



*IELTS READING TEST*

# Essential Information



READING TEST

# Essential Information

**60 minutes**

**40 questions**



READING TEST

# Academic Reading Test

**3 texts**

**Books, journals, magazines,  
newspapers**

# William Henry Perkin

## *The man who invented synthetic dyes*

William Henry Perkin was born on March 12, 1838, in London, England. As a boy, Perkin's curiosity prompted early interests in the arts, sciences, photography, and engineering. But it was a chance stumbling upon a run-down, yet functional, laboratory in his late grandfather's home that solidified the young man's enthusiasm for chemistry.

As a student at the City of London School, Perkin became immersed in the study of chemistry. His talent and devotion to the subject were perceived by his teacher, Thomas Hall, who encouraged him to attend a series of lectures given by the eminent scientist Michael Faraday at the Royal Institution. Those speeches fired the young chemist's enthusiasm further, and he later went on to attend the Royal College of Chemistry, which he succeeded in entering in 1853, at the age of 15.

At the time of Perkin's enrolment, the Royal College of Chemistry was headed by the noted German chemist August Wilhelm Hofmann. Perkin's scientific gifts soon caught Hofmann's attention and, within two years, he became Hofmann's youngest assistant. Not long after that, Perkin made the scientific breakthrough that would bring him both fame and fortune.

At the time, quinine was the only viable medical treatment for malaria. The drug is derived from the bark of the cinchona tree, native to South America, and by 1856 demand for the drug was surpassing the available supply. Thus, when Hofmann made some passing comments about the desirability of a synthetic substitute for quinine, it was unsurprising that his star pupil was moved to take up the challenge.

During his vacation in 1856, Perkin spent his time in the laboratory on the top floor of his family's house. He was attempting to manufacture quinine from aniline, an inexpensive and readily available coal tar waste product. Despite his best efforts, however, he did not end up with quinine. Instead, he produced a mysterious dark sludge. Luckily, Perkin's scientific training and nature prompted him to investigate the substance further. Incorporating potassium dichromate and alcohol into the aniline at various stages of the experimental process, he finally produced a deep purple solution. And, proving the truth of the famous scientist Louis Pasteur's words 'chance favours only the prepared mind', Perkin saw the potential of his unexpected find.

Historically, textile dyes were made from such natural sources as plants and animal excretions. Some of these, such as the glandular mucus of snails, were difficult to obtain and outrageously expensive. Indeed, the purple colour extracted from a snail was once so costly that in society at the time only the rich could afford it. Further, natural dyes tended to be muddy in hue and fade quickly. It was against this backdrop that Perkin's discovery was made.

Perkin quickly grasped that his purple solution could be used to colour fabric, thus making it the world's first synthetic dye. Realising the importance of this breakthrough, he lost no time in patenting it. But perhaps the most fascinating of all Perkin's reactions to his find was his nearly instant recognition that the new dye had commercial possibilities.

Perkin originally named his dye Tyrian Purple, but it later became commonly known as mauve (from the French for the plant used to make the colour violet). He asked advice of Scottish dye works owner Robert Pullar, who assured him that manufacturing the dye would be well worth it if the colour remained fast (i.e. would not fade) and the cost was relatively low. So, over the fierce objections of his mentor Hofmann, he left college to give birth to the modern chemical industry.

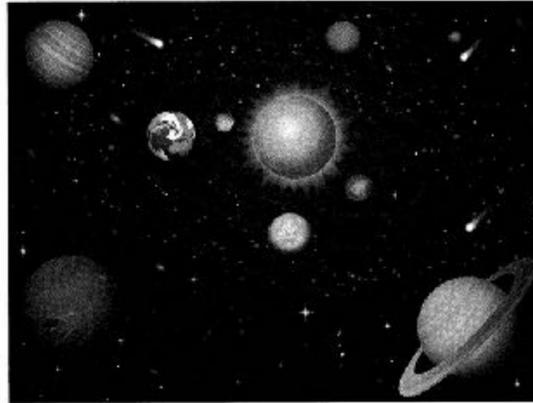
With the help of his father and brother, Perkin set up a factory not far from London. Utilising the cheap and plentiful coal tar that was an almost unlimited byproduct of London's gas street lighting, the dye works began producing the world's first synthetically dyed material in 1857. The company received a commercial boost from the Empress Eugénie of France, when she decided the new colour flattered her. Very soon, mauve was the necessary shade for all the fashionable ladies in that country. Not to be outdone, England's Queen Victoria also appeared in public wearing a mauve gown, thus making it all the rage in England as well. The dye was bold and fast, and the public clamoured for more. Perkin went back to the drawing board.

