

Part I

A) Comprehension questions on the text. Read the text and choose the correct answer. You must choose and answer only 2 out of the 3 questions below. (0,4 points each)

Butterfly wings are pretty cool, literally. That's due to special structures that protect them from overheating in the sun. Researchers took new thermal images of butterfly wings. These images showed the heat released by each part of a wing, which revealed the living parts of the wing. Those parts include veins that transport insect blood. Those veins also release more heat than surrounding dead scales. And that keeps the living wing parts cooler than the dead ones. The researchers described their findings on January 28th in the journal Nature Communications.

Tracking the insect's heat is important. Small changes in body temperature can affect a butterfly's ability to fly. The muscles in the insect's midsection -its thorax -must be warm. That's so the butterfly can flap its wings fast enough for take off. But the butterfly's wings are thin. So they heat up faster than the thorax and can rapidly overheat. People might think that butterfly wings are lifeless. They may think they are like a fingernail, a bird feather or a human hair, says Nanfang Yu. He is a physicist at Columbia University in New York City. In fact, he notes, those wings contain living tissues. These tissues are crucial for survival and flight. High temperatures will make the insect "really feel uncomfortable," Yu says. The wings had distinct features that helped them stay cool, the researchers found. The first was a thick substance called chitin that covers veins in the wings. Insect blood called hemolymph flows through those veins. The chitin is thicker over the veins. And it releases excess heat. Chitin also is what gives the rest of the butterfly its tough exterior.

There's another wing part that does that too. It's a tiny structure shaped like a tube. On the scale of a billionth of a meter, it's called a nanotube. A butterfly's wing can have several of them. These sit on wing structures known as scent pads. These pads give off certain smells that males can use to attract mates. Scent pads contain both the nanotubes and chitin. The chitin makes the veins and scent pads thicker than dead material, such as the scales covering each wing. The tubes give the scent pads a hollow structure. Thicker or hollow materials are better at radiating heat than thin, solid materials, Yu says.

A butterfly can still overheat. That's why it will move away from intense light if it gets too warm. But the chitin and nanostructures protect a wing only up to a point. To test this, the researchers beamed a laser on the wing's scales. Their temperature rose, Yu says – "but butterflies can't feel it and they don't care." When the laser's light warmed a butterfly's veins too much, the insect flapped its wings. Or it moved away from the heat.

The team also discovered some butterflies have what looks like a beating "heart" on their wings. This structure pumps insect blood through the scent pads. And it "beats" a few dozen times per minute. The team found it in two species of butterflies, the males of the hickory hairstreak (*Satyrrium caryaevorus*) and white M hairstreak (*Parrhasius m-album*). It's surprising to find such a structure in the middle of the wing, Yu says. Why? To fly well, he explains, the wing has to be light.

The extra structure adds weight. Still, that it exists, he says, “can only mean that this wing heart is very important for the function and health of the scent pad.”

1. Why is wing temperature important for butterflies?

- a) Because their wings should be warm.
- b) Because it determines the insects' ability to fly.**
- c) Because butterflies like cold temperatures.

2. According to the text, butterfly wings...

- a) are lifeless, just like hair.
- b) contain a billion nanotubes.
- c) have features that regulate temperature.**

3. According to the text, a beating "heart" was found in...

- a) several species of butterflies.**
- b) the hickory hairstreak and white M hairstreak.
- c) the males of two species.

B) Use of English. Choose the correct answer. You must choose and answer only 8 out of the 11 questions below (0,4 points each).

4. Firstly, I want to congratulate you all. Secondly, I would like to wish you good luck and _____ I hope you have enjoyed the course.

