READING PASSAGE 1

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

Tea and Industrial Revolution

A

Alan Macfarlane thinks he could rewrite history. The professor of anthropological science at King's College, Cambridge has, like other historians, spent decades trying to understand the enigma of the Industrial Revolution. Why did this particular important event – the world-changing birth of industry – happen in Britain? And why did it happen at the end of the 18th century?

B

Macfarlane compares the question to a puzzle. He claims that there were about 20 different factors and all of them needed to be present before the revolution could happen. The chief conditions are to be found in history textbooks. For industry to 'take off', there needed to be the technology and power to drive factories, large urban populations to provide cheap labour easy transport to move goods around, an affluent middle-class willing to buy mass-produced objects, a market-driven economy, and a political system that allowed this to happen. While this was the case for England, other nations, such as Japan, Holland and France also met some of these criteria. All these factors must have been necessary but not sufficient to cause the revolution. Holland had everything except coal, while China also had many of these factors.

C

Most historians, however, are convinced that one or two missing factors are needed to solve the puzzle. The missing factors, he proposes, are to be found in every kitchen cupboard. Tea and beer, two of the nation's favorite drinks, drove the revolution. Tannin, the active ingredient in tea, and hops, used in making beer, both contain antiseptic properties. This -plus the fact that both are made with boiled water- helped prevent epidemics of waterborne diseases, such as dysentery, in densely populated urban areas. The theory initially sounds eccentric but his explanation of the detective work that went into his deduction and the fact his case has been strengthened by a favorable appraisal of his research by Roy Porter (distinguished medical historian) the skepticism gives way to wary admiration.

D

Historians had noticed one interesting factor around the mid-18th century that required explanation. Between about 165D and 1740, the population was static. But then there was a burst in population. The infant mortality rate halved in the space of 20 years, and this happened in both rural areas and cities, and across all classes. Four possible causes have been suggested. There could have been a sudden

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change in the viruses and bacteria present at that time, but this is unlikely. Was there a revolution in medical science? But this was a century before Lister introduced antiseptic surgery. Was there a change in environmental conditions? There were improvements in agriculture that wiped out malaria, but these were small gains. Sanitation did not become widespread until the 19th century. The only option left was food. But the height and weight statistics show a decline. So the food got worse. Efforts to explain this sudden reduction in child deaths appeared to draw a blank.

E

This population burst seemed to happen at just the right time to provide labor for the Industrial Revolution. But why? When the Industrial Revolution started, it was economically efficient to have people crowded together forming towns and cities. But with crowded living conditions comes disease, particularly from human waste. Some research in the historical records revealed that there was a change in the incidence of waterborne disease at that time, the English were protected by the strong antibacterial agent in hops, which were added to make beer last. But in the late 17th century a tax was introduced on malt. The poor turned to water and gin, and in the 1720s the mortality rate began to rise again.

F

Macfarlane looked to Japan, which was also developing large cities about the same time, and also had no sanitation. Waterborne diseases in the Japanese population were far fewer than those in Britain. Could it be the prevalence of tea in their culture? That was when Macfarlane thought about the role of tea in Britain. The history of tea in Britain provided an extraordinary coincidence of dates. Tea was relatively expensive until Britain started direct hade with China in the early 18th century. By the 1740s, about the time that infant mortality was falling, the drink was common. Macfarlane guesses that the fact that water had to be boiled, together with the stomach-purifying properties of tea so eloquently described in Buddhist texts, meant that the breast milk provided by mothers was healthier than it had ever been. No other European nation drank tea so often as the British, which, by Macfarlane's logic, pushed the other nations out of the race for the Industrial Revolution.

G

But, if tea is a factor in the puzzle, why didn't this cause an industrial revolution in Japan? Macfarlane notes that in the 17th century, Japan had large cities, high literacy rates and even a futures market. However, Japan decided against a work-based revolution, by giving up labor-saving devices even animals, to avoid putting people out of work. Astonishingly, the nation that we now think of as one of the most technologically advanced, entered the 19th century having almost abandoned

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the wheel. While Britain was undergoing the Industrial Revolution, Macfarlane notes wryly, Japan was undergoing an industrious one.

Questions 1-7

Reading passage 1 has seven paragraphs, **A-G**.

Choose the correct heading for paragraphs **A-G** from the list of headings below.

