READING

READING PASSAGE 1

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

Alexander Henderson (1831–1913)

Born in Scotland, Henderson emigrated to Canada in 1855 and became a well-known landscape photographer

Alexander Henderson was born in Scotland in 1831 and was the son of a successful merchant. His grandfather, also called Alexander, had founded the family business, and later became the first chairman of the National Bank of Scotland. The family had extensive landholdings in Scotland. Besides its residence in Edinburgh, it owned Press Estate, 650 acres of farmland about 35 miles southeast of the city. The family often stayed at Press Castle, the large mansion on the northern edge of the property, and Alexander spent much of his childhood in the area, playing on the beach near Eyemouth or fishing in the streams nearby.

Even after he went to school at Murcheston Academy on the outskirts of Edinburgh, Henderson returned to Press at weekends. In 1849 he began a three-year apprenticeship to become an accountant. Although he never liked the prospect of a business career, he stayed with it to please his family. In October 1855, however, he emigrated to Canada with his wife Agnes Elder Robertson and they settled in Montreal.

Henderson learned photography in Montreal around the year 1857 and quickly took it up as a serious amateur. He became a personal friend and colleague of the Scottish–Canadian photographer William Notman. The two men made a photographic excursion to Niagara Falls in 1860 and they cooperated on experiments with magnesium flares as a source of artificial light in 1865. They belonged to the same societies and were among the founding members of the Art Association of Montreal. Henderson acted as chairman of the association's first meeting, which was held in Notman's studio on 11 January 1860.

In spite of their friendship, their styles of photography were quite different. While Notman's landscapes were noted for their bold realism, Henderson for the first 20 years of his career produced romantic images, showing the strong influence of the British landscape tradition. His artistic and technical progress was rapid and in 1865 he published his first major collection of landscape photographs. The publication had limited circulation (only seven copies have ever been found), and was called *Canadian Views and Studies*. The contents of each copy vary significantly and have proved a useful source for evaluating Henderson's early work.

This text is taken, for the most part, verbatim from the *Dictionary of Canadian Biography* Volume XIV (1911–1920). For design purposes, quotation marks have been omitted. Source: http://www.biographi.ca/en/bio/henderson_alexander_1831_1913_14E.html. Reproduced with permission.

In 1866, he gave up his business to open a photographic studio, advertising himself as a portrait and landscape photographer. From about 1870 he dropped portraiture to specialize in landscape photography and other views. His numerous photographs of city life revealed in street scenes, houses, and markets are alive with human activity, and although his favourite subject was landscape he usually composed his scenes around such human pursuits as farming the land, cutting ice on a river, or sailing down a woodland stream. There was sufficient demand for these types of scenes and others he took depicting the lumber trade, steamboats and waterfalls to enable him to make a living. There was little competing hobby or amateur photography before the late 1880s because of the time-consuming techniques involved and the weight of the equipment. People wanted to buy photographs as souvenirs of a trip or as gifts, and catering to this market, Henderson had stock photographs on display at his studio for mounting, framing, or inclusion in albums.

Henderson frequently exhibited his photographs in Montreal and abroad, in London, Edinburgh, Dublin, Paris, New York, and Philadelphia. He met with greater success in 1877 and 1878 in New York when he won first prizes in the exhibition held by E and H T Anthony and Company for landscapes using the Lambertype process. In 1878 his work won second prize at the world exhibition in Paris.

In the 1870s and 1880s Henderson travelled widely throughout Quebec and Ontario, in Canada, documenting the major cities of the two provinces and many of the villages in Quebec. He was especially fond of the wilderness and often travelled by canoe on the Blanche, du Lièvre, and other noted eastern rivers. He went on several occasions to the Maritimes and in 1872 he sailed by yacht along the lower north shore of the St Lawrence River. That same year, while in the lower St Lawrence River region, he took some photographs of the construction of the Intercolonial Railway. This undertaking led in 1875 to a commission from the railway to record the principal structures along the almost-completed line connecting Montreal to Halifax. Commissions from other railways followed. In 1876 he photographed bridges on the Quebec, Montreal, Ottawa and Occidental Railway between Montreal and Ottawa. In 1885 he went west along the Canadian Pacific Railway (CPR) as far as Rogers Pass in British Columbia, where he took photographs of the mountains and the progress of construction.