Although Perkin's fame was achieved and fortune assured by his first discovery, the chemist continued his research. Among other dyes he developed and introduced were aniline red (1859) and aniline black (1863) and, in the late 1860s, Perkin's green. It is important to note that Perkin's synthetic dye discoveries had outcomes far beyond the merely decorative. The dyes also became vital to medical research in many ways. For instance, they were used to stain previously invisible microbes and bacteria, allowing researchers to identify such bacilli as tuberculosis, cholera, and anthrax. Artificial dyes continue to play a crucial role today. And, in what would have been particularly pleasing to Perkin, their current use is in the search for a vaccine against malaria.

# IS THERE ANYBODY OUT THERE?

## The Search for Extra-terrestrial Intelligence

*The question of whether we are alone in the Universe has haunted humanity for centuries, but we may now stand poised on the brink of the answer to that question, as we search for radio signals from other intelligent civilisations. This search, often known by the acronym SETI (search for extra-terrestrial intelligence), is a difficult one. Although groups around the world have been searching intermittently for three decades, it is only now that we have reached the level of technology where we can make a determined attempt to search all nearby stars for any sign of life.*



**A**  
The primary reason for the search is basic curiosity – the same curiosity about the natural world that drives all pure science. We want to know whether we are alone in the Universe. We want to know whether life evolves naturally if given the right conditions, or whether there is something very special about the Earth to have fostered the variety of life forms that we see around us on the planet. The simple detection of a radio signal will be sufficient to answer this most basic of all questions. In this sense, SETI is another cog in the machinery of pure science which is continually pushing out the horizon of our knowledge. However, there are other reasons for being interested in whether life exists elsewhere. For example, we have had civilisation on Earth for perhaps only a few thousand years, and the threats of nuclear war and pollution over the last few decades have told us that our survival may be tenuous. Will we last another two thousand years or will we wipe ourselves out? Since the lifetime of a planet like ours is several billion years, we can expect that, if other civilisations do survive in our galaxy, their ages will range from zero to several billion years. Thus any other civilisation that we hear from is likely to be far older, on average, than ourselves. The mere existence of such a civilisation will tell us that long-term survival is possible, and gives us some cause for optimism. It is even possible that the older civilisation may pass on the benefits of their experience in dealing with threats to survival such as nuclear war and global pollution, and other threats that we haven't yet discovered.

**B**  
In discussing whether we are alone, most SETI scientists adopt two ground rules. First, UFOs (Unidentified Flying Objects) are generally ignored since most scientists don't consider the evidence for them to be strong enough to bear serious consideration (although it is also important to keep an open mind in case any really convincing evidence emerges in the future). Second, we make a very conservative assumption that we are looking for a life form that is pretty well like us, since if it differs radically from us we may well not recognise it as a life form, quite apart from whether we are able to communicate

with it. In other words, the life form we are looking for may well have two green heads and seven fingers, but it will nevertheless resemble us in that it should communicate with its fellows, be interested in the Universe, live on a planet orbiting a star like our Sun, and perhaps most restrictively, have a chemistry, like us, based on carbon and water.

**C**  
Even when we make these assumptions, our understanding of other life forms is still severely limited. We do not even know, for example, how many stars have planets, and we certainly do not know how likely it is that life will arise naturally, given the right conditions. However, when we look at the 100 billion stars in our galaxy (the Milky Way), and 100 billion galaxies in the observable Universe, it seems inconceivable that at least one of these planets does not have a life form on it; in fact, the best educated guess we can make, using the little that we do know about the conditions for carbon-based life, leads us to estimate that perhaps one in 100,000 stars might have a life-bearing planet orbiting it. That means that our nearest neighbours are perhaps 100 light years away, which is almost next door in astronomical terms.

