PART 1:

Battery-powered future

The US electric car manufacturer Tesla Motors has announced plans to sell battery technology capable of powering individual homes and businesses.
The batteries use energy drawn from solar panels.
Tesla's billionaire founder, Elon Musk, said they'll allow homeowners to go off the electric grid and will change the way the world uses energy.

1. Choose the correct summary for the passage above:

A) An American company is planning to sell car batteries charged with energy from the sun which will change the way the world uses energy.

B) An American company is making plans to sell batteries charged with energy from the sun which will be able to provide enough power for a whole house or company and change the way the world uses energy.

C) An American company is making plans to sell solar panels which will be able to power houses and cars and change the way the world uses electricity.

China´s Greenhouse Gases

A new study of China's greenhouse gas emissions suggest they could start to decline within the next 10 years. The research by the London School of Economics indicates that the fall could happen five years earlier than forecast. Despite being the world's leading carbon polluter, China is also the biggest investor in solar, wind and nuclear power.

2. Choose the correct summary for the passage above:

A) A new report has shown that greenhouse gas emissions by China will end in 10 years' time.

B) A new report has forecast that China will produce the world's biggest emission of greenhouse gases in five years' time.

C) A new report predicts China is going to reduce its emission of greenhouse gas earlier than expected.

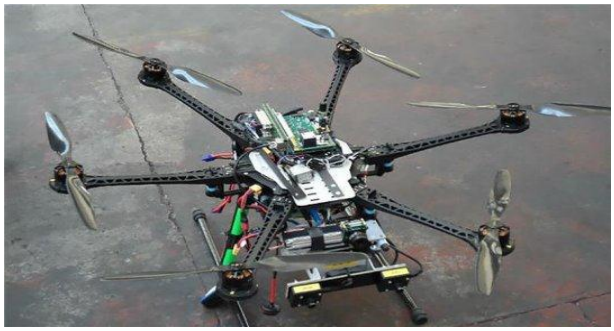
Source:

PART 2:

TEXT 1:

Drones say goodbye to pilots.

With the goal of achieving autonomous flight of these aerial vehicles, the researcher José Martínez Carranza from the National Institute of Astrophysics, Optics and Electronics (INAOE) in Mexico, developed a vision and learning system to control and navigate them without relying on a GPS signal or trained personnel.



Drone manufactured by Blue Bear Systems Research Ltd.
Credit: Image courtesy of Investigación y Desarroll

Mexican José Martínez, structured an innovative method to estimate the position and orientation of the vehicle, allowing it to recognize its environment, hence to replace the GPS location system for low-cost sensors such as accelerometers, gyroscopes and camcorders.

The main idea was to avoid the use of GPS and opted for the use of video cameras on board of the vehicle for visual information and applying an algorithm to locate and orient the drone during its flight to use such information. To do this, a function that allows to draw a specific route on a map using aerial view was also adapted, similar to google maps, it indicates autonomous navigation to a particular destination.

This knowledge was developed in the "PUCE projects: 'Precise navigation of UAVs in Complex Environments and SMART Boomerang'," work developed during his postdoc at the University of Bristol, in collaboration with the British company Blue Bear Ltd, which provided the drones and control algorithms while financing was obtained from Innovative UK and the Defence Science and Technology Laboratory (DSTL), British government agencies that finance technological innovation projects.

"Upon completion of these projects, I returned to Mexico as full-time researcher at the INAOE, where I won the Royal Society-Newton Advanced Fellowship financing awarded by the British Academy of Sciences. This will allow me to perform basic science research focused on the issue of aerial robotics," said the researcher, who also holds a Master in Computer Science.

The project for which funding was obtained is called "RAFAGA: Robust Autonomous Flight of unmanned aerial vehicles in GPS-denied outdoor areas." Its main objective is to investigate different methods to perform autonomous flight of a drone on the outside environment where several challenges as wind currents occur in areas where there is no GPS signal and have limited computational processing capabilities.

"At the stage of repeating, the pilot just makes the drone take off, but once in the air, autonomous flight algorithms kick into action and, by processing visual information captured by the camera, the vehicle recognizes where in the environment it is positioned, "said the researcher at INAOE.

Once it has recognized its location, visual information estimates vehicle position, which is sent to the control algorithms, responsible for moving the drone, so that it navigates to each of the points made in the route recorded during the stage teaching.

Software for ground control station was also developed, where the visual transmission from the drone is received in real time, this through the inspection chamber in charge to take photos or videos needed to detect fractures or flaws in structures.

The INAOE researcher reports that RAFAGA was achieved thanks to the Newton Fund, which aims to promote collaboration between the UK and developing countries in order to promote scientific and technological research. This time, funding ends in February 2017 and was awarded in partnership with CONACYT and the Mexican Academy of Sciences.

In the future Martinez Carranza wants to make the drone capable of being operated from wearable devices, or wearables, and used in various civil applications such as surveillance, exploration of properties in the inspection of towers, among others that are beneficial to society

Source: Investigación y Desarrollo. "Scientist created drones that fly autonomously and learn new routes." ScienceDaily. ScienceDaily, 26 May 2015. <www.sciencedaily.com/releases/2015/05/150526085134.htm>.

