

Academic Reading Paper 10

Rubber, Ridges and Dictionaries

Time allowed: 1 hour

INSTRUCTIONS TO CANDIDATES

- Do not open this booklet until you are told to do so.
- Write your name and the date at the top of the answer sheet.
- Answer **all** the questions.
- Write your answers **on the answer sheet**, not in this booklet.
- You must transfer your answers within the hour. **No extra time is given for transferring answers in the Reading test.**
- Do not remove this booklet from the examination room.

INFORMATION FOR CANDIDATES

- There are 40 questions in this paper.
- Each question carries one mark.
- There are three passages, with 13, 13 and 14 questions.

These passages were written for this library. They are **not** reproduced from any published past paper. The format, timing and task types follow the published specification for the Academic Reading test so that sitting this on paper feels like the real thing.

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

The tree that cannot go home

Raw rubber is a disappointing material. Tapped from the tree it is a white latex that dries to something elastic and promising, and then behaves badly: sticky and shapeless in summer heat, hard and brittle in a frost. For the first forty years of the nineteenth century a series of companies were founded on the assumption that this could be worked around, and most of them failed, taking their investors with them.

The problem was solved in 1839 by an American named Charles Goodyear, who had been mixing rubber with anything he could obtain and testing the results. A mixture containing sulphur reached a hot stove, and instead of melting it charred at the edge and stayed flexible in the middle. Heating rubber with sulphur creates cross-links between the long molecules, so that the material recovers its shape instead of flowing, and it does this across a far wider range of temperature than untreated rubber will tolerate. The process was later named vulcanisation. Goodyear patented it in the United States in 1844, spent the rest of his life in litigation over it, and died owing about two hundred thousand dollars. The process was worth a great deal to other people. Thomas Hancock, in England, examined samples of the treated rubber, worked out what had been done to it, and filed a British patent a few weeks before Goodyear's own application reached the office.

What vulcanisation created was a demand, and for fifty years the demand could be met from one place. The rubber tree, *Hevea brasiliensis*, grew wild in the Amazon basin, and the trade was organised around men who walked circuits through the forest cutting the bark, most of them held in debt to the traders who supplied them. Money accumulated at the river ports. Manaus, a thousand kilometres upstream, acquired electric light, a tramway and an opera house, which opened in 1896 and was built from materials shipped in from Europe.

The monopoly ended with an act of collection whose legality is still argued about. In 1876 Henry Wickham gathered some seventy thousand *Hevea* seeds in the Amazon and shipped them to Kew Gardens in London. Rubber seeds do not keep, and only about two thousand four hundred of them germinated — a poor return that was entirely sufficient. The seedlings went to Ceylon and to Singapore, and at Singapore the botanist Henry Ridley worked out a way of cutting the bark in a shallow spiral that could be reopened each day without killing the tree. Wild tapping damaged trees. Ridley's method turned them into a crop.

The consequences arrived quickly. Plantations in Ceylon and Malaya, planted in rows on flat ground and tapped by a resident workforce, produced rubber far more cheaply than men walking a forest circuit could. Within about fifteen years of the first plantings reaching maturity, Asia supplied the great majority of the world's rubber and the Amazon trade had collapsed. The opera house at Manaus stayed shut for decades. Nothing about the collapse was gradual. A trade that had built a city of tens of thousands became, inside a single generation, a matter of local supply for local use.

Rubber then became a strategic material, and when Japan took Malaya in 1942 the United States found that most of its supply had gone in a fortnight. The response was an emergency programme to make rubber out of petroleum, which succeeded, and synthetic rubber has supplied more than half the world market ever since.

It has not, however, replaced the tree, and the reason is specific rather than sentimental. Natural rubber builds up less heat when it is repeatedly flexed and resists the growth of cracks better than the synthetic equivalents. For a tyre that carries a heavy load at speed, and above all for an aircraft tyre landing at two hundred and fifty kilometres an hour, that difference is not a preference. Something close to half of all rubber used in the world is still cut from a tree. Aircraft tyres are also retreaded several times before they are discarded, which multiplies the number of flexing cycles the material has to survive, and the margin the natural product holds widens with each one of them.

