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IELTS

ACADEMIC

IELTS 11

ACADEMIC

WITH ANSWERS

WITH ANSWERS

AUTHENTIC EXAMINATION PAPERS

Cambridge English



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Introduction

The International English Language Testing System (IELTS) is widely recognised as a reliable means of assessing the language ability of candidates who need to study or work where English is the language of communication. These Practice Tests are designed to give future IELTS candidates an idea of whether their English is at the required level.

IELTS is owned by three partners, Cambridge English Language Assessment, part of the University of Cambridge, the British Council and IDP Education Pty Limited (through its subsidiary company, IELTS Australia Pty Limited). Further information on IELTS can be found on the IELTS website www.ielts.org.

WHAT IS THE TEST FORMAT?

IELTS consists of four components. All candidates take the same Listening and Speaking tests. There is a choice of Reading and Writing tests according to whether a candidate is taking the Academic or General Training module.

Academic For candidates wishing to study at undergraduate or postgraduate levels, and for those seeking professional registration.	General Training For candidates wishing to migrate to an English-speaking country (Australia, Canada, New Zealand, UK), and for those wishing to train or study at below degree level.
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The test components are taken in the following order:

Listening 4 sections, 40 items approximately 30 minutes		
Academic Reading 3 sections, 40 items 60 minutes	or	General Training Reading 3 sections, 40 items 60 minutes
Academic Writing 2 tasks 60 minutes	or	General Training Writing 2 tasks 60 minutes
Speaking 11 to 14 minutes		
Total Test Time 2 hours 44 minutes		

ACADEMIC TEST FORMAT

Listening

This test consists of four sections, each with ten questions. The first two sections are concerned with social needs. The first section is a conversation between two speakers and the second section is a monologue. The final two sections are concerned with situations related to educational or training contexts. The third section is a conversation between up to four people and the fourth section is a monologue.

A variety of question types is used, including: multiple choice, matching, plan/map/diagram labelling, form completion, note completion, table completion, flow-chart completion, summary completion, sentence completion, short-answer questions.

Candidates hear the recording once only and answer the questions as they listen. Ten minutes are allowed at the end for candidates to transfer their answers to the answer sheet.

Reading

This test consists of three sections with 40 questions. There are three texts, which are taken from journals, books, magazines and newspapers. The texts are on topics of general interest. At least one text contains detailed logical argument.

A variety of question types is used, including: multiple choice, identifying information (True/False/Not Given), identifying the writer's views/claims (Yes/No/Not Given), matching information, matching headings, matching features, matching sentence endings, sentence completion, summary completion, note completion, table completion, flow-chart completion, diagram label completion, short-answer questions.

Writing

This test consists of two tasks. It is suggested that candidates spend about 20 minutes on Task 1, which requires them to write at least 150 words, and 40 minutes on Task 2, which requires them to write at least 250 words. Task 2 contributes twice as much as Task 1 to the Writing score.

Task 1 requires candidates to look at a diagram or some data (graph, table or chart) and to present the information in their own words. They are assessed on their ability to organise, present and possibly compare data, describe the stages of a process, describe an object or event, or explain how something works.

In Task 2, candidates are presented with a point of view, argument or problem. They are assessed on their ability to present a solution to the problem, present and justify an opinion, compare and contrast evidence and opinions, evaluate and challenge ideas, evidence or arguments.

Candidates are also assessed on their ability to write in an appropriate style.

More information on assessing the Writing test, including Writing Assessment Criteria (public version), is available on the IELTS website.

Speaking

This test takes between 11 and 14 minutes and is conducted by a trained examiner. There are three parts:

Part 1

The candidate and the examiner introduce themselves. Candidates then answer general questions about themselves, their home/family, their job/studies, their interests and a wide range of similar familiar topic areas. This part lasts between four and five minutes.

Part 2

The candidate is given a task card with prompts and is asked to talk on a particular topic. The candidate has one minute to prepare and they can make some notes if they wish, before speaking for between one and two minutes. The examiner then asks one or two questions on the same topic.

Part 3

The examiner and the candidate engage in a discussion of more abstract issues which are thematically linked to the topic in Part 2. The discussion lasts between four and five minutes.

The Speaking test assesses whether candidates can communicate effectively in English. The assessment takes into account Fluency and Coherence, Lexical Resource, Grammatical Range and Accuracy, and Pronunciation. More information on assessing the Speaking test, including Speaking Assessment Criteria (public version), is available on the IELTS website.

HOW IS IELTS SCORED?

IELTS results are reported on a nine-band scale. In addition to the score for overall language ability, IELTS provides a score in the form of a profile for each of the four skills (Listening, Reading, Writing and Speaking). These scores are also reported on a nine-band scale. All scores are recorded on the Test Report Form along with details of the candidate's nationality, first language and date of birth. Each Overall Band Score corresponds to a descriptive statement which gives a summary of the English language ability of a candidate classified at that level. The nine bands and their descriptive statements are as follows:

- 9 **Expert User** – Has fully operational command of the language: appropriate, accurate and fluent with complete understanding.
- 8 **Very Good User** – Has fully operational command of the language with only occasional unsystematic inaccuracies and inappropriacies. Misunderstandings may occur in unfamiliar situations. Handles complex detailed argumentation well.
- 7 **Good User** – Has operational command of the language, though with occasional inaccuracies, inappropriacies and misunderstandings in some situations. Generally handles complex language well and understands detailed reasoning.
- 6 **Competent User** – Has generally effective command of the language despite some inaccuracies, inappropriacies and misunderstandings. Can use and understand fairly complex language, particularly in familiar situations.
- 5 **Modest User** – Has partial command of the language, coping with overall meaning in most situations, though is likely to make many mistakes. Should be able to handle basic communication in own field.
- 4 **Limited User** – Basic competence is limited to familiar situations. Has frequent problems in understanding and expression. Is not able to use complex language.
- 3 **Extremely Limited User** – Conveys and understands only general meaning in very familiar situations. Frequent breakdowns in communication occur.
- 2 **Intermittent User** – No real communication is possible except for the most basic information using isolated words or short formulae in familiar situations and to meet immediate needs. Has great difficulty understanding spoken and written English.
- 1 **Non User** – Essentially has no ability to use the language beyond possibly a few isolated words.
- 0 **Did not attempt the test** – No assessable information provided.

MARKING THE PRACTICE TESTS

Listening and Reading

The Answer Keys are on pages 124–131.

Each question in the Listening and Reading tests is worth one mark.

Questions which require letter / Roman numeral answers

- For questions where the answers are letters or Roman numerals, you should write *only* the number of answers required. For example, if the answer is a single letter or numeral you should write only one answer. If you have written more letters or numerals than are required, the answer must be marked wrong.

Questions which require answers in the form of words or numbers

- Answers may be written in upper or lower case.
- Words in brackets are *optional* – they are correct, but not necessary.
- Alternative answers are separated by a slash (/).
- If you are asked to write an answer using a certain number of words and/or (a) number(s), you will be penalised if you exceed this. For example, if a question specifies an answer using **NO MORE THAN THREE WORDS** and the correct answer is 'black leather coat', the answer 'coat of black leather' is *incorrect*.
- In questions where you are expected to complete a gap, you should only transfer the necessary missing word(s) onto the answer sheet. For example, to complete 'in the ...', and the correct answer is 'morning', the answer 'in the morning' would be *incorrect*.
- All answers require correct spelling (including words in brackets).
- Both US and UK spelling are acceptable and are included in the Answer Key.
- All standard alternatives for numbers, dates and currencies are acceptable.
- All standard abbreviations are acceptable.
- You will find additional notes about individual answers in the Answer Key.

Writing

The sample answers are on pages 132–139. It is not possible for you to give yourself a mark for the Writing tasks. We have provided sample answers (written by candidates), showing their score and the examiner's comments. These sample answers will give you an insight into what is required for the Writing test.

HOW SHOULD YOU INTERPRET YOUR SCORES?

At the end of each Listening and Reading Answer Key you will find a chart which will help you assess whether, on the basis of your Practice Test results, you are ready to take the IELTS test.

In interpreting your score, there are a number of points you should bear in mind. Your performance in the real IELTS test will be reported in two ways: there will be a Band Score from 1 to 9 for each of the components and an Overall Band Score from 1 to 9, which is the average of your scores in the four components. However, institutions considering your application are advised to look at both the Overall Band Score and the Bands for each component in order to determine whether you have the language skills needed for a particular course of study. For example, if your course has a lot of reading and writing, but no lectures, listening skills might be less important and a score of 5 in Listening might be acceptable if the Overall Band Score was 7. However, for a course which has lots of lectures and spoken instructions, a score of 5 in Listening might be unacceptable even though the Overall Band Score was 7.

Once you have marked your tests, you should have some idea of whether your listening and reading skills are good enough for you to try the IELTS test. If you did well enough in one component, but not in others, you will have to decide for yourself whether you are ready to take the test.

The Practice Tests have been checked to ensure that they are of approximately the same level of difficulty as the real IELTS test. However, we cannot guarantee that your score in the Practice Tests will be reflected in the real IELTS test. The Practice Tests can only give you an idea of your possible future performance and it is ultimately up to you to make decisions based on your score.

Different institutions accept different IELTS scores for different types of courses. We have based our recommendations on the average scores which the majority of institutions accept. The institution to which you are applying may, of course, require a higher or lower score than most other institutions.