Answer to questions 3 to 7 according to the text "Drones say goodbye to pilots":

3. Which alternative is <u>TRUE</u>, according to the text?

A) The project was ,at first, financed by Innovative UK and the Defence Science and Technology Laboratory (DSTL)

B) Recordings of the visual transmission from the drone is processed only when it gets to the ground.

C) The Master Program in Computer science at INAOE finances Prof. Carranza´s basic science research focused on the issue of aerial robotics.

D) The future applications of the drone listed on the text include military operations.

4. According to the text, the alternatives below are objectives of the project designed and developed by the researcher José Martínez Carranza. <u>EXCEPT</u> :

A) to substitute the GPS location system for less expensive sensors.

B) to develop strategies to perform autonomous flight of a drone on the environmentally challenging outside environment.

C) to create a system that would not depend on human intervention at any stage.

D) to create a system that could operate in areas where there is no GPS signal.

5. The word “hence”, in the following passage “ (...) hence to replace the GPS location system (...)”(line 2), could NOT be replaced by:

A) For this reason

B) Following from this

C) Therefore

D) However

6. <u>Write T for True and F for False</u>, according to the text “Drones say goodbye to pilots”:

A) ( ) O projeto de Martinez desenvolveu um método de orientação que visa substituir o GPS por sensores de mais baixo custo.

B) ( ) O sistema utiliza o Google maps para orientar o vôo do drone.

C) ( ) Não há necessidade de intervenção humana, a partir do momento em que o drone está em vôo.

D) ( ) A informação visual transmitida pelo drone é recebida pelo controle de terra assim que ele aterrissa.

7. The word “Once”, in the passage “Once it has recognized its location, visual information estimates vehicle position (…)”, could be replaced by:

A) Although

B) Nevertheless

C) From the moment

D) Therefore

TEXT 2:

People´s ability to compute.

People appear to be born to compute. The numerical skills of children develop so early and so inexorably that it is easy to imagine an internal clock of mathematical maturity guiding their growth. Not long after learning to walk and talk, they can set the table with impressive accuracy – one plate, one knife one spoon, one fork, for each of the five chairs. Soon they are capable for nothing that they placed five knives, spoons and forks on the table and, a bit later that this amounts to fifteen pieces of silverware. Having thus mastered addition, they move on to subtraction. It seems almost reasonable to expect that if a child were secluded on a desert island at birth and retrieved seven years later, he or she could enter a second enter a second-grade mathematics class without any serious problems of intellectual adjustment.

Of course, the truth is not so simple. In the twentieth century, the work of cognitive psychologists illuminated the subtle forms of daily learning on which intellectual progress depends. Children were observed as they slowly grasped-----or, as the case might be, bumped into-----concepts that adults take for granted, as they refused, for instance, to concede that quantity is unchanged as water pours from a short glass into a tall thin one. Psychologists have since demonstrated that young children, asked to count the pencils in a pile, readily report the number of blue or red pencils, but must be coaxed into finding the total. Such studies have suggested that the rudiments of mathematics are mastered gradually, and with effort. *They* have also suggested that the very concept of abstract numbers------the idea of a oneness, a twoness, a threeness that applies to any class of objects and is a prerequisite for doing anything more mathematically demanding than setting a table-----is itself far from innate

Source: Toefl ITP Practice Test. ETS 2015

Check the CORRECT alternatives in questions 8 to 15 according to the text "People´s Ability to Compute":

8. What does the passage mainly discuss?

A) Trends in teaching mathematics to children.
B) The use of mathematics in child psychology.
C) The development of mathematical ability in children.
D) The fundamental concepts of mathematics that children must learn.

9. It can be inferred from the passage that children normally learn simple counting

A) soon after they learn to talk
B) by looking at the clock
C) when they begin to be mathematically mature
D) after they reach second grade at school

10. The author implies that most small children believe that the quantity of water changes when it is transferred to a container of a different

A) color
B) quality
C) weight
D) shape

11. According to the text, when small children were asked to count a pile of red and blue pencils, they

A) counted the number of pencils of each color
B) guessed at the total number of pencils
C) counted only the pencils of their favorite color
D) subtracted the number of red pencils from the number of blue pencils

12. The word "they" in line 18 refers to

A) mathematicians
B) children
C) pencils
D) studies

13. The word "prerequisite" in line 19 refers to

A) reason
B) theory
C) requirement
D) technique

14. The word "itself" in line 20 refers to

A) the total
B) the concept of abstract numbers
C) any class of objects
D) setting a table

15. With which of the following statements would the author be LEAST likely to agree?

A) Children naturally and easily learn mathematics
B) Children learn to add before they learn to subtract
C) Most people follow the same pattern of mathematical development
D) Mathematical is subtle and gradual

TEXT 3:

Identifying Greenhouse Emissions

Greenhouse gases arise from a wide range of sources and their increasing concentration is largely related to the compound effects of increased population, improved living standards and changes in lifestyle. From a current base of 5 billion, the United Nations predicts that the global population may stabilise in the twenty-first century between 8 and 14 billion, with more than 90 per cent of the projected increase taking place in the world's developing nations. The associated activities to support that growth, particularly to produce the required energy and food, will cause further increases in greenhouse gas emissions. The challenge, therefore, is to attain a sustainable balance between population, economic growth and the environment.

