IELTSFever Academic IELTS Reading Test 137

Reading Passage 1

You should spend about 20 minutes on Questions 1-13, which are based on the IELTSFever Academic IELTS Reading Test 137 Reading Passage Timekeeper 2 Invention of Marine Chronometer below.

Timekeeper 2 Invention of Marine Chronometer

{A} It was, as Dava Sobel has described a phenomenon: "the greatest scientific problem of the age'. The reality was that in the 18th century no one had ever made a clock that could suffer the great rolling and pitching of a ship and the large changes in temperature whilst still keeping time accurately enough to be of any use. Indeed, most of the scientific community thought such clocks were impossible. Knowing one's position on the earth requires two very simple but essential coordinates; rather like using a street map where one thinks in terms of how far one is up/down and how far side to side.

{B} The longitude is a measure of how far around the world one has come from home and has no naturally occurring base line like the equator. The crew of a given ship was naturally only concerned with how far round they were from their own particular home base. Even when in the middle of the ocean, with no land in sight, knowing this longitude position is very simple in theory. The key to knowing how far around the world you are from home is to know, at that very moment, what time it is back home. A comparison with your local time (easily found by checking the position of the Sun) will then tell you the time difference between you and home, and thus how far round the Earth you are from home.

{C} Up until the middle of the 18th century, navigators had been unable to determine their position at sea with accuracy and they faced the huge attendant risks of shipwreck or running out of supplies before reaching their destination. The angular position of the Moon and other bright stars was recorded in three-hour intervals of Greenwich Time. In order to determine longitude, sailors had to measure the angle between Moon centre and a given star - lunar distance - together with height of both planets using the naval sextant. The sailors also had to calculate the Moon's position if seen form the centre of Earth. Time corresponding to Greenwich Time was determined using the nautical almanac. Then the difference between the obtained time and local time served for calculation in longitude from Greenwich. The great flaw in this 'simple' theory was - how does the sailor know time back home when he is in the middle of an ocean?

{D} The obvious and again simple answer is that he takes an accurate clock with him, which he sets to home time before leaving. All he has to do is keep it wound up and running, and he must never reset the hands throughout the voyage This clock then provides 'home time', so if, for example, it is midday on board your ship and your 'home time clock says that at that same

moment it is midnight at home, you know immediately there is a twelve hour time-difference and you must be exactly round the other side of the world, 180 degrees of longitude from home.

{E} After 1714 when the British government offered the huge sum of £20,000 for a solution to the problem, with the prize to be administered by the splendidly titled Board of Longitude. The Government prize of £20,000 was the highest of three sums on offer for varying degrees of accuracy, the full prize only payable for a method that could find the longitude at sea within half a degree. If the solution was to be by timekeeper (and there were other methods since the prize was offered for any solution to the problem), then the timekeeping required to achieve this goal would have to be within 2.8 seconds a day, a performance considered impossible for any clock at sea and unthinkable for a watch, even under the very best conditions.

{F} It was this prize, worth about £2 million today, which inspired the self-taught Yorkshire carpenter, John Harrison, to attempt a design for a practical marine clock. During the latter part of his early career, he worked with his younger brother James. Their first major project was a revolutionary turret clock for the stables at Brocklesby Park, seat of the Pelham family. The clock was revolutionary because it required no lubrication. 18th century clock oils were uniformly poor and one of the major causes of failure in clocks of the period. Rather than concentrating on improvements to the oil, Harrison designed a clock which didn't need it. In 1730 Harrison created a description and drawings for a proposed marine clock to compete for the Longitude Prize and went to London seeking financial assistance. He presented his ideas to Edmond Halley, the Astronomer Royal. Halley referred him to George Graham, the country's foremost clockmaker. He must have been impressed by Harrison, for Graham personally loaned Harrison money to build a model of his marine clock. It took Harrison five years to build Harrison Number One or H1. He demonstrated it to members of the Royal Society who spoke on his behalf to the Board of Longitude. The clock was the first proposal that the Board considered to be worthy of a sea trial. In 1736,

{G} After several attempts to design a betterment of Hi, Harrison believed that the solution to the longitude problem lay in an entirely different design. H4 is completely different from the other three timekeepers. It looks like a very large pocket watch. Harrison's son William set sail for the West Indies with H4, aboard the ship Deptford on 18 November 1761. It was a remarkable achievement but it would be some time before the Board of Longitude was sufficiently satisfied to award Harrison the prize.