Further information

For more information about IELTS or any other Cambridge English Language Assessment examination, write to:

Cambridge English Language Assessment
1 Hills Road
Cambridge
CB1 2EU
United Kingdom

<https://support.cambridgeenglish.org>
<http://www.ielts.org>

Test 1

LISTENING

SECTION 1 Questions 1–10

Complete the notes below.

Write **ONE WORD AND/OR A NUMBER** for each answer.

HIRING A PUBLIC ROOM

Example

- the Main Hall – seats200.....

Room and cost

- the 1 Room – seats 100
- Cost of Main Hall for Saturday evening: 2 £
+ £250 deposit (3 payment is required)
- Cost includes use of tables and chairs and also 4
- Additional charge for use of the kitchen: £25

Before the event

- Will need a 5 licence
- Need to contact caretaker (Mr Evans) in advance to arrange
6

During the event

- The building is no smoking
- The band should use the 7 door at the back
- Don't touch the system that controls the volume
- For microphones, contact the caretaker

After the event

- Need to know the **8** for the cleaning cupboard
- The **9** must be washed and rubbish placed in black bags
- All **10** must be taken down
- Chairs and tables must be piled up

SECTION 2 **Questions 11–20**

Questions 11–14

Complete the notes below.

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

Fiddy Working Heritage Farm

Advice about visiting the farm

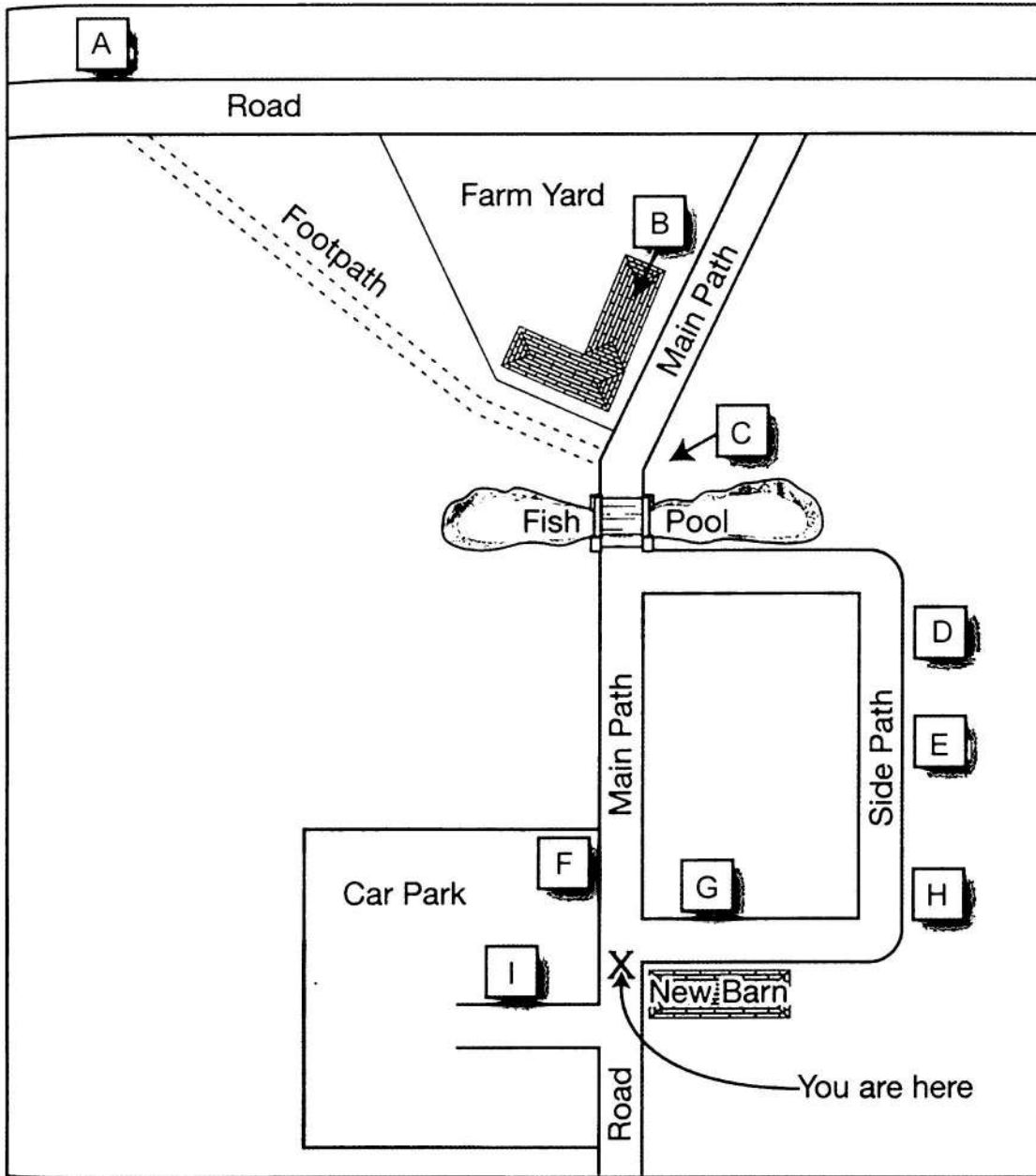
Visitors should

- take care not to harm any **11**
- not touch any **12**
- wear **13**
- not bring **14** into the farm, with certain exceptions

Questions 15–20

Label the map below.

Write the correct letter A–I, next to Questions 15–20.



- 15 Scarecrow
- 16 Maze
- 17 Café

- 18 Black Barn
- 19 Covered picnic area
- 20 Fiddy House

SECTION 3 Questions 21–30

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

Study on Gender in Physics

- 21 The students in Akira Miyake's study were all majoring in
- A physics.
 - B psychology or physics.
 - C science, technology, engineering or mathematics.
- 22 The aim of Miyake's study was to investigate
- A what kind of women choose to study physics.
 - B a way of improving women's performance in physics.
 - C whether fewer women than men study physics at college.
- 23 The female physics students were wrong to believe that
- A the teachers marked them in an unfair way.
 - B the male students expected them to do badly.
 - C their test results were lower than the male students'.
- 24 Miyake's team asked the students to write about
- A what they enjoyed about studying physics.
 - B the successful experiences of other people.
 - C something that was important to them personally.
- 25 What was the aim of the writing exercise done by the subjects?
- A to reduce stress
 - B to strengthen verbal ability
 - C to encourage logical thinking
- 26 What surprised the researchers about the study?
- A how few students managed to get A grades
 - B the positive impact it had on physics results for women
 - C the difference between male and female performance
- 27 Greg and Lisa think Miyake's results could have been affected by
- A the length of the writing task.
 - B the number of students who took part.
 - C the information the students were given.

- 28 Greg and Lisa decide that in their own project, they will compare the effects of
- A two different writing tasks.
 - B a writing task with an oral task.
 - C two different oral tasks.
- 29 The main finding of Smolinsky's research was that class teamwork activities
- A were most effective when done by all-women groups.
 - B had no effect on the performance of men or women.
 - C improved the results of men more than of women.
- 30 What will Lisa and Greg do next?
- A talk to a professor
 - B observe a science class
 - C look at the science timetable

SECTION 4 Questions 31–40

Complete the notes below.

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

Ocean Biodiversity

Biodiversity hotspots

- areas containing many different species
- important for locating targets for 31
- at first only identified on land

Boris Worm, 2005

- identified hotspots for large ocean predators, e.g. sharks
- found that ocean hotspots:
 - were not always rich in 32
 - had higher temperatures at the 33
 - had sufficient 34 in the water

Lisa Ballance, 2007

- looked for hotspots for marine 35
- found these were all located where ocean currents meet

Census of Marine Life

- found new ocean species living:
 - under the 36
 - near volcanoes on the ocean floor

Global Marine Species Assessment

- want to list endangered ocean species, considering:
 - population size
 - geographical distribution
 - rate of 37
- Aim: to assess 20,000 species and make a distribution 38 for each one

Recommendations to retain ocean biodiversity

- increase the number of ocean reserves
- establish 39 corridors (e.g. for turtles)
- reduce fishing quotas
- catch fish only for the purpose of 40

READING

READING PASSAGE 1

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

Crop-growing skyscrapers

By the year 2050, nearly 80% of the Earth's population will live in urban centres. Applying the most conservative estimates to current demographic trends, the human population will increase by about three billion people by then. An estimated 10^9 hectares of new land (about 20% larger than Brazil) will be needed to grow enough food to feed them, if traditional farming methods continue as they are practised today. At present, throughout the world, over 80% of the land that is suitable for raising crops is in use. Historically, some 15% of that has been laid waste by poor management practices. What can be done to ensure enough food for the world's population to live on?

The concept of indoor farming is not new, since hothouse production of tomatoes and other produce has been in vogue for some time. What is new is the urgent need to scale up this technology to accommodate another three billion people. Many believe an entirely new approach to indoor farming is required, employing cutting-edge technologies. One such proposal is for the 'Vertical Farm'. The concept is of multi-storey

buildings in which food crops are grown in environmentally controlled conditions. Situated in the heart of urban centres, they would drastically reduce the amount of transportation required to bring food to consumers. Vertical farms would need to be efficient, cheap to construct and safe to operate. If successfully implemented, proponents claim, vertical farms offer the promise of urban renewal, sustainable production of a safe and varied food supply (through year-round production of all crops), and the eventual repair of ecosystems that have been sacrificed for horizontal farming.

