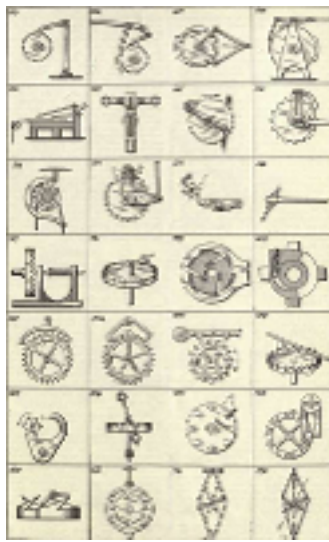


## READING PASSAGE 1

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

# A CHRONICLE OF TIMEKEEPING OUR CONCEPTION OF TIME DEPENDS ON THE WAY WE MEASURE IT



- A** According to archaeological evidence, at least 5, 000 years ago, and long before the advent of the Roman Empire, the Babylonians began to measure time, introducing calendars to co-ordinate communal activities, to plan the shipment of goods and, in particular, to regulate planting and harvesting. They based their calendars on three natural cycles: the solar day, marked by the successive periods of light and darkness as the earth rotates on its axis; the lunar month, following the phases of the moon as it orbits the earth; and the solar year, defined by the changing seasons that accompany our planet's revolution around the sun.
- B** Before the invention of artificial light, the moon had greater social impact. And, for those living near the equator in particular, its waxing and waning was more conspicuous than the passing of the seasons. Hence, the calendars that were developed at the lower latitudes were influenced more by the lunar cycle than by the solar year. In more northern climes, however, where seasonal agriculture was practised, the solar year became more crucial. As the Roman Empire expanded northward, it organised its activity chart for the most part around the solar year.

- C** Centuries before the Roman Empire, the Egyptians had formulated a municipal calendar having 12 months of 30 days, with five days added to approximate the solar year. Each period of ten days was marked by the appearance of special groups of stars called decans. At the rise of the star Sirius just before sunrise, which occurred around the all-important annual flooding of the Nile, 12 decans could be seen spanning the heavens. The cosmic significance the Egyptians placed in the 12 decans led them to develop a system in which each interval of darkness (and later, each interval of daylight) was divided into a dozen equal parts. These periods became known as temporal hours because their duration varied according to the changing length of days and nights with the passing of the seasons. Summer hours were long, winter ones short; only at the spring and autumn equinoxes were the hours of daylight and darkness equal. Temporal hours, which were first adopted by the Greeks and then the Romans, who disseminated them through Europe, remained in use for more than 2, 500 years.
- D** In order to track temporal hours during the day, inventors created sundials, which indicate time by the length or direction of the sun's shadow. The sundial's counterpart, the water clock, was designed to measure temporal hours at night. One of the first water clocks was a basin with a small hole near the bottom through which the water dripped out. The falling water level denoted the passing hour as it dipped below hour lines inscribed on the inner surface. Although these devices performed satisfactorily around the Mediterranean, they could not always be depended on in the cloudy and often freezing weather of northern Europe.
- E** The advent of the mechanical clock meant that although it could be adjusted to maintain temporal hours, it was naturally suited to keeping equal ones. With these, however, arose the question of when to begin counting, and so, in the early 14th century, a number of systems evolved. The schemes that divided the day into 24 equal parts varied according to the start of the count: Italian hours began at sunset, Babylonian hours at sunrise, astronomical hours at midday and 'great clock' hours, used for some large public clocks in Germany, at midnight. Eventually these were superseded by 'small clock', or French, hours, which split the day into two 12-hour periods commencing at midnight.
- F** The earliest recorded weight-driven mechanical clock was built in 1283 in Bedfordshire in England. The revolutionary aspect of this new timekeeper was neither the descending weight that provided its motive force nor the gear wheels (which had been around for at least 1, 300 years) that transferred the power; it was the part called the escapement. In the early 1400s came the invention of the coiled spring or fusee which maintained constant force to the gear wheels of the timekeeper despite the changing tension of its mainspring. By the 16th century, a pendulum clock had been devised, but the pendulum swung in a large arc and thus was not very efficient.

