113 學年度桃園市立武陵高級中學科學班英文試題

注意：全部試題皆為選擇題，請用 2B 鉛筆於答案卡上清楚劃記答案

I. Vocabulary (每題 2 分，共 30 分)

1. Thanks to computers, people are _____ to solve millions of math questions in a short period of time.
   (A) wise (B) able (C) active (D) slim
2. Researchers believe that there are other living beings _____ our solar system, but we don't have the technology to prove it yet.
   (A) anywhere (B) altogether (C) beyond (D) abroad
3. I couldn't finish my phone _____ with my mother because the phone went dead while we were chatting.
   (A) conversation (B) information (C) comment (D) program
4. Scientists are not _____ what could be on the other side of a black hole, because they have never tried to send anything through one.
   (A) absent (B) jealous (C) certain (D) common
5. It has been firmly proved that people who smoke often have a higher risk of getting lung cancer because of _____ smoking.
   (A) regular (B) distant (C) relative (D) basic
6. Since I easily feel nervous about the smallest things, I _____ my sister's gift of staying calm during stressful times.
   (A) affect (B) agree (C) avoid (D) admire
7. Children are expected to show good manners by saying 'please,' and always to _____ themselves in public.
   (A) gesture (B) behave (C) prepare (D) handle
8. If you want to eat healthily, you need to _____ both fruits and vegetables in your daily diet.
   (A) include (B) measure (C) remind (D) receive
9. The hill is covered with colorful wild flowers every summer, _____ in the month of July.
   (A) generally (B) especially (C) naturally (D) personally
10. The kid touched the hot metal by _____, and quickly pulled his hand away with a cry of pain.
    (A) custom (B) machine (C) experience (D) accident
11. Popular _____ tends to place a great value on brand names, encouraging people to buy expensive goods that they don't necessarily need.
    (A) scenery (B) member (C) culture (D) knowledge
12. Instead of making her dog _____ its injuries from being hit by a car, the dog's owner finally made a painful decision to put her dog to sleep.
    (A) care for (B) stand by (C) speed up (D) suffer from

13. After a long meeting, the management finally _____ some amazing plans that could drive up sales in the next season.
(A) came up with (B) gave up on (C) ran out of (D) looked forward to

14. The kindergartener was _____ her artwork; she showed her paintings to anyone who would look to win praise.
(A) concerned about (B) satisfied with (C) exhausted from (D) worthy of

15. Flight attendants show passengers how to use oxygen masks _____ a sudden loss of cabin pressure.
(A) in spite of (B) in charge of (C) in need of (D) in case of

II. Cloze (每題 2 分，共 26 分)

1. Recent research suggests* that American horseshoe crab populations in the U.S. have decreased* sharply over the past 30 years. __16__, growth numbers for the animal are down two-thirds from 1990 in an area of the Delaware Bay. To save the species from extinction*, a collection of 23 environmental groups __17__ to call for an official declaration* that American horseshoe crabs are endangered, and the effort is underway.

The groups name quite a few of threats* to the animal, and one of them is __18__ activities. Drug manufacturers* harvest horseshoe crabs in large numbers for their blue-colored blood. The blood __19__ to test and develop* drugs. Current law permits* the industry to catch small amounts of horseshoe crab blood before __20__ the animals alive back to their habitats. However, 10 to 15 percent of harvested animals die during this process. In fact, non-industry research suggests that the death rate is even __21__ higher: about 30 percent of captured* horseshoe crabs die before they are released.

If the endangered declaration is approved* in the future, it would generally make it unlawful for people to harm or kill a horseshoe crab without an official permit to do so.

suggest 表明	decrease 減少	extinction 滅絕	declaration 宣言	threat 威脅
manufacturer 製造商	develop 發展	permit 允許	capture 捕獲	approve 核可

16. (A) Rather (B) However (C) For example (D) Otherwise
17. (A) have joined (B) were joined (C) joining (D) being joined
18. (A) environmental (B) physical (C) geographical (D) biomedical
19. (A) uses (B) used (C) is used (D) is using
20. (A) releases (B) releasing (C) to release (D) having released
21. (A) much (B) more (C) least (D) most

2. Tropical storms have been becoming more and more powerful in recent years because of climate change. As a result, the __22__ five-category* Saffir-Simpson scale, designed over 50 years ago based on wind speed, may not be accurate* in showing the true power of the strongest storms. Scientists have thus proposed* a sixth category for storms with winds faster than 309 kilometers per hour.