It took humans 10,000 years to learn how to grow most of the crops we now take for granted. Along the way, we despoiled most of the land we worked, often turning verdant, natural ecozones into semi-arid deserts. Within that same time frame, we evolved into an urban species, in which 60% of the human population now lives vertically in cities. This means that, for the majority, we humans have shelter from the elements, yet we subject our food-

bearing plants to the rigours of the great outdoors and can do no more than hope for a good weather year. However, more often than not now, due to a rapidly changing climate, that is not what happens. Massive floods, long droughts, hurricanes and severe monsoons take their toll each year, destroying millions of tons of valuable crops.

The supporters of vertical farming claim many potential advantages for the system. For instance, crops would be produced all year round, as they would be kept in artificially controlled, optimum growing conditions. There would be no weather-related crop failures due to droughts, floods or pests. All the food could be grown organically, eliminating the need for herbicides, pesticides and fertilisers. The system would greatly reduce the incidence of many infectious diseases that are acquired at the agricultural interface. Although the system would consume energy, it would return energy to the grid via methane generation from composting non-edible parts of plants. It would also dramatically reduce fossil fuel use, by cutting out the need for tractors, ploughs and shipping.

A major drawback of vertical farming, however, is that the plants would require artificial light. Without it, those plants nearest the windows would be exposed to more sunlight and grow more quickly, reducing

the efficiency of the system. Single-storey greenhouses have the benefit of natural overhead light: even so, many still need artificial lighting. A multi-storey facility with no natural overhead light would require far more. Generating enough light could be prohibitively expensive, unless cheap, renewable energy is available, and this appears to be rather a future aspiration than a likelihood for the near future.

One variation on vertical farming that has been developed is to grow plants in stacked trays that move on rails. Moving the trays allows the plants to get enough sunlight. This system is already in operation, and works well within a single-storey greenhouse with light reaching it from above: it is not certain, however, that it can be made to work without that overhead natural light.

Vertical farming is an attempt to address the undoubted problems that we face in producing enough food for a growing population. At the moment, though, more needs to be done to reduce the detrimental impact it would have on the environment, particularly as regards the use of energy. While it is possible that much of our food will be grown in skyscrapers in future, most experts currently believe it is far more likely that we will simply use the space available on urban rooftops.

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bearing plants to the rigours of the great outdoors and can do no more than hope for a good weather year. However, more often than not now, due to a rapidly changing climate, that is not what happens. Massive floods, long droughts, hurricanes and severe monsoons take their toll each year, destroying millions of tons of valuable crops.

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Questions 1–7

Complete the sentences below.

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

Write your answers in boxes 1–7 on your answer sheet.

Indoor farming

- 1 Some food plants, including, are already grown indoors.
- 2 Vertical farms would be located in, meaning that there would be less need to take them long distances to customers.
- 3 Vertical farms could use methane from plants and animals to produce
- 4 The consumption of would be cut because agricultural vehicles would be unnecessary.
- 5 The fact that vertical farms would need light is a disadvantage.
- 6 One form of vertical farming involves planting in which are not fixed.
- 7 The most probable development is that food will be grown on in towns and cities.

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 agrees with the information
FALSE if the statement contradicts the information
NOT GIVEN if there is no information on this

- 8 Methods for predicting the Earth's population have recently changed.
- 9 Human beings are responsible for some of the destruction to food-producing land.
- 10 The crops produced in vertical farms will depend on the season.
- 11 Some damage to food crops is caused by climate change.
- 12 Fertilisers will be needed for certain crops in vertical farms.
- 13 Vertical farming will make plants less likely to be affected by infectious diseases.

READING PASSAGE 2

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

THE FALKIRK WHEEL

A unique engineering achievement

The Falkirk Wheel in Scotland is the world's first and only rotating boat lift. Opened in 2002, it is central to the ambitious £84.5m Millennium Link project to restore navigability across Scotland by reconnecting the historic waterways of the Forth & Clyde and Union Canals.

The major challenge of the project lay in the fact that the Forth & Clyde Canal is situated 35 metres below the level of the Union Canal. Historically, the two canals had been joined near the town of Falkirk by a sequence of 11 locks – enclosed sections of canal in which the water level could be raised or lowered – that stepped down across a distance of 1.5 km. This had been dismantled in 1933, thereby breaking the link. When the project was launched in 1994, the British Waterways authority were keen to create a dramatic twenty-first-century landmark which would not only be a fitting commemoration of the Millennium, but also a lasting symbol of the economic regeneration of the region.

Numerous ideas were submitted for the project, including concepts ranging from rolling eggs to tilting tanks, from giant seesaws to overhead monorails. The eventual winner was a plan for the huge rotating steel boat lift which was to become The Falkirk Wheel. The unique shape of the structure is claimed to have been inspired by various sources, both manmade and natural, most notably a Celtic double-

headed axe, but also the vast turning propeller of a ship, the ribcage of a whale or the spine of a fish.

The various parts of The Falkirk Wheel were all constructed and assembled, like one giant toy building set, at Butterley Engineering's Steelworks in Derbyshire, some 400 km from Falkirk. A team there carefully assembled the 1,200 tonnes of steel, painstakingly fitting the pieces together to an accuracy of just 10 mm to ensure a perfect final fit. In the summer of 2001, the structure was then dismantled and transported on 35 lorries to Falkirk, before all being bolted back together again on the ground, and finally lifted into position in five large sections by crane. The Wheel would need to withstand immense and constantly changing stresses as it rotated, so to make the structure more robust, the steel sections were bolted rather than welded together. Over 45,000 bolt holes were matched with their bolts, and each bolt was hand-tightened.

The Wheel consists of two sets of opposing axe-shaped arms, attached about 25 metres apart to a fixed central spine. Two diametrically opposed water-filled 'gondolas', each with a capacity of 360,000 litres, are fitted between the ends of the arms. These gondolas always weigh the same, whether or not they are carrying boats. This is because, according to Archimedes' principle of displacement,

floating objects displace their own weight in water. So when a boat enters a gondola, the amount of water leaving the gondola weighs exactly the same as the boat. This keeps the Wheel balanced and so, despite its enormous mass, it rotates through 180° in five and a half minutes while using very little power. It takes just 1.5 kilowatt-hours (5.4 MJ) of energy to rotate the Wheel – roughly the same as boiling eight small domestic kettles of water.

Boats needing to be lifted up enter the canal basin at the level of the Forth & Clyde Canal and then enter the lower gondola of the Wheel. Two hydraulic steel gates are raised, so as to seal the gondola off from the water in the canal basin. The water between the gates is then pumped out. A hydraulic clamp, which prevents the arms of the Wheel moving while the gondola is docked, is removed, allowing the Wheel to turn. In the central machine room an array of ten hydraulic motors then begins to rotate the central axle. The axle connects to the outer arms of the

Wheel, which begin to rotate at a speed of $1/8$ of a revolution per minute. As the wheel rotates, the gondolas are kept in the upright position by a simple gearing system. Two eight-metre-wide cogs orbit a fixed inner cog of the same width, connected by two smaller cogs travelling in the opposite direction to the outer cogs – so ensuring that the gondolas always remain level. When the gondola reaches the top, the boat passes straight onto the aqueduct situated 24 metres above the canal basin.

The remaining 11 metres of lift needed to reach the Union Canal is achieved by means of a pair of locks. The Wheel could not be constructed to elevate boats over the full 35-metre difference between the two canals, owing to the presence of the historically important Antonine Wall, which was built by the Romans in the second century AD. Boats travel under this wall via a tunnel, then through the locks, and finally on to the Union Canal.

Questions 14–19

Do the following statements agree with the information given in Reading Passage 2?

In boxes 14–19 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

- 14 The Falkirk Wheel has linked the Forth & Clyde Canal with the Union Canal for the first time in their history.
- 15 There was some opposition to the design of the Falkirk Wheel at first.
- 16 The Falkirk Wheel was initially put together at the location where its components were manufactured.
- 17 The Falkirk Wheel is the only boat lift in the world which has steel sections bolted together by hand.
- 18 The weight of the gondolas varies according to the size of boat being carried.
- 19 The construction of the Falkirk Wheel site took into account the presence of a nearby ancient monument.