There is a last turn to the story. *Hevea* is native to the Amazon, and so is a leaf fungus that attacks it. In the forest the trees grow scattered and the disease moves slowly between them. Planted in rows, they are destroyed. Every serious attempt to establish plantations in Brazil, including a very large one financed by Henry Ford in the 1930s, has failed for this reason. The world's rubber is grown in Asia and Africa because the one place it cannot be grown commercially is where it comes from.

Questions 1–5

Complete the notes below.

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

How rubber became a crop

Making it usable

- Untreated rubber is sticky in heat and brittle in cold.
- 1839 — Goodyear finds that heating rubber with **1** makes it hold its shape.
- The heat creates **2** between the long molecules.

Moving it

- 1876 — Wickham ships about seventy thousand seeds to **3** in London.
- At Singapore, Ridley develops a way of cutting the bark in a shallow **4** that does not kill the tree.

Losing it

- 1942 — Japan takes Malaya and the United States loses most of its supply within a **5**

Questions 6–9

Answer the questions below.

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

- 6 Of the seventy thousand seeds, only about two thousand four hundred
- 7 In which year did the opera house at Manaus open?
- 8 What is made from petroleum as a substitute for natural rubber?
- 9 What attacks Hevea trees when they are planted close together?

Questions 10–13

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

Write **TRUE** if the statement agrees with the information, **FALSE** if the statement contradicts the information, or **NOT GIVEN** if there is no information on this.

- 10 Goodyear made a large fortune from the process he discovered.
- 11 Ridley's method allowed the same tree to be cut again the next day.
- 12 Plantation rubber was of better quality than rubber tapped from wild trees.
- 13 Synthetic rubber has entirely replaced natural rubber in aircraft tyres.

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

Reading the ocean floor

- A** Until the middle of the twentieth century the floor of the deep ocean was, for practical purposes, unknown. It was assumed to be flat, old and dull: a basin that had been collecting sediment since the earth cooled. The instrument that changed this was the echo sounder, which fires a pulse at the sea floor and times the return, and which ships had been carrying since the 1920s without anybody assembling what they recorded into a picture.
- B** The assembling was done at a laboratory north of New York by Marie Tharp, who was not permitted to go to sea and worked instead from the profiles the ships brought back. Converting a stack of one-dimensional traces into a landscape is slow and interpretative work, and by 1952 she had noticed something in the middle of the Atlantic: running along the crest of the mid-ocean ridge, in profile after profile, was a deep notch. A continuous valley down the centre of a mountain range is what happens where a crust is being pulled apart. Tharp redrew the profiles repeatedly to satisfy herself that the notch was not an artefact of the way she was reading them, and it was in every one. Bruce Heezen, who supplied her with the data, initially dismissed the finding, since it implied continental drift, which no respectable geologist then accepted.
- C** The argument was settled by a second data set that neither of them had been looking at. Heezen was separately plotting the locations of ocean earthquakes, and when the two maps were laid over one another the epicentres fell along the rift valley. Two independent measurements — the shape of the sea floor and the places where it was breaking — described the same line.
- D** A mechanism was proposed in 1962 by Harry Hess, a Princeton geologist who had commanded a transport ship in the Pacific and used its echo sounder throughout the war. His suggestion was that new sea floor is created at the ridges, spreads outward, and is destroyed where it descends into the deep trenches, so that the ocean floor is not an ancient basin but a surface being continuously replaced. Hess was aware of how this would be received and described his paper as an essay in geopoetry.
- E** What turned the proposal into an accepted theory was a test that could fail. The earth's magnetic field reverses at irregular intervals, and molten rock records the direction of the field at the moment it cools and locks it in. If Hess was right, then the crust either side of a ridge should carry a pattern of alternating magnetic stripes, running parallel to the ridge and mirrored across it, with each pair recording the same reversal at the same distance from the centre. If Hess was wrong there was no reason for such a pattern to exist at all. That asymmetry is what makes a prediction worth making. A hypothesis equally comfortable with stripes and with no stripes cannot be tested by going to look for them.

