

ÜDS

Fen Bilimleri

Tüm İlgisiz Cümle Soruları



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1. (I) When rainfall occurs regularly, the moisture of the surface soil is maintained in a constant condition. (II) In some countries irrigation can be costly. (III) This is made possible by the downward movement of water through the soil. (IV) However, during periods of drought the surface soil becomes very dry, its moisture having evaporated into the air. (V) On the whole, this is not harmful since within two or three inches of the surface moist soil can still be found.

A) I B) II C) III D) IV E) V

2. (I) Biologists have made various studies of living organism. (II) First of all, they have classified them on the basis of their structure. (III) They have divided them into two classes, the single-celled organisms and the many-celled organisms. (IV) In almost all plants and animals, the individual cells have different functions. (V) For instance, bacteria and algae are single-celled, while insects, fish and flowering plants are many-celled.

A) I B) II C) III D) IV E) V

3. (I) Cyclones are a constantly recurring fact of life in Bangladesh. (II) But the one that hit the country on 29 April was the worst for a decade. (III) However, controlling the flow of water can reduce the risk of flood. (IV) Within hours, 130 000 people were dead and four million people were homeless. (V) Conditions were so bad that, only a week after the cyclone, many felt that the dead, not the living, were the fortunate ones.

A) I B) II C) III D) IV E) V

4. (I) It is common for a liquid to turn into a vapour when heated. (II) It is less common for a solid substance to turn directly into vapour without ever going through a liquid stage. (III) The best known example of this latter process is solid carbon dioxide, which has the appearance of cloudy ice. (IV) When this is heated, it doesn't turn to liquid but to gas. (V) Indeed, nuclear reactions involving certain substances are highly complex and unpredictable.

A) I B) II C) III D) IV E) V

5. (I) In the universe, hydrogen is apparently the most abundant of all the elements. (II) For instance, analysis of the light emitted by stars indicates that most stars are predominantly hydrogen. (III) Molecular hydrogen is the lightest off all gases. (IV) Similarly, of the Sun's mass, approximately 90 % is hydrogen. (V) However, hydrogen is much less abundant on the earth.

A) I B) II C) III D) IV E) V

6. (I) Deserts are dry areas found in both temperate and tropical region. (II) The low water content of the desert atmosphere leads to daily temperature extremes of heat and cold. (III) Not surprisingly, the flowers of many desert plants are extremely beautiful. (IV) Deserts vary greatly depending on the amount of precipitation they receive. (V) Some are so dry that virtually no plant life occurs on them.

A) I B) II C) III D) IV E) V

7. (I) Far from being a sinister pest, bats are actually a good friend to humankind. (II) For a start, they eat huge quantities of insects. (III) They are sometimes described "mice with wings," but this is totally untrue. (IV) The little brown bat, for instance, is capable of catching and eating 1200 small insects in an hour. (V) They also play an important role in pollinating flowers.

A) I B) II C) III D) IV E) V

8. (I) So far, no one has managed to complete a solo crossing of the Arctic. (II) This is primarily because of the extremely harsh natural conditions. (III) To start with, there are the bitterly cold temperatures to be endured. (IV) The attempt has been made several times, but has never met with success. (V) But that is not all; the explorer has also to battle against the strong tidal pull on the ice.

A) I B) II C) III D) IV E) V

9. (I) Leaves are the main photosynthetic organs of most plants. (II) Because leaves have such a large surface area, water loss by evaporation is inevitable. (III) Their structure is superbly adapted for its primary function of photosynthesis. (IV) Most leaves are thin and flat to allow them maximum absorption of light energy. (V) Further, their ordered arrangement on the stem makes them efficient at catching the sun's rays.

A) I B) II C) III D) IV E) V

10. (I) The terms velocity and speed are often used interchangeably in ordinary language. (II) But in physics we make a distinction between the two. (III) An aircraft travelling faster than the speed of sound breaks the sound barrier. (IV) Most importantly the term velocity is used to signify both the magnitude of movement and the direction in which an object moving. (V) Speed, on the other hand, relates to magnitude only.

A) I B) II C) III D) IV E) V

11. (I) Industrialization came late to Italy. **(II)** Most of the industry is in the north along the Po Valley and particularly around Turin, Genoa and Milan. **(III)** This was partly due to political reasons and partly to the lack of basic raw materials. **(IV)** It was the availability of hydroelectric power and a labour force capable of acquiring the necessary skills, which together brought about the rapid development in the 20th century. **(V)** Indeed, the industrial progress in Italy during the 1950s has been described as “miraculous”

A) I B) II C) III D) IV E) V

12. (I) The simplest type of engine classification is doubtless by reference to the kind of fuel used. **(II)** Nevertheless, reciprocating engines may be divided more fundamentally into those running on the Otto cycle (spark ignition) and those running on Akrody's and Diesel's cycles (compression ignition). **(III)** The former are usually used for small scale power generation. **(IV)** The latter, which burn heavy oil are of two types, slow speed for ships and high speed for motor vehicles. **(V)** Subsequently, improvements in engine design appeared at an amazing speed.

