Date: .... Name: ………………………………

A. Read the following information about Mars and answer the questions below

<u>Why is Mars red and is there any life on the planet?</u>

Mars is the fourth planet away from the Sun and is about half the size of our planet Earth.

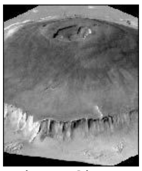
For many years, we used to think there might be life on Mars. *This* came from astronomers who looked at the planet through really simple telescopes. They thought they could see dark lines all over the surface of the planet. This made them think that the dark lines were actually huge alien-made rivers to carry water from the frozen north and south pole of the planet to the drier areas.

But since then, we have found that the telescopes they were using were so bad that the lines really weren't there and were just a trick of the eye.

We are now sure there is no intelligent life on Mars, but who knows, there may be really simple forms of life, maybe even simpler than the bacteria on the Earth. Maybe one day, one of you will be the scientist who discovers life on Mars or somewhere else in space!

Why is Mars red?

Mars is red because it's covered in iron oxide. *This* is the proper name for rust. If you leave any metal object outside in the rain, the iron in the metal and the oxygen in the rain water join up to make iron oxide which we know as rust. The surface of Mars is covered in the same sort of material giving it its red colour.



Volcano Olympus Mons on Mars

One other really amazing thing about Mars is that it's got the biggest known volcano in the Solar System. This volcano is called Olympus Mons. It's so big that it would tower above the biggest volcanoes on the Earth. It hasn't erupted for many thousands of years but if it ever does erupt we'll get a fantastic view from the Earth.

1) Why did astronomers use to think there might be life on Mars?

....

2) Were the dark lines real? Justify your answer.

....

3) When is rust formed? Explain in your own words.

....

4) What does *This* in lines 3 and 14 refer to?

……………………………………………………………………………………………

5) Will it be possible for us to see Olympus Mons' eruption one day?

....

B. Listen to an interview with Barry Goldstein about the Mars Phoenix Lander mission and write true (T) or false (F)

1) Phoenix is going to be the second mission to successfully land north of the arctic circle on Mars. __

2) One of the aims of Phoenix is to analyse the ice water found in the north of Mars. __

3) Phoenix is a life detection mission. __

4) Phoenix lander only uses new technology. __

5) While testing the hardware and analysing the system design, several problems were solved. __

C. Some astronomers are talking about NASA's Mars Reconnaissance Orbiter. Complete part of their telephone conversation.

__________ : one word or contraction
.... : one or more words

Tom: Hi Helen! How are you? .... (you / see) the TV programme about Mars Reconnaissance Orbiter yesterday?

Helen: Yes, ______ was very interesting but I .... only .... (can / see) the last part **because / although** Boby, _______ is now seven, needed help with **some / any** of his school homework.

Tom: Oh, ... (not / worry)! The beginning .... (not / be) so important. The ________ exciting part was **after / when** the orbiter got closer to Mars. Fascinating... I ______ like to control one of **this / these** machines one day!

Helen: Me, too. .... (you / ever work) with orbiters?

Tom: Yes, I ________. ____ December 2003, when I ………………..... (work) in California.

Helen: I .... (do) **a / some** research on one of Mars orbiters next month.

Tom: Wow! I think you'll enjoy that.

Helen: Definitely. I must prepare dinner **now / then**. I .... (call) you tomorrow. Bye!

Tom: Goodbye! Have a good night sleep.

D. Read the extract below and complete it with the correct form of the verbs in brackets.

Life On Mars BBC2 9.00pm Thursday 11th January 2001

JACK FORTUNE: In the last few months a probe orbiting Mars _________ (send) back astonishing pictures which have rekindled the search for life. Billions of years ago ____ a river ____ (flow) through this canyon? If these gullies* _______ (create) by water and if this ____ (be) once a lake then there is every chance we _____ one day ____ (find) signs of life on Mars. Ever since humans first ______ (realise) there might be life elsewhere in the universe we've dreamed of aliens on Mars. Finding even a primitive life form would be one of the most important discoveries of all time.

PROF. WILLIAM HARTMANN (Planetary Science Institute, Arizona): I _____ (think) the search for life on Mars _____ (be) a perfect scientific question because either answer is so philosophically profound and interesting.

