Zanzibar as a recruiting station for porters, soldiers and guides who would then travel thousands of miles across the continent. In some accounts, the leading African members of expedition parties – the 'officers' or 'foremen' – are identified, and their portraits published alongside those of European explorers.
- E The information provided by locals and intermediaries was of potential importance to geographical science. How was this evidence judged? The formal procedures of scientific evaluation provided one framework. Alongside these were more 'common sense' notions of veracity and reliability, religiously-inspired judgments about the authenticity of testimony, and the routine procedures for cross-checking empirical observations developed in many professions.
- F Given explorers' need for local information and support, it was in their interests to develop effective working partnerships with knowledgeable intermediaries who could act as brokers in their dealings with local inhabitants. Many of these people acquired far more experience of exploration than most Europeans could hope to attain. Some managed large groups of men and women, piloted the explorers' river craft, or undertook mapping work. The tradition was continued with the Everest expeditions in the 1920s and 1930s, which regularly employed the Tibetan interpreter Karma Paul. In Europe, exploration was increasingly thought of as a career; the same might be said of the non-Europeans on whom their expeditions depended.
- G These individuals often forged close working relationships with European explorers. Such partnerships depended on mutual respect, though they were not always easy or intimate, as is particularly clear from the history of the Everest expeditions depicted in the Hidden Histories exhibition. The entire back wall is covered by an enlarged version of a single sheet of photographs of Sherpas taken during the 1936 Everest expedition. The document is a powerful reminder of the manpower on which European mountaineering expeditions depended, and also of the importance of local knowledge and assistance. Transformed from archive to wall display, it tells a powerful story through the medium of individual portraits – including Karma Paul, veteran of previous expeditions, and the young Tensing Norgay, 17 years before his successful 1953 ascent. This was a highly charged and transitional moment as the contribution of the Sherpas, depicted here with identity tags round their necks, was beginning to be much more widely recognised. These touching portraits encourage us to see them as agents rather than simply colonial subjects or paid employees. Here is a living history, which looks beyond what we already know about exploration: a larger history in which we come to recognise the contribution of everyone involved.

Questions 1–7

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

In boxes 1–7 on your answer sheet, write

| | |
|------------------|---|
| TRUE | <i>if the statement agrees with the information</i> |
| FALSE | <i>if the statement contradicts the information</i> |
| NOT GIVEN | <i>if there is no information on this</i> |

- 1 The Hidden Histories of Exploration exhibition aims to show the wide range of people involved in expeditions.
- 2 The common belief about how Park and Livingstone travelled is accurate.
- 3 The RGS has organised a number of exhibitions since it was founded.
- 4 Some of the records in the RGS archives are more useful than others.
- 5 Materials owned by the RGS can be used in ways that were not originally intended.
- 6 In their publications, European explorers often describe their dependence on their helpers.
- 7 Local helpers refused to accompany William Smyth during parts of his journey.

Questions 8–13

Reading Passage 1 has seven paragraphs, **A–G**.

Which paragraph contains the following information?

Write the correct letter, **A–G**, in boxes 8–13 on your answer sheet.

- 8 reference to the distances that some non-European helpers travelled
- 9 description of a wide range of different types of documents
- 10 belief about the effect of an exhibition on people seeing it
- 11 examples of risks explorers might have been unaware of without local help
- 12 reference to various approaches to assessing data from local helpers
- 13 reference to people whose long-term occupation was to organise local assistance for European explorers

READING PASSAGE 2

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

Fatal Attraction

Evolutionist Charles Darwin first marvelled at flesh-eating plants in the mid-19th century. Today, biologists, using 21st-century tools to study cells and DNA, are beginning to understand how these plants hunt, eat and digest – and how such bizarre adaptations arose in the first place.