A) I B) II C) III D) IV E) V

13. (I) The industrial revolution should be seen as a stil continuing process. **(II)** It has now, however, taken a new turn. **(III)** It used to be concerned largely with the making of machines to replace human labour. **(IV)** The underlying mathematical theory for the handling of information is “information theory.” **(V)** The emphasis now is on developing machines and instruments to take over certain mental tasks, in particular, the handling of all forms of data.

A) I B) II C) III D) IV E) V

14. (I) Most of our knowledge regarding the structure of the earth has been from the study of rocks. **(II)** Nevertheless, the deeper parts of the earth's crust have a higher temperature than the surface. **(III)** Surface rocks have been studied as have those which can be reached in mines and through borings. **(IV)** Recent techniques have made it possible to carry bore-holes down to depths of several miles. **(V)** In general, however, these borings only reveal rocks comparable in age and character to those found at the surface of the ground.

A) I B) II C) III D) IV E) V

15. (I) It is hard to imagine a better means of preservation than entombment in amber **(II)** Indeed, amber or hardened tree resin has preserved organisms ranging from bacteria to mammals for millions of years. **(III)** It is clear that spiders, for instance, had their fair share of specialized enemies then as now. **(IV)** It surpassed even the finest grain sediments in its ability to retain details. **(V)** Deposits are found round the world, but amber from Hispaniola is especially fossil-rich.

A) I B) II C) III D) IV E) V

16. (I) A series of birth defects among frogs in Canada caused great consternation. **(II)** Most of the defects concern the legs. **(III)** The deformity is indeed widespread and the cause has not as yet been identified. **(IV)** Some have extra legs, some legs that are webbed together and some with paralysed legs. **(V)** In some, missing eyes have also been noticed.

A) I B) II C) III D) IV E) V

17. (I) NASA is considering using nuclear boosters to lift spacecraft into orbit at a fraction of the cost of today's all-chemical launchers. **(II)** The nuclearassisted rocket produced far more thrust than any of the conventional ones which meant the time required for the launching was still further reduced. **(III)** But anti-nuclear protesters claim nuclear launchers would make accidents much more dangerous and accuse NASA of "playing Russian Roulette". **(IV)** NASA, however, disregards all this and remains keen to move away from conventional chemical rockets to lighter, more powerful propulsion systems. **(V)** “Nuclear systems give you a chance to reduce your mass and so your overall costs to orbit” says R. Adams, of NASA's Marshall of Space Flight Center in Alabama.

A) I B) II C) III D) IV E) V

18. (I) When a tunnel is to go through rock, holes are drilled and charged with explosives, **(II)** The pattern of the holes and the timing of the explosives are worked out carefully . **(III)** The aim is to get as clean a cut as possible **(IV)** But the problems of removing the soil have also to be taken into consideration. **(V)** If the rock is solid, huge chambers can be cut out cheaply.

A) I B) II C) III D) IV E) V

19. (I) An important secondary effect of noise is noise-induced vibrations. **(II)** For example, certain construction operations in urban areas may be prohibited during specified hours. **(III)** Sound of sufficient intensity may cause buildings to vibrate and windows to break. **(IV)** This is most likely to happen in construction areas where explosives are used or where blasting operations are conducted. **(V)** In such circumstances, it is important that precautions are taken to protect nearby structures.

A) I B) II C) III D) IV E) V

20. (I) Lubrication reduces friction and, because the surfaces do not scrape against each other, it reduces wear on the material. **(II)** Although dry friction can be eliminated in this way, some power will still be lost depending on the thickness of the lubricant seed. **(III)** If the lubricant is too thick, the lubricant itself will offer some resistance to motion. **(IV)** A greater force is required to start surfaces moving than to keep them in motion. **(V)** The selection of the correct lubricant depends on many factors, chief among them being the operating speed of the machinery.

A) I B) II C) III D) IV E) V

21. (I) A committee of prominent physicists, chemists and others was appointed to investigate the properties of TEL (tetraethyl lead). **(II)** The committee presently reported mild health effects from the use of lead but nothing drastic enough to justify a ban. **(III)** Increased ventilation and other plant improvements reduced the workplace hazard to an acceptable level. **(IV)** In their opinion, TEL was dangerous only in concentrated form, not when diluted in gasoline. **(V)** If reasonable precautions were taken and mixing was performed at distribution centres instead of at the point of purchase, there would be no cause for concern.