*Write the correct number, **i-x**, in boxes **1-7** on your answer sheet*

List of headings

i Cases of Japan, Holland and France City development in Japan

ii Tea drinking in Japan and Britain

iii Failed to find a plausible cause for mystery about lower mortality rate

iv Preconditions necessary for industrial revolution

V Time and place of industrialization

vi Conclusion drawn from the comparison with Japan

viii Relation between population and changes of drink in Britain

ix Two possible solutions to the puzzle

1 Paragraph **A**

2 Paragraph **B**

3 Paragraph **C**

4 Paragraph **D**

5 Paragraph **E**

6 Paragraph **F**

7 Paragraph **G**

Questions 8-13

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

*In boxes **8-13** on your answer sheet, write*

TRUE if the statement is true

FALSE if the statement is false

NOT GIVEN if the information is not given in the passage 1

8 The industrialization did not happen in China because of its inefficient railway transportation.

9 Tea and beer contributed to protect people from waterborne disease.

10 Roy Porter disagreed with the proposed theory about the missing factors

11 The reason of lower child deaths is fully explained by food.

12 The British made beer by themselves.

13 Tax on malt indirectly affected the increase of population in late 17th century.

READING PASSAGE 2

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

Tidal Power! in Britain

Tidal power, also called tidal energy, is a form of hydropower that converts the energy of tides into useful forms of power-mainly electricity. Although not yet widely used, tidal power has potential for future electricity generation. Tides are more predictable than wind energy and solar power. Among sources of renewable energy, tidal power has traditionally suffered from relatively high cost and limited availability of sites with sufficiently high tidal ranges or flow velocities, thus constricting its total availability. However, many recent technological developments and improvements, both in design and turbine technology, indicate that the total availability of tidal power may be much higher than previously assumed, and that economic and environmental costs may be brought down to competitive levels. Undersea turbines which produce electricity from the tides are set to become an important source of renewable energy for Britain. It is still too early to predict the extent of the impact they may have, but all the signs are that they will play a significant role in the future.

A

Operating on the same principle as wind turbines, the power in sea turbines comes from tidal currents which turn blades similar to ships' propellers, but, unlike wind, the tides are predictable and the power input is constant. The technology raises the prospect of Britain becoming self-sufficient in renewable energy and drastically reducing its carbon dioxide emissions. If tide, wind and wave power are all developed, Britain would be able to close gas, coal and nuclear power plants and export renewable power to other parts of Europe. Unlike wind power, which Britain originally developed and then abandoned for 20 years allowing the Dutch to make it a major industry, undersea turbines could become a big export earner to island nations such as Japan and New Zealand.

B

Tidal sites have already been identified that will produce one sixth or more of the UK's power and at prices competitive with modern gas turbines and undercutting those of the already ailing nuclear industry. One site alone, the Pentland Firth, between Orkney and mainland Scotland, could produce 10% of the country's electricity with banks of turbines under the sea, and another at Alderney in the Channel Islands three times the 1,200 megawatts of Britain's largest and newest nuclear plant, Sizewell B, in Suffolk. Other sites identified include the Bristol Channel and the west coast of Scotland, particularly the channel between Campbeltown and Northern Ireland.

C

Work on designs for the new turbine blades and sites are well advanced at the University of Southampton's sustainable energy research group. The first station is expected to be installed off Lynmouth in Devon shortly to test the technology in a venture jointly funded by the department of Trade and Industry and the European

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Union. AbuBakr Bahaj, in charge of the Southampton research, said: 'The prospects for energy from tidal currents are far better than from wind because the flows of water are predictable and constant. The technology for dealing with the hostile saline environment under the sea has been developed in the North Sea oil industry and much is already known about turbine blade design, because of wind power and ship propellers. There are a few technical difficulties, but I believe in the next five to ten years we will be installing commercial marine turbine farms.' Southampton has been awarded £215,000 over three years to develop the turbines and is working with Marine Current Turbines, a subsidiary of IT power, on the Lynmouth project. EU research has now identified 106 potential sites for tidal power, 80% round the coasts of Britain. The best sites are between islands or around heavily indented coasts where there are strong tidal currents.

