Name: ....

Class: .....

Date: .....

FINAL TEST

READING

READING PASSAGE 1

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

Could urban engineers learn from dance?

A The way we travel around cities has a major impact on whether they are sustainable. Transportation is estimated to account for 30% of energy consumption in most of the world's most developed nations, so lowering the need for energy-using vehicles is essential for decreasing the environmental impact of mobility. But as more and more people move to cities, it is important to think about other kinds of sustainable travel too. The ways we travel affect our physical and mental health, our social lives, our access to work and culture, and the air we breathe. Engineers are tasked with changing how we travel round cities through urban design, but the engineering industry still works on the assumptions that led to the creation of the energy-consuming transport systems we have now: the emphasis placed solely on efficiency, speed, and quantitative data. We need radical changes, to make it healthier, more enjoyable, and less environmentally damaging to travel around cities.

B Dance might hold some of the answers. That is not to suggest everyone should dance their way to work, however healthy and happy it might make us, but rather that the techniques used by choreographers to experiment with and design movement in dance could provide engineers with tools to stimulate new ideas in city-making. Richard Sennett, an influential urbanist and sociologist who has transformed ideas about the way cities are made, argues that urban design has suffered from a separation between mind and body since the introduction of the architectural blueprint.

C Whereas medieval builders improvised and adapted construction through their intimate knowledge of materials and personal experience of the conditions on a site, building

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designs are now conceived and stored in media technologies that detach the designer from the physical and social realities they are creating. While the design practices created by these new technologies are essential for managing the technical complexity of the modern city, they have the drawback of simplifying reality in the process.

D To illustrate, Sennett discusses the Peachtree Center in Atlanta, USA, a development typical of the modernist approach to urban planning prevalent in the 1970s. Peachtree created a grid of streets and towers intended as a new pedestrian-friendly downtown for Atlanta. According to Sennett, this failed because its designers had invested too much faith in computer-aided design to tell them how it would operate. They failed to take into account that purpose-built street cafés could not operate in the hot sun without the protective awnings common in older buildings, and would need energy-consuming air conditioning instead, or that its giant car park would feel so unwelcoming that it would put people off getting out of their cars. What seems entirely predictable and controllable on screen has unexpected results when translated into reality.

E The same is true in transport engineering, which uses models to predict and shape the way people move through the city. Again, these models are necessary, but they are built on specific world views in which certain forms of efficiency and safety are considered and other experiences of the city ignored. Designs that seem logical in models appear counter-intuitive in the actual experience of their users. The guard rails that will be familiar to anyone who has attempted to cross a British road, for example, were an engineering solution to pedestrian safety based on models that prioritise the smooth flow of traffic. On wide major roads, they often guide pedestrians to specific crossing points and slow down their progress across the road by using staggered access points that divide the crossing into two – one for each carriageway. In doing so they make crossings feel longer, introducing psychological barriers greatly impacting those that are the least mobile, and encouraging others to make dangerous crossings to get around the guard rails. These barriers don't just make it harder to cross the road: they divide communities and decrease opportunities for healthy transport. As a result, many are now being removed, causing disruption, cost, and waste.

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F If their designers had had the tools to think with their bodies – like dancers – and imagine how these barriers would feel, there might have been a better solution. In order to bring about fundamental changes to the ways we use our cities, engineering will need to develop a richer understanding of why people move in certain ways, and how this movement affects them. Choreography may not seem an obvious choice for tackling this problem. Yet it shares with engineering the aim of designing patterns of movement within limitations of space. It is an art form developed almost entirely by trying out ideas with the body, and gaining instant feedback on how the results feel. Choreographers have deep understanding of the psychological, aesthetic, and physical implications of different ways of moving.

G Observing the choreographer Wayne McGregor, cognitive scientist David Kirsh described how he 'thinks with the body', Kirsh argues that by using the body to simulate outcomes, McGregor is able to imagine solutions that would not be possible using purely abstract thought. This kind of physical knowledge is valued in many areas of expertise, but currently has no place in formal engineering design processes. A suggested method for transport engineers is to improvise design solutions and instant feedback about how they would work from their own experience of them, or model designs at full scale in the way choreographers experiment with groups of dancers. Above all, perhaps, they might learn to design for emotional as well as functional effects

Questions 1 - 6

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

Which paragraph contains the following information?