A) I B) II C) III D) IV E) V

22. (I) Of all the legacies of the ancient seas the most valuable is petroleum. **(II)** No one knows exactly what geologic processes have created these precious pools of liquid deep within the earth. **(III)** But one thing seems certain. **(IV)** On the other hand, few geologists believe that petroleum formation is linked with volcanic action. **(V)** Petroleum is a result of fundamental earth processes that have been operating at least since the beginning of Palaeozoic time.

A) I B) II C) III D) IV E) V

23. (I) Geologists are presently seeking ways of detecting earthquakes before they strike. **(II)** If they are successful, then people may be evacuated from a danger area before the earthquake happens. **(III)** Geologists are also carrying out experiments in earthquake control. **(IV)** It is calculated that there are as many as 500,000 earthquakes in a single year. **(V)** If these experiments are successful, it may be possible, in the future, to minimize the destructive force of earthquakes.

A) I B) II C) III D) IV E) V

24. (I) The origin of the asteroids is uncertain. **(II)** An asteroid would then remain in the same relative position, provided the initial velocity were suitably chosen. **(III)** It has been supposed that they are fragments of a former planet which has broken up. **(IV)** An alternative view is that they represent material, which did not coalesce to form a single body at the time the other planets were formed. **(V)** If so, this was possibly the result of the disturbing action of Jupiter.

A) I B) II C) III D) IV E) V

25. (I) One main challenge in the production of readymixed paints was the achievement of complete dispersion of the pigment in the vehicle. **(II)** All the early patent paints had a poor reputation because they were thin and lacked opacity. **(III)** The widespread use of lime and calcium carbonate instead of the more expensive white lead produced paint that streaked. **(IV)** Some manufacturers diluted their paints with too much water. **(V)** Others added crushed pebbles to make the cans heavier.

A) I B) II C) III D) IV E) V

26. (I) Gravity has always been regarded by scientists as the most important force in the universe. **(II)** Cosmic expansion was triggered by the Big Bang 15 billion years ago. **(III)** They also believed that gravity was gradually slowing down cosmic expansion. **(IV)** Recently, however, there is evidence to suggest that the universal expansion is actually accelerating. **(V)** If this is so, then it would seem that gravity is actually being opposed by an even more powerful cosmic force.

A) I B) II C) III D) IV E) V

27. (I) A new kind of cat's-eye is now being tried out on some UK roads. **(II)** These new road studs flash without a headlight beam passing over them. **(III)** However, they just might be useful for attracting the driver's attention for a pedestrian crossing. **(IV)** They include high-intensity light-emitting diodes (LEDs) to provide illumination. **(V)** The studs are solar-powered and contain rechargeable batteries to store energy over long periods of bad weather.

A) I B) II C) III D) IV E) V

28. (I) The use of radio waves as a medium for making interstellar contact is discouraging. **(II)** The galaxy's enormous distances inevitably require fantastic measures such as stunningly high transmitter power or huge antennas and impractically narrow beams. **(III)** Certainly the kinds of systems that would be needed to mount a realistic project to beam a signal to a group of stars are probably beyond the resources of the world. **(IV)** Furthermore, even if contact could somehow be made, the time delay before a response to a message could be received might very well stretch into many centuries. **(V)** For four decades, researchers have sporadically scanned the heavens for any radio signals.

A) I B) II C) III D) IV E) V

29. (I) Wind power is gaining in favor all across Europe. **(II)** Indeed, it is only the building of a wind-farm that is expensive, running costs are low. **(III)** There are several reasons for this. **(IV)** One is that all the technical obstacles that previously existed have been overcome. **(V)** Another is the increase in efficiency, which means that wind can now compete directly with traditional power-generation methods.

A) I B) II C) III D) IV E) V

30. (I) Water filters are particularly useful if you live in a hard water area. **(II)** Hard water contains a higher concentration of calcium than soft water. **(III)** It is this that causes lime scale in kettles, irons and other electrical appliances. **(IV)** The main function of a filter is to improve the appearance and the taste of water. **(V)** It also means that you have to use more soap than you would in soft water areas.

A) I B) II C) III D) IV E) V

31. (I) Apart from hydroelectricity, there are several other non-depletable energy sources in use such as wind turbines and solar heating. **(II)** However, it is only in relatively few circumstances that any of them prove to be economic. **(III)** In fact, the developing countries account for one-fourth of the world's production and one-fifth of the world's consumption of commercial energy. **(IV)** Even where they appear to be operating as ordinary commercial ventures, they are usually heavily subsidized. **(V)** So, at present, oil, natural gas and coal are still the major suppliers of energy in the world.

A) I B) II C) III D) IV E) V

32. (I) Photosynthesis today is the largest single chemical process on Earth. **(II)** When molecules absorb light energy, they become "excited" and transfer the gain in energy to their electrons. **(III)** It has been estimated that each year about 150,000 million tons of carbon dioxide and 120,000 million tons of water are used to produce 100,000 million tons of organic matter and about 110,000 million tons of oxygen gas by the process of photosynthesis. **(IV)** Moreover, it is assumed that the oxygen in our atmosphere is replaced by the process of photosynthesis every 2000 years. **(V)** Also, interestingly, the photosynthesis of ages past is responsible for the fossil fuels that have made our industrial civilization possible.

