B2+ LEVEL ENGLISH EXAM

FOR STUDENTS OF BIOTECHNOLOGY

STUDENT'S NAME: _____

POINTS: _____ TEACHER'S SINGATURE: _____

Listening 1	Listening 2	Reading 1	Reading 2	G&V 1	G&V 2	Writing

PART ONE: LISTENING COMPREHENSION (20 points)

I. Listen to a scientist talking about a method of purifying air. Fill in the gaps with the missing words. The number of gaps corresponds to the number of words you need. You will hear the recording twice. (10 points)

Indoor pollution is caused by VOCs, which stands for volatile organic (1)_____ .

These include building materials (paints, carpets, adhesives, vinyl floors, varnishes and (2)_____) as well as home and personal care products, cleaning chemicals, 3)_____ _____ and cosmetics.

One day Niri visited a (4)_____ _____ and was struck by the smell of acetone in the air.

Acetone can not only act as an irritating agent but high concentrations are likely to cause (5)_____ and other problems, such as headaches.

The branch of science that deals with plants as environmental cleanup agents is called (6)_____, or phytoremediation.

Niri conducted his own experiments using houseplants such as a (7)_____ plant, a spider plant etc.

Draecena was the most effective in removing acetone as it managed to eliminate (8)_____ percent of the substance from the air.

He suggests using a (9)_____ of plants at home to remove VOCs from the air.

The method is a "green" solution because it doesn't consume (10)_____ .

Adapted from: https://www.scientificamerican.com/podcast/episode/a-green-solution-to-improve-indoor-air-quality/

II. You are going to listen to an interview with a scientist. The following facts come from the interview, but have been paraphrased and mixed. Rearrange the sentences to recreate the original order. You will hear the recording twice. (10 points)

A. A cancer cell dies once it is deprived of the ability to react to stress.

B. In nervous system diseases when a cell dies there is a misfolded protein in it.

C. The scientists who discovered the ubiquitin system have been given an important award.

D. The scientists decided to collaborate after a discussion which happened during an outdoor adventure.

E. Ubiquitin produces a gene that outlines the plan for what is going to happen to the cell.

F. The system Saunders describes is all-present in a human organism.

G. Saunders says that his team's approach to cancer cells is challenging for him and differs from what he has done already.

H. If it were not for proteostasis, cancer cells would not be able to cope with stress.

I. There is a medicine for multiple myeloma that successfully uses the idea of ubiquitin system.

J. The social situation turned into multidisciplinary research on some chronic degenerative diseases.

Adapted from: abc.net.au

PART TWO: READING COMPREHENSION (20 points)

I. Read the text about microbes and complete the gaps (1 - 10) with the sentences (A-K) given below. There is one sentence you DO NOT NEED to use. (10 points)

Giant cave crystals may be home to 50,000-year-old microbes

Scientists have turned up truly ancient microbes. (1)_____ The stowaways may have survived there, unseen, for tens of thousands of years, new data indicate. Vastly different from nearly all other life-forms known, these germs offer a good indication of how resilient life can be in extremely harsh environments — even, potentially, conditions on other worlds.

"These organisms are so extraordinary," says Penelope Boston, the director of NASA's Astrobiology Institute in Moffett Field, California. Boston spoke here during a February 17 news conference at the annual meeting of the American Association for the Advancement of Science. (2)_____ Some of their closest relatives live in caves halfway around the world. Others make their homes in volcanic soils or thrive on toxic chemicals, such as toluene.

Full of lead, silver and zinc, the Naica Mine is in Chihuahua, Mexico. (3)_____ The crystal stowaways they turned up had been in fluid pockets inside massive crystals of calcium sulfate.

One might think of these microbes as having been tucked away in a time capsule for 10,000 to 50,000 years. (4)_____ They "remained viable," Boston reports. In the lab, her team woke them up and studied their genetic material. The scientists also probed the genetic material in microbes on walls of the cave and elsewhere near the crystals.

Microbes from inside the crystals appear similar to — but not quite the same as — those on the cave walls and nearby areas, Boston says. Her team also thinks its age estimates for the crystal-trapped microbes are solid.