Questions 20–26

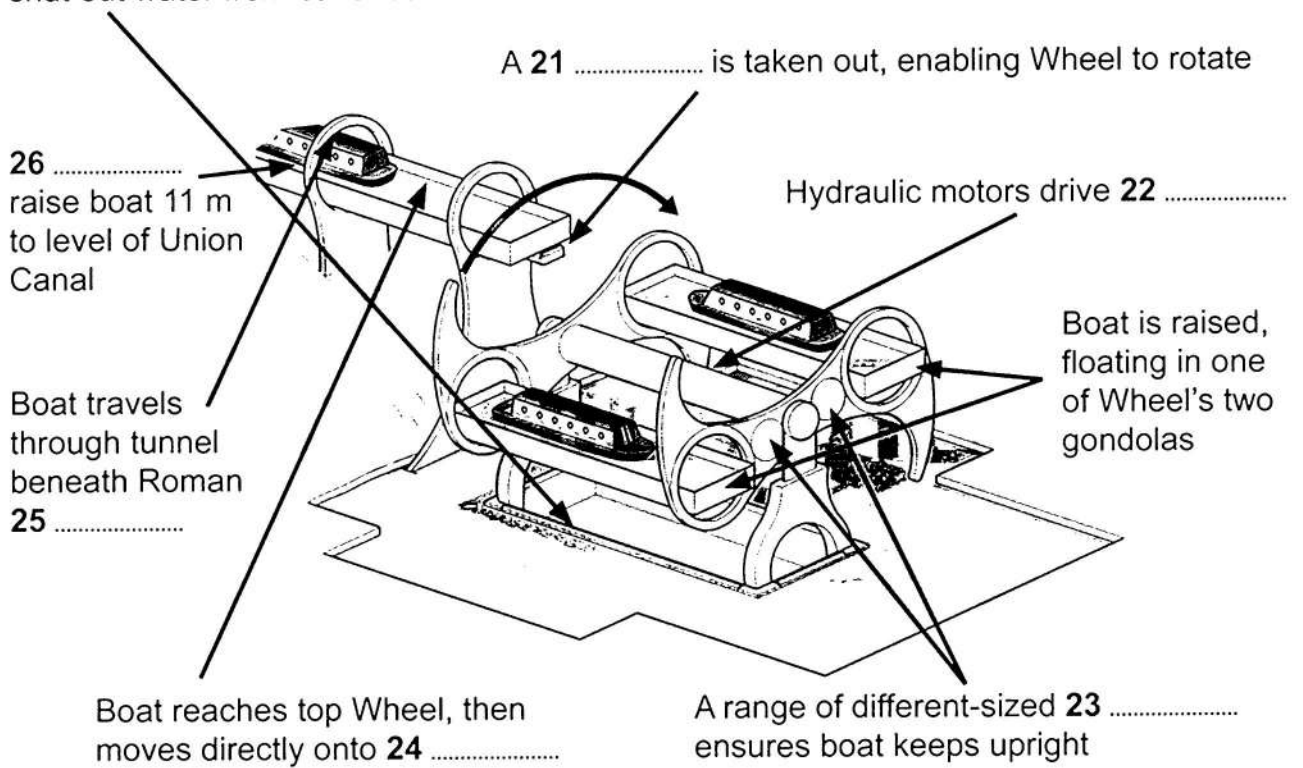
Label the diagram below.

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

Write your answers in boxes 20–26 on your answer sheet.

How a boat is lifted on the Falkirk Wheel

A pair of **20** are lifted in order to shut out water from canal basin



READING PASSAGE 3

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

Reducing the Effects of Climate Change

Mark Rowe reports on the increasingly ambitious geo-engineering projects being explored by scientists

- A** Such is our dependence on fossil fuels, and such is the volume of carbon dioxide already released into the atmosphere, that many experts agree that significant global warming is now inevitable. They believe that the best we can do is keep it at a reasonable level, and at present the only serious option for doing this is cutting back on our carbon emissions. But while a few countries are making major strides in this regard, the majority are having great difficulty even stemming the rate of increase, let alone reversing it. Consequently, an increasing number of scientists are beginning to explore the alternative of geo-engineering – a term which generally refers to the intentional large-scale manipulation of the environment. According to its proponents, geo-engineering is the equivalent of a backup generator: if Plan A – reducing our dependency on fossil fuels – fails, we require a Plan B, employing grand schemes to slow down or reverse the process of global warming.
- B** Geo-engineering has been shown to work, at least on a small localised scale. For decades, May Day parades in Moscow have taken place under clear blue skies, aircraft having deposited dry ice, silver iodide and cement powder to disperse clouds. Many of the schemes now suggested look to do the opposite, and reduce the amount of sunlight reaching the planet. The most eye-catching idea of all is suggested by Professor Roger Angel of the University of Arizona. His scheme would employ up to 16 trillion minute spacecraft, each weighing about one gram, to form a transparent, sunlight-refracting sunshade in an orbit 1.5 million km above the Earth. This could, argues Angel, reduce the amount of light reaching the Earth by two per cent.
- C** The majority of geo-engineering projects so far carried out – which include planting forests in deserts and depositing iron in the ocean to stimulate the growth of algae – have focused on achieving a general cooling of the Earth. But some look specifically at reversing the melting at the poles, particularly the Arctic. The reasoning is that if you replenish the ice sheets and frozen waters of the high latitudes, more light will be reflected back into space, so reducing the warming of the oceans and atmosphere.
- D** The concept of releasing aerosol sprays into the stratosphere above the Arctic has been proposed by several scientists. This would involve using sulphur or hydrogen sulphide aerosols so that sulphur dioxide would form clouds, which would, in turn, lead to a global dimming. The idea is modelled on historic volcanic explosions, such as that of Mount Pinatubo in the Philippines in 1991, which led to a short-term cooling of global temperatures by 0.5 °C. Scientists have also scrutinised whether it's possible to preserve the ice sheets of Greenland with reinforced high-tension cables, preventing icebergs from moving into the sea. Meanwhile in the Russian Arctic, geo-engineering plans include the planting of millions of birch trees. Whereas the region's native evergreen pines shade the snow and absorb radiation, birches would shed their

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leaves in winter, thus enabling radiation to be reflected by the snow. Re-routing Russian rivers to increase cold water flow to ice-forming areas could also be used to slow down warming, say some climate scientists.

- E** But will such schemes ever be implemented? Generally speaking, those who are most cautious about geo-engineering are the scientists involved in the research. Angel says that his plan is ‘no substitute for developing renewable energy: the only permanent solution’. And Dr Phil Rasch of the US-based Pacific Northwest National Laboratory is equally guarded about the role of geo-engineering: ‘I think all of us agree that if we were to end geo-engineering on a given day, then the planet would return to its pre-engineered condition very rapidly, and probably within ten to twenty years. That’s certainly something to worry about.’
- F** The US National Center for Atmospheric Research has already suggested that the proposal to inject sulphur into the atmosphere might affect rainfall patterns across the tropics and the Southern Ocean. ‘Geo-engineering plans to inject stratospheric aerosols or to seed clouds would act to cool the planet, and act to increase the extent of sea ice,’ says Rasch. ‘But all the models suggest some impact on the distribution of precipitation.’
- G** ‘A further risk with geo-engineering projects is that you can “overshoot”,’ says Dr Dan Lunt, from the University of Bristol’s School of Geophysical Sciences, who has studied the likely impacts of the sunshade and aerosol schemes on the climate. ‘You may bring global temperatures back to pre-industrial levels, but the risk is that the poles will still be warmer than they should be and the tropics will be cooler than before industrialisation.’ To avoid such a scenario, Lunt says Angel’s project would have to operate at half strength; all of which reinforces his view that the best option is to avoid the need for geo-engineering altogether.
- H** The main reason why geo-engineering is supported by many in the scientific community is that most researchers have little faith in the ability of politicians to agree – and then bring in – the necessary carbon cuts. Even leading conservation organisations see the value of investigating the potential of geo-engineering. According to Dr Martin Sommerkorn, climate change advisor for the World Wildlife Fund’s International Arctic Programme, ‘Human-induced climate change has brought humanity to a position where we shouldn’t exclude thinking thoroughly about this topic and its possibilities.’

Questions 27–29

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

Which paragraph contains the following information?

*Write the correct letter, **A–H**, in boxes 27–29 on your answer sheet.*

- 27** mention of a geo-engineering project based on an earlier natural phenomenon
- 28** an example of a successful use of geo-engineering
- 29** a common definition of geo-engineering

Questions 30–36

Complete the table below.

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

Write your answers in boxes 30–36 on your answer sheet.

GEO-ENGINEERING PROJECTS

Procedure	Aim
put a large number of tiny spacecraft into orbit far above Earth	to create a 30 that would reduce the amount of light reaching Earth
place 31 in the sea	to encourage 32 to form
release aerosol sprays into the stratosphere	to create 33 that would reduce the amount of light reaching Earth
fix strong 34 to Greenland ice sheets	to prevent icebergs moving into the sea
plant trees in Russian Arctic that would lose their leaves in winter	to allow the 35 to reflect radiation
change the direction of 36	to bring more cold water into ice-forming areas

Questions 37–40

Look at the following statements (Questions 37–40) and the list of scientists below.

Match each statement with the correct scientist, **A–D**.

Write the correct letter, **A–D**, in boxes 37–40 on your answer sheet.

- 37 The effects of geo-engineering may not be long-lasting.
- 38 Geo-engineering is a topic worth exploring.
- 39 It may be necessary to limit the effectiveness of geo-engineering projects.
- 40 Research into non-fossil-based fuels cannot be replaced by geo-engineering.