A) I B) II C) III D) IV E) V

33. (I) Pergamum is an ancient city in western Asia Minor. **(II)** It achieved great political importance in the second century B.C. **(III)** At that time it also became a centre of art and culture. **(IV)** Archeologists are still working to restore this ancient city. **(V)** Its library was particularly famous, but the contents were given by Mark Antony to Cleopatra and transported to Alexandria.

A) I B) II C) III D) IV E) V

34. (I) The aberration of starlight is an optical illusion caused by the motion of the Earth. **(II)** Rain falling appears vertical when seen from the window of a stationary train; when seen from the window of a moving train, the rain appears to follow a sloping path. **(III)** In the same way light from a star "falling" down a telescope seems to follow a sloping path because the Earth is moving. **(IV)** Optical aberration is one of a number of defects that impair the image in an optical instrument. **(V)** Thus, an apparent displacement or aberration in the position of the star takes place.

A) I B) II C) III D) IV E) V

35. (I) Adding sugar to a drink taken straight from a microwave can trigger an eruption of boiling liquid. **(II)** Heat may be transferred from one place to another by conduction. **(III)** The cause of such incidents is uneven heating by microwaves, which leads to some parts of the liquid being superheated beyond their boiling point. **(IV)** If just a few grains of sugar are then added to this unstable mix, they act as nucleation sites for bubbles. **(V)** It is these bubbles that form with explosive violence.

A) I B) II C) III D) IV E) V

36. (I) The remotely operated vehicle (ROV), *Jason II*, resembles its predecessor, but nearly every component has been much improved. **(II)** To start with, it is bigger, so it can retrieve more material from the ocean floor. **(III)** Further, a second manipulator arm has been added which has increased maneuverability and power. **(IV)** Another advantage is the fact that it can function at greater depths. **(V)** Indeed, a lot of people feel that the costs of ROV technology are in excess of its usefulness.

A) I B) II C) III D) IV E) V

37. (I) Tides are the result of the gravitational pull of both the Moon and the Sun which cause a swell of water to sweep across the oceans twice a day. **(II)** Even so, in some parts of the world one is hardly aware of high tide and low tide. **(III)** This swell is only about 1 metre high, but it contains a huge volume of water. **(IV)** As it tries to squeeze into a tight inlet, the result can be a substantial rise in sea level at high tide and a huge tidal range. **(V)** The world's largest tidal range is thought to be in the Bay of Fundy in Nova Scotia.

A) I B) II C) III D) IV E) V

38. (I) The California condor is a critically endangered bird. **(II)** It has, fortunately, been saved from extinction by a captive breeding programme. **(III)** Young condors are now being successfully reintroduced into the wild. **(IV)** This underlines the urgency with which protective action is needed. **(V)** The situation, however, still remains precarious, as there are presently no reproductive condors in the wild.

A) I B) II C) III D) IV E) V

39. (I) The speeds of Saturn's equatorial jet winds have dropped noticeably over the last two decades. **(II)** The slowdown is probably part of the long seasonal cycle on Saturn, which takes thirty years to orbit the Sun. **(III)** For the last five years, the research team has been comparing cloud features and storm systems on Saturn. **(IV)** It may also be due in part to extreme differences between the seasons. **(V)** This occurs because the rotational axis of the planet is highly tilted.

A) I B) II C) III D) IV E) V

40. (I) Industrial robots are now in great demand. **(II)** The variety in shape and size of these particular "task-specific" robots is one reason why they are so expensive to produce. **(III)** At least 750,000 robots are currently engaged in global industry. **(IV)** As regards production, Japan is in the lead, producing twice as many industrial robots as the rest of the world combined. **(V)** It is followed by the EU, where Germany is the leader.

A) I B) II C) III D) IV E) V

41. (I) Neutrinos have been eluding physicists ever since Pauli first hypothesized their existence in 1930. **(II)** In the physical universe, what goes in, equals what comes out, in one form or another. **(III)** So there will be no need to postulate a particle that cannot be detected. **(IV)** But physicists had noticed that when radioactive atoms spat out electrons and transformed into other kinds of atoms, some of the original energy appeared to be missing. **(V)** Pauli proposed that it had been carried away by a virtually invisible particle.

A) I B) II C) III D) IV E) V

42. (I) Extinction, the end of a lineage, occurs when the last individual of a species dies. **(II)** The loss is permanent, for once a species is extinct it can never reappear. **(III)** Extinctions have occurred continually since the origin of life. **(IV)** The habitats of many animal and plant species have been altered or destroyed by human activities. **(V)** By one estimate, only one species is alive today for every 2,000 that have become extinct.