The new findings have not yet been published in a scientific journal. But if confirmed, these microbes would represent some of the toughest extremophiles on Earth. They might come from where it's extremely hot, such as near a volcano. (5)_____ The Naica Mine microbes came from 100 to 400 meters (330 to 1,300 feet) below Earth's surface. (6)_____

The new data show that microbes can be quite hardy. Almost any habitat can nurture some type of microbe. (7)_____ It means that for life to exist on some distant planet, the conditions there may not have to match those on Earth.

Researchers are starting to plan probes to other worlds. (8)_____ The new discovery in Mexico is a reminder of how little scientists know about the range of microbes that make their home on Earth. What scientists do not want is to risk that any of them might stow aboard a spacecraft sent to space, notes Cassie Conley. She's NASA's planetary protection officer. (9)_____

"If you took some of these organisms from Earth and put them elsewhere, they may do just fine," she explains. (10)_____

Adapted from https://www.sciencenewsforstudents.org/article/giant-cave-crystals-may-be-home-50000-year-old-microbes

A. The microbes she described are not closely related to any known *genus*, she said.
B. What we don't know about this particular species is how long it can last in such extreme conditions.
C. For eight years, Boston was part of a team probing microbes there.
D. They weren't dead, just in suspended animation — perhaps for the entire time.
E. That means Earth's germs could one day end up living on — and polluting — other worlds.
F. Temperatures there run 45° to 65° Celsius (110° to 150° Fahrenheit).
G. And that's promising news in the hunt for life beyond Earth
H. They were extracted from giant cave crystals in Mexico.
I. It's her job to make sure that Earth's microbes don't contaminate other planets.
J. Others may live in the ocean's great depths or in around toxic chemicals.
K. These include Jupiter's moon Europa and Saturn's moon Enceladus.

II. Read the text about a new treatment for dog diseases. Then decide if the statements under the text are true (T) or false (F). (10 points)

Stem cells for Snoopy

Little Jonah once radiated pain. The 12-year-old Maltese dog's body was curled and stiff from the effort of walking with damaged knees. But after Kristi Lively, Jonah's veterinary surgeon, enrolled him in a clinical trial of a therapeutic antibody to treat pain, his owner returned to the Village Veterinary Medical Center in Farragut, Tennessee, with tears in her eyes. Her tiny companion trotted easily alongside her. "I got my dog back," she said.

Such cutting-edge treatments were once reserved for humans. But in recent years, the changing nature of pet ownership has sparked a boom in sophisticated therapies for animals — and many are now approaching the market. On 9 June, the company that sponsored the antibody trial, Nexvet of Dublin, presented its results at the American College of Veterinary Internal Medicine Forum in Denver, Colorado. Other companies are working on bone-marrow transplants, sophisticated cell therapies and cancer vaccines.

"When I was a child and just wanted to be a veterinarian, certainly I didn't imagine I'd be doing what I'm doing now," says Heather Wilson-Robles, a veterinary oncologist at Texas A&M University in College Station, who is engineering canine immune cells to fight cancer.

Cancer, arthritis and other diseases associated with old age are becoming more common as pets live longer, thanks in part to better treatment by their owners. “A generation ago, as beloved as Snoopy was, he lived in the backyard in the doghouse,” says Steven St. Peter, president of Aratana Therapeutics, a pet-therapy company in Leawood, Kansas. Now, pets are considered family members, often sharing beds with owners who are willing to pay hefty veterinary bills.
Many standard pet treatments are human drugs given at lower doses to account for animals’ smaller size. But antibodies and cell therapies generally cannot be used across species without provoking an unwanted immune response. And some human treatments simply will not work in pets: many common pain medications are toxic to cats.

Nexvet, which has raised more than US$80 million from investors since it was founded in 2011, takes antibodies that have been approved as human medicines and alters their structures to make them effective in cats or dogs. Moving from a drug lead to safety testing takes about 18 months, says chief executive Mark Heffernan, who estimates that Nexvet’s antibody therapies for pain will cost around $1,500 a year. The company is now looking into developing antibodies that block a protein called PD-1, thereby unleashing the immune system to fight cancer. This approach has shown tremendous promise for treating cancer in people.