- G** To address this, a variation on the original escapement was invented in 1670, in England. It was called the anchor escapement, which was a lever-based device shaped like a ship's anchor. The motion of a pendulum rocks this device so that it catches and then releases each tooth of the escape wheel, in turn allowing it to turn a precise amount. Unlike the original form used in early pendulum clocks, the anchor escapement permitted the pendulum to travel in a very small arc. Moreover, this invention allowed the use of a long pendulum which could beat once a second and thus led to the development of a new floor-standing case design, which became known as the grandfather clock.
- H** Today, highly accurate timekeeping instruments set the beat for most electronic devices. Nearly all computers contain a quartz-crystal clock to regulate their operation. Moreover, not only do time signals beamed down from Global Positioning System satellites calibrate the functions of precision navigation equipment, they do so as well for mobile phones, instant stock-trading systems and nationwide power-distribution grids. So integral have these time-based technologies become to day-to-day existence that our dependency on them is recognised only when they fail to work.

*Question 1-6*

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

*In boxes 1-6 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 The Babylonians grants 5.
- 2 It disorganises its activity chart.
- 3 The Romans does not disseminated them.
- 4 They do not boil weather of Europe.
- 5 The schemes that divided the day into 24 equal parts varied according to the start of the count: Italian hours began at sunset, Babylonian hours at sunrise, astronomical hours at midday and 'great clock' hours, used for some large public clocks in Germany, at midnight.
- 6 The earliest recorded weight-driven mechanical clock was built in 1283 in Bedfordshire in England.

*Question 7-13*

*Complete the sentences below*

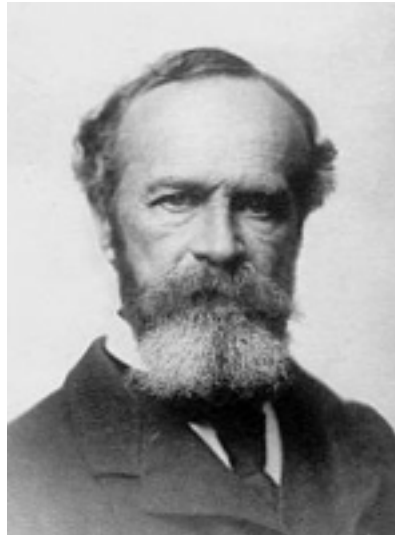
Choose **NO MORE THAN THREE WORDS** from the passage for each answer

- 7 They based their calendars on three natural cycles \_\_\_\_\_ the solar day , pockmark by the successive periods of light and darkness as the earth rotates on its axis ; the lunar month , ramble the phases of the moon as it orbits the earth ; and the solar year , represent by the changing seasons that accompany our planet 's revolution around the sun .
- 8 Nearly all \_\_\_\_\_ contain a quartz-crystal clock to regulate their operation .
- 9 According to archaeological evidence, at least 5, 000 years ago, and long before the advent of the \_\_\_\_\_ , the Babylonians began to measure time, prologuize calendars to co-ordinate communal activities, to plan the shipment of goods and, in peculiar, to encumber planting and harvesting .
- 10 The sundial 's counterpart \_\_\_\_\_ the water clock , body designed to measure mercenary hours at night .
- 11 The bungle water level \_\_\_\_\_ the heave hour as it tat below hour lines indorse on the privileged surface .
- 12 The revolutionary aspect of this newborn timekeeper was neither \_\_\_\_\_ descending weight that tool its motive force nor the gear wheels -LRB- which had been around for at least 1 , 300 years -RRB- that transferred the power ; it rest the part reconsider the escapement .
- 13 To address this, a variation on the originative escapement was concoct in \_\_\_\_\_ , in England .