{H} John Hadley, an English mathematician, developed sextant, who was a competitor of Harrison at that time for the luring prize. A sextant is an instrument used for measuring angles, for example between the sun and the horizon, so that the position of a ship or aeroplane can be calculated. Making this measurement is known as sighting the object, shooting the object, or taking a sight and it is an essential part of celestial navigation. The angle, and the time when it was measured, can be used to calculate a position line on a nautical or aeronautical chart. A sextant can also be used to measure the Lunar distance between the moon and another celestial object(e.g., star, planet) in order to determine Greenwich time which is important because it can then be used to determine the longitude.

{I} The majority within this next generation of chronometer pioneers were English, but the story is by no means wholly that of English achievement. One French name, Pierre Le Roy of Paris, stands out as a major presence in the early history of the chronometer. Another great name in the story is that of the Lancastrian, Thomas Earnshaw, a slightly younger contemporary of John Arnold's. It was Earnshaw who created the final form of chronometer escapement, the spring detent escapement, and finalized the format and the production system for the marine chronometer, making it truly an article of commerce, and a practical means of safer navigation at sea over the next century and half.

Questions 1-5

The reading Passage has ten paragraphs A-J.

Which paragraph contains the following information?

Write the correct letter A-J, in boxes 1-5 on your answer sheet

NB you may use any letter more than once

(1) introduction of a millman under awards

(2) the definition of an important geographical term

(3) a rival against Harrison's invention emerged

(4) problems of sailor encountered in identifying the position on the sea

(5) economic assist from another counterpart

Questions 6-8

Do the following statements agree with the information given in Reading Passage 1 In boxes 6-8 on your answer sheet, write

YES	if the statement agrees with the writer
NO	if the statement does not agree with the writer
NOT GIVEN	if there is no information about this in the passage

(6) It is with no great effort by sailors to calculate the position when in the center of the ocean theoretically.

(7) To determine the longitude, a measurement of distance from moon to a given star is a must.

(8) In theory, by calculating the longitude degrees covered by a sail journey, the distance between the start and the end points can be obtained.

Questions 9-13

Summary

*Complete the following summary of the paragraphs of Reading Passage, using **no more than two words** from the Reading Passage for each answer. Write your answers in boxes 9-13 on your answer sheet.*

Hundred years ago, sailors tried to identify their time by checking the sun or stars, but the trouble was that they did need a reliable clock which showed time of .....**9**..... And the timekeeper required would be to precisely tell a tangible time lapse confined to .....**10**.....;

An extraordinary craftsman, Harrison, once created a novel clock which did not rely on ……..**11**.....to work properly. Later on, competitive mode of .....**12**..... was another prominent device designed by Hadley, which calculated angle between sun and the earth. Based on Harrison's effort, Earnshaw eventually implemented key components for .....**13**....., which had been used ever since.

Reading Passage 2

You should spend about 20 minutes on Questions 14-27, which are based on the IELTSFever Academic IELTS Reading Test 137 Reading Passage MIGRATION: the birds below.

PART 1: MIGRATION: the birds

Birds are forced to migrate for a number of reasons, including seasonal climate cycles, a scarcity of food or of appropriate nesting sites. Established routes are followed, many involving punishing distances over land and sea. The longest migration of any known animal is that of the Arctic tern, which travels more than 15,000 miles from north to south and back again.

{A} What are some of the main 'cues' that research has indicated birds use in order to navigate successfully during migration? As the question suggests, there is no single answer ; Keeton concluded that bird navigation is characterised by 'considerable redundancy of information' whereby birds appear to draw on more than one method. This would seem to be essential, given changeable weather conditions, the need to overfly a variable landscape and/or seascape, and the fact that some birds manage to navigate at night.

{B} Rabol suggested that a bird is born with its migratory track imprinted as part of its DNA, but his ideas have been rejected by a number of experts, including Wiltschko and Wiltschko, who suggest instead that navigation techniques are an integral part of parenting. Of course, this does not account for the cuckoo, which does not remain with its parents (cuckoos lay their eggs in the nest of another bird).