**D**  
An alien civilisation could choose many different ways of sending information across the galaxy, but many of these either require too much energy, or else are severely attenuated while traversing the vast distances across the galaxy. It turns out that, for a given amount of transmitted power, radio waves in the frequency range 1000 to 3000 MHz travel the greatest distance, and so all searches to date have concentrated on looking for radio waves in this frequency range. So far there have been a number of searches by various groups around the world, including Australian searches using the radio telescope at Parkes, New South Wales. Until now there have not been any detections from the few hundred stars which have been searched. The scale of the searches has been increased dramatically since 1992, when the US Congress voted NASA \$10 million per year for ten years to conduct a thorough search for extra-terrestrial life. Much of the money in this project is being spent on developing the special hardware needed to search many frequencies at once. The project has two parts. One part is a targeted search using the world's largest radio telescopes, the American-operated telescope in Arecibo, Puerto Rico and the French telescope in Nancy in France. This part of the project is searching the nearest 1000 likely stars with high sensitivity for signals in the frequency range 1000 to 3000 MHz. The other part of the project is an undirected search which is monitoring all of space with a lower sensitivity, using the smaller antennas of NASA's Deep Space Network.

**E**  
There is considerable debate over how we should react if we detect a signal from an alien civilisation. Everybody agrees that we should not reply immediately. Quite apart from the impracticality of sending a reply over such large distances at short notice, it raises a host of ethical questions that would have to be addressed by the global community before any reply could be sent. Would the human race face the culture shock if faced with a superior and much older civilisation? Luckily, there is no urgency about this. The stars being searched are hundreds of light years away, so it takes hundreds of years for their signal to reach us, and a further few hundred years for our reply to reach them. It's not important, then, if there's a delay of a few years, or decades, while the human race debates the question of whether to reply, and perhaps carefully drafts a reply.

# The history of the tortoise

If you go back far enough, everything lived in the sea. At various points in evolutionary history, enterprising individuals within many different animal groups moved out onto the land, sometimes even to the most parched deserts, taking their own private seawater with them in blood and cellular fluids. In addition to the reptiles, birds, mammals and insects which we see all around us, other groups that have succeeded out of water include scorpions, snails, crustaceans such as woodlice and land crabs, millipedes and centipedes, spiders and various worms. And we mustn't forget the plants, without whose prior invasion of the land none of the other migrations could have happened.

Moving from water to land involved a major redesign of every aspect of life, including breathing and reproduction. Nevertheless, a good number of thoroughgoing land animals later turned around, abandoned their hard-earned terrestrial re-tooling, and returned to the water again. Seals have only gone part way back. They show us what the intermediates might have been like, on the way to extreme cases such as whales and dugongs. Whales (including the small whales we call dolphins) and dugongs, with their close cousins the manatees, ceased to be land creatures altogether and reverted to the full marine habits of

their remote ancestors. They don't even come ashore to breed. They do, however, still breathe air, having never developed anything equivalent to the gills of their earlier marine incarnation. Turtles went back to the sea a very long time ago and, like all vertebrate returnees to the water, they breathe air. However, they are, in one respect, less fully given back to the water than whales or dugongs, for turtles still lay their eggs on beaches.

There is evidence that all modern turtles are descended from a terrestrial ancestor which lived before most of the dinosaurs. There are two key fossils called *Proganochelys quenstedti* and *Palaeochersis talampayensis* dating from early dinosaur times, which appear to be close to the ancestry of all modern turtles and tortoises. You might wonder how we can tell whether fossil animals lived on land or in water, especially if only fragments are found. Sometimes it's obvious. Ichthyosaurs were reptilian contemporaries of the dinosaurs, with fins and streamlined bodies. The fossils look like dolphins and they surely lived like dolphins, in the water. With turtles it is a little less obvious. One way to tell is by measuring the bones of their forelimbs.

Walter Joyce and Jacques Gauthier, at Yale University, obtained three measurements in these particular bones

of 71 species of living turtles and tortoises. They used a kind of triangular graph paper to plot the three measurements against one another. All the land tortoise species formed a tight cluster of points in the upper part of the triangle; all the water turtles cluster in the lower part of the triangular graph. There was no overlap, except when they added some species that spend time both in water and on land. Sure enough, these amphibious species show up on the triangular graph approximately half way between the 'wet cluster' of sea turtles and the 'dry cluster' of land tortoises. The next step was to determine where the fossils fell. The bones of *P. quenstedti* and *P. talampayensis* leave us in no doubt. Their points on the graph are right in the thick of the dry cluster. Both these fossils were dry-land tortoises. They come from the era before our turtles returned to the water.