- a) in the end
- b) at last
- c) finally**

5. You clean your teeth twice a day to avoid having problems.

- a) can't
- b) should**
- c) need

6. The boys thought they were _____ when they saw the bull.

- a) in a danger
- b) in danger**
- c) in the danger

7. A. "I think it is going to rain soon".

B. "I _____. The clouds are clearing".

A. "We will soon see".

- a) argue b) complain **c) disagree**

8. I really don't like this meal. _____ money in the world wouldn't get me to eat it.

- a) Whatever
- b) Enough
- c) All the**

9. That's very good of you but you _____ have paid me back until tomorrow.

- a) needn't**
- b) wouldn't
- c) couldn't

10. I _____ intending to stop smoking even before I got this bad cough.

- a) would have been
- b) had been**
- c) will have been

11. You planned this essay _____ much more carefully this time. Well done!

- a) so**
- b) such
- c) as

12. If I'd planted seeds in spring, I _____ tomatoes now.

a) would have

b) had have

c) will have

13. My birthday, _____ was my 42nd, turned out to be a wonderful day.

a) what

b) that

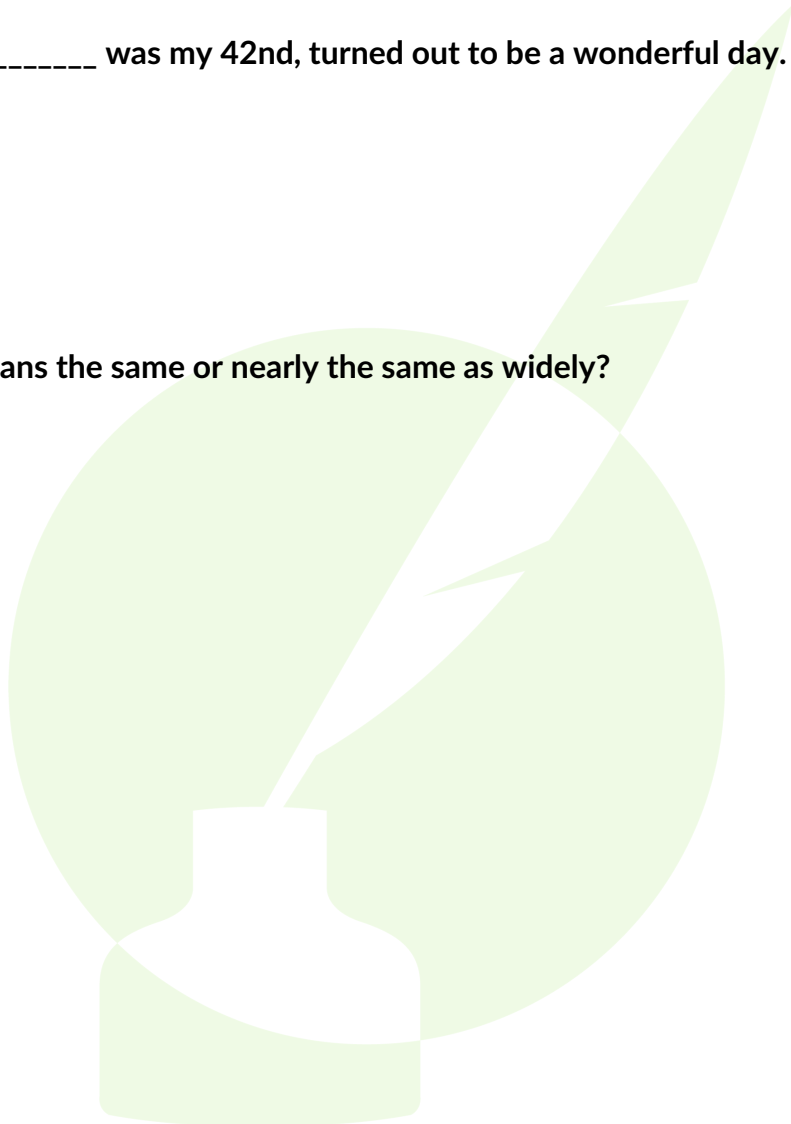
c) which

14. Which word means the same or nearly the same as widely?

a) narrowly

b) extensively

c) shortly



Part II

Write an essay of 150-180 words on ONE of the following subjects (6 points):

A- "We are what we wear." Explain your view and provide as many examples as possible.

Every year a regular citizen may spend a great part of their salary on clothes. That is a clear example of how important it is our attire for most of us, but can it be stated that we are what we wear?

It is undeniable the crucial role that clothes have throughout the different stages of our life. In the adolescence the choice of clothes is essential to send a message to the world and to try to belong to a certain group of people. As we grow old, the sense of belonging diminishes but it is not lost. We still want to show others that we are no longer teenagers, or that we belong –or would like to belong– to a certain economic status.

Another aspect worth mentioning is how we can show our mental health through our clothes. When we are extremely tired or sad we don't really care about how we look, or what others may perceive through our outfit.

In short, the saying "we are what we wear" may seem too radical, but it is fair to say that the way we wear is extremely linked to how we want to show ourselves to others.

B- Describe someone you respect deeply. Explain why you respect him/her so much. Provide as much information and details as possible.

It may sound weird but I think one of the persons I admire and respect the most is my former boss. She has recently retired and we are about to throw her a big surprise party to bid her farewell.

There are several reasons why I respect her. I have known her since 2009 and she has always been a caring and determined person. Whenever she entered a room you could feel a happiness energy and she has always tried to treat us workers with fairness and affection, and she has never stopped protecting the company.

Her life has been intense. She married very young and had 4 children. At her mid-forties, when her children had grown up, she studied a degree in History and later on, after working for some time in a high school, she started up Luis Vives Academy with some colleagues.

In her early sixties she divorced and started a new life on her own. She is very energetic and unlike many people her age, she enjoys going out and doing many different activities such as cinema, theatre, or travelling. She is now training in wine tasting and her next trip is Nepal.