In 1892 Henderson accepted a full-time position with the CPR as manager of a photographic department which he was to set up and administer. His duties included spending four months in the field each year. That summer he made his second trip west, photographing extensively along the railway line as far as Victoria. He continued in this post until 1897, when he retired completely from photography.

When Henderson died in 1913, his huge collection of glass negatives was stored in the basement of his house. Today collections of his work are held at the National Archives of Canada, Ottawa, and the McCord Museum of Canadian History, Montreal.

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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 Henderson rarely visited the area around Press estate when he was younger.

2 Henderson pursued a business career because it was what his family wanted.

3 Henderson and Notman were surprised by the results of their 1865 experiment.

4 There were many similarities between Henderson's early landscapes and those of Notman.

5 The studio that Henderson opened in 1866 was close to his home.

6 Henderson gave up portraiture so that he could focus on taking photographs of scenery.

7 When Henderson began work for the Intercolonial Railway, the Montreal to Halifax line had been finished.

8 Henderson's last work as a photographer was with the Canadian Pacific Railway.

Questions 9–13

Complete the notes below.

*Choose **ONE WORD ONLY** from the passage for each answer.*

Write your answers in boxes 9–13 on your answer sheet.

Alexander Henderson

Early life

- was born in Scotland in 1831 – father was a **9** .....
- trained as an accountant, emigrated to Canada in 1855

Start of a photographic career

- opened up a photographic studio in 1866
- took photos of city life, but preferred landscape photography
- people bought Henderson's photos because photography took up considerable time and the **10** ..... was heavy
- the photographs Henderson sold were **11** ..... or souvenirs

Travelling as a professional photographer

- travelled widely in Quebec and Ontario in 1870s and 1880s
- took many trips along eastern rivers in a **12** .....
- worked for Canadian railways between 1875 and 1897
- worked for CPR in 1885 and photographed the **13** ..... and the railway at Rogers Pass

READING PASSAGE 2

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

Back to the future of skyscraper design

Answers to the problem of excessive electricity use by skyscrapers and large public buildings can be found in ingenious but forgotten architectural designs of the 19th and early-20th centuries

A *The Recovery of Natural Environments in Architecture* by Professor Alan Short is the culmination of 30 years of research and award-winning green building design by Short and colleagues in Architecture, Engineering, Applied Maths and Earth Sciences at the University of Cambridge.

'The crisis in building design is already here,' said Short. 'Policy makers think you can solve energy and building problems with gadgets. You can't. As global temperatures continue to rise, we are going to continue to squander more and more energy on keeping our buildings mechanically cool until we have run out of capacity.'

B Short is calling for a sweeping reinvention of how skyscrapers and major public buildings are designed – to end the reliance on sealed buildings which exist solely via the 'life support' system of vast air conditioning units.

Instead, he shows it is entirely possible to accommodate natural ventilation and cooling in large buildings by looking into the past, before the widespread introduction of air conditioning systems, which were 'relentlessly and aggressively marketed' by their inventors.

C Short points out that to make most contemporary buildings habitable, they have to be sealed and air conditioned. The energy use and carbon emissions this generates is spectacular and largely unnecessary. Buildings in the West account for 40–50% of electricity usage, generating substantial carbon emissions, and the rest of the world is catching up at a frightening rate. Short regards glass, steel and air-conditioned skyscrapers as symbols of status, rather than practical ways of meeting our requirements.

D Short's book highlights a developing and sophisticated art and science of ventilating buildings through the 19th and earlier-20th centuries, including the design of ingeniously ventilated hospitals. Of particular interest were those built to the designs of John Shaw Billings, including the first Johns Hopkins Hospital in the US city of Baltimore (1873–1889).