You might think, therefore, that modern land tortoises have probably stayed on land ever since those early terrestrial times, as most mammals did after a few of them went back to the sea. But apparently

not. If you draw out the family tree of all modern turtles and tortoises, nearly all the branches are aquatic. Today's land tortoises constitute a single branch, deeply nested among branches consisting of aquatic turtles. This suggests that modern land tortoises have not stayed on land continuously since the time of *P. quenstedti* and *P. talampayensis*. Rather, their ancestors were among those who went back to the water, and they then re-emerged back onto the land in (relatively) more recent times.

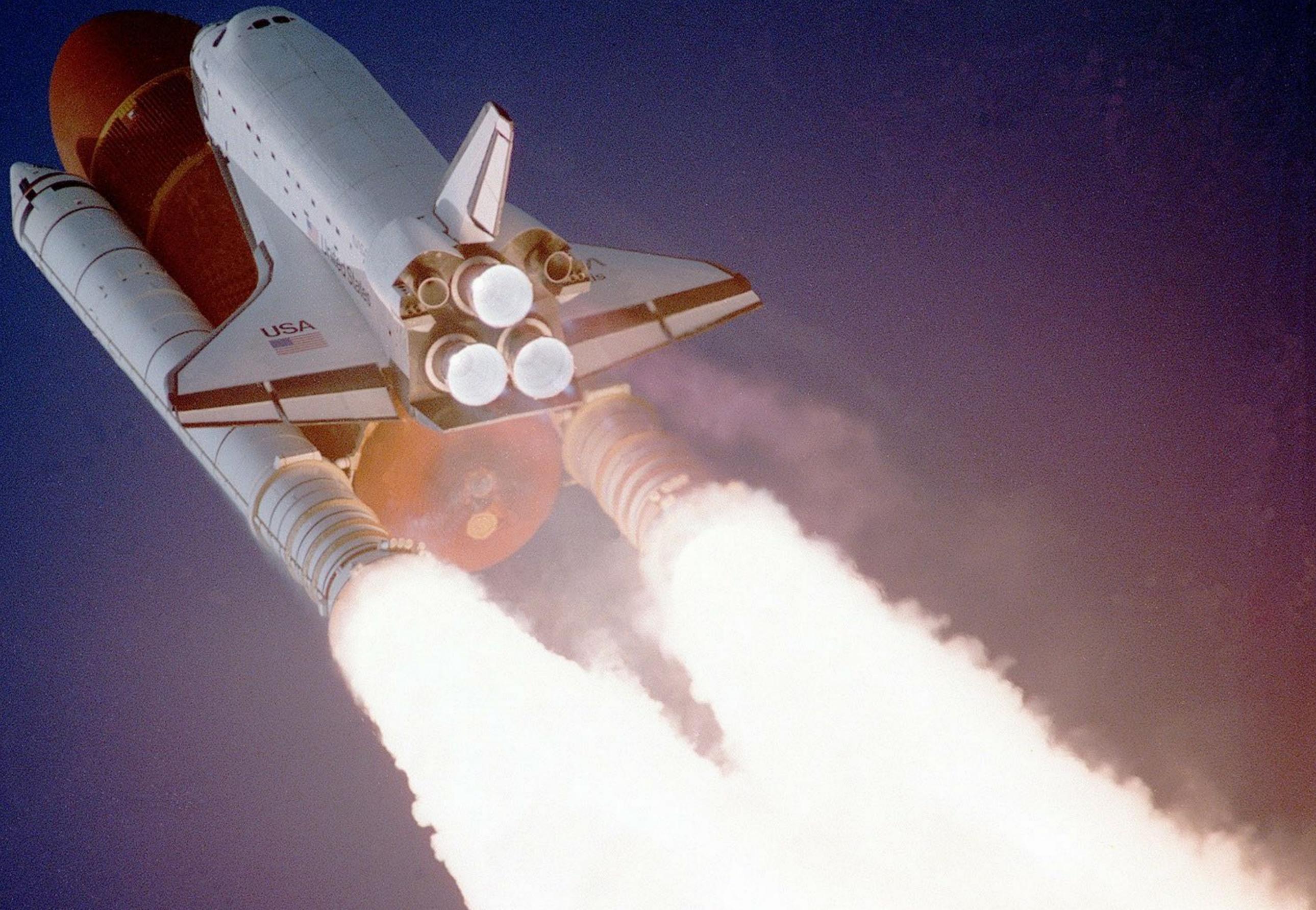
Tortoises therefore represent a remarkable double return. In common with all mammals, reptiles and birds, their remote ancestors were marine fish and before that various more or less worm-like creatures stretching back, still in the sea, to the primeval bacteria. Later ancestors lived on land and stayed there for a very large number of generations. Later ancestors still evolved back into the water and became sea turtles. And finally they returned yet again to the land as tortoises, some of which now live in the driest of deserts.