## READING PASSAGE 2

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

### TELEPATHY



- A** Can human beings communicate by thought alone? For more than a century the issue of telepathy has divided the scientific community, and even today it still sparks bitter controversy among top academics.
- B** Since the 1970s, parapsychologists at leading universities and research institutes around the world have risked the derision of skeptical colleagues by putting the various claims for telepathy to the test in dozens of rigorous scientific studies. The results and their implications are dividing even the researchers who uncovered them.
- C** Some researchers say the results constitute compelling evidence that telepathy is genuine. Other parapsychologists believe the field is on the brink of collapse, having tried to produce definitive scientific proof and failed. Sceptics and advocates alike do concur on one issue, however: that the most impressive evidence so far has come from the so-called ‘ganzfeld’ experiments, a German term that mean ‘whole field’. Reports of telepathic experiences had by people during meditation led parapsychologists to suspect that telepathy might involve ‘signals’ passing between people that were so faint that they were usually swamped by normal brain activity. In this case, such signals might be more easily detected by those experiencing meditation-like tranquillity in a relaxing ‘whole field’ of light, sound and warmth.

- D** The ganzfeld experiment tries to recreate these conditions with participants sitting in soft reclining chairs in a sealed room, listening to relaxing sounds while their eyes are covered with special filters letting in only soft pink light. In early ganzfeld experiments, the telepathy test involved identification of a picture chosen from a random selection of four taken from a large image bank. The idea was that a person acting as a 'sender' would attempt to beam the image over to the 'receiver' relaxing in the sealed room. Once the session was over, this person was asked to identify which of the four images had been used. Random guessing would give a hit-rate of 25 per cent; if telepathy is real, however, the hit-rate would be higher. In 1982, the results from the first ganzfeld studies were analysed by one of its pioneers, the American parapsychologist Charles Honorton. They pointed to typical hit-rates of better than 30 per cent- a small effect, but one which statistical tests suggested could not be put down to chance.
- E** The implication was that the ganzfeld method had revealed real evidence for telepathy. But there was a crucial flaw in this argument- one routinely overlooked in more conventional areas of science. Just because chance had been ruled out as an explanation did not prove telepathy must exist; there were many other ways of getting positive results. There ranged from 'sensory leakage' – where clues about the pictures accidentally reach the receiver – to outright fraud. In response, the researchers issued a review of all the ganzfeld studies done up to 1985 to show that 80 per cent had found statistically significant evidence. However, they also agreed that there were still too many problems in the experiments which could lead to positive results, and they drew up a list demanding new standards for future research.
- F** After this, many researchers switched to autoganzfeld tests-an automated variant of the technique which used computers to perform many of the key tasks such as the random selection of images. By minimizing human involvement, the idea was to minimize the risk of flawed results. In 1987, results from hundreds of autoganzfeld tests were studied by Honorton in a 'meta-analysis', statistical technique for finding the overall results from a set of studies. Though less compelling than before, the outcome was still impressive.
- G** Yet some parapsychologists remain disturbed by the lack of consistency between individual ganzfeld studies. Defenders of telepathy point out that demanding impressive evidence from every study ignores one basic statistical fact: it takes large samples to detect small effects. If, as current results suggest, telepathy produces hit-rates only marginally above the 25 per cent expected by chance, it's unlikely to be detected by a typical ganzfeld study involving around 40 people: the group is just not big enough. Only when many studies are combined in a meta-analysis will the faint signal of telepathy really become apparent. And that is what researchers do seem to be finding.

- H** What they are certainly not finding, however, is any change in attitude of mainstream scientists: most still totally reject the very idea of telepathy. The problem stems at least in part from the lack of any plausible mechanism for telepathy.
- I** Various theories have been put forward, many focusing on esoteric ideas from theoretical physics. They include ‘quantum entanglement’, in which events affecting one group of atoms instantly affect another groups, no matter how far apart they may be. While physicists have demonstrated entanglement with specially prepared atoms, no-one knows if it also exists between atoms making up human minds. Answering such questions would transform parapsychology. This has prompted some researchers to argue that the future lies not in collecting more evidence for telepathy, but in probing possible mechanisms. Some work has begun already, with researchers trying to identify people who are particularly successful in autoganzfeld trials. Early results show that creative and artistic people do much better than average: in one study at the University of Edinburgh, musicians achieved a hit-rate of 56 per cent. Perhaps more tests like these will eventually give the researchers the evidence they are seeking and strengthen the case for the existence of telepathy.