- F** Fred Vine and Drummond Matthews published that prediction in 1963 and matched it against magnetic surveys of the Indian Ocean. The stripes were there and they were symmetrical. Lawrence Morley, a Canadian geophysicist, had reached the same idea independently and slightly earlier, and had submitted it to two journals; both rejected it, and one reviewer suggested it was the sort of thing to discuss at a cocktail party rather than to publish. The hypothesis is now generally given all three names.
- G** One further fact closed the case for anybody still hesitating. If the sea floor is being manufactured and destroyed, it should be young. Drilling and dating showed that no part of the ocean floor is much more than two hundred million years old, while the rocks of the continents run to billions. A basin collecting sediment since the earth cooled would not look like that, and nothing else explains why it does. The sediment itself told the same story from another direction: thin near the ridges and thick near the continents, exactly the pattern expected if the floor grows older the further one travels from the centre.
- H** Tharp's maps, drawn by hand and published from 1957, were for a long time the only way most people had of seeing what the argument was about. She was for many years listed as an assistant on the work she had done, and the recognition arrived late enough to be almost posthumous. The rift she found in 1952 is now the most-reproduced feature of any map of the ocean.

Questions 14–18

Reading Passage 2 has eight sections, A–H.

Which section contains the following information?

Write the correct letter, A–H.

NB You may use any letter more than once.

- 14** a description of what the prediction would look like if it were wrong
- 15** a reference to a paper being turned down
- 16** two separate measurements that produced the same line
- 17** an author's own description of his paper
- 18** an age comparison between two parts of the earth's surface

Questions 19–22

Look at the following contributions and the list of people below.

Match each contribution with the correct person, A–D.

NB You may use any letter more than once.

List of People

- A** Marie Tharp
- B** Bruce Heezen
- C** Harry Hess
- D** Lawrence Morley

- 19** She identified a continuous valley along the crest of a ridge.
- 20** He proposed that the sea floor is created and destroyed continuously.
- 21** He mapped where earthquakes occur under the ocean.
- 22** He arrived at an explanation that two journals declined to publish.

Questions 23–26

Complete the sentences below.

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

- 23** Ships had carried echo sounders since the 1920s, but nobody had assembled the records into a
- 24** Heezen at first rejected Tharp's finding because it implied continental
- 25** Molten rock records the direction of the magnetic field at the moment it
- 26** For many years Tharp was credited on the work only as an

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

Who decides what a word means?

When Samuel Johnson began his dictionary in 1746 he intended, as he later admitted, to fix the English language: to establish what its words meant and to arrest the drift that was making older books harder to read. By the time he finished, nine years later, he had changed his mind, and the preface to the 1755 edition says so with some feeling. Sounds are too volatile to be held, he wrote; to imagine that a language can be embalmed is to expect that a man may lengthen his own life by cutting off his shadow. He had set out as a legislator and finished as a recorder.

The recorder's position became the professional one. When the Oxford dictionary was assembled in the second half of the nineteenth century, James Murray and his readers worked from citation slips: volunteers read printed books and copied out sentences showing words in use, and a definition was written from the evidence rather than from an opinion about what the word ought to mean. The method has a consequence that is often missed. A dictionary built this way cannot endorse anything, because endorsement is not among the operations it performs. It reports. The slips ran to millions, and the entry for a common verb might rest on several hundred of them, arranged by date so that a shift in meaning could be watched happening.

The clearest demonstration of how badly this is understood came in 1961, when Webster's Third New International appeared in the United States. It had dropped a large number of the labels earlier editions used to mark usages as incorrect, and it recorded, with a note on its distribution, the word *ain't*. The reaction was extraordinary. Newspapers denounced it, one arguing that the edition should be rejected wholesale, and a competing dictionary was commissioned largely so that somebody would still be telling readers what not to say. The complaint was that Webster's had approved of *ain't*. Webster's had listed it.