The major greenhouse gas emissions from human activities are carbon dioxide (CO2), methane and nitrous oxide. Chlorofluorocarbons (CFCs) are the only major contributor to the greenhouse effect that does not occur naturally, coming from such sources as refrigeration, plastics and manufacture. Coal's total contribution to greenhouse gas emissions is thought to be about 18 per cent, with about half of this coming from electricity generation.

The worldwide coal industry allocates extensive resources to researching and developing new technologies and ways of capturing greenhouse gases. Efficiencies are likely to be improved dramatically, and hence CO_2 emissions reduced, through combustion and gasification techniques which are now at pilot and demonstration stages.

Clean coal is another avenue for improving fuel conversion efficiency. Investigations are under way into *super-clean* coal (35 per cent ash) and *ultraclean* coal (less than 1 per cent ash). Super-clean coal has the potential to enhance the combustion efficiency of conventional pulverised fuel power plants. Ultra-clean coal will enable coal to be used in advanced power systems such as coal-fired gas turbines which, when operated in combined cycle, have the potential to achieve much greater efficiencies.

Defendants of mining point out that, environmentally, coal mining has two important factors in its favour. It makes only temporary use of the land and produces no toxic chemical wastes. By carefully pre-planning projects, implementing pollution control measures, monitoring the effects of mining and rehabilitating mined areas, the coal industry minimises the impact on the neighbouring community, the immediate environment and long-term land capability.

Dust levels are controlled by spraying roads and stockpiles, and water pollution is controlled by carefully separating clean water runoff from runoff which contains sediments or salt from mine workings. The latter is treated and reused for dust suppression. Noise is controlled by modifying equipment and by using insulation and sound enclosures around machinery.

Since mining activities represent only a temporary use of the land, extensive rehabilitation measures are adopted to ensure that land capability after mining meets agreed and appropriate standards which, in some cases, are superior to the land's pre-mining condition. Where the mining is underground, the surface area can be simultaneously used for forests, cattle grazing and crop raising, or even reservoirs and urban development, with little or no disruption to the existing land use. In all cases, mining is subject to stringent controls and approvals processes.

Source: http://www.ielts.org/test_takers_information/test_sample/general_training_-_reading.aspx

Check the CORRECT alternatives in questions 16 to 20 according to the text "Identifying Greenhouse Emissions":

16. The global increase in greenhouse gases has been attributed to

A) industrial pollution in developing countries.
B) coal mining and electricity generation.
C) reduced rainfall in many parts of the world.
D) trends in population and lifestyle.

17. The proportion of all greenhouse gases created by coal is approximately

A) 14 per cent.
B) 18 per cent.
C) 27 per cent.
D) 90 per cent.

18. Current research aims to increase the energy-producing efficiency of coal by

A) burning it at a lower temperature.
B) developing new gasification techniques.
C) extracting CO2 from it.
D) recycling greenhouse gases.

19. Compared with ordinary coal, new, 'clean' coals may generate power

A) more cleanly and more efficiently.
B) more cleanly but less efficiently.
C) more cleanly but at higher cost.
D) more cleanly but much more slowly.

20. To control dust at mine sites, mining companies often use

A) chemicals which may be toxic.
B) topsoil taken from the site before mining.
C) fresh water from nearby dams.
D) runoff water containing sediments.

GABARITO

FAVOR MARCAR UM X AS RESPOSTAS À CANETA NO GABARITO ABAIXO.
AS MARCAÇÕES FEITAS FORA DESTE QUADRO E/OU À LAPIS NÃO SERÃO CORRIGIDAS.

1- A ( ) B ( ) C ( )	11- A ( ) B ( ) C ( ) D ( )
2- A ( ) B ( ) C ( )	12- A ( ) B ( ) C ( ) D ( )
3- A ( ) B ( ) C ( ) D ( )	13- A ( ) B ( ) C ( ) D ( )
4- A ( ) B ( ) C ( ) D ( )	14- A ( ) B ( ) C ( ) D ( )
5- A ( ) B ( ) C ( ) D ( )	15- A ( ) B ( ) C ( ) D ( )
6 – A) T ( ) F ( ) B) T ( ) F ( ) C) T ( ) F ( ) D) T ( ) F ( )	16- A ( ) B ( ) C ( ) D ( )
7- A ( ) B ( ) C ( ) D ( )	17- A ( ) B ( ) C ( ) D ( )
8- A ( ) B ( ) C ( ) D ( )	18- A ( ) B ( ) C ( ) D ( )
9- A ( ) B ( ) C ( ) D ( )	19- A ( ) B ( ) C ( ) D ( )
10- A ( ) B ( ) C ( ) D ( )	20- A ( ) B ( ) C ( ) D ( )