READING TEST

# GT Reading Test

**At least 5 texts**

**Information leaflets, adverts,  
instruction manuals, brochures,  
newspapers, magazines**

A

## **HELP – snack bar serving person**

Bright, friendly, experience not essential  
Energy and enthusiasm an absolute must

Sat & Sun only

Call or drop in at Kingsway Centre, Melbourn/Royston.

Tel: 01763 24272 and ask for the Manager.

B

## **Granta Hotel**

**requires a part-time silver  
service waiter/waitress.**

Only applicants with experience  
and good references need apply.  
Excellent wages, meals on duty.

Tel: 01223 51468 (office hours)

C

**WANTED** from January till July, a nanny/carer for  
Toby, 2 yrs. Formal qualifications not as important  
as a sensible, warm and imaginative approach.

Hours: 8.30-5.00 Mon-Fri

Car driver essential, non smoker

References required

For further details phone: 01480 88056 after 6pm.

D

**Cleaner required for 12-floor modern office  
block in the Station Road area, St Ives.**

2 hours per day. Mondays to Fridays –  
to finish work before the offices open

Wages: £80 per week

Tel: 01223 93292

E

**Mature, experienced  
Administrator/Secretary**

for soft furnishing company, working  
within the hotel industry

Hours: 1pm – 5pm, Mon – Fri

Phone: Mr S Quinn 01353 71251

F

**FULL-TIME COOK** for a new and exciting café venture.  
Good conditions. Pay and hours can be negotiated.

Apply Red Cafe (01863) 72052

G

**50-Seater Restaurant  
TO LET**

Ideal for very experienced person looking to  
start up on their own.

Located on busy A10 road.

Reply Box No. P762, Newmarket Newspapers Ltd.,  
51 Cambridge Road, Newmarket, CB8 3BN

## ***INTERCITY Sleeper between London and Scotland***

Most tickets may be used for travel by *Sleeper*, subject to availability, and a reservation in a two-berth cabin can be made for £25, except in the case of Solo and Special tickets, which include *Sleeper* reservations in the fare. The price includes early morning tea or coffee and biscuits. A continental or hot breakfast can be ordered if you wish.

Choose from a range of tickets to suit your journey.



### **A – SuperApex**

Only available for travel after 9am. Book at least 2 weeks ahead and travel between Edinburgh or Glasgow and London for the unbeatable price of £59 return. This ticket is non-refundable unless the service is cancelled.

### **B – Apex**

A real bargain fare. Only £69 return between Edinburgh or Glasgow and London. Great value *Sleeper* travel available by booking at least a week before outward travel. Ticket refundable on payment of a 25% administrative charge.

### **C – SuperSaver**

Available right up to the day of travel and valid any day except these peak days: all Fridays, also 18-30 December, 31 March and 28 May. Departures between midnight and 2am count as previous day's departures. London to Glasgow or Edinburgh £82.

### **D – Saver**

This flexible ticket is valid every day and can be bought on the day of travel. Your ticket allows standard class travel on any train between 10am and midnight. No seat reservations available. London to Glasgow or Edinburgh £95.

### **E – Solo**

Treat yourself and enjoy exclusive use of a Standard cabin. Solo is an inclusive return travel ticket with *Sleeper* reservations for one or both directions. Outward and return reservations should be made at the time of booking. The journey must include a Saturday night away. £140-£160 London to Edinburgh/Glasgow return.