- A** The leaves of the Venus flytrap plant are covered in hairs. When an insect brushes against them, this triggers a tiny electric charge, which travels down tunnels in the leaf and opens up pores in the leaf's cell membranes. Water surges from the cells on the inside of the leaf to those on the outside, causing the leaf to rapidly flip in shape from convex to concave, like a soft contact lens. As the leaves flip, they snap together, trapping the insect in their sharp-toothed jaws.
- B** The bladderwort has an equally sophisticated way of setting its underwater trap. It pumps water out of tiny bag-like bladders, making a vacuum inside. When small creatures swim past, they bend the hairs on the bladder, causing a flap to open. The low pressure sucks water in, carrying the animal along with it. In one five-hundredth of a second, the door swings shut again. The Drosera sundew, meanwhile, has a thick, sweet liquid oozing from its leaves, which first attracts insects, then holds them fast before the leaves snap shut. Pitcher plants use yet another strategy, growing long tube-shaped leaves to imprison their prey. Raffles' pitcher plant, from the jungles of Borneo, produces nectar that both lures insects and forms a slick surface on which they can't get a grip. Insects that land on the rim of the pitcher slide on the liquid and tumble in.
- C** Many carnivorous plants secrete enzymes to penetrate the hard exoskeleton of insects so they can absorb nutrients from inside their prey. But the purple pitcher plant, which lives in bogs and infertile sandy soils in North America, enlists other organisms to process its food. It is home to an intricate food web of mosquito larvae, midges and bacteria, many of which can survive only in this unique habitat. These animals shred the prey that fall into the pitcher, and the smaller organisms feed on the debris. Finally, the plant absorbs the nutrients released.
- D** While such plants clearly thrive on being carnivorous, the benefits of eating flesh are not the ones you might expect. Carnivorous animals such as ourselves use the carbon in protein and the fat in meat to build muscles and store energy. Carnivorous plants instead draw nitrogen, phosphorus, and other critical nutrients from their prey in order to build light-harvesting enzymes. Eating animals, in other words, lets carnivorous plants do what all plants do: carry out photosynthesis, that is, grow by harnessing energy directly from the sun.
- E** Carnivorous plants are, in fact, very inefficient at converting sunlight into tissue. This is because of all the energy they expend to make the equipment to catch animals – the enzymes, the pumps, and so on. A pitcher or a flytrap cannot carry out much photosynthesis because, unlike plants with ordinary leaves, they do not

have flat solar panels that can grab lots of sunlight. There are, however, some special conditions in which the benefits of being carnivorous do outweigh the costs. The poor soil of bogs, for example, offers little nitrogen and phosphorus, so carnivorous plants enjoy an advantage over plants that obtain these nutrients by more conventional means. Bogs are also flooded with sunshine, so even an inefficient carnivorous plant can photosynthesise enough light to survive.

- F Evolution has repeatedly made this trade-off. By comparing the DNA of carnivorous plants with other species, scientists have found that they evolved independently on at least six separate occasions. Some carnivorous plants that look nearly identical turn out to be only distantly related. The two kinds of pitcher plants – the tropical genus *Nepenthes* and the North American *Sarracenia* – have, surprisingly, evolved from different ancestors, although both grow deep pitcher-shaped leaves and employ the same strategy for capturing prey.
- G In several cases, scientists can see how complex carnivorous plants evolved from simpler ones. Venus flytraps, for example, share an ancestor with Portuguese sundews, which only catch prey passively, via 'flypaper' glands on their stems. They share a more recent ancestor with *Drosera* sundews, which can also curl their leaves over their prey. Venus flytraps appear to have evolved an even more elaborate version of this kind of trap, complete with jaw-like leaves.
- H Unfortunately, the adaptations that enable carnivorous plants to thrive in marginal habitats also make them exquisitely sensitive. Agricultural run-off and pollution from power plants are adding extra nitrogen to many bogs in North America. Carnivorous plants are so finely tuned to low levels of nitrogen that this extra fertilizer is overloading their systems, and they eventually burn themselves out and die.
- I Humans also threaten carnivorous plants in other ways. The black market trade in exotic carnivorous plants is so vigorous now that botanists are keeping the location of some rare species a secret. But even if the poaching of carnivorous plants can be halted, they will continue to suffer from other assaults. In the pine savannah of North Carolina, the increasing suppression of fires is allowing other plants to grow too quickly and outcompete the flytraps in their native environment. Good news, perhaps, for flies. But a loss for all who, like Darwin, delight in the sheer inventiveness of evolution.

Questions 14–18

Complete the notes below.

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

Write your answers in boxes 14–18 on your answer sheet.

How a Venus flytrap traps an insect

- insect touches **14** on leaf of plant
- small **15** passes through leaf
- **16** in cell membrane open
- outside cells of leaves fill with **17**
- leaves change so that they have a **18** shape and snap shut

Questions 19–22

Look at the following statements (Questions 19–22) and the list of plants.

Match each statement with the correct plant, **A, B, C, D** or **E**.

Write the correct letter, **A, B, C, D** or **E**, in boxes 19–22 on your answer sheet.