A) I B) II C) III D) IV E) V

43. (I) The century that has just ended saw many new materials adapted for battery use. **(II)** These include mercury, silver oxide and nickel-cadmium. **(III)** At first, little thought was given to what would happen when millions of tons of these substances were discarded into the environment. **(IV)** But recently mercury has been eliminated from batteries because of its toxicity, and cadmium may follow. **(V)** For devices used only occasionally, the zinc-carbon battery can be more cost-effective than other types.

A) I B) II C) III D) IV E) V

44. (I) During the 1960s and 1970s, the decision was made to send humans into space, instead of just shipping machines. **(II)** There were two main reasons for this. **(III)** One was the ability of humans to respond to unexpected situations; the other was curiosity and the thirst for excitement. **(IV)** Long-term journeys into space are particularly stressful. **(V)** There are, however, major problems to be overcome by the human astronauts; these are medical, physiological, psychological and psycho-social in nature.

A) I B) II C) III D) IV E) V

45. (I) Tides on Jupiter's satellite, Europa, are different from those on the Earth in important ways. **(II)** The length of Europa's day matches its orbital period of 85 hours. **(III)** For one thing, Jupiter is huge, and it produces enormous tides on Europa. **(IV)** In fact, the height of the tide is about 500 meters at its peak. **(V)** The daily tidal change, however, is much smaller.

A) I B) II C) III D) IV E) V

46. (I) Theoretically, large oil tankers can stop within about 3 km from their typical cruising speed of 30 km per hour. **(II)** Wind and sea currents can also cause problems. **(III)** In practice, however, distances can be 15 km or more. **(IV)** To stop quickly, a vessel needs to reverse its propellers at full power. **(V)** This can take some time and breaking depends on how efficient propellers are in reverse.

A) I B) II C) III D) IV E) V

47. (I) It is convenient to use symbols for the atoms of the different elements. **(II)** An atomic symbol is a one- or two-letter notation used to represent an atom corresponding to a particular element. **(III)** Today we know that atoms are not truly indivisible. **(IV)** Typically, the atomic symbol consists of the first letter, capitalized, from the name of the element, sometimes with an additional letter from the name in lowercase. **(V)** For example, chlorine has the symbol Cl.

A) I B) II C) III D) IV E) V

48. (I) Until recently most big ships were built up to a standard "Panamax" size so they could pass through the Panama Canal. **(II)** The plan proposes a major enlargement of the canal. **(III)** But now new "post-Panamax" ships, up to 150 feet across and 1,200 feet long, are emerging from Asian shipyards. **(IV)** Apparently 160 such vessels are due to be built over the next few years. **(V)** As a result, ports around the world are being upgraded to accommodate them.

A) I B) II C) III D) IV E) V

49. (I) The newly discovered crater has been named "Silver Pir" after the local fishing grounds. **(II)** It is situated 140 km off the east coast of Britain and is around 3 km across and 300 m deep. **(III)** It has been estimated that the asteroid that caused the crater must have been between 200 and 500 m across. **(IV)** However, it is not the size but the structure of a crater that is interesting. **(V)** As far as timing goes, the crash-landing must have occurred between 60 and 65 million years ago.

A) I B) II C) III D) IV E) V

50. (I) Laser light is coherent. **(II)** This means that the waves forming the beam are all in phase; that is, the waves have their maxima and minima at the same points in space and time. **(III)** The word laser is an acronym meaning light amplification by stimulated emission of radiation. **(IV)** The property of coherence of a laser beam is used in compact disc (CD) audio players. **(V)** Music is encoded on the disc in the form of pits, or indentations, on a spiral track.

A) I B) II C) III D) IV E) V

51. (I) IRAS was one of the most productive satellites in the history of astronomy. **(II)** Though functional for only 10 months in 1983, the observations it performed continue to be a major source of information for astronomers. **(III)** The satellite undertook a complete survey of the sky in mid- and far-infrared light, with wavelengths between 12 and 100 microns. **(IV)** The spectrum also reveals the geometry of the dust. **(V)** This part of the spectrum is difficult or impossible to detect from the ground so the survey was of immense importance.

A) I B) II C) III D) IV E) V

52. (I) Australia is home to marsupials like kangaroos and koalas. **(II)** The ability to generate body heat is what enables mammals to survive in so many different climates. **(III)** These are animals that give birth to underdeveloped young who crawl into the mother's pouch. **(IV)** There they develop further until they can live in the outside world. **(V)** The way of rearing the babies is unusual but they are fed in the usual way, on mother's milk.