'We spent three years digitally modelling Billings' final designs,' says Short. 'We put pathogens* in the airstreams, modelled for someone with tuberculosis (TB) coughing in the wards and we found the ventilation systems in the room would have kept other patients safe from harm.

* pathogens: microorganisms that can cause disease

E 'We discovered that 19th-century hospital wards could generate up to 24 air changes an hour – that's similar to the performance of a modern-day, computer-controlled operating theatre. We believe you could build wards based on these principles now.

Single rooms are not appropriate for all patients. Communal wards appropriate for certain patients – older people with dementia, for example – would work just as well in today's hospitals, at a fraction of the energy cost.'

Professor Short contends the mindset and skill-sets behind these designs have been completely lost, lamenting the disappearance of expertly designed theatres, opera houses, and other buildings where up to half the volume of the building was given over to ensuring everyone got fresh air.

F Much of the ingenuity present in 19th-century hospital and building design was driven by a panicked public clamouring for buildings that could protect against what was thought to be the lethal threat of miasmas – toxic air that spread disease. Miasmas were feared as the principal agents of disease and epidemics for centuries, and were used to explain the spread of infection from the Middle Ages right through to the cholera outbreaks in London and Paris during the 1850s. Foul air, rather than germs, was believed to be the main driver of 'hospital fever', leading to disease and frequent death. The prosperous steered clear of hospitals.

While miasma theory has been long since disproved, Short has for the last 30 years advocated a return to some of the building design principles produced in its wake.

G Today, huge amounts of a building's space and construction cost are given over to air conditioning. 'But I have designed and built a series of buildings over the past three decades which have tried to reinvent some of these ideas and then measure what happens.

'To go forward into our new low-energy, low-carbon future, we would be well advised to look back at design before our high-energy, high-carbon present appeared. What is surprising is what a rich legacy we have abandoned.'

H Successful examples of Short's approach include the Queen's Building at De Montfort University in Leicester. Containing as many as 2,000 staff and students, the entire building is naturally ventilated, passively cooled and naturally lit, including the two largest auditoria, each seating more than 150 people. The award-winning building uses a fraction of the electricity of comparable buildings in the UK.

Short contends that glass skyscrapers in London and around the world will become a liability over the next 20 or 30 years if climate modelling predictions and energy price rises come to pass as expected.

I He is convinced that sufficiently cooled skyscrapers using the natural environment can be produced in almost any climate. He and his team have worked on hybrid buildings in the harsh climates of Beijing and Chicago – built with natural ventilation assisted by back-up air conditioning – which, surprisingly perhaps, can be switched off more than half the time on milder days and during the spring and autumn.

Short looks at how we might reimagine the cities, offices and homes of the future. Maybe it's time we changed our outlook.

Questions 14–18

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

Which section contains the following information?

*Write the correct letter, **A–I**, in boxes 14–18 on your answer sheet.*

14 why some people avoided hospitals in the 19th century

15 a suggestion that the popularity of tall buildings is linked to prestige

16 a comparison between the circulation of air in a 19th-century building and modern standards

17 how Short tested the circulation of air in a 19th-century building

18 an implication that advertising led to the large increase in the use of air conditioning

Questions 19–26

Complete the summary below.

*Choose **ONE WORD ONLY** from the passage for each answer.*

Write your answers in boxes 19–26 on your answer sheet.

Ventilation in 19th-century hospital wards

Professor Alan Short examined the work of John Shaw Billings, who influenced the architectural **19** ..... of hospitals to ensure they had good ventilation. He calculated that **20** ..... in the air coming from patients suffering from **21** ..... would not have harmed other patients. He also found that the air in **22** ..... in hospitals could change as often as in a modern operating theatre. He suggests that energy use could be reduced by locating more patients in **23** ..... areas.

A major reason for improving ventilation in 19th-century hospitals was the demand from the **24** ..... for protection against bad air, known as **25** ..... . These were blamed for the spread of disease for hundreds of years, including epidemics of **26** ..... in London and Paris in the middle of the 19th century.