- 19** It uses other creatures to help it digest insects.
- 20** It produces a slippery substance to make insects fall inside it.
- 21** It creates an empty space into which insects are sucked.
- 22** It produces a sticky substance which traps insects on its surface.

List of plants

- A** Venus flytrap
- B** bladderwort
- C** Drosera sundew
- D** Raffles' pitcher plant
- E** purple pitcher plant

Questions 23–26

Reading Passage 2 has nine paragraphs, **A–I**.

Which paragraph contains the following information?

*Write the correct letter, **A–I**, in boxes 23–26 on your answer sheet.*

- 23** a mention of a disadvantage of the leaf shape of some carnivorous plants
- 24** an example of an effort made to protect carnivorous plants
- 25** unexpected information about the origins of certain carnivorous plants
- 26** an example of environmental changes that shorten the life cycles of carnivorous plants

READING PASSAGE 3

You should spend about 20 minutes on **Questions 27–40**, which are based on Reading Passage 3 on the following pages.

Questions 27–32

Reading Passage 3 has seven paragraphs, **A–G**.

Choose the correct heading for paragraphs **B–G** from the list of headings below.

Write the correct number, **i–x**, in boxes 27–32 on your answer sheet.

List of Headings

- i** A shift in our fact-finding habits
- ii** How to be popular
- iii** More personal information being known
- iv** The origins of online social networks
- v** The link between knowledge and influence
- vi** Information that could change how you live
- vii** The emotional benefits of online networking
- viii** A change in how we view our online friendships
- ix** The future of networking
- x** Doubts about the value of online socialising

27 Paragraph **B**

28 Paragraph **C**

29 Paragraph **D**

30 Paragraph **E**

31 Paragraph **F**

32 Paragraph **G**

WANT TO BE FRIENDS?

Could the benefits of online social networking be too good to miss out on?

- A** For many hundreds of thousands of people worldwide, online networking has become enmeshed in our daily lives. However, it is a decades-old insight from a study of traditional social networks that best illuminates one of the most important aspects of today's online networking. In 1973 sociologist Mark Granovetter showed how the loose acquaintances, or 'weak ties', in our social network exert a disproportionate influence over our behaviour and choices. Granovetter's research showed that a significant percentage of people get their jobs as a result of recommendations or advice provided by a weak tie. Today our number of weak-tie contacts has exploded via online social networking. 'You couldn't maintain all of those weak ties on your own,' says Jennifer Golbeck of the University of Maryland. 'Online sites, such as Facebook, give you a way of cataloguing them.' The result? It's now significantly easier for the schoolfriend you haven't seen in years to pass you a tip that alters your behaviour, from recommendation of a low-cholesterol breakfast cereal to a party invite where you meet your future wife or husband.
- B** The explosion of weak ties could have profound consequences for our social structures too, according to Judith Donath of the Berkman Center for Internet and Society at Harvard University. 'We're already seeing changes,' she says. For example, many people now turn to their online social networks ahead of sources such as newspapers and television for trusted and relevant news or information. What they hear could well be inaccurate, but the change is happening nonetheless. If these huge 'supernets' – some of them numbering up to 5,000 people – continue to thrive and grow, they could fundamentally change the way we share information and transform our notions of relationships.
- C** But are these vast networks really that relevant to us on a personal level? Robin Dunbar, an evolutionary anthropologist at the University of Oxford, believes that our primate brains place a cap on the number of genuine social relationships we can actually cope with: roughly 150. According to Dunbar, online social networking appears to be very good for 'servicing' relationships, but not for establishing them. He argues that our evolutionary roots mean we still depend heavily on physical and face-to-face contact to be able to create ties.
- D** Nonetheless, there is evidence that online networking can transform our daily interactions. In an experiment at Cornell University, psychologist Jeff Hancock asked participants to try to encourage other participants to like them via instant messaging conversation. Beforehand, some members of the trial were allowed to view the Facebook profile of the person they were trying to win over. He found that those with Facebook access asked questions to which they already knew the answers or raised things they had in common, and as result were much more successful in their social relationships. Hancock concluded that people who use these sites to keep updated on the activities of their acquaintances are more likely to be liked in subsequent social interactions.
- E** Online social networking may also have tangible effects on our well-being. Nicole Ellison of Michigan State University found that the frequency of networking site use correlates with greater self-esteem. Support and affirmation from