### **F – Special**

Special is an inclusive return travel package for two people including sleeper reservations for one or both directions. It can mean savings for both of you. Outward and return reservations should be made at the time of booking. From £120.

### **G – Standard**

Not the cheapest option but available up to the time of travel and valid for all trains and at all times. You are advised to turn up early for travel on a Friday.

## **FORMAL DRESS CODE FOR COMPANY EMPLOYEES**

At TransitEuropean, the company's objective in establishing a formal dress code is to enable our employees to project the professional image that is in keeping with the needs of our clients and customers who seek our guidance, input, and professional services. Because our industry requires the appearance of trusted business professionals and we serve clients at our site on a daily basis, a more formal dress code is necessary for our employees.

### **Formal Dress Code Guidelines**

In a formal business environment, the standard of dressing for men and women is a suit. Alternatively a jacket may be worn with appropriate accessories. Torn, dirty, or frayed clothing is unacceptable. Clothing should be pressed and never wrinkled. No dress code can cover all contingencies so employees must exert a certain amount of judgement in their choice of clothing to wear to work. If you experience uncertainty, please ask your supervisor for advice.

### **Shoes and Footwear**

Conservative walking shoes, dress shoes, loafers, boots, flats, dress heels, and backless shoes are acceptable for work. Not wearing stockings or socks is inappropriate. Tennis shoes and any shoe with an open toe are not acceptable in the office.

### **Accessories and Jewellery**

The wearing of ties, scarves, belts, and jewellery is encouraged, provided they are tasteful. Items which are flashy should be avoided.

### **Makeup, Perfume, and Cologne**

A professional appearance is encouraged and excessive makeup is unprofessional. Remember that some employees may have allergic reactions to the chemicals in perfumes and makeup, so wear these substances in moderation.

### **Hats and Head Covering**

Hats are not appropriate in the office. Head covers that are required for reasons of faith or to honour cultural tradition are permitted.

### **Dress Down Days**

Certain days can be declared dress down days, generally Fridays. On these days, business casual clothing is allowed. Clothing that has our company logo is strongly encouraged. Sports team, university, and fashion brand names on clothing are generally acceptable. However, you may wish to keep a jacket in your office in case a client unexpectedly appears.

### **Violation of Dress Code**

If clothing fails to meet these standards, as determined by the employee's supervisor, the employee will be asked not to wear the inappropriate item to work again. If the problem persists, the employee will receive a verbal warning and may be sent home to change clothes.

# JLP RETAIL: STAFF BENEFITS

*Whatever your role, your pay range will be extremely competitive and reviewed in the light of your progress. In addition to your salary, you will enjoy an array of excellent benefits from the moment you join the company.*

## **Paid holiday**

The holiday entitlement is four weeks per year, rising to five weeks after three years (or in the case of IT graduate trainees, after promotion to programmer or trainee analyst). There are further long-service increases for most staff after ten or fifteen years. Managers, including graduate trainees, receive five weeks' holiday from the outset.

## **Pension scheme**

We offer a non-contributory final salary pension scheme, payable from the age of 60, to most staff who have completed the qualifying period of five years.

## **Life assurance**

Our life assurance scheme pays a sum equivalent to three times your annual salary to your nominated beneficiary.

## **Discounts**

After three months' service, all staff are entitled to a 12% discount on most purchases from the company's stores. This rises to 25% after one year's service.

## **Subsidised dining room**

In most sites, we provide a dining room where you can enjoy excellent food at very reasonable prices.

## **Holiday and leisure facilities**

The business owns a number of residential clubs which offer subsidised holiday accommodation for staff with at least three years' service.



## **Sports clubs**

We support an extensive range of sports activities including football, netball, golf, skiing, sailing, squash, riding and gliding.

## **Ticket subsidies**

Ticket subsidies of 50% of the cost of plays or concerts are available. Staff may also take advantage of corporate membership to bodies such as the Science Museum.

## **Education subsidies**

We give generous financial support to staff who wish to acquire leisure skills or continue their education, e.g. through the Open University or evening classes.

## **Extended leave**

Staff who complete 25 years' service can enjoy paid sabbatical leave of up to six months.

## **Health services**

We have an occupational health service staffed by full-time doctors and health advisers.