A) I B) II C) III D) IV E) V

53. (I) Egypt is restricted in the amount of water it is allowed to take each year from the Nile. **(II)** Although its population is increasing, the amount of available water remains the same. **(III)** Wealthy investors and poor farmers alike used the water to grow crops. **(IV)** Moreover, much water is lost through evaporation from the surface of Lake Nasser and from old, inefficient irrigation systems, **(V)** So Egypt is building a giant canal which will take water from Lake Nasser's overflow basin and carry it to new irrigation systems in the desert.

A) I B) II C) III D) IV E) V

54. (I) Amphibians are in decline, and the causes remain controversial. **(II)** Among the earliest suspected culprits were pesticides. **(III)** Only a very few reports, however, have linked amphibian declines to pesticides in a convincing manner. **(IV)** Even DDT's role in wildlife problems took years to decipher. **(V)** And even in those few studies, the pesticide concentrations appear to be too low to kill amphibians.

A) I B) II C) III D) IV E) V

55. (I) The Museum of the History of Science occupies the building that was originally the Ashmolean Museum. **(II)** Here, from the 17th century onwards, there was a programme of experimentation and discovery. **(III)** Recent building work at the Museum has unearthed insights into the nature of this work and afforded new items for display. **(IV)** These range from scientific apparatus to fragments of everyday life such as specimen labels. **(V)** Actually, in some science museums one can even watch scientists at work on their experiments.

A) I B) II C) III D) IV E) V

56. (I) Computer researchers predict that quantum computers will become a reality within 10 to 15 years. **(II)** However, these machines pose a security threat, because their ability to perform many calculations at once means they will be able to uncover the encryption keys that are, for practical purposes, untraceable by today's "classical" conventional computers. **(III)** If that happens, people will be able to tap into cell phone calls. **(IV)** A quantum computer can represent a 0 and a 1 at the same time in a quantum bit (called a qubit). **(V)** Furthermore, secure e-commerce will be a thing of the past.

A) I B) II C) III D) IV E) V

57. (I) Everyone knew that freezing rain could be bad, but what the researchers learned was frightening. **(II)** All aircraft designers are familiar with the challenge of icing. **(III)** Manufacturers must demonstrate that their aircraft are capable of flying safely in cold, wet conditions where they might ice up. **(IV)** In the US, those conditions are specified by the Federal Aviation Administration's (FAA) "Appendix C". **(V)** This appendix clearly states the kinds of cold weather which an aircraft must be able to deal with.

A) I B) II C) III D) IV E) V

58. (I) Mother Columbian rainbow boas, *Epicrates cenchria maurus*, have the strange habit of eating some of their own young. **(II)** Now new research reveals why. **(III)** Within two weeks, these mothers regained their lost muscle. **(IV)** Stillborns and undeveloped eggs in a clutch, which the mother consumes soon after laying or giving birth, are rich in energy and contain a diversity of proteins and essential nutrients. **(V)** Therefore, maternal cannibalism leads to a quick recovery after giving birth.

A) I B) II C) III D) IV E) V

59. (I) Nyos is a crater lake formed by a volcanic eruption roughly five centuries ago. **(II)** In these lakes the gas saturates the bottom water. **(III)** It is one of many such lakes, found the world over in volcanic chains. **(IV)** It is, however, one of only two lakes known to have exploded. **(V)** And when it exploded a jet of gas-laden water rose 80 meters high and carbon dioxide filled the air.

A) I B) II C) III D) IV E) V

60. (I) Most of the military robotic systems currently operating are airborne. **(II)** This is because robots for use in a ground war present serious problems as conditions are more complex and less predictable. **(III)** The Army's first ground robots were devoted to mine-sweeping. **(IV)** For instance, what works in a desert will be unsuited to jungles. **(V)** Similarly, a machine designed for use in cities is unlikely to adapt to mountains.

A) I B) II C) III D) IV E) V

61. (I) With the advent of relativity theory, the physicist Max Born was the first to develop a relativistic theory of the rigid electron. **(II)** The theory brought him into contact with Albert Einstein, first in 1909 and later during World War I. **(III)** He and Einstein were to remain close friends. **(IV)** Studies in nuclear physics have had a pattern of staggering progress. **(V)** Their correspondence is one of the treasures of 20th century history.

A) I B) II C) III D) IV E) V

62. (I) A compound is a substance containing two or more elements in a fixed ratio. **(II)** The smallest unit of an element having all the characteristics of that element is an atom. **(III)** They are much more common than pure elements in nature. **(IV)** In fact, few elements exist in a pure state in nature. **(V)** Many compounds consist of only two elements; for instance, table salt (sodium chloride, NaCl) has an equal number of parts of the elements sodium and chlorine.