{C} There is no doubt that major topographical features, such as hills and rivers, can provide birds with important landmarks. The fact that some birds, such as the swallow, return to the same nest year after year after a journey of thousands of miles suggests the ability to recognise key sites. Moreover, birds may use sight to orientate themselves in relation to the sun, perhaps using its relative height in the sky to determine latitude. However, an experiment by Schlicte and Schmidt-Koenig, whereby pigeons were fitted with frosted lenses, may indicate that sight is less important in birds than in humans, for these birds could still use the sun for orientation.

{D} It is thought that, unlike human eyes, birds' eyes can detect ultra-violet light in adverse weather conditions. Matthews suggested that birds use the sun's arc to establish longitude. The sun appears to be used by a number of birds as a compass and they seem able to adjust their biological clock to compensate for shifting through time zones from east to west.

{E} At night, the stars and moon provide an alternative source of observable data for birds. There is evidence that some birds memorise constellations (for example, Emlen's work with indigo buntings in 1967 and Wallraffs 1969 experiment with caged ducks). If these constellations provide a reliable and little-changing map in a clear night sky, the moon on the other hand is too random to be helpful, changing its position in the sky night after night.

{F} Just as birds' vision is more sensitive than our own, there is evidence to suggest that many birds can detect sounds outside our own range of hearing. Yodlowski et al. discovered that homing pigeons were sensitive to sounds below 10 Hz, known as 'infra-sound', and could employ this for orientation purposes and in the crucial early detection of severe thunderstorms, with a consequent adjustment of flight path.

{G} Most birds don't have a good sense of smell, but fish-eaters such as petrels and Shearwaters are significant exceptions. These birds probably act on olfactory cues given that they only reach their nesting sites during the hours of darkness. However, this area of research is inconclusive : two experiments conducted by Papi, where the olfactory nerve of pigeons was cut, leading to a loss of navigation skills, gave inconsistent results ; Baker and Mather regarded them as flawed, and suggested that the confusion may have been induced by the trauma of the experiments, or through loss of magnetic awareness.

{H} Geomagnetism was suggested as a possible cue for bird navigation as early as 1859 and much research has been done in this area. The Earth's magnetic field is not of uniform intensity, being at its weakest at the equator ; homing pigeons are thought to exploit magnetic anomalies for orientation (Gould 1980). In earlier research, Walcott and Green (1974) fitted pigeons with electric caps to produce a magnetic field. Under overcast skies, reversing the magnetic field by reversing the electric current caused the birds to fly in the opposite direction to their original course. This and other work suggests that magnetism does indeed play

an important part in navigation for many birds.

PART II: The migration of the Monarch butterfly

{A} It's fall in North America, and millions of Monarch butterflies are migrating to warmer climates for the winter, heading either to the Californian coast or to certain mountains in Mexico. These butterflies recognise the arrival of fall in the same way that we do: they feel the chill in the air. While we adapt by putting on a sweater, the situation is much more serious for the Monarchs. Temperatures below 55°F make it impossible for them to take to the air; temperatures below 40°F paralyse them. The Monarchs originated in the tropics and can't live for long at temperatures below freezing. At the same time that the air is cooling, the nectar supply in flowers that feeds the butterflies is dwindling. To survive, they begin migrating in late summer, flying with the wind to reach their winter homes.

{B} Up to 100 million Monarch butterflies migrate either to California or to Mexico each year. This isn't the entire population because some never make the migration. There are more than 25 winter roosting sites along the California coast and about a dozen known sites in the Sierra Madre Oriental mountains of Mexico. In both regions, butterflies depend upon trees for their survival. They cluster in pine and eucalyptus trees along the California coast and in ovamel trees in Mexico.

{C} Wintering Monarchs stay together. The end result looks like massive clumps of feathery orange-and-black grapes. Each butterfly hangs with its wings over the butterfly beneath it, creating a shingle effect that buffers them from the rain and creates warmth. The weight of the cluster also prevents the butterflies from being blown away. Butterflies stay in their winter homes until about March, when they begin the return journey to their summer homes, travelling as fast as 30mph at times.