*Question 14-9*

Reading Passage 2 has 9 paragraphs labelled **A-I**

Which paragraphs contains the following information?

*Write the correct letter **A-I** in boxes 14-9 on your answer sheet.*

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

- 14** Creative and artistic people does much better than average.
- 15** A person acts as a 'sender'.
- 16** The ganzfeld method has revealed real evidence for telepathy.
- 17** The results is dividing the researchers who uncovered them.
- 18** Telepathy is genuine.
- 19** The idea is.
- 20** The faint signal of telepathy wills.
- 21** For more than a century the issue of telepathy has divided the scientific community.
- 22** The problem stems from the lack of any plausible mechanism for telepathy.

*Question 23-26*

*Choose the appropriate letters **A, B, C** or **D**.*

*Write your answers in boxes 23-26 on your answer sheet.*

**23** The ganzfeld method has revealed

- A** many other ways of getting positive results
- B** statistically significant evidence
- C** real evidence for telepathy
- D** new standards for future research

**24** Which of the following correctly describe the paragraph A ? (Choose the best one)

- A** Science
- B** Religion
- C** Human
- D** Scientific method

**25** Telepathy is

- A** real
- B** which
- C** higher
- D** these conditions with participants

**26** Which of the following correctly describe the paragraph F ? (Choose the best one)

- A** tests-an automated variant
- B** statistical technique
- C** The Key
- D** autoganzfeld tests

## READING PASSAGE 3

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

### AIR TRAFFIC CONTROL IN THE USA



- A** An accident that occurred in the skies over the Grand Canyon in 1956 resulted in the establishment of the Federal Aviation Administration (FAA) to regulate and oversee the operation of aircraft in the skies over the United States, which were becoming quite congested. The resulting structure of air traffic control has greatly increased the safety of flight in the United States, and similar air traffic control procedures are also in place over much of the rest of the world.
- B** Rudimentary air traffic control (ATC) existed well before the Grand Canyon disaster. As early as the 1920s, the earliest air traffic controllers manually guided aircraft in the vicinity of the airports, using lights and flags, while beacons and flashing lights were placed along cross-country routes to establish the earliest airways. However, this purely visual system was useless in bad weather, and, by the 1930s, radio communication was coming into use for ATC. The first region to have something approximating today's ATC was New York City, with other major metropolitan areas following soon after.
- C** In the 1940s, ATC centres could and did take advantage of the newly developed radar and improved radio communication brought about by the Second World War, but the system remained rudimentary. It was only after the creation of the FAA that full-scale regulation of America's airspace took place, and this was fortuitous, for the advent of the jet engine suddenly resulted in a large number of very fast planes, reducing pilots' margin of error and practically demanding some set of rules to keep everyone well separated and operating safely in the air.

- D** Many people think that ATC consists of a row of controllers sitting in front of their radar screens at the nation's airports, telling arriving and departing traffic what to do. This is a very incomplete part of the picture. The FAA realised that the airspace over the United States would at any time have many different kinds of planes, flying for many different purposes, in a variety of weather conditions, and the same kind of structure was needed to accommodate all of them.
- E** To meet this challenge, the following elements were put into effect. First, ATC extends over virtually the entire United States. In general, from 365m above the ground and higher, the entire country is blanketed by controlled airspace. In certain areas, mainly near airports, controlled airspace extends down to 215m above the ground, and, in the immediate vicinity of an airport, all the way down to the surface. Controlled airspace is that airspace in which FAA regulations apply. Elsewhere, in uncontrolled airspace, pilots are bound by fewer regulations. In this way, the recreational pilot who simply wishes to go flying for a while without all the restrictions imposed by the FAA has only to stay in uncontrolled airspace, below 365m, while the pilot who does want the protection afforded by ATC can easily enter the controlled airspace.
- F** he FAA then recognised two types of operating environments. In good meteorological conditions, flying would be permitted under Visual Flight Rules (VFR), which suggests a strong reliance on visual cues to maintain an acceptable level of safety. Poor visibility necessitated a set of Instrumental Flight Rules (IFR), under which the pilot relied on altitude and navigational information provided by the plane's instrument panel to fly safely. On a clear day, a pilot in controlled airspace can choose a VFR or IFR flight plan, and the FAA regulations were devised in a way which accommodates both VFR and IFR operations in the same airspace. However, a pilot can only choose to fly IFR if they possess an instrument rating which is above and beyond the basic pilot's license that must also be held.