Aratana is also developing antibody therapies for pets, and has applied for regulatory approval of a cancer vaccine that uses a bacterium to target malignant cells. The company hopes to move into cell therapies, and to develop a way to manufacture stem cells from fat for use against joint pain. St. Peter wants his company to be the first to win approval from the US Food and Drug Administration for a stem-cell therapy — ahead of firms developing such treatments for people.

Other forms of cell therapy could also result in new veterinary remedies. Last July, veterinary oncologist Colleen O’Connor founded a cancer-treatment company in Houston, Texas, called CAVU Biotherapies. To treat lymphoma, CAVU aims to isolate a sick dog’s immune cells, rejuvenate them in culture, and then infuse them back into the dog’s blood to stimulate an immune response. O’Connor used a similar approach in 2011 to treat Dakota, a bichon frise that belonged to then-US Senator Kent Conrad (Democrat, North Dakota). The dog, a Capitol Hill fixture known as the ‘101st senator’, entered remission but later died of cancer.

For many pet owners, cost is no object. Steven Suter, a veterinary oncologist at North Carolina State University in Raleigh, runs a bone-marrow transplant clinic for dogs that claims to cure 33% of lymphomas. Suter’s clinic was booked solid after it opened in 2008, despite offering treatment that can cost a dog owner up to $24,000. Still, Suter has worked to drive down the cost of care: to filter stem cells from blood, his clinic uses second-hand machines that were donated by a physician with a soft spot for schnauzers. Earlier this year, several major pet-insurance companies added bone-marrow transplants to the lists of procedures that they will pay for.

But when it comes to the latest pet treatments, some animals might be more equal than others. Cats are “physiologically finicky”, Suter says, noting that they may be too small to allow bone-marrow transplants using his usual machines. And O’Connor notes that cats’ immune systems also differ wildly from those of both humans and dogs — meaning that more basic research must be done before sophisticated immunotherapies can be deployed against feline ailments.

At Lively’s clinic, many dog and cat owners were grateful that their animals could participate in Nexvet’s clinical trial. But about a month after the trial ended, the effects of the antibody therapy began to fade. Jonah’s owner was among the clients who called Lively, desperate for a way to access the treatment again. “It’s tough,” Lively says. “They’ll have to wait until this product comes to market.”

Adapted from: http://www.nature.com/news/stem-cells-for-snoopy-pet-medicines-spark-a-biotech-boom-1.20087

1. Only small-size animals can be given lower doses of standard drugs for humans.
2. Both humans and animals can successfully undergo the same advanced therapies.
3. Widely-used analgesics may hurt domestic animals.
4. Clinical trials typically begin about one year and a half after a drug molecule is developed.
5. One of the pharmaceutical companies is planning to work on a drug against arthralgia, using stem cells from adipose tissue.
6. Restored immune cells can help dogs which suffer from lymphoma.
7. In the beginning Suter's clinic did not have many customers due to expensive procedures.
8. Some equipment in Suter's clinic has been sponsored by a doctor who wanted to help schnauzers in particular.
9. According to Suter, feline body systems are not as demanding as those of other mammals.
10. The results of the therapy lasted about one month after Nexvet's clinical trials had ended.

PART THREE: GRAMMAR AND VOCABULARY (20 POINTS)

I. For questions 1-10, complete the gaps in the following sentences with ONE word only. (10 points)

1. Neither plants _____ fungi are examples of prokaryotic organisms.
2. The laboratory experiments are _____ carried out as we speak in Block B of our facility.
3. _____ the data proves conclusive, we'll have to run more tests.
4. In ancient times beer was made _____ fermenting grain steeped in water.
5. As far as I'm _____, creating a designer baby is completely unethical.
6. The DNA of all living things is made _____ of the same four molecular components called nucleotides.
7. Antibiotic resistance can lead to incurable UTI infections, _____ can in turn result in sepsis if the kidneys are affected.
8. If I _____ to decide, I would rather come up with a new plan to tackle the problem.
9. _____ seen the report, I must say I never expected the results to be so promising.
10. We _____ better postpone the project until we receive more funding.