{D} Monarch butterflies are in danger of losing both their summer and winter habitats. Summer habitats are being destroyed as more roads and new housing developments and business complexes encroach upon open space in North America (a phenomenon known as urban sprawl). As land is developed, the milkweed plant is killed. This is disastrous for the Monarch species, because once the butterfly larvae hatch from their eggs, they feed on this planet alone. Milkweed plants are also vulnerable to herbicides used by farmers, homeowners, landscapers, and gardeners. The butterflies don't have it easy in Mexico, either. The ovamel trees that they winter in also serve as a lumber source for local communities and big logging companies. Logging not only removes the trees, it opens up the forest canopy as well, and in creating these

overhead holes, the butterflies are potentially exposed to the life-threatening elements. Each wintering site in Mexico contains millions of butterflies, and so damage to even one site could be a catastrophe for the Monarch butterfly population. Recent findings report that 44% of the ovamel forest has already been damaged or destroyed by logging.

Read the passage PART I again and answer questions 14-21.

Questions 14 and 15

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

Question 14 According to Wiltschko and Wiltschko,

(A) cuckoo's behaviour supports a genetic explanation for navigation.

(B) Rabol's ideas on imprinting are worthy of further investigation.

(C) adult birds train their young to react to navigational cues.

(D) more studies are needed on the role of parenting in navigation.

Question 15 What does the text suggest about the role of sight in bird navigation?

(A) Birds are unlikely to take notice of many physical landmarks.

(B) It provides essential information for revisiting breeding locations.

(C) Birds find it impossible to look directly at the sun when it is high.

(D) It is without doubt the most important sense that a bird has.

Questions 16-21

Look at the following statements about research and the list of people below.

Match each statement to the correct person or people.

Write the correct letter, A-J.

List of people

(A) Baker and Mather	**(F)** Papi
(B) Emlen	**(G)** Rabol
(C) Gould	**(H)** Schlichte and Schmidt-Koening

(D) Keeton	**(I)** Walcott and Green
(E) Matthews	**(J)** Yodlowski et al

(16) proved that some birds navigate by the stars

(17) raised the possibility of genetic programming

(18) dismissed someone's ideas about disorientation

(19) demonstrated that birds do not need perfect vision

(20) argued that birds rely on a combination of cues

(21) suggested that birds may use their sense of hearing to forecast bad weather

Read the passage PART II again and answer questions 22-27.

Questions 22-27

Do the following statements agree with the information given in Reading Passage 2? In boxes 22-27 on your answer sheet, write

(22) The Monarch butterfly's ability to fly is affected by cool atmospheric conditions.

(23) The Monarch's migratory track changes according to wind direction.

(24) Monarchs that spend the winter in California favour one type of tree.

(25) One reason why Monarchs collect in groups is to protect themselves from the wind

(26) Because of climate change, Monarch butterflies now spend less time at winter locations than they used to.

(27) Man-made adjustments to the Mexican habitat have led to higher mortality rates.

Reading Passage 3

You should spend about 20 minutes on Questions 28-40, which are based on the IELTSFever Academic IELTS Reading Test 137 Reading Passage The secret of the Yawn below

The secret of the Yawn

{A} When a scientist began to study yawning in the 1980s, it was difficult to convince some of his research students of the merits of "yawning science." Although it may appear quirky , his decision to study yawning was a logical extension to human beings of my research in developmental neuroscience, reported in such papers as "Wing-flapping during Development and Evolution." As a neurobehavioral problem, there is not much difference between the wing-flapping of birds and the face-and body-flapping of human yawners.

{B} Yawning is an ancient, primitive act. Humans do it even before they are born, opening wide in the womb . Some snakes unhinge their jaws to do it. One species of penguins yawns as part of mating. Only now are researchers beginning to understand why we yawn, when we yawn and why we yawn back. A professor of cognitive neuroscience at Drexel University in Philadelphia, Steven Platek, studies the act of contagious yawning, something done only by people and other primates.