The same confusion runs through every version of this argument since. Take the word *literally*, used as an intensifier by writers who plainly did not mean it in its narrow sense — a practice found in Dickens, in Twain and in Joyce, which is to say that it is not a recent decay. Dictionaries now record that use, and the recording is read as permission. The narrow sense being defended is itself a faded metaphor: *literally* once meant according to the letter, and applying it to something that happened rather than to something written is already an extension of it. It is not permission. It is a statement that if you encounter the word in that construction, this is what the person is doing with it.

It is worth being clear that the people objecting are not simply wrong, and the descriptive side has a habit of being glib about them. The observation that language changes is true and is not an answer. Somebody deciding what to write in a report tomorrow is not asking a historical question; they are asking which choices will be understood, and which will make a reader stop and think about the writing instead of the content. That is a real question with real answers, and it varies by context in ways a dictionary cannot capture.

The mistake on both sides is to think that these are the same activity. A dictionary describes; a style guide prescribes; and the two do not compete, because they are not answering the same question. A house style that forbids literally as an intensifier is not making a claim about the English language. It is making a claim about what that publication will print, which is entirely within its authority and requires no support from lexicography at all.

Once that is separated out, most of the heat goes. The prescriptivist's real position — that in this setting, for this audience, some usages cost the writer more than they gain — survives intact and is defensible on its own terms. What does not survive is the further claim that such a preference is a fact about what a word means, or that a dictionary which fails to share it has been negligent. Separating the two also gives the argument somewhere to go. People who agree that a dictionary records and a style guide instructs can then have the useful argument, which is about what the style guide ought to say.

There remains a genuine difficulty, which is that people do not experience a usage rule as a local convention. They experience it as correctness, and being told that a form they were taught to avoid is merely one of several is heard as being told their education was pointless. That reaction is not stupidity and it will not be argued away by explaining lexicography. It is the reason this dispute has run for three centuries and will keep running, and it is a better explanation than either side's account of the other.

Questions 27–32

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

Write **YES** if the statement agrees with the claims of the writer, **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

- 27** Johnson held the same view of his task at the end of the work as at the beginning.
- 28** The writer thinks people who object to new usages are simply mistaken.
- 29** Murray's volunteers were paid for the citations they supplied.
- 30** The writer accepts that a publication may forbid a usage in its own pages.
- 31** The writer believes dictionaries should include usage labels marking forms as incorrect.
- 32** The writer thinks the strength of feeling in this dispute is explained by what a rule feels like to the person who learned it.

Questions 33–36

Complete each sentence with the correct ending, A–G, below.

Endings

- A reports how a word has been used rather than approving of it.
- B states what a particular publication will print.
- C shows that the usage is much older than the complaint about it.
- D explains why the argument cannot be settled by explanation.
- E proves that all usages are equally appropriate in every setting.
- F was written in order to settle the 1961 controversy.
- G abolished the distinction between speech and writing.

- 33 A dictionary built from citations
- 34 A house style rule
- 35 The appearance of literally as an intensifier in Dickens and Joyce
- 36 The final paragraph's account of how a rule is experienced

Questions 37–40

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

- 37 Johnson's dictionary was published
 - A in 1746.
 - B in 1755.
 - C nine years after it was finished.
 - D before he changed his mind about its purpose.
- 38 What does the writer say the critics of Webster's Third believed?
 - A That the dictionary had recorded a usage.
 - B That the dictionary had approved a usage.
 - C That the dictionary had omitted a usage.
 - D That the dictionary was too expensive.
- 39 According to the writer, the observation that language changes is
 - A false.
 - B true but not a reply to the question being asked.
 - C the strongest argument against prescriptivism.
 - D only true of spoken language.

- 40** Which of the following best states the writer's position?
- A** Dictionaries should take a firmer line on incorrect usage.
 - B** Describing and prescribing are different activities that do not compete.
 - C** Style guides should be based on dictionary definitions.
 - D** The dispute would end if both sides read more history.