JACK FORTUNE: Maybe life on Earth _____ (be) unique.

MATTHEW GOLOMBEK (NASA Jet Propulsion Laboratory): Maybe actually life ______ (start) on Mars and _____ (come) to Earth via meteorites. Maybe in fact we're all Martians. I mean you can ask one of the most fundamental questions that scientists can ask:: _____ (be) we alone in the universe? What's the frequency of life in the universe?

*Gully: deep ditch cut by running water

E. Imagine you are Tom's friend. <u>You are on holiday now</u>. Write an e-mail to him. Include information about: your routine, likes, last week activities and future plans. Write about 100 words.

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F. a)Read the text and write a summary in Spanish using <u>your own words</u>

<u>A Master Plan for Mars</u>

Leonard David, 1999

Throughout the opening decades of the 21st century, Mars is to be visited more often than any other planet in our solar system. Indeed, the great void between *<u>here</u>* and *<u>there</u>* will be trekked often by spacecraft from various nations, *<u>each</u>* adding to a sustained robotic presence around Mars and on its surface. This flotilla of orbiters, landers, roving vehicles, return sample craft, balloons, and even miniaturized airplanes could set the stage for human footfall on the red planet as early as 2014. The entire Mars exploration endeavor is founded on a *<u>trio</u>* of primary goals: the search for evidence of life, past or present; understanding long-term climatic change on Mars; and surveying the planet's natural resources, assessing in particular their utility for future explorations. The common thread in this triad of research targets is that universally recognized elixir of life, water.

After some two decades of exploratory neglect, Mars now stars in a script in which spacecraft will be sent its way whenever planetary geometry is favorable, roughly every two years. The first overtures, launched in 1996, were NASA's Mars Pathfinder and Mars Global Surveyor, along with Russia's ill-fated Mars '96 mission. The next group consists of NASA's Mars Climate Orbiter (MCO) and Mars Polar Lander (MPL), collectively known as the Mars Surveyor '98 project, together with a Japanese spacecraft called Nozomi. Arriving at Mars on September 23, 1999, MCO is to study water's distribution on the planet using two instruments. An *<u>infrared radiometer</u>* will scan Mars's thin atmosphere to profile its temperature, dust and water-vapor content, and clouds. Meanwhile an *<u>imager</u>* will snap color pictures of the surface with a resolution of 40 meters and produce daily global images of the Martian atmosphere.

Shortly before its arrival next December 3rd, MPL will jettison two instrumented packages. These tiny probes, *<u>which</u>* are part of the Deep Space technology-development program, will crash headlong into Mars's surface, penetrating to a depth of perhaps 2 meters in a search for water ice. After plowing through the Martian atmosphere, the main MPL spacecraft is to acquire a series of images as it descends toward touchdown at the edge of the planet's south polar cap. Nobody is quite sure what kind of landscape MPL will find, though the best guess is a smooth terrain with alternating layers of ice and dusty, frost-free ground. Once on Mars the lander is to begin four months of climatic and geologic study, including use of a robotic arm. "By digging a half meter or a meter into the surface, we might be able to examine 100,000 years of the Mars geologic record," says Richard W. Zurek, project scientist for both Surveyor '98 missions. The robot arm is to place soil samples into small ovens that will heat the specimens to reveal their concentrations of water and carbon dioxide. The lander also sports an "electronic ear" to capture, perhaps, the whistling of Martian winds or the robot arm's trench-digging operations. Japan's first Mars-bound spacecraft, Nozomi (meaning "hope"), was hurled spaceward last July 3rd. Formerly known as Planet B, the 258-kilogram craft made swingbys of the Earth and Moon in December to pick up the needed speed to reach Mars in October 1999. *<u>However</u>*, an engine problem has delayed the craft's arrival until the year 2004.

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b. Answer in Spanish:

1. What do *here* and *there* refer to?
2. What does *each* refer to?
3. Find a synonym for *trio*. What do these terms refer to?
4. What does *which* refer to?
5. What do an *infrared radiometer* and an *imager* have in common?
6. What kind of relationship does *However* establish between the two sentences it links?