## **Financial help, benefits and discounted deals**

In cases of particular hardship, we will help staff with a loan. We have also negotiated a range of benefits for staff such as discounted private healthcare and a car purchase scheme, along with a number of one-off deals with hotels and amusement parks.

# OUT OF THE ASHES

**A** On the afternoon of 30<sup>th</sup> August 1989, fire broke out at Uppark, a large eighteenth-century house in Sussex. For a year builders had been replacing the lead on the roof, and by a stroke of irony, were due to finish the next day, on August 31<sup>st</sup>. Within fifteen minutes of the alarm being sounded, the fire brigade had arrived on the scene, though nothing was to survive of the priceless collection on the first floor apart from an oil painting of a dog which the firemen swept up as they finally retreated from the blaze. But due to the courage and swift action of the previous owners, the Meade-Featherstonhaugh family, and the staff, stewards and visitors to the house, who formed human chains to pass the precious pieces of porcelain, furniture and paintings out on to the lawn, 95 per cent of the contents from the ground floor and the basement were saved. As the fire continued to rage, the National Trust's conservators were being mobilised, and that evening local stationers were especially opened to provide the bulk supplies of blotting paper so desperately needed in the salvage operation.

**B** The following morning, Uppark stood open to the sky. A sludge of wet charcoal covered the ground floor and basement, and in every room charred and fallen timbers lay amongst the smoke. It was a scene of utter devastation.

**C** After the initial sense of shock, the days which followed the fire were filled with discoveries. Helped by volunteers, the National Trust's archaeologists and conservators swung into action, first of all marking the site out into a grid and then salvaging everything down to the last door handle. The position of each fragment was recorded, and all the debris was stored in countless dustbins before being sifted and categorised.

**D** There was great excitement as remnants of the lantern from the Staircase Hall were pulled out from the debris of two fallen floors, and also three weeks later when the Red Room carpet, thought to have been totally lost, was found wrapped around the remains of a piano. There was a lucky reprieve for the State Bed too. Staff who had left the scene at 3am on the night of the fire had thought its loss was inevitable, but when they returned the next morning it had escaped largely undamaged. Firemen, directed by the National Trust's conservators from outside the Tapestry Room window, dismantled the silk-hung bed and passed it out piece by piece. Twenty minutes later the ceiling fell in.

**E** The scale of the task to repair Uppark was unprecedented in the National Trust. The immediate question was whether it should be done at all. A decision had to be

taken quickly, as the building was unsound and whatever had not been damaged by the fire was exposed to the elements. Within a month, after consulting many experts and with the agreement of the National Trust's Executive Committee, the restoration programme began. It was undertaken for three main reasons. After the fire it had become apparent just how much remained of the structure with its splendidly decorated interiors; to have pulled the house down, as one commentator suggested, would have been vandalism. Also the property was covered by insurance, so the repairs would not call upon the National Trust's own funds. Lastly, much had been saved of the fine collection acquired especially for Uppark from 1747 by Sir Matthew Featherstonhaugh and his son Harry. These objects belonged nowhere else, and complete restoration of the house would allow them to be seen and enjoyed again in their original setting.

**F** The search for craftsmen and women capable of doing the intricate restoration work was nation-wide. Once the quality and skill of the individual or company had been ascertained, they had to pass an economic test, as every job was competitively tendered. This has had enormous benefits because not only have a number of highly skilled people come to the fore - woodcarvers for example, following in the footsteps of Grinling Gibbons - but many of them, for example plasterers, have relearnt the skills of the seventeenth and eighteenth centuries which can now be of use to other country house owners when the need arises.

**G** In June 1994 the building programme was completed, on time and on budget. The total cost of the work to repair the house and its contents came to be nearly £20 million, largely met from insurance. In addition, it made economic sense for the National Trust to invest time and money in upgrading water and heating systems, installing modern environmental controls, and updating fire and security equipment.

**H** The final stages of restoration and the massive programme of reinstallation took eight months. The family and the room stewards were visibly moved when returning to their old haunts, perhaps the best testament that the spirit of Uppark had not died. But the debate will no doubt continue as to whether or not it was right to repair the house after the fire. The National Trust has done its best to remain true to Uppark; it is for others to judge the success of the project.

*Note: The National Trust is a charitable organisation in Britain set up over a hundred years ago to preserve the national heritage.*





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