List of Scientists

- A** Roger Angel
- B** Phil Rasch
- C** Dan Lunt
- D** Martin Sommerkorn

WRITING

WRITING TASK 1

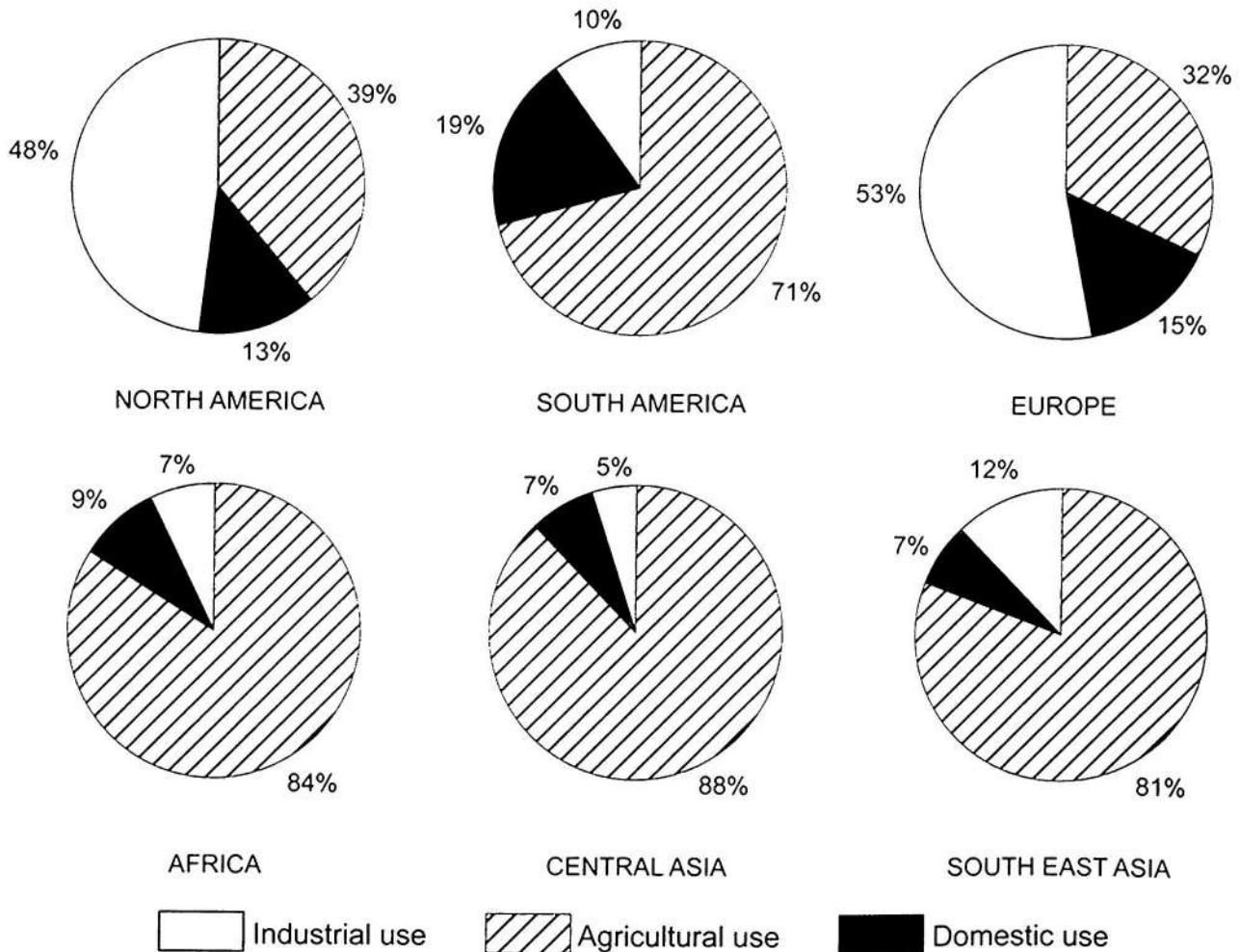
You should spend about 20 minutes on this task.

The charts below show the percentage of water used for different purposes in six areas of the world.

Summarise the information by selecting and reporting the main features, and make comparisons where relevant.

Write at least 150 words.

Percentage of water used for different purposes in six areas of the world



WRITING TASK 2

You should spend about 40 minutes on this task.

Write about the following topic:

Governments should spend money on railways rather than roads.

To what extent do you agree or disagree with this statement?

Give reasons for your answer and include any relevant examples from your own knowledge or experience.

Write at least 250 words.

SPEAKING**PART 1**

The examiner asks the candidate about him/herself, his/her home, work or studies and other familiar topics.

EXAMPLE**Food and cooking**

- What sorts of food do you like eating most? [Why?]
- Who normally does the cooking in your home? [Why/Why not?]
- Do you watch cookery programmes on TV? [Why/Why not?]
- In general, do you prefer eating out or eating at home? [Why?]

PART 2

Describe a house/apartment that someone you know lives in.

You should say:

**whose house/apartment this is
where the house/apartment is
what it looks like inside
and explain what you like or dislike
about this person's house/apartment.**

You will have to talk about the topic for one to two minutes.

You have one minute to think about what you are going to say.

You can make some notes to help you if you wish.

PART 3**Discussion topics:****Different types of home**

Example questions:

What kinds of home are most popular in your country? Why is this?

What do you think are the advantages of living in a house rather than an apartment?

Do you think that everyone would like to live in a larger home? Why is that?

Finding a place to live

Example questions:

How easy is it to find a place to live in your country?

Do you think it's better to rent or to buy a place to live in? Why?

Do you agree that there is a right age for young adults to stop living with their parents? Why is that?

Test 2

LISTENING

SECTION 1 Questions 1–10

Complete the notes below.

Write **ONE WORD AND/OR A NUMBER** for each answer.

Enquiry about joining Youth Council

Example

Name: Roger.....Brown.....

Age: 18

Currently staying in a 1 during the week

Postal address: 2 17, Street, Stamford, Lincs

Postcode: 3

Occupation: student and part-time job as a 4

Studying 5 (major subject) and history (minor subject)

Hobbies: does a lot of 6 , and is interested in the

7

On Youth Council, wants to work with young people who are

8

Will come to talk to the Elections Officer next Monday at

9 pm

Mobile number: 10

SECTION 2 *Questions 11–20***New staff at theatre**

Questions 11 and 12

Choose **TWO** letters, **A–E**.

Which **TWO** changes have been made so far during the refurbishment of the theatre?

- A** Some rooms now have a different use.
- B** A different type of seating has been installed.
- C** An elevator has been installed.
- D** The outside of the building has been repaired.
- E** Extra seats have been added.

Questions 13 and 14

Choose **TWO** letters, **A–E**.

Which **TWO** facilities does the theatre currently offer to the public?

- A** rooms for hire
- B** backstage tours
- C** hire of costumes
- D** a bookshop
- E** a café

Questions 15 and 16

Choose **TWO** letters, **A–E**.

Which **TWO** workshops does the theatre currently offer?

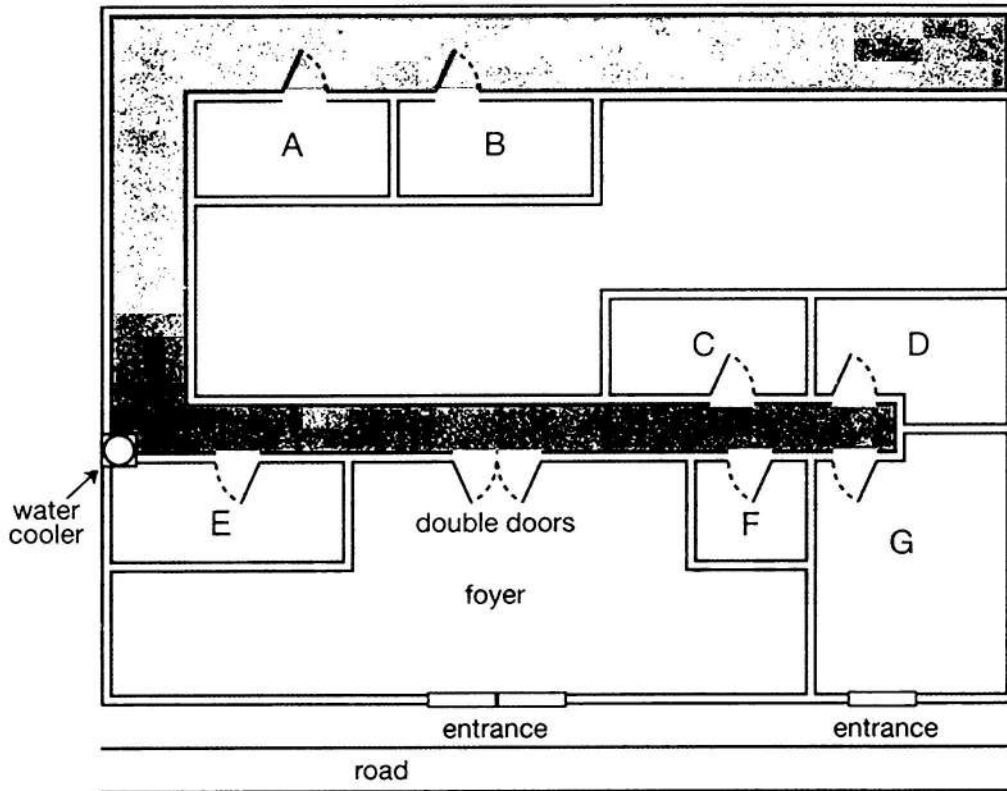
- A** sound
- B** acting
- C** making puppets
- D** make-up
- E** lighting

Questions 17–20

Label the plan below.

Write the correct letter, A–G, next to Questions 17–20.

Ground floor plan of theatre



- 17 box office
- 18 theatre manager's office
- 19 lighting box
- 20 artistic director's office

SECTION 3 Questions 21–30*Questions 21–26*

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

Rocky Bay field trip

- 21 What do the students agree should be included in their aims?
- A factors affecting where organisms live
 - B the need to preserve endangered species
 - C techniques for classifying different organisms
- 22 What equipment did they forget to take on the Field Trip?
- A string
 - B a compass
 - C a ruler
- 23 In Helen's procedure section, Colin suggests a change in
- A the order in which information is given.
 - B the way the information is divided up.
 - C the amount of information provided.
- 24 What do they say about the method they used to measure wave speed?
- A It provided accurate results.
 - B It was simple to carry out.
 - C It required special equipment.
- 25 What mistake did Helen make when first drawing the map?
- A She chose the wrong scale.
 - B She stood in the wrong place.
 - C She did it at the wrong time.
- 26 What do they decide to do next with their map?
- A scan it onto a computer
 - B check it using photographs
 - C add information from the internet

Questions 27 and 28

Choose **TWO** letters, **A–E**.