A) I B) II C) III D) IV E) V

63. (I) In his article "The Future Doesn't Need Us", the scientist Bill Joy describes advances in three fields: genetic engineering, nanotechnology and robotics. **(II)** The first has created the possibility of gene therapy that could bring diseases like cancer under control. **(III)** These technological advances carry a strong potential for improving our quality of life in the not-too-distant future. **(IV)** The second refers to technologies that manipulate matter on the extremely small scale of nanometres, allowing the creation of novel plant species or new viruses. **(V)** Finally, robotics will eventually raise the possibility of intelligent and self-replicating machines that are barely distinguishable from humans.

A) I B) II C) III D) IV E) V

64. (I) With shipping predicted to increase threefold within the next 30 years, there are plans for a zeroemissions ferry. **(II)** It will catch the wind through computer-controlled sails covered by solar cells to generate extra electricity. **(III)** The vessel will have a main hull surrounded by four side hulls, cutting drag. **(IV)** This will also eliminate the need for ballast water, which can have a negative environmental impact. **(V)** Shipping is one of the cheaper ways of transporting goods across the vast oceans of our planet.

A) I B) II C) III D) IV E) V

65. (I) The narwhale has an eight-foot-long spiralled tooth that makes it resemble a unicorn of the sea. **(II)** Some thought that the whale used it to break arctic ice; others theorized that it served as a weapon in male fights. **(III)** Narwhales typically live for 40 to 50 years, and seldom leave their arctic habitat. **(IV)** The tooth, in fact, may be a giant sensor for navigating and hunting. **(V)** It appears capable of detecting changes in water temperature, pressure, and particle gradients linked with salinity and prey.

A) I B) II C) III D) IV E) V

66. (I) Are humans the only primates that cry? **(II)** The answer depends on how you define "crying". **(III)** If it is defined as tears coming from the eyes, then the answer is yes. **(IV)** Others take a conservative stance and say that it is too difficult to tell whether or not non-human primates have feelings. **(V)** However, if crying is vocalization that occurs under the conditions of distress, then you can find crying in almost all primates.

A) I B) II C) III D) IV E) V

67. (I) Vertebrate skeletons must be both rigid and strong. **(II)** However, there are disadvantages to having grossly under- or overbuilt bones. **(III)** Animals have to balance the needs for strength and stability against the cost of producing, maintaining and manufacturing a heavier skeleton. **(IV)** Consequently, skeletal size tends to match mechanical requirements closely. **(V)** Indeed, limb-bone fractures are relatively rare.

A) I B) II C) III D) IV E) V

68. (I) The world's coral reefs are in trouble. **(II)** According to an international consortium of scientists and volunteers, only 30 per cent of reefs are healthy now. **(III)** Modern coral reefs as we know them have been accumulating since the Holocene Epoch 10,000 years ago. **(IV)** US government agencies, conservation organizations and other scientists echo the point. **(V)** A few go so far as to say that coral reefs in some areas may be doomed.

A) I B) II C) III D) IV E) V

69. (I) Plant biologists estimate that 25-50% of all plant species are polyploids, that is, having three or more sets of chromosomes. **(II)** Hybridization between two species accounts for most of this polyploidy, perhaps because the unusually diverse assortment of genes a hybrid inherits from parents of different species can be advantageous. **(III)** Many of the plants we grow for food are polyploids, including oats, potatoes, bananas, plums, apples and wheat. **(IV)** Cotton, also a polyploid, is the source of one of the world's most popular clothing fibres. **(V)** Cotton thread is made from the long white plumes that extend from the seeds of the plant.

A) I B) II C) III D) IV E) V

70. (I) Migration is a very precise evolutionary adaptation to seasonal changes, but the benefits of migration are not without cost. **(II)** Many weeks may be spent each year on energy-demanding journeys. **(III)** Some animals may become lost or die along the way. **(IV)** Green turtles migrate more than 2,000 kilometres across open ocean between their feeding area off the coast of Brazil and their nesting place on Ascension Island. **(V)** And migrating individuals are often at greater risk from predators in unfamiliar areas.

A) I B) II C) III D) IV E) V

71. (I) When their nuclear fuel is exhausted, stars die, and the residual iron core collapses on itself. **(II)** The outcome of a star's death depends on mass, however. **(III)** Stars with between 10 and 20 times the mass of the Sun collapse in a spectacular explosion known as a supernova, leaving behind a neutron star, whereas those larger than 20 solar masses implode to form black holes in a hypernova. **(IV)** In both cases, copious bursts of neutrinos are released along with optical, x-ray and gamma radiation. **(V)** Recent studies indicate that some massive stars may be rotating only slowly or not at all.

A) I B) II C) III D) IV E) V

72. (I) Since the cloned-sheep Dolly's birth, researchers have cloned many other mammals, including mice, cats, horses, cows and pigs. **(II)** Such reproductive cloning has many potential applications. **(III)** Their most advanced embryo, however, had stopped growing at about six cells, and their intention was solely to harvest embryonic stem cells. **(IV)** By using genetically engineered donor nuclei, geneticists can study the effects of changing single genes or combinations of genes. **(V)** And in the future, biologists may routinely produce genetically identical animals for experimentation, a potential benefit to genetics research.