D

A marine turbine blade needs to be only one third of the size of a wind generator to produce three times as much power. The blades will be about 20 meters in diameter, so around 30 meters of water is required. Unlike wind power, there are unlikely to be environmental objections. Fish and other creatures are thought unlikely to be at risk from the relatively slow-turning blades. Each turbine will be mounted on a tower which will connect to the national power supply grid via underwater cables. The towers will stick out of the water and be lit, to warn shipping, and also be designed to be lifted out of the water for maintenance and to clean seaweed from the blades.

E

Dr. Bahaj has done most work on the Alderney site, where there are powerful currents. The single undersea turbine farm would produce far more power than needed for the Channel Islands and most would be fed into the French Grid and be re-imported into Britain via the cable under the Channel.

F

One technical difficulty is cavitation, where low pressure behind a turning blade causes air bubbles. These can cause vibration and damage the blades of the turbines. Dr. Bahaj said: "We have to test a number of blade types to avoid this happening or at least make sure it does not damage the turbines or reduce performance. Another slight concern is submerged debris floating into the blades. So far we do not know how much of a problem it might be. We will have to make the turbines robust because the sea is a hostile environment, but all the signs are good that we can do it."

Questions 14-17

Reading Passage 2 has six paragraphs, **A-F**.

Which paragraph contains the following information?

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*Write the correct letter, **A-F**, in boxes **14-17** on your answer sheet*

NB You may use any letter more than once.

14 the location of the first test site

15 bringing the power produced on one site back into Britain again

16 a potentially promising alternative energy for island countries

17 possibility of applying technique from another field due to its stable feature

Questions 18-22

Choose **FIVE** letters, **A-I**.

Write the correct letters in boxes **18-22** on your answer sheet.

Which **FIVE** of the following statements about tidal power are made by the author?

A It is best produced in the scene of particular coastlines.

B It would take place all other ways of energy in Britain.

C It is a more reliable source of energy than wind power.

D It would cut down on air pollution.

E It could generate a lot of carbon dioxide to the environment.

F It could contribute to the closure of many existing power stations in Britain.

G It could be the most expensive energy in Britain.

H It could be a means of increasing national income.

I It could compensate for the shortage of inland sites.

Questions 23-26

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 **23-26** on your answer sheet.*

Marine turbine has small environmental impact, for example, sea life would not in danger due to the fact that blades are comparatively **23** _____. Each tower equipped with turbine can be raised for **24** _____ and extracted seaweed from the blades. However, one practical issue is that air bubble may result from the **25** _____ (behind blades). This is known as **26** _____.

READING PASSAGE 3

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

The Columbian Exchange

A

Millions of years ago, continental drift carried the Old World and New World apart, splitting North and South America from Eurasia and Africa. That separation lasted

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so long that it fostered divergent evolution; for instance, the development of rattlesnakes on one side of the Atlantic and of vipers on the other. After 1492, human voyagers in part reversed this tendency. Their artificial re-establishment of connections through the commingling of Old and New World plants, animals, and bacteria, commonly known as the Columbian Exchange, is one of the more spectacular and significant ecological events of the past millennium.

B

When Europeans first touched the shores of the Americas, Old World crops such as wheat, barley, rice, and turnips had not travelled west across the Atlantic, and New World crops such as maize, white potatoes, sweet potatoes, and manioc had not travelled east to Europe. In the Americas, there were no horses, cattle, sheep, or goats, all animals of Old World origin. Except for the llama, alpaca, dog, a few fowl, and guinea pig, the New World had no equivalents to the domesticated animals associated with the Old World, nor did it have the pathogens associated with the Old World's dense populations of humans and such associated creatures as chickens, cattle, black rats, and Aedes aegypti mosquitoes. Among these germs were those that carried smallpox, measles, chickenpox, influenza, malaria, and yellow fever.

C

As might be expected, the Europeans who settled on the east coast of the United States cultivated crops like wheat and apples, which they had brought with them. European weeds, which the colonists did not cultivate, and, in fact, preferred to uproot, also fared well in the New World. John Josselyn, an Englishman and amateur naturalist who visited New England twice in the seventeenth century, left us a list, "Of Such Plants as Have Sprung Up since the English Planted and Kept Cattle in New England," which included couch grass, dandelion, shepherd's purse, groundsel, sow thistle, and chickweed.