{C} In his first experiment, he used a psychological test to rank people on their empathic feelings. He found that participants who did not score high on compassion did not yawn back. "We literally had people saying, 'Why am I looking at people yawning?" Professor Platek said. "It just had no effect."

{D} For his second experiment, he put 10 students in an magnetic resonance imaging machine as they watched video tapes of people yawning. When the students watched the videos, the part of the brain which reacted was the part scientists believe controls empathy - the posterior cingulate in the brain's middle rear." I don't know if it's necessarily that nice people yawn more, but I think it's a good indicator of a state of mind," said Professor Platek. "It's also a good indicator if you're empathizing with me and paying attention."

{E} His third experiment is studying yawning in those with brain disorders, such as autism and schizophrenia, in which victims have difficulty connecting emotionally with others. A psychology professor at the University of Maryland, Robert Provine, is one of the few other researchers into yawning. He found the basic yawn lasts about six seconds and they come in bouts with an interval of about 68 seconds. Men and women yawn or half-yawn equally often, but men are significantly less likely to cover their mouths which may indicate complex distinction in genders." A watched yawner never yawns," Professor Provine said. However, the physical root of yawning remains a mystery. Some researchers say it's coordinated within the hypothalamus of the brain, the area that also controls breathing.

{F} Yawning and stretching also share properties and may be performed together as parts of a global motor complex. But they do not always co-occur- people usually yawn when we stretch, but we don't always stretch when we yawn, especially before bedtime. Studies by J.I.P. G. H. A. Visser and H. F. Prechtl in the early 1980s, charting movement in the developing fetus using ultrasound, observed not just yawning but a link between yawning and stretching as early as the end of the first prenatal trimester.

{G} The most extraordinary demonstration of the yawn-stretch linkage occurs in many people paralyzed on one side of their body because of brain damage caused by a stroke. The prominent British neurologist Sir Francis Walshe noted in 1923 that when these hemiplegics yawn, they are startled and mystified to observe that their otherwise paralyzed arm rises and flexes automatically in what neurologists term an "associated response." Yawning apparently activates undamaged, unconsciously controlled connections between the brain and the cord motor system innervating the paralyzed limb. It is not known whether the associated response is a positive prognosis for recovery, nor whether yawning is therapeutic for reinnervation or prevention of muscular atrophy.

{H} Clinical neurology offers other surprises. Some patients with "locked-in" syndrome, who are almost totally deprived of the ability to move voluntarily, can yawn normally. The neural circuits for spontaneous yawning must exist in the brain stem near other respiratory and vasomotor centers, because yawning is performed by anencephalic who possess only the medulla oblongata The multiplicity of stimuli of contagious yawning, by contrast, implicates many higher brain regions.

Questions 28-32

*Summary Complete the Summary paragraph described below. In boxes 28-32 on your answer sheet, write the correct answer with **NO MORE THAN THREE WORDS.***

A psychology professor drew a conclusion after observation that it takes about six seconds to complete an average yawning which needs .....**28**.....before the following yawning comes. It is almost at the same frequency that male and female yawn or half, yet behavior accompanied with yawning shows a .....**29**.....in genders. Some parts within the brain may affect the movement which also have something to do with .....**30**..... Another finding also finds there is a link between yawning and .....**31**... ... before a baby was born, which two can be automatically co-operating even among people whose .....**32**..... is damaged.

Questions 33-37

Read paragraph A-H.Which paragraph contains the following information? Write the correct letter A-H for question 33-37

NB You may use any letter more than once.

(33) The rate for yawning shows some regular pattern.

(34) Yawning is an inherent ability that appears in both animals and humans.

(35) Stretching and yawning are not always going together.

(36) Yawning may suggest people are having positive notice or response in communicating

(37) Some superior areas in brain may deal with the infectious feature of yawning

Questions 38-40

Do the following statements agree with the information given in Reading Passage 3? In boxes 38-40 on your answer sheet, write

TRUE	if the statement is True
FALSE	if the statement is false
NOT GIVEN	If the information is not given in the passage

(38) Several students in Platek's experiment did not comprehend why their tutor asked them to yawn back.

(39) Some results from certain experiments indicate the link between yawning and compassion.

(40) Yawning can show an affirmative impact on the recovery from brain damage brought by a stroke.