Which **TWO** problems affecting organisms in the splash zone are mentioned?

- A** lack of water
- B** strong winds
- C** lack of food
- D** high temperatures
- E** large waves

Questions 29 and 30

Choose **TWO** letters, **A–E**.

Which **TWO** reasons for possible error will they include in their report?

- A** inaccurate records of the habitat of organisms
- B** influence on behaviour of organisms by observer
- C** incorrect identification of some organisms
- D** making generalisations from a small sample
- E** missing some organisms when counting

SECTION 4 Questions 31–40

Complete the notes below.

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

DESIGNING A PUBLIC BUILDING: THE TAYLOR CONCERT HALL

Introduction

The designer of a public building may need to consider the building's

- function
- physical and 31 context
- symbolic meaning

Location and concept of the Concert Hall

On the site of a disused 32

Beside a 33

The design is based on the concept of a mystery

Building design

It's approached by a 34 for pedestrians

The building is the shape of a 35

One exterior wall acts as a large 36

In the auditorium:

- the floor is built on huge pads made of 37
- the walls are made of local wood and are 38 in shape
- ceiling panels and 39 on walls allow adjustment of acoustics

Evaluation

Some critics say the 40 style of the building is inappropriate

READING**READING PASSAGE 1**

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

Raising the *Mary Rose*

How a sixteenth-century warship was recovered from the seabed

On 19 July 1545, English and French fleets were engaged in a sea battle off the coast of southern England in the area of water called the Solent, between Portsmouth and the Isle of Wight. Among the English vessels was a warship by the name of *Mary Rose*. Built in Portsmouth some 35 years earlier, she had had a long and successful fighting career, and was a favourite of King Henry VIII. Accounts of what happened to the ship vary: while witnesses agree that she was not hit by the French, some maintain that she was outdated, overladen and sailing too low in the water, others that she was mishandled by undisciplined crew. What is undisputed, however, is that the *Mary Rose* sank into the Solent that day, taking at least 500 men with her. After the battle, attempts were made to recover the ship, but these failed.

The *Mary Rose* came to rest on the seabed, lying on her starboard (right) side at an angle of approximately 60 degrees. The hull (the body of the ship) acted as a trap for the sand and mud carried by Solent currents. As a result, the starboard side filled rapidly, leaving the exposed port (left) side to be eroded by marine organisms and mechanical degradation. Because of the way the ship sank, nearly

all of the starboard half survived intact. During the seventeenth and eighteenth centuries, the entire site became covered with a layer of hard grey clay, which minimised further erosion.

Then, on 16 June 1836, some fishermen in the Solent found that their equipment was caught on an underwater obstruction, which turned out to be the *Mary Rose*. Diver John Deane happened to be exploring another sunken ship nearby, and the fishermen approached him, asking him to free their gear. Deane dived down, and found the equipment caught on a timber protruding slightly from the seabed. Exploring further, he uncovered several other timbers and a bronze gun. Deane continued diving on the site intermittently until 1840, recovering several more guns, two bows, various timbers, part of a pump and various other small finds.

The *Mary Rose* then faded into obscurity for another hundred years. But in 1965, military historian and amateur diver Alexander McKee, in conjunction with the British Sub-Aqua Club, initiated a project called 'Solent Ships'. While on paper this was a plan to examine a number of known wrecks in the Solent, what McKee

really hoped for was to find the *Mary Rose*. Ordinary search techniques proved unsatisfactory, so McKee entered into collaboration with Harold E. Edgerton, professor of electrical engineering at the Massachusetts Institute of Technology. In 1967, Edgerton's side-scan sonar systems revealed a large, unusually shaped object, which McKee believed was the *Mary Rose*.

Further excavations revealed stray pieces of timber and an iron gun. But the climax to the operation came when, on 5 May 1971, part of the ship's frame was uncovered. McKee and his team now knew for certain that they had found the wreck, but were as yet unaware that it also housed a treasure trove of beautifully preserved artefacts. Interest in the project grew, and in 1979, The *Mary Rose* Trust was formed, with Prince Charles as its President and Dr Margaret Rule its Archaeological Director. The decision whether or not to salvage the wreck was not an easy one, although an excavation in 1978 had shown that it might be possible to raise the hull. While the original aim was to raise the hull if at all feasible, the operation was not given the go-ahead until January 1982, when all the necessary information was available.

An important factor in trying to salvage the *Mary Rose* was that the remaining

hull was an open shell. This led to an important decision being taken: namely to carry out the lifting operation in three very distinct stages. The hull was attached to a lifting frame via a network of bolts and lifting wires. The problem of the hull being sucked back downwards into the mud was overcome by using 12 hydraulic jacks. These raised it a few centimetres over a period of several days, as the lifting frame rose slowly up its four legs. It was only when the hull was hanging freely from the lifting frame, clear of the seabed and the suction effect of the surrounding mud, that the salvage operation progressed to the second stage. In this stage, the lifting frame was fixed to a hook attached to a crane, and the hull was lifted completely clear of the seabed and transferred underwater into the lifting cradle. This required precise positioning to locate the legs into the 'stabbing guides' of the lifting cradle. The lifting cradle was designed to fit the hull using archaeological survey drawings, and was fitted with air bags to provide additional cushioning for the hull's delicate timber framework. The third and final stage was to lift the entire structure into the air, by which time the hull was also supported from below. Finally, on 11 October 1982, millions of people around the world held their breath as the timber skeleton of the *Mary Rose* was lifted clear of the water, ready to be returned home to Portsmouth.

Questions 1–4

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

In boxes 1–4 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 There is some doubt about what caused the *Mary Rose* to sink.
- 2 The *Mary Rose* was the only ship to sink in the battle of 19 July 1545.
- 3 Most of one side of the *Mary Rose* lay undamaged under the sea.
- 4 Alexander McKee knew that the wreck would contain many valuable historical objects.

Questions 5–8

Look at the following statements (Questions 5–8) and the list of dates below.

Match each statement with the correct date, **A–G**.

Write the correct letter, **A–G**, in boxes 5–8 on your answer sheet.

- 5 A search for the *Mary Rose* was launched.
- 6 One person's exploration of the *Mary Rose* site stopped.
- 7 It was agreed that the hull of the *Mary Rose* should be raised.
- 8 The site of the *Mary Rose* was found by chance.

List of Dates			
A	1836	E	1971
B	1840	F	1979
C	1965	G	1982
D	1967		

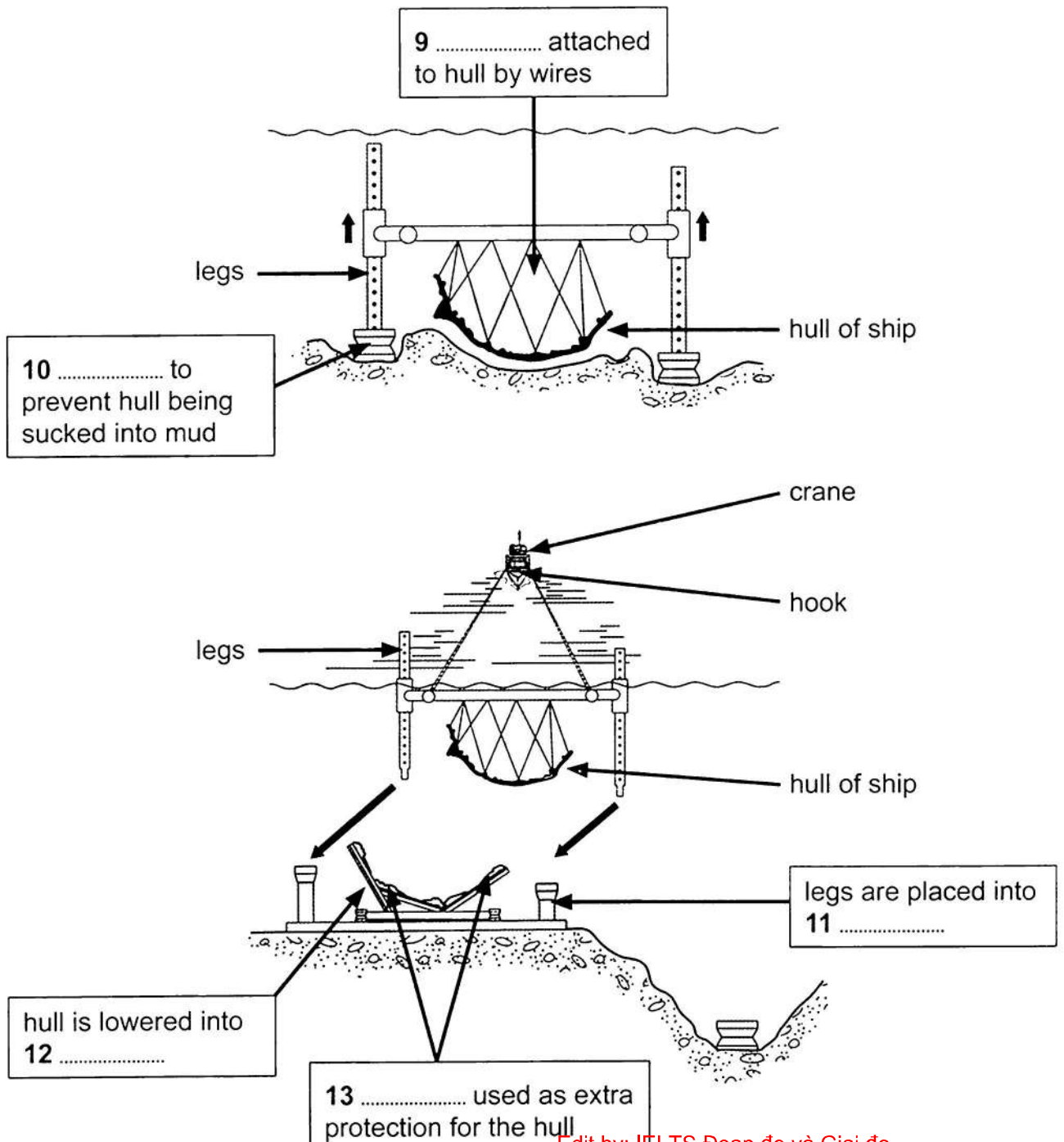
Questions 9–13

Label the diagram below.