KEY

A –

1) Because, through really simple telescopes, they could see dark lines all over the surface of Mars. They compare these lines to huge alien-made rivers.

2) No, they weren't. They were a trick of the eye. / They were an illusion.

3) It is formed when it rains and the iron of a metal object comes into contact with the oxygen from the rain.

4) *This* in line 3 refers to the thought / belief that there might be life on Mars and *This* in line 14 refers to iron oxide.

5) Yes, it will.

B – F, T, F, F, T

C -

1- Did you see -	8- wasn't –	15- In –
2- it -	9- most -	16- was working -
3- could see –	10- when –	17- 'm going to do –
4- because –	11- 'd / would –	18- some –
5- who –	12- these –	19- now –
6- some -	13- Have you ever worked –	20- 'll call –
7- don't worry –	14- have -	

D –

1st para: has sent, did ... flow, were created, was, will / can... find, realised	2nd para: think, is / has been	3rd para: is	4th para: started, came, are

F – a

b.

1. *here* se refiere a la Tierra y *there* a Marte; 2. *each* se refiere a las varias naves (de distintas naciones) que irán a Marte; 3. un sinónimo de *trio* es *triad*. Ambos términos refieren a los tres objetivos de la exploración en Marte: la búsqueda de evidencia de vida, el estudio de los cambios climáticos y el estudio de los recursos naturales; 4. *Which* refiere a las sondas que lanzará MPL; 5. ambos son instrumentos del MCO; 6.*however* establece un contraste entre el objetivo inicial de llegar a Marte en 1999 y la demora para fines del 2004 por problemas técnicos.

Script

Countdown to Mars Touchdown

Narrator: A countdown to a touchdown on Mars. I'm Jane Platt with JPL -- NASA's Jet Propulsion Laboratory in Pasadena, California. It's really hard to successfully land a spacecraft on Mars. But if all goes as planned, that's exactly what will happen on May 25. Joining us is Barry Goldstein of JPL, project manager for Mars Phoenix Lander. Barry, first off, why don't you tell me where exactly Phoenix is headed and why it's going there?

Goldstein: Well, Phoenix is going to be the first mission to hopefully successfully land north of the arctic circle on Mars. And the reason we're going there is consistent with the Mars program theme of following the water. We're actually going to dig and anaylze the recently discovered near-surface water, ice water in the northern plains of Mars.

Narrator: And how does this mission fit in with the science goals of NASA's Mars program overall?

Goldstein: One of the obvious themes of the Mars program has been to follow the water, and the reason the theme was to follow the water is we know on Earth that wherever there is water, regardless of other environmental extremes, whether it's at the volcanic trenches in the ocean or even up in the Arctic, no matter how cold or hot, where there's water there's always been various signs of life. And while Phoenix is not a life detection mission, what we are trying to do is determine the biological potential, the potential for life being in a region on Mars and where better to go than where the water is.

Narrator: OK, and the Phoenix lander is going there, and has actually inherited some old technology. Tell me about that

Goldstein: Yes, what we've done on Phoenix, and its name is somewhat apropos, is we've taken the concepts and designs of the payload from the Mars Polar Lander, and we've taken the hardware that was actually in development for the Mars '01 lander, which was postponed after the MPL, Mars Polar Lander failure. And we've basically resurrected them in a mission, and we've spent an enormous time over the past five years testing, analyzing and simulating all the capabilities of the '01 lander to make sure it's a success.

Narrator: Can you explain a little bit about how you took the existing technology and you tested it and tested it and tested it again?

Goldstein: Absolutely. What we had proposed when we first put together our mission concept was that we would spend the first portion of the mission actually going through the analysis that was done and looking at the pedigree of the hardware and making sure that it would be compatible with the mission we've designed. So the first part of the mission, what we call Phase B, we went and we re-did and re-looked at all the analyses and re-verified the capabilities of the system performing the way we wanted it to. We made several changes based on that, and then we went into the next phase, which is looking at the system design and seeing how it performed analytically. There is where the focus on EDL really took hold, and we found several issues that we've corrected relative to the architecture it was designed or defined, I should say. And entry, descent and landing, which is our most difficult phase. And we did a significant amount of testing, and we identified several problems that were not known before with the architecture, and we've mitigated all of them.