One of these, a plantain (Plantago major), was named "Englishman's Foot" by the Amerindians of New England and Virginia who believed that it would grow only where the English "have trodden, and was never known before the English came into this country". Thus, as they intentionally sowed Old World crop seeds, the European settlers were unintentionally contaminating American fields with weed seeds. More importantly, they were stripping and burning forests, exposing the native minor flora to direct sunlight, and the hooves and teeth of Old World livestock. The native flora could not tolerate the stress. The imported weeds could, because they had lived with large numbers of grazing animals for thousands of years.

D

Cattle and horses were brought ashore in the early 1600s and found hospitable climate and terrain in North America. Horses arrived in Virginia as early as 1620 and

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in Massachusetts in 1629. Many wandered free with little more evidence of their connection to humanity than collars with a hook at the bottom to catch on fences as they tried to leap over them to get at crops. Fences were not for keeping livestock in, but for keeping livestock out.

E

Native American resistance to the Europeans was ineffective. Indigenous peoples suffered from white brutality, alcoholism, the killing and driving off of game, and the expropriation of farmland, but all these together are insufficient to explain the degree of their defeat. The crucial factor was not people, plants, or animals, but germs. Smallpox was the worst and the most spectacular of the infectious diseases mowing down the Native Americans. The first recorded pandemic of that disease in British North America detonated among the Algonquin of Massachusetts in the early 1630s. William Bradford of Plymouth Plantation wrote that the victims "fell down so generally of this disease as they were in the end not able to help one another, no, not to make a fire nor fetch a little water to drink, nor any to bury the dead". The missionaries and the traders who ventured into the American interior told the same appalling story about smallpox and the indigenes. In 1738 alone, the epidemic destroyed half the Cherokee; in 1759 nearly half the Catawbas; in the first years of the next century, two thirds of the Omahas and perhaps half the entire population between the Missouri River and New Mexico; in 1837-38 nearly every last one of the Mandans and perhaps half the people of the high plains.

F

The export of America's native animals has not revolutionised Old World agriculture or ecosystems as the introduction of European animals to the New World did. America's grey squirrels and muskrats and a few others have established themselves east of the Atlantic and west of the Pacific, but that has not made much of a difference. Some of America's domesticated animals are raised in the Old World, but turkeys have not displaced chickens and geese, and guinea pigs have proved useful in laboratories, but have not usurped rabbits in the butcher shops.

G

The New World's great contribution to the Old is in crop plants. Maize, white potatoes, sweet potatoes, various squashes, chiles, and manioc have become essentials in the diets of hundreds of millions of Europeans, Africans, and Asians. Their influence on Old World peoples, like that of wheat and rice on New World peoples, goes far to explain the global population explosion of the past three centuries. The Columbian Exchange has been an indispensable factor in that demographic explosion.

H

All this had nothing to do with superiority or inferiority of biosystems in any absolute sense. It has to do with environmental contrasts. Amerindians were

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accustomed to living in one particular kind of environment, Europeans and Africans in another. When the Old World peoples came to America, they brought with them all their plants, animals, and germs, creating a kind of environment to which they were already adapted, and so they increased in number. Amerindians had not adapted to European germs, and so initially their numbers plunged. That decline has reversed in our time as Amerindian populations have adapted to the Old World's environmental influence, but the demographic triumph of the invaders, which was the most spectacular feature of the Old World's invasion of the New, still stands.

Questions 27-34

Reading Passage 3 has eight paragraphs **A-H**.

Which paragraph contains the following information?

*Write the correct letter **A-H** in boxes **27-34** on your answer sheet.*

27 A description of an imported species that is named after the English colonists

28 The reason why both the New World and Old World experienced population growth

29 The formation of new continents explained

30 The reason why the indigenous population declined

31 An overall description of the species lacked in the Old World and New World

32 A description of some animal species being ineffective in affecting the Old World

33 An overall explanation of the success of the Old World species invasion

34 An account of European animals taking roots in the New World

Questions 35-38

Do the following statements agree with the claims of the writer in Reading Passage 3?

*In boxes **35-38** 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

35 European settlers built fences to keep their cattle and horses inside.

36 The indigenous people had been brutally killed by the European colonists.

37 America's domesticated animals, such as turkey, became popular in the Old World.

38 Crop exchange between the two worlds played a major role in world population growth.

Questions 39-40

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Answer the questions below using **NO MORE THAN THREE WORDS** from the passage for each answer.

39 Who reported the same story of European diseases among the indigenes from the American interior?

40 What is the still existing feature of the Old World's invasion of the New?

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