Facultad de Ciencias Astronómicas y Geofísicas
UNIVERSIDAD NACIONAL DE LA PLATA

Examen Libre - Inglés II Astronomía

NAME:..... **DATE:.....**

SECTION A

Read the following text and answer the questions below in your own words

NEW SYSTEM COULD PREDICT SOLAR FLARES, GIVE WARNINGS

Taken from: http://www.astronomynow.com/news/n1208/15solarflares/

Researchers may have discovered a new method to predict solar flares more than a day before they occur, providing advance warning to help protect satellites, power grids and astronauts from potentially dangerous radiation.

The system works by measuring differences in gamma radiation emitted when atoms in radioactive elements "decay" or lose energy. This rate of decay is widely believed to be constant, but recent findings challenge that long-accepted rule.

The new detection technique is based on a hypothesis that radioactive decay rates are influenced by solar activity, possibly streams of subatomic particles called solar neutrinos. This influence can wax and wane due to seasonal changes in the Earth's distance from the sun and also during solar flares, according to the hypothesis.

Fischbach and Jere Jenkins, a nuclear engineer and director of radiation laboratories in the School of Nuclear Engineering, are leading research to study the phenomenon and possibly develop a new warning system. Jenkins, monitoring a detector in his lab in 2006, discovered that the decay rate of a radioactive sample changed slightly beginning 39 hours before a large solar flare.

Since then, researchers have been examining similar variation in decay rates before solar flares, as well as those resulting from Earth's orbit around the sun and changes in solar rotation and activity.

"It's the first time the same isotope has been used in two different experiments at two different labs, and it showed basically the same effect," Fischbach said. Data were recorded during routine weekly calibration of an instrument used for radiological safety at Ohio State's research reactor. Findings showed a clear annual variation in the decay rate of a radioactive isotope called chlorine 36, with the highest rate in January and February and the lowest rate in July and August, over a period from July 2005 to June 2011.

The new observations support previous work by Jenkins and Fischbach to develop a method for predicting solar flares. Advance warning could allow satellite and power grid operators to take steps to minimize impact and astronauts to shield themselves from potentially lethal radiation emitted during solar storms.

Large solar flares may produce a "coronal mass ejection" of highly energetic particles, which can interact with the Earth's magnetosphere, triggering geomagnetic storms that sometimes knock out power. The sun's activity is expected to peak over the next year or so as part of an 11-year cycle that could bring strong solar storms.

Solar storms can be especially devastating for the Earth´s electric systems if the flare happens to be aimed at the Earth, hitting the planet directly with powerful charged particles.

1. Why may the new method discovered be important?

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2. What is the main difference between the traditional belief and the new hypothesis?

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3. Who will benefit from the new findings?

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4. What are the consequences of solar storms for the Earth?

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SECTION B

a. Listen to a discussion with the panelist Doug Cook about a Lunar Reconnaissance Orbiter (LRO) and write true (T) or false (F)

1. The LRO is still orbiting the Moon and collecting data. ___
2. The data loaded into the planetary data system is very large. ___
3. LRO's data doesn't include photographies. ___
4. LRO scientists are seeing details of the moon that have already been seen. ___
5. The data loaded into the planetary system is only available to NASA scientists. ___

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

Asteroid probe loses another pointing system wheel

Taken from: http://www.astronomynow.com/news/n1208/15dawn/

Engineers working on NASA's Dawn spacecraft ……..……..……. (assess) the status of a reaction wheel – part of a system that helps the spacecraft point precisely – after onboard software powered it off on August 8. Dawn's mission is to study the geology and geochemistry of the giant asteroid Vesta and dwarf planet Ceres, the two most massive objects in the main asteroid belt. Now, Dawn …… (use) its thrusters to point at Earth for communications. The rest of the spacecraft is otherwise healthy.

During a planned communications pass on August 9, 2012 , the team …….. (learn) that the reaction wheel ……..……

(already/power off). Telemetry data from the spacecraft suggest the wheel developed excessive friction, similar to the experience with another Dawn reaction wheel in June 2010. The Dawn team …….. (demonstrate) during the cruise to Vesta in 2011 that, if necessary, they could complete the cruise to Ceres without the use of reaction wheels.