Write the correct letter ***A-G*** *in boxes 1-6 on your answer sheet.*

1 reference to an appealing way of using dance that the writer is not proposing

2 an example of a contrast between past and present approaches to building

3 mention of an objective of both dance and engineering

4 reference to an unforeseen problem arising from ignoring the climate

5 why some measures intended to help people are being reversed

6 reference to how transport has an impact on human lives

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Questions 7 - 13

Complete the summary below.

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

*Write your answers in boxes **7-13** on your answer sheet.*

Guard rails

Guard rails were introduced on British roads to improve the **7**..... of pedestrians, while ensuring that the movement of **8**..... is not disrupted. Pedestrians are led to access points, and encouraged to cross one **9**..... at a time.

An unintended effect is to create psychological difficulties in crossing the road, particularly for less **10**..... people. Another result is that some people cross the road in a **11**..... way. The guard rails separate **12**....., and make it more difficult to introduce forms of transport that are **13**.....

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READING PASSAGE 2

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

Driverless cars

A The automotive sector is well used to adapting to automation in manufacturing. The implementation of robotic car manufacture from the 1970s onwards led to significant cost savings and improvements in the reliability and flexibility of vehicle mass production. A new challenge to vehicle production is now on the horizon and, again, it comes from automation. However, this time it is not to do with the manufacturing process, but with the vehicles themselves.

Research projects on vehicle automation are not new. Vehicles with limited self-driving capabilities have been around for more than 50 years, resulting in significant contributions towards driver assistance systems. But since Google announced in 2010 that it had been trialling self-driving cars on the streets of California, progress in this field has quickly gathered pace.

B There are many reasons why technology is advancing so fast. One frequently cited motive is safety; indeed, research at the UK's Transport Research Laboratory has demonstrated that more than 90 percent of road collisions involve human error as a contributory factor, and it is the primary cause in the vast majority. Automation may help to reduce the incidence of this.

Another aim is to free the time people spend driving for other purposes. If the vehicle can do some or all of the driving, it may be possible to be productive, to socialise or simply to relax while automation systems have responsibility for safe control of the vehicle. If the vehicle can do the driving, those who are challenged by existing mobility models – such as older or disabled travellers – may be able to enjoy significantly greater travel autonomy.

C Beyond these direct benefits, we can consider the wider implications for transport and society, and how manufacturing processes might need to respond as a result. At present, the average car spends more than 90 percent of its life parked. Automation means that initiatives for car-sharing become much more viable, particularly in urban

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areas with significant travel demand. If a significant proportion of the population choose to use shared automated vehicles, mobility demand can be met by far fewer vehicles.

D The Massachusetts Institute of Technology investigated automated mobility in Singapore, finding that fewer than 30 percent of the vehicles currently used would be required if fully automated car sharing could be implemented. If this is the case, it might mean that we need to manufacture far fewer vehicles to meet demand. However, the number of trips being taken would probably increase, partly because empty vehicles would have to be moved from one customer to the next.

Modelling work by the University of Michigan Transportation Research Institute suggests automated vehicles might reduce vehicle ownership by 43 percent, but that vehicles' average annual mileage double as a result. As a consequence, each vehicle would be used more intensively, and might need replacing sooner. This faster rate of turnover may mean that vehicle production will not necessarily decrease.

E Automation may prompt other changes in vehicle manufacture. If we move to a model where consumers are tending not to own a single vehicle but to purchase access to a range of vehicle through a mobility provider, drivers will have the freedom to select one that best suits their needs for a particular journey, rather than making a compromise across all their requirements.

Since, for most of the time, most of the seats in most cars are unoccupied, this may boost production of a smaller, more efficient range of vehicles that suit the needs of individuals. Specialised vehicles may then be available for exceptional journeys, such as going on a family camping trip or helping a son or daughter move to university.

F There are a number of hurdles to overcome in delivering automated vehicles to our roads. These include the technical difficulties in ensuring that the vehicle works reliably in the infinite range of traffic, weather and road situations it might encounter; the regulatory challenges in understanding how liability and enforcement might change when drivers are no longer essential for vehicle operation; and the societal changes that may be required for communities to trust and accept automated vehicles as being a valuable part of the mobility landscape.

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G It's clear that there are many challenges that need to be addressed but, through robust and targeted research, these can most probably be conquered within the next 10 years. Mobility will change in such potentially significant ways and in association with so many other technological developments, such as telepresence and virtual reality, that it is hard to make concrete predictions about the future. However, one thing is certain: change is coming, and the need to be flexible in response to this will be vital for those involved in manufacturing the vehicles that will deliver future mobility.