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

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

Raising the hull of the *Mary Rose*: Stages one and two



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READING PASSAGE 2

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

Questions 14–20

Reading Passage 2 has seven paragraphs, **A–G**.

Choose the correct heading for each paragraph from the list of headings below.

Write the correct number, **i–ix**, in boxes 14–20 on your answer sheet.

List of Headings

- i** Evidence of innovative environment management practices
- ii** An undisputed answer to a question about the moai
- iii** The future of the moai statues
- iv** A theory which supports a local belief
- v** The future of Easter Island
- vi** Two opposing views about the Rapanui people
- vii** Destruction outside the inhabitants' control
- viii** How the statues made a situation worse
- ix** Diminishing food resources

- 14 Paragraph **A**
- 15 Paragraph **B**
- 16 Paragraph **C**
- 17 Paragraph **D**
- 18 Paragraph **E**
- 19 Paragraph **F**
- 20 Paragraph **G**

What destroyed the civilisation of Easter Island?

- A** Easter Island, or Rapa Nui as it is known locally, is home to several hundred ancient human statues – the *moai*. After this remote Pacific island was settled by the Polynesians, it remained isolated for centuries. All the energy and resources that went into the *moai* – some of which are ten metres tall and weigh over 7,000 kilos – came from the island itself. Yet when Dutch explorers landed in 1722, they met a Stone Age culture. The *moai* were carved with stone tools, then transported for many kilometres, without the use of animals or wheels, to massive stone platforms. The identity of the *moai* builders was in doubt until well into the twentieth century. Thor Heyerdahl, the Norwegian ethnographer and adventurer, thought the statues had been created by pre-Inca peoples from Peru. Bestselling Swiss author Erich von Däniken believed they were built by stranded extraterrestrials. Modern science – linguistic, archaeological and genetic evidence – has definitively proved the *moai* builders were Polynesians, but not how they moved their creations. Local folklore maintains that the statues walked, while researchers have tended to assume the ancestors dragged the statues somehow, using ropes and logs.
- B** When the Europeans arrived, Rapa Nui was grassland, with only a few scrawny trees. In the 1970s and 1980s, though, researchers found pollen preserved in lake sediments, which proved the island had been covered in lush palm forests for thousands of years. Only after the Polynesians arrived did those forests disappear. US scientist Jared Diamond believes that the Rapanui people – descendants of Polynesian settlers – wrecked their own environment. They had unfortunately settled on an extremely fragile island – dry, cool, and too remote to be properly fertilised by windblown volcanic ash. When the islanders cleared the forests for firewood and farming, the forests didn't grow back. As trees became scarce and they could no longer construct wooden canoes for fishing, they ate birds. Soil erosion decreased their crop yields. Before Europeans arrived, the Rapanui had descended into civil war and cannibalism, he maintains. The collapse of their isolated civilisation, Diamond writes, is a 'worst-case scenario for what may lie ahead of us in our own future'.
- C** The *moai*, he thinks, accelerated the self-destruction. Diamond interprets them as power displays by rival chieftains who, trapped on a remote little island, lacked other ways of asserting their dominance. They competed by building ever bigger figures. Diamond thinks they laid the *moai* on wooden sledges, hauled over log rails, but that required both a lot of wood and a lot of people. To feed the people, even more land had to be cleared. When the wood was gone and civil war began, the islanders began toppling the *moai*. By the nineteenth century none were standing.

- D** Archaeologists Terry Hunt of the University of Hawaii and Carl Lipo of California State University agree that Easter Island lost its lush forests and that it was an 'ecological catastrophe' – but they believe the islanders themselves weren't to blame. And the moai certainly weren't. Archaeological excavations indicate that the Rapanui went to heroic efforts to protect the resources of their wind-lashed, infertile fields. They built thousands of circular stone windbreaks and gardened inside them, and used broken volcanic rocks to keep the soil moist. In short, Hunt and Lipo argue, the prehistoric Rapanui were pioneers of sustainable farming.
- E** Hunt and Lipo contend that moai-building was an activity that helped keep the peace between islanders. They also believe that moving the moai required few people and no wood, because they were walked upright. On that issue, Hunt and Lipo say, archaeological evidence backs up Rapanui folklore. Recent experiments indicate that as few as 18 people could, with three strong ropes and a bit of practice, easily manoeuvre a 1,000 kg moai replica a few hundred metres. The figures' fat bellies tilted them forward, and a D-shaped base allowed handlers to roll and rock them side to side.
- F** Moreover, Hunt and Lipo are convinced that the settlers were not wholly responsible for the loss of the island's trees. Archaeological finds of nuts from the extinct Easter Island palm show tiny grooves, made by the teeth of Polynesian rats. The rats arrived along with the settlers, and in just a few years, Hunt and Lipo calculate, they would have overrun the island. They would have prevented the reseedling of the slow-growing palm trees and thereby doomed Rapa Nui's forest, even without the settlers' campaign of deforestation. No doubt the rats ate birds' eggs too. Hunt and Lipo also see no evidence that Rapanui civilisation collapsed when the palm forest did. They think its population grew rapidly and then remained more or less stable until the arrival of the Europeans, who introduced deadly diseases to which islanders had no immunity. Then in the nineteenth century slave traders decimated the population, which shrivelled to 111 people by 1877.
- G** Hunt and Lipo's vision, therefore, is one of an island populated by peaceful and ingenious moai builders and careful stewards of the land, rather than by reckless destroyers ruining their own environment and society. 'Rather than a case of abject failure, Rapa Nui is an unlikely story of success', they claim. Whichever is the case, there are surely some valuable lessons which the world at large can learn from the story of Rapa Nui.

Questions 21–24

Complete the summary below.

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

Write your answers in boxes 21–24 on your answer sheet.

Jared Diamond's View

Diamond believes that the Polynesian settlers on Rapa Nui destroyed its forests, cutting down its trees for fuel and clearing land for **21** Twentieth-century discoveries of pollen prove that Rapa Nui had once been covered in palm forests, which had turned into grassland by the time the Europeans arrived on the island. When the islanders were no longer able to build the **22** they needed to go fishing, they began using the island's **23** as a food source, according to Diamond. Diamond also claims that the moai were built to show the power of the island's chieftains, and that the methods of transporting the statues needed not only a great number of people, but also a great deal of **24**

Questions 25 and 26

Choose **TWO** letters, **A–E**.

Write the correct letters in boxes 25 and 26 on your answer sheet.

On what points do Hunt and Lipo disagree with Diamond?

- A** the period when the moai were created
- B** how the moai were transported
- C** the impact of the moai on Rapanui society
- D** how the moai were carved
- E** the origins of the people who made the moai

READING PASSAGE 3

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

Neuroaesthetics

An emerging discipline called neuroaesthetics is seeking to bring scientific objectivity to the study of art, and has already given us a better understanding of many masterpieces. The blurred imagery of Impressionist paintings seems to stimulate the brain's amygdala, for instance. Since the amygdala plays a crucial role in our feelings, that finding might explain why many people find these pieces so moving.

Could the same approach also shed light on abstract twentieth-century pieces, from Mondrian's geometrical blocks of colour, to Pollock's seemingly haphazard arrangements of splashed paint on canvas? Sceptics believe that people claim to like such works simply because they are famous. We certainly do have an inclination to follow the crowd. When asked to make simple perceptual decisions such as matching a shape to its rotated image, for example, people often choose a definitively wrong answer if they see others doing the same. It is easy to imagine that this mentality would have even more impact on a fuzzy concept like art appreciation, where there is no right or wrong answer.

Angelina Hawley-Dolan, of Boston College, Massachusetts, responded to this debate by asking volunteers to view pairs of paintings – either the creations of famous abstract artists or the doodles of infants, chimps and elephants. They then had to judge which they preferred. A third of the paintings were given no captions, while many were labelled incorrectly – volunteers might think they were viewing a chimp's messy brushstrokes when they were actually seeing an acclaimed masterpiece. In each set of trials, volunteers generally preferred the work of renowned artists, even when they believed it was by an animal or a child. It seems that the viewer can sense the artist's vision in paintings, even if they can't explain why.