The spacecraft ……..…….. (orbit) Vesta since July 15, 2011. Dawn …….. (conclude) its primary science observations of Vesta on July 25, 2012, and has been spiraling slowly away from the giant asteroid using its ion propulsion system. Ion thrusting was halted to accommodate the reaction wheel investigation, which may briefly delay the escape from Vesta.

"The Vesta mission ……..…….. (be) spectacularly successful, and we are looking forward to the exciting Ceres mission ahead of us," ……..….. (say) Robert Mase, Dawn project manager, of NASA's Jet Propulsion Laboratory, Pasadena, California.

JPL manages the Dawn mission for NASA's Science Mission Directorate in Washington. Dawn is a project of the directorate's Discovery Program, managed by NASA's Marshall Space Flight Center in Huntsville, Alabama. The University of California at Los Angeles (UCLA) is responsible for overall Dawn mission science. Orbital Sciences Corp. in Dulles, Viginia., …… (design) and built the spacecraft. The German Aerospace Center, the Max Planck Institute for Solar System Research, the Italian Space Agency and the Italian National Astrophysical Institute are international partners on the mission team.

c. Some astronomers are talking about a meteorite. Complete part of their telephone conversation.

Mark: ..... (you / hear) about the meteorite which fell in Russia last Sunday? There was a documentary on TV yesterday.

Henry: Yes, _____ was really interesting, but I ..... only …..... (can / see) the last part **however / because** my wife, _____ works until late, needed help with **some / any** of the housework.

Mark: Well, ... (not / worry)! The beginning ..... (not / be) so important. The _____ interesting part was **after / when** the team talked about the identification of a part found in the lake. Amazing... I _____ like to work in one of **this / these** teams one day!

Henry: I do it and it's great! ..... (you / ever work) in meteorite's identification?

Mark: No, I _____. But _____ October 2012, when I ……..... (participate) in a project for the NASA, we were shown some test results.

Henry: I ..... (lead) **the / a** research project on specific particles present in meteorites with my team, why don't you join us?

Mark: That'd be awesome! I think I'd really enjoy that. Could you tell me more about the project?

Henry: Of course. **But / However** I have to go now. Why don't we meet next Friday at the University?

Mark: Of course, I ……..…… (send) you a message when I arrive. Bye!

Henry: Bye Mark! See you **on / in** Friday.

d. Imagine you are Henry's friend. <u>You are on holiday now</u>. Write an e-mail to Henry. Include information about: your routine, likes and dislikes, last week activities and future plans. Write about 120 words.

To: _____
From: _____
Subject: _____

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SECTION C

a) Read the text and write a summary in Spanish using your own words

Phoenix Cluster Sets Record Pace at Forming Stars

Taken from: http://www.astronomynow.com/news/n1208/16phoenix/

Astronomers have found an extraordinary galaxy cluster, one of the largest objects in the universe that is breaking several important cosmic records. Observations of the Phoenix cluster with NASA's Chandra X-ray Observatory, the National Science Foundation's South Pole Telescope, and eight other world-class observatories may force astronomers to rethink how these colossal structures and the galaxies that inhabit ***them*** evolve.

Stars are forming in the Phoenix cluster at the highest rate ever observed for the middle of a galaxy cluster. The object is also the most powerful producer of X-rays of any known cluster and among the most massive. The data ***also*** suggests the rate of hot gas cooling in the central regions of the cluster is the largest ever observed.

"***While*** galaxies at the center of most clusters may have been dormant for billions of years, the central galaxy in this cluster seems to have come back to life with a new burst of star formation," said Michael McDonald, a Hubble Fellow at the Massachusetts Institute of Technology. "The mythology of the Phoenix, a bird rising from the dead, is a great way to describe this revived object" ***he*** added.

Like other galaxy clusters, Phoenix contains a vast reservoir of hot gas, which ***itself*** holds more normal matter – not dark matter – than all of the galaxies in the cluster combined. This reservoir can be detected only with X-ray telescopes such as Chandra. The prevailing wisdom once had been that this hot gas should cool over time ***and*** sink to the galaxy at the center of the cluster, forming huge numbers of stars. ***However***, most galaxy clusters have formed very few stars during the last few billion years. Astronomers think the supermassive black hole in the central galaxy of a cluster pumps energy into the system, preventing cooling of gas from causing a burst of star formation.