A) I B) II C) III D) IV E) V

73. (I) The algal ancestors of plants may have carpeted moist fringes of lakes or coastal salt marshes over 500 million years ago. **(II)** Both groups have similar microscopic structures for making their cellulose cell walls and a similar mechanism for forming the cell plate that divides the cytoplasm during cell division. **(III)** These shallow-water habitats were subject to occasional drying, and natural selection would have favoured algae that could survive periodic droughts. **(IV)** Some species accumulated adaptations that enabled them to live permanently above the water line. **(V)** The modern-day green alga *Coleochaete* may resemble an early plant ancestor, and it grows at the edges of lakes as disk-like, multicellular colonies.

A) I B) II C) III D) IV E) V

74. (I) Humans have a long history of studying, appreciating, and using animal diversity, but classifying a new animal isn't always easy. **(II)** Imagine you were the first European zoologist to encounter a strange animal in Australia that has the following physical features. **(III)** It has a bill and webbed feet similar to a duck's, but the rest of its furry body looks very much like that of a muskrat or other aquatic rodent, and it lays eggs. **(IV)** Unlike the rest of the world, Australia has relatively few placental mammals. **(V)** How would you classify it?

A) I B) II C) III D) IV E) V

75. (I) Reefs are under attack from all sides. **(II)** Coral reefs are one of the oldest and most diverse ecosystems on Earth. **(III)** Hurricanes and tsunamis can cause injuries that take decades for a reef to repair naturally. **(IV)** Meanwhile, destructive fishing practices, pollution, ships running aground and climate change pose an even more serious threat. **(V)** A report issued by the UN Environment Programme warned that 30 per cent of the world's coral reefs are either already dead or seriously damaged.

A) | B) | C) | D) | E) | V

76. (I) In science fiction, the worst threats to space travellers are large ones: asteroids, ravenous creatures, and imperial battle cruisers. **(II)** The journey time from Earth to Mars could be reduced from six months to less than six weeks. **(III)** In reality, though, the scariest menaces for humans in space are the tiniest: fast-moving elementary particles known as cosmic rays. **(IV)** On a long journey, these would give astronauts a dose of radiation serious enough to cause cancer. **(V)** Unlike most of the other challenges of venturing into deep space, which engineers should be able to solve, cosmic rays pose irreducible risks.

A) | B) | C) | D) | E) | V

77. (I) A dramatic cut in the cost of a super-efficient new breed of solar cell could put domestic solar power on a more economic footing. **(II)** The cells, which helped take NASA's electric-powered aircraft Helios to record altitudes, have until now been too expensive. **(III)** But their manufacturer has found a way to make them as much as 20 times cheaper. **(IV)** The cells convert light energy into electricity with an efficiency of 20 per cent – which means they generate one-third more electrical power than conventional silicon solar cells. **(V)** NASA's electrically powered plane Helios soared to altitudes above 96,000 feet (29 kilometres) – a world record for a winged plane not powered by a rocket engine.

A) | B) | C) | D) | E) | V

78. (I) Our knowledge of cell structure took a giant leap forward as biologists began using the electron microscope in the 1950s. **(II)** Instead of light, the electron microscope (EM) uses a beam of electrons. **(III)** Actually, specimens should have been cut into extremely thin sections and stained with atoms of heavy metals such as gold. **(IV)** The EM has a much greater resolution than the light microscope. **(V)** Under special conditions, the most powerful EMs can detect individual atoms.

A) | B) | C) | D) | E) | V

79. (I) Early in the 20th century, oranges and grapefruits were ripened for market in sheds equipped with kerosene stoves. **(II)** Before leaves fall, many of their essential elements are stored in the stem. **(III)** Fruit growers thought it was the heat that ripened the fruit, but when they tried newer, cleaner-burning stoves, the fruit did not ripen fast enough. **(IV)** Plant biologists learned later that ripening in the sheds was actually due to ethylene, a gaseous by-product of kerosene combustion. **(V)** We now know that plants produce their own ethylene, which functions as a hormone that triggers a variety of aging responses, including fruit ripening and programmed cell death.

A) | B) | C) | D) | E) | V

80. (I) Since the terrorist attacks on 11 September 2001, anti-aircraft missile batteries have been installed to protect buildings in US cities. **(II)** However, less drastic solutions have also been suggested. **(III)** No software simulation is going to be sufficient to convince any pilot about the new avionics systems. **(IV)** An aerospace company, for instance, has proposed installing the electronics from its pilotless plane in passenger aircraft to allow ground control to take over a hijacked plane and land it remotely. **(V)** Others say automatic landing systems could steer planes to safety without human intervention.

A) | B) | C) | D) | E) | V