Questions 14-18

*Reading Passage 2 has seven paragraphs **A-G**.*

Which section contains the following information?

*Write the correct letter **A-G** in boxes **14-18** on your answer sheet.*

14 reference to the amount of time when a car is not in use

15 mention of several advantages of driverless vehicles for individual road-users

16 reference to the opportunity of choosing the most appropriate vehicle for each trip

17 an estimate of how long it will take to overcome a number of problems

18 a suggestion that the use of driverless cars may have no effect on the number of vehicles manufactured

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Questions 19-22

Complete the summary below.

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

*Write your answers in boxes **19-22** on your answer sheet.*

The impact of driverless cars figures from the Transport Research Laboratory indicate that most motor accidents are partly due to **19**....., so the introduction of driverless vehicles will result in greater safety. In addition to the direct benefits of automation, it may bring other advantages. For example, schemes for **20**..... will be more workable, especially in towns and cities, resulting in fewer cars on the road. According to the University of Michigan Transportation Research Institute, there could be a 43 percent drop in **21**..... of cars. However, this would mean that the yearly **22**..... of each car would, on average, be twice as high as it currently is. this would lead to a higher turnover of vehicles, and therefore no reduction in automotive manufacturing

Questions 23-24

*Choose **TWO** letters, **A-E**.*

*Write the correct letters in boxes **23** and **24** on your answer sheet.*

*Which **TWO** benefits of automated vehicles does the writer mention?*

A Car travellers could enjoy considerable cost savings.

B It would be easier to find parking spaces in urban areas.

C Travellers could spend journeys doing something other than driving.

D People who find driving physically difficult could travel independently.

E A reduction in the number of cars would mean a reduction in pollution.

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Questions 25 and 26

*Choose **TWO** letters, **A-E**.*

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

*Which **TWO** challenges to automated vehicle development does the writer mention?*

A making sure the general public has confidence in automated vehicles

B managing the pace of transition from conventional to automated vehicles

C deciding how to compensate professional drivers who become redundant

D setting up the infrastructure to make roads suitable for automated vehicles

E getting automated vehicles to adapt to various different driving conditions

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READING PASSAGE 3

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

What is exploration?

We are all explorers. Our desire to discover, and then share that new-found knowledge, is part of what makes us human – indeed, this has played an important part in our success as a species. Long before the first caveman slumped down beside the fire and grunted news that there were plenty of wildebeest over yonder, our ancestors had learnt the value of sending out scouts to investigate the unknown. This questing nature of ours undoubtedly helped our species spread around the globe, just as it nowadays no doubt helps the last nomadic Penan maintain their existence in the depleted forests of Borneo, and a visitor negotiate the subways of New York.

Over the years, we've come to think of explorers as a peculiar breed – different from the rest of us, different from those of us who are merely 'well travelled', even; and perhaps there is a type of person more suited to seeking out the new, a type of caveman more inclined to risk venturing out. That, however, doesn't take away from the fact that we all have this enquiring instinct, even today; and that in all sorts of professions – whether artist, marine biologist or astronomer – borders of the unknown are being tested each day.

Thomas Hardy set some of his novels in Egdon Heath, a fictional area of uncultivated land, and used the landscape to suggest the desires and fears of his characters. He is delving into matters we all recognise because they are common to humanity. This is surely an act of exploration, and into a world as remote as the author chooses. Explorer and travel writer Peter Fleming talks of the moment when the explorer returns to the existence he has left behind with his loved ones. The traveller 'who has for weeks or months seen himself only as a puny and irrelevant alien crawling laboriously over a country in which he has no roots and no background, suddenly encounters his other self, a relatively solid figure, with a place in the minds of certain people'.

In this book about the exploration of the earth's surface, I have confined myself to those whose travels were real and who also aimed at more than personal discovery. But that still left me with

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another problem: the word 'explorer' has become associated with a past era. We think back to a golden age, as if exploration peaked somehow in the 19th century – as if the process of discovery is now on the decline, though the truth is that we have named only one and a half million of this planet's species, and there may be more than 10 million – and that's not including bacteria. We have studied only 5 per cent of the species we know. We have scarcely mapped the ocean floors, and know even less about ourselves; we fully understand the workings of only 10 per cent of our brains.