II. For questions 1-10, decide which of the words given fills the gap best. (10 points)

1. Some more tests need to be _____ before the FDA approves the use of this drug.
   a) run b) undergone c) carried d) made

2. The groundbreaking immunotherapy instituted by scientists from Moffitt Cancer Center, Florida, can _____ the course of lymphoma.
   a) develop b) object c) afford d) alter

3. New tuberculosis vaccines are based on _____ strains of the mycobacterium tuberculosis complex.
   a) debilitated b) deteriorated c) attenuated d) attainable

4. Stem cells can be _____ from bone marrow, peripheral blood or umbilical cord blood.
   a) harvested b) plucked c) raised d) gathered

5. A new laboratory equipment has _____ the techniques used to transform molecules.
   a) revitalized b) revolutionized c) revealed d) restored

6. Cancer _____ programmes involve testing apparently healthy people for signs of the disease.
   a) skimming b) scaling c) screening d) scanning

7. Our team needs to do more research to find out if the findings are _____.
   a) accented b) collectable c) genuine d) accurate

8. Combustion is a chemical process in which a substance reacts rapidly with oxygen and _____ heat.
   a) brings off b) gets out c) puts out d) gives off

9. Thanks to the grant we have conducted a clinical _____ concerning the activation of the XBP1 gene in triple-negative breast cancer.
   a) trial b) trail c) drill d) vial

10. Experiments on rats have proved that prenatal exposure to acyclovir results in _____ function of the immune system.
    a) impelled b) impaired c) impacted d) paired

PART FOUR: WRITING (20 points)

Choose ONE of the following topics. Write between 150 and 250 words.

I. You would like to take part in an student exchange programme at one of European Universities. Write a letter of application to the programme introducing yourself, stating why you would be a good candidate and what benefits it could bring to your future career.

II. Are biotechnological advancements the greatest achievement of humanity or its greatest curse? Discuss the question supporting your opinion with suitable examples.

ANSWERS AND TRANSCRIPTS:

LISTENING COMPREHENSION 1:

1. compounds
2. solvents
3. air fresheners
4. nail salon
5. nausea
6. biofiltration
7. jade
8. 94
9. variety
10. energy

LISTENING COMPREHENSION 2:

1. F
2. E
3. C
4. H
5. I
6. A
7. D
8. J
9. B
10. G

READING COMPREHENSION 1:

1. H
2. A
3. C
4. D
5. J
6. F
7. G
8. K
9. I
10. E

READING COMPREHENSION 2:

1. F
2. F
3. T
4. T
5. T
6. T
7. F
8. F
9. F
10. T

GRAMMAR AND VOCABULARY:

I.

1. nor
2. being
3. unless
4. by
5. concerned
6. up
7. which
8. were
9. having
10. had

II.

1. A
2. D
3. C
4. A
5. B
6. C
7. D
8. D
9. A
10. B

LISTENING COMPREHENSION 1:

Transcript:

Air pollution *outside* is easy to spot, hanging over the city, or sputtering from a tailpipe. But there's lot of *indoor* air pollution, too, even if it's not as obvious. It's caused by volatile organic compounds, or VOCs.

"They can come from building materials like paints, carpet, adhesives, vinyl floors, varnishes, solvents, etc." Vadoud Niri, an analytical chemist at the State University of New York, Oswego. "And also they can come from home and personal care products, cleaning chemicals, air freshener, cosmetics."

And that *cosmetics* part… is what caught Niri's attention. "One day when I went to a nail salon with my wife, I noticed the smell of, specifically, acetone in there. And since I was doing air analysis at that time, I thought maybe we can do something about this." Acetone can irritate your eyes, skin, nose and throat and at high concentrations can cause nausea, headaches and other nervous system problems.

Niri figured one way to get rid of acetone might be with houseplants. So he reviewed decades of literature in the field of plants as environmental cleanup agents—which is called biofiltration or phytoremediation. He then ran his own experiment, using an airtight chamber, eight VOCs, in concentrations similar to those found in nail salons, and five common houseplants: a jade plant, a spider plant, a bromeliad, a Caribbean tree cactus, and what's known as a *Dracaena* plant.

LISTENING COMPREHENSION 2:

Transcript:

But up first, Darren Saunders is the kind of scientist who goes on mountain biking holidays with his mates, and he is also a cancer researcher who recently set up a unique collaboration. To set the scene, the story centres on a truly ubiquitous protein.