Robert Pepperell, an artist based at Cardiff University, creates ambiguous works that are neither entirely abstract nor clearly representational. In one study, Pepperell and his collaborators asked volunteers to decide how 'powerful' they considered an artwork to be, and whether they saw anything familiar in the piece. The longer they took to answer these questions, the more highly they rated the piece under scrutiny, and the greater their neural activity. It would seem that the brain sees these images as puzzles, and the harder it is to decipher the meaning, the more rewarding is the moment of recognition.



And what about artists such as Mondrian, whose paintings consist exclusively of horizontal and vertical lines encasing blocks of colour? Mondrian's works are deceptively simple, but eye-tracking studies confirm that they are meticulously composed, and that simply rotating a piece radically changes the way we view it. With the originals, volunteers' eyes tended to stay longer on certain places in the image, but with the altered versions they would flit across a piece more rapidly. As a result, the volunteers considered the altered versions less pleasurable when they later rated the work.

In a similar study, Oshin Vartanian of Toronto University asked volunteers to compare original paintings with ones which he had altered by moving objects around within the frame. He found that almost everyone preferred the original, whether it was a Van Gogh still life or an abstract by Miró. Vartanian also found that changing the composition of the paintings reduced activation in those brain areas linked with meaning and interpretation.

In another experiment, Alex Forsythe of the University of Liverpool analysed the visual intricacy of different pieces of art, and her results suggest that many artists use a key level of detail to please the brain. Too little and the work is boring, but too much results in a kind of 'perceptual overload', according to Forsythe. What's more, appealing pieces both abstract and representational, show signs of 'fractals' – repeated motifs recurring in different scales. Fractals are common throughout nature, for example in the shapes of mountain peaks or the branches of trees. It is possible that our visual system, which evolved in the great outdoors, finds it easier to process such patterns.

It is also intriguing that the brain appears to process movement when we see a handwritten letter, as if we are replaying the writer's moment of creation. This has led some to wonder whether Pollock's works feel so dynamic because the brain reconstructs the energetic actions the artist used as he painted. This may be down to our brain's 'mirror neurons', which are known to mimic others' actions. The hypothesis will need to be thoroughly tested, however. It might even be the case that we could use neuroaesthetic studies to understand the longevity of some pieces of artwork. While the fashions of the time might shape what is currently popular, works that are best adapted to our visual system may be the most likely to linger once the trends of previous generations have been forgotten.

It's still early days for the field of neuroaesthetics – and these studies are probably only a taste of what is to come. It would, however, be foolish to reduce art appreciation to a set of scientific laws. We shouldn't underestimate the importance of the style of a particular artist, their place in history and the artistic environment of their time. Abstract art offers both a challenge and the freedom to play with different interpretations. In some ways, it's not so different to science, where we are constantly looking for systems and decoding meaning so that we can view and appreciate the world in a new way.

Questions 27–30

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

Write the correct letter in boxes 27–30 on your answer sheet.

- 27 In the second paragraph, the writer refers to a shape-matching test in order to illustrate
- A the subjective nature of art appreciation.
 - B the reliance of modern art on abstract forms.
 - C our tendency to be influenced by the opinions of others.
 - D a common problem encountered when processing visual data.
- 28 Angelina Hawley-Dolan's findings indicate that people
- A mostly favour works of art which they know well.
 - B hold fixed ideas about what makes a good work of art.
 - C are often misled by their initial expectations of a work of art.
 - D have the ability to perceive the intention behind works of art.
- 29 Results of studies involving Robert Pepperell's pieces suggest that people
- A can appreciate a painting without fully understanding it.
 - B find it satisfying to work out what a painting represents.
 - C vary widely in the time they spend looking at paintings.
 - D generally prefer representational art to abstract art.
- 30 What do the experiments described in the fifth paragraph suggest about the paintings of Mondrian?
- A They are more carefully put together than they appear.
 - B They can be interpreted in a number of different ways.
 - C They challenge our assumptions about shape and colour.
 - D They are easier to appreciate than many other abstract works.

Questions 31–33

Complete the summary using the list of words, **A–H**, below.

Write the correct letters, **A–H**, in boxes 31–33 on your answer sheet.

Art and the Brain

The discipline of neuroaesthetics aims to bring scientific objectivity to the study of art. Neurological studies of the brain, for example, demonstrate the impact which Impressionist paintings have on our **31** Alex Forsythe of the University of Liverpool believes many artists give their works the precise degree of **32** which most appeals to the viewer's brain. She also observes that pleasing works of art often contain certain repeated **33** which occur frequently in the natural world.

A interpretation

B complexity

C emotions

D movements

E skill

F layout

G concern

H images

Questions 34–39

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

In boxes 34–39 on your answer sheet, write

- YES** if the statement agrees with the views of the writer
NO if the statement contradicts the views of the writer
NOT GIVEN if there is no information on this

- 34 Forsythe's findings contradicted previous beliefs on the function of 'fractals' in art.
- 35 Certain ideas regarding the link between 'mirror neurons' and art appreciation require further verification.
- 36 People's taste in paintings depends entirely on the current artistic trends of the period.
- 37 Scientists should seek to define the precise rules which govern people's reactions to works of art.
- 38 Art appreciation should always involve taking into consideration the cultural context in which an artist worked.
- 39 It is easier to find meaning in the field of science than in that of art.

Question 40

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

Write the correct letter in box 40 on your answer sheet.

- 40 What would be the most appropriate subtitle for the article?
- A** Some scientific insights into how the brain responds to abstract art
B Recent studies focusing on the neural activity of abstract artists
C A comparison of the neurological bases of abstract and representational art
D How brain research has altered public opinion about abstract art

WRITING

WRITING TASK 1

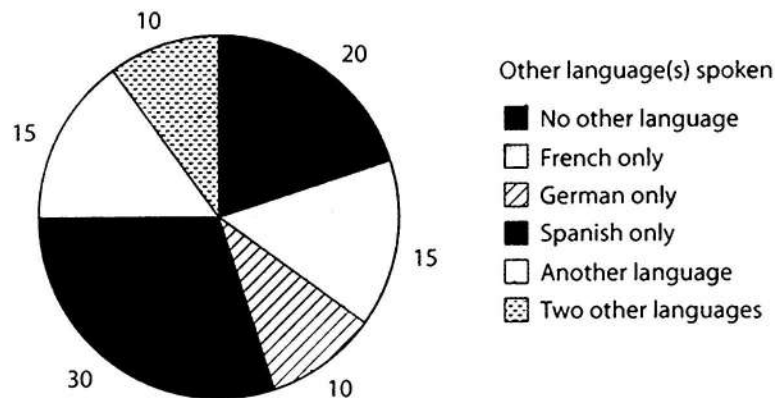
You should spend about 20 minutes on this task.

The charts below show the proportions of British students at one university in England who were able to speak other languages in addition to English, in 2000 and 2010.

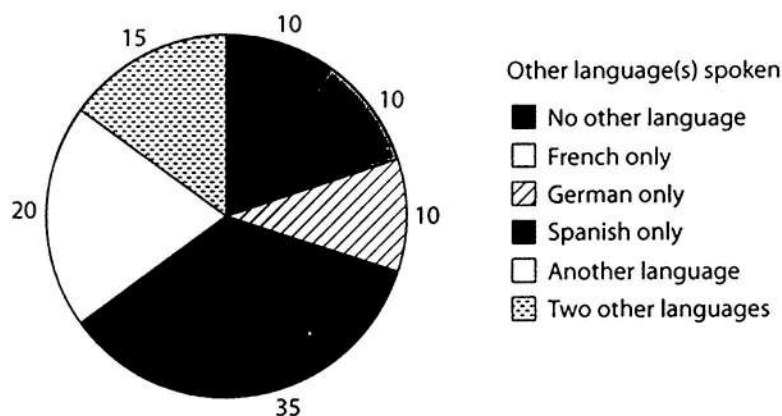
Summarise the information by selecting and reporting the main features, and make comparisons where relevant.

Write at least 150 words.

% of British Students able to speak languages other than English, 2000



% of British Students able to speak languages other than English, 2010



WRITING TASK 2

You should spend about 40 minutes on this task.

Write about the following topic:

Some people claim that not enough of the waste from homes is recycled. They say that the only way to increase recycling is for governments to make it a legal requirement.

To what extent do you think laws are needed to make people recycle more of their waste?

Give reasons for your answer and include any relevant examples from your own knowledge or experience.

Write at least 250 words.

SPEAKING**PART 1**

The examiner asks the candidate about him/herself, his/her home, work or studies and other familiar topics.

EXAMPLE**Friends**

- How often do you go out with friends? [Why/Why not?]
- Tell me about your best friend at school.
- How friendly are you with your neighbours? [Why/Why not?]
- Which is more important to you, friends or family? [Why?]

PART 2

Describe a writer you would like to meet.

You should say:

who the writer is

what you know about this writer already

what you would like to find out about him/her

and explain why you would like to meet this writer.

You will have to talk about the topic for one to two minutes. You have one minute to think about what you are going to say. You can make some notes to help you if you wish.

PART 3**Discussion topics:****Reading and children**

Example questions:

What kinds of book are most popular with children in your country? Why do you think that is?

Why do you think some children do not read books very often?

How do you think children can be encouraged to read more?

Reading for different purposes

Example questions:

Are there any occasions when reading at speed is a useful skill to have? What are they?

Are there any jobs where people need to read a lot? What are they?

Do you think that reading novels is more interesting than reading factual books?

Why is that?