Here is how some of today's 'explorers' define the word. Ran Fiennes, dubbed the 'greatest living explorer', said, 'An explorer is someone who has done something that no human has done before – and also done something scientifically useful.' Chris Bonington, a leading mountaineer, felt exploration was to be found in the act of physically touching the unknown: 'You have to have gone somewhere new.' Then Robin Hanbury-Tenison, a campaigner on behalf of remote so-called 'tribal' peoples, said, 'A traveller simply records information about some far-off world, and reports back; but an explorer changes the world.' Wilfred Thesiger, who crossed Arabia's Empty Quarter in 1946, and belongs to an era of unmechanised travel now lost to the rest of us, told me, 'If I'd gone across by camel when I could have gone by car, it would have been a stunt.' To him, exploration meant bringing back information from a remote place regardless of any great self-discovery.

Each definition is slightly different – and tends to reflect the field of endeavour of each pioneer. It was the same whoever I asked: the prominent historian would say exploration was a thing of the past, the cutting-edge scientist would say it was of the present. And so on. They each set their own particular criteria; the common factor in their approach being that they all had, unlike many of us who simply enjoy travel or discovering new things, both a very definite objective from the outset and also a desire to record their findings.

I'd best declare my own bias. As a writer, I'm interested in the exploration of ideas. I've done a great many expeditions and each one was unique. I've lived for months alone with isolated groups of people all around the world, even two 'uncontacted tribes'. But none of these things is

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of the slightest interest to anyone unless, through my books, I've found a new slant, explored a new idea. Why? Because the world has moved on. The time has long passed for the great continental voyages – another walk to the poles, another crossing of the Empty Quarter. We know how the land surface of our planet lies; exploration of it is now down to the details – the habits of microbes, say, or the grazing behaviour of buffalo. Aside from the deep sea and deep underground, it's the era of specialists. However, this is to disregard the role the human mind has in conveying remote places; and this is what interests me: how a fresh interpretation, even of a well-travelled route, can give its readers new insights.

Questions 27-32

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

Write the correct letter in boxes ***27-32*** *on your answer sheet.*

27 The writer refers to visitors to New York to illustrate the point that

A exploration is an intrinsic element of being human.

B most people are enthusiastic about exploring.

C exploration can lead to surprising results.

D most people find exploration daunting.

28 According to the second paragraph, what is the writer's view of explorers?

A Their discoveries have brought both benefits and disadvantages.

B Their main value is in teaching others.

C They act on an urge that is common to everyone.

D They tend to be more attracted to certain professions than to others.

29 The writer refers to a description of Egdon Heath to suggest that

A Hardy was writing about his own experience of exploration.

B Hardy was mistaken about the nature of exploration.

C Hardy's aim was to investigate people's emotional states.

D Hardy's aim was to show the attraction of isolation.

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30 In the fourth paragraph, the writer refers to 'a golden age' to suggest that

A the amount of useful information produced by exploration has decreased.

B fewer people are interested in exploring than in the 19th century.

C recent developments have made exploration less exciting.

D we are wrong to think that exploration is no longer necessary.

31 In the sixth paragraph, when discussing the definition of exploration, the writer argues that

A people tend to relate exploration to their own professional interests.

B certain people are likely to misunderstand the nature of exploration.

C the generally accepted definition has changed over time.

D historians and scientists have more valid definitions than the general public.

32 In the last paragraph, the writer explains that he is interested in

A how someone's personality is reflected in their choice of places to visit.

B the human ability to cast new light on places that may be familiar.

C how travel writing has evolved to meet changing demands.

D the feelings that writers develop about the places that they explore.

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Questions 33-37

Look at the following statements (Questions 33-37) and the list of explorers below.

Match each statement with the correct explorer, ***A-E****.*

Write the correct letter, ***A-E****, in boxes* ***33-37*** *on your answer sheet.*

NB *You may use any letter more than once.*

33 He referred to the relevance of the form of transport used.

34 He described feelings on coming back home after a long journey.

35 He worked for the benefit of specific groups of people.

36 He did not consider learning about oneself an essential part of exploration.

37 He defined exploration as being both unique and of value to others.

List of Explorers
A Peter Fleming
B Ran Fiennes
C Chris Bonington
D Robin Hanbury-Tenison
E Wilfred Thesiger

Questions 38-40

Complete the summary below.

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

Write your answer in boxes ***38-40*** *on your answer sheet.*

The writer's own bias
The writer has experience of a large number of **38**....., and was the first stranger that certain previously **39**..... people had encountered. He believes there is no need for further exploration of Earth's **40**....., except to answer specific questions such as how buffalo eat.

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