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b) Answer in Spanish:

1. What do the following words refer to in the text?

a. them (L. 5) ……

b. he (L. 15) ……

2. What word/s are used instead of *galaxy cluster*?

……

3. What kind of relation do these conjunctions express? (addition, opposition/contrast, cause/consequence, time)

also (L. 9) ……

While (L. 11) ……

and (L. 19) ……

However (L. 20) ……

Sample answers

SECTION A

1. Because it may allow to predict solar flares and thus allow to provide advance warning for protection.
2. According to the traditional belief, the decay rate is almost constant whereas the new hypothesis states that it varies influenced by solar activity.
3. These findings will be especially useful for satellite and power grid operators to take steps to minimize impact and astronauts to protect themselves from potentially lethal radiation emitted during solar storms.
4. Solar storms can trigger geomagnetic storms that sometimes knock out power. They can be especially devastating for the Earth´s electric systems if the flare hits the planet directly with powerful charged particles.

SECTION B

1. T 2. T 3. F 4. F 5. F

b

1st para: are assessing – is using	2nd para: learned – had been powered off - demonstrated	3rd para: has been orbiting/has orbited - concluded	4th para: has been – said 5th para: designed

c -

1- Did you hear/Have you heard - 2- it - 3- could see – 4- because – 5- who – 6- some – 7- don't worry –	8- wasn't – 9- most - 10- when – 11- 'd / would – 12- these – 13- Have you ever worked – 14- haven't -	15- In - 16- participated - 17- lead /'m leading/'ve been leading – 18- a – 19- But – 20- 'll send – 21. on

d –

Fluency:	Accuracy:
Content:; cohesion & coherence:	

SECTION C

b –

1.

a. these colossal structures.

b. Michael McDonald.

2.

Phoenix, the object

3.

also (L. 9) addition

While (L. 11) opposition

and (L. 19) addition

However (L. 20) contrast

Listening script

Lunar Reconnaissance Orbiter Highlights
06.23.11

So with that, I'd like to hand the discussion off to our current panelist, Doug Cook. Doug?

Cook:
Thank you, J.D.

As J.D. said, we're holding this telecon today to announce the point in time where the LRO team has reached full mission success for the ESMD portion of the mission. We're doing that while LRO is still orbiting the moon and continuing to gather incredible data that we'll benefit from for years to come. To me, this is exciting, I'm very proud of this mission, we and the team that pulled this off and has really provided some incredible data.

Our organization, the ESMD, actually turned over the keys to the LRO mission to the Science Mission Directorate back last fall, when we had achieved all of our objectives. At this point in time, we're having this discussion because now all the data has been loaded into the planetary data system, and it's on the order of a hundred- ninety two terabytes of data, which is more than all the other spacecraft studying the solar system. So it's an incredible achievement, and a lot of data.

LRO's seven instruments provided data on topography including 3-D maps, including incredible photography. It provided data on composition, radiation environment, temperatures on the surface with changing light conditions, resources such as volatiles and potential water ice that could be of incredible interest in the future, as well as lighting changes as the moon rotates.

The photography from the LROC instrument that I find truly stunning. We're seeing details of the moon that we've never seen before. We're seeing features and unique details that have not been possible. And all of the other instruments are providing valuable new insights into the moon. Although some of the findings have been- have already been published in publications, it will undoubtedly be decades- it'll take decades to make the discoveries that are now in the data system, embedded there, waiting to be mined and studied. Later scientists will continue to study and make these discoveries for years to come. With the data now loaded into the planetary data system, it's available to anyone interested in studying the lunar surface. It provides a wealth of information that can inform future missions- robotic and human- in years to come.

As a part of this point in time, I do want to thank the Goddard design team that provided such an incredible spacecraft that continues to operate very well, providing the capability for all of these instruments to make their measurements.

I also want to thank the United States and Russian scientists who were the principal investigators on these instruments. They led the teams that envisioned what could be learned from these instruments and are now producing these incredible results that we're seeing. I also want to thank our own LRO team at Headquarters, who has helped work through a lot of different details in order to help make all of this mission a success.

In the future, you'll be hearing more from the Science Mission Directorate as our lunar robotic orbiter continues to explore the moon through this data, and gathering new information. So with that, I want to turn it back to J.D. to- and we'll get to the next speaker. Thank you.