- G** Controlled airspace is divided into several different types, designated by letters of the alphabet. Uncontrolled airspace is designated Class F, while controlled airspace below 5,490m above sea level and not in the vicinity of an airport is Class E. All airspace above 5,490m is designated Class A. The reason for the division of Class E and Class A airspace stems from the type of planes operating in them. Generally, Class E airspace is where one finds general aviation aircraft (few of which can climb above 5,490m anyway), and commercial turboprop aircraft. Above 5,490m is the realm of the heavy jets, since jet engines operate more efficiently at higher altitudes. The difference between Class E and A airspace is that in Class A, all operations are IFR, and pilots must be instrument-rated, that is, skilled and licensed in aircraft instrumentation. This is because ATC control of the entire space is essential. Three other types of airspace, Classes D, C and B, govern the vicinity of airports. These correspond roughly to small municipal, medium-sized metropolitan and major metropolitan airports respectively, and encompass an increasingly rigorous set of regulations. For example, all a VFR pilot has to do to enter Class C airspace is establish two-way radio contact with ATC. No explicit permission from ATC to enter is needed, although the pilot must continue to obey all regulations governing VFR flight. To enter Class B airspace, such as on approach to a major metropolitan airport, an explicit ATC clearance is required. The private pilot who cruises without permission into this airspace risks losing their license.

*Question 27-33*

Reading Passage 3 has 7 sections, **A-G**

*Choose the correct heading for sections **A-G** from the list of headings below.*

*Write the correct number i-vii in boxes 27-33 on your answer sheet.*

**List of Headings**

- i. The resulting structure increases safety of flight.
- ii. The first region has something approximating today ATC.
- iii. Full-scale regulation takes place.
- iv. The airspace has different many kinds of planes.
- v. ATC enters controlled airspace.
- vi. A pilot flies IFR.
- vii. The private pilot loses their license.

**27** Section **A**

**28** Section **B**

**29** Section **C**

**30** Section **D**

**31** Section **E**

**32** Section **F**

**33** Section **G**

*Question 34-40*

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

*Write the correct letter, **A-G**, in boxes 34-40 on your answer sheet.*

- 34** On a clear day, a pilot in possessed airspace can choose a VFR or IFR flight plan, and the FAA regulations were devised in a way which accommodates
- 35** For example, all a VFR pilot has to do to enter Class C airspace is establish
- 36** An accident that occurred in the skies over the Grand Canyon in 1956 resulted in the establishment of the Federal Aviation Administration -LRB- FAA -RRB- to regulate and oversee the operation of aircraft in the skies over the United States, which were becoming quite engorged
- 37** It was only after the creation of the FAA that complete regulation of America 's airspace took place, and this was fortuitous, for the advent of the jet engine suddenly resulted in a deep number of very fast planes, reducing pilots ' margin of error and practically demanding some set of rules to keep everyone well spaced and operating safely
- 38** In this way, the nonprofessional pilot who simply wishes to go flying for a while without all the restrictions imposed by the FAA has only to stay in unrestrained airspace, below 365m, while the pilot who does want the protection afforded by ATC can easily enter the controlled
- 39** The first region to have something approximating today 's ATC was
- 40** The FAA realized that the airspace over the United States would at any time have many different kinds of planes, flying for more different purposes, in a variety of weather conditions, and the assonant kind of structure was needed to accommodate

- A** two-way radio contact with ATC .
- B** airspace .
- C** all of them .
- D** New York City, with unusual major metropolitan areas following soon after .
- E** .
- F** both VFR and IFR operations in the identical airspace .
- G** in the air .