Darren Saunders: So we've been interested for a really long time in this system called the ubiquitin system. It's called ubiquitin, it's the name of a gene because it's everywhere, in every cell we look at we find this gene switched on. And what this gene does is make a little protein that is kind of like a flag that gets stuck on other proteins in yourself. And that little flag tells your cell what to do with the protein. So it could flag it to get destroyed, like taking out the garbage if you like, or it could flag it for recycling, to get taken to another part of the cell, broken down and then remade into new proteins, or it can help the cells signalling, it can help cells switch on the way that they communicate with each other and communicate inside the cell.

And people, not just me, but lots of people have been interested in this system for a very long time, it was discovered 30 or 40 years ago, and the guys that discovered it won the Nobel Prize. And it's important in the way your immune system works, it's important in the way your brain works, basically every system in the body that we look at.

Joel Werner: So with your work in cancer, what role were you thinking the ubiquitin system might play there?

Darren Saunders: Right, so it turns out that to be a cancer cell is a really stressful situation. So you have extra copies of DNA floating around, you've got mistakes in the genome, the metabolism of the cell has kind of gone out of control, and in order to deal with that the cell

needs to be able to handle this stress. We call that proteostasis. It's a big word but it basically means maintaining normal protein chemistry, if you like. And one of the ways the cells do that is using this ubiquitin system. And so for a long time people have been looking at this system as a therapeutic target, and there are therapies out there in the clinic that target this. So there's a drug called Velcade which is used for multiple myeloma, and basically the way that works is that if you take a cancer cell that's very stressed out and you take away its capacity to respond to that stress, the cancer cell dies. And now we are looking at that in a whole bunch of different contexts in cancer.

Joel Werner: What other contexts are you looking at?

Darren Saunders: So we think are most cancer cells do this. The way we are approaching it is we are able to use a method that lets us look at all of the proteins in the cell that are flagged with this little ubiquitin tag, so we can do it sort of systematically. We smash the cells up or we smash up some tissue and we run it through a machine called a mass spectrometer which is able to measure things very accurately. And that gives us a map, if you like, of what has been ubiquitinated or flagged with this little ubiquitin protein at any one time. And what we are interested in is whether or not we can find specific proteins in the cell that we have drugs against that we can switch off and try and kill the cell. That's the kind of principle behind it.

Joel Werner: What's super interesting about the work you're doing, apart from the work itself, is its potential application to another area of medical research. Before you describe what that application is, can you tell us about how this collaboration came about? It's seemingly rare in modern science for people to peer over the backyard fence of another researcher and say, hey, we could actually work together.

Darren Saunders: It really is, it's a really interesting one. This came about literally from a mountain biking trip. I was away mountain biking with some mates, some of my mates are other medical researchers, they work in other fields, in this case neuroscience, and we literally got chatting over a mountain bike ride about this field…you know, we started to see some crossover in what we were working on and what we were talking about. And that just grew into now a really serious collaboration. We've managed to get funding for it, and basically what we are doing is using the approach that we've taken in cancer to understand this system and start to look at it in a neurodegeneration context. So that's in things like Alzheimer's disease and motor neuron disease.

Joel Werner: So who was on the other bike, on this mountain biking trip?

Darren Saunders: So this was my colleague Justin Yerbury down at the University of Wollongong, and also Kara Perrow who is another scientist at the University of Wollongong, so the three of us have been putting our heads together on this problem for a while. And it turns out that we've probably got the flip side of the coin happening in neurodegeneration.

So in diseases like a motor neuron disease, nerve cells start to die, and they start to die along with accumulating these great big clumps of misfolded protein inside the cell. And of those big clumps seem to soak up all of this ubiquitin tag because the cell is trying to deal with all this misfolded protein. And we think that that then stops the cells from being able to function properly.

The really interesting thing is in cancer for years we've been trying to understand this system as a way to try and kill cells, and now we've got to flip this on our head, and from my perspective this has been quite challenging, to flip it on its head and try and save cells now, we are trying to keep them alive to stop them dying because that's what causes the progression of the disease. And so you've got to think about things differently. And so I've had to learn an awful lot from a neuroscience perspective, and the guys that I work with in neuroscience are having to think about things differently in a cancer perspective. So there's a really nice cross-fertilisation of concepts and frameworks and ideas going on.