__23__, storms with winds of 252 kilometers per hour or higher are category five, while this grouping may fail to warn people about the greater dangers from future storms with even stronger winds. However, some scientists do not think __24__ category is needed. They believe the new category can even send a wrong message to the public because it is based on wind speed __25__ water, which is by far the deadliest part of hurricanes*.

__26__, either side has strong reasons because situations vary* in different regions*. For instance*, storms formed in the Pacific Ocean are stronger because there is __27__ land to weaken them and __27__ room for storms to grow more intense*. That is not the same situation in the Gulf of Mexico and in the Caribbean. In this case, if the Pacific areas keep to the current five-category scale, people there __28__ the risks as storms get larger and more powerful.

category 類別	accurate 精準	propose 提出	hurricane 颶風
vary 變化	region 區域	for instance 例如	intense 強烈的

22. (A) ordinary (B) traditional (C) similar (D) successful
23. (A) Previously (B) Futuristically (C) Currently (D) Instantly
24. (A) another (B) other (C) one another (D) the other
25. (A) as well as (B) except for (C) besides (D) rather than
26. (A) With the idea in mind (B) As clearly presented above
    (C) From a fair point of view (D) To draw the discussion to an end
27. (A) less; more (B) more; less (C) few ; little (D) little; few
28. (A) don't understand (B) misunderstand (C) might understand (D) will misunderstand

III. Reading Comprehension (42~45 題每題 1 分，其餘題目每題 2 分，共 44 分)

1. (Question. 29-37)

Earth is made up of four different layers*, which are the inner core, the outer core, the mantle and the crust.

The inner core looks like a solid* metal ball that has a radius* of 1,220 kilometers, or about three-quarters that of the moon. It's located some 6,378 to 5,100 kilometers beneath Earth's surface. Extremely dense*, it is made mostly from iron and nickel. The inner core turns a bit faster than the rest of the planet. It is also intensely hot. The temperature of this part of Earth **sizzles** at 5,400° Celsius, almost as hot as the surface of the sun.

The outer core, also made from iron and nickel, is in liquid* form. It sits some 5,100 to 2,900 kilometers below the surface. Heated largely by the radioactive* decay* of the elements* uranium and thorium, this liquid causes huge, turbulent* currents*. That motion generates* electrical currents, which generates* Earth's magnetic field*.

The mantle is nearly 3,000 kilometers thick, and it is Earth's thickest layer. It starts a mere 30 kilometers beneath the surface. Made mostly of iron, magnesium and silicon, this layer also circulates* like the one below it, but far more slowly. Near its upper edges, the mantle's temperature reaches the melting point of rock.

It forms a layer of partially melted rock known as the asthenosphere. Geologists believe this weak, hot, slippery part of the mantle is what Earth's tectonic plates ride upon and slide across.

Lastly, the crust looks like the shell of a hard-boiled egg. It is extremely thin, cold and brittle* compared to what lies below it. The crust is made of relatively light elements, especially silica, aluminum and oxygen. It is also highly variable* in its thickness. Under the oceans, it may be as little as 5 kilometers thick. Beneath the continents, the crust may be 30 to 70 kilometers thick.

layer 層	solid 固體	radius 半徑	dense 密度大的	liquid 液體
radioactive 輻射	decay 衰變	element 元素	turbulent 混亂的	current 流體
generate 產生	magnetic field 磁場	circulate 循環	brittle 脆的	variable 變化的

29. What is the main idea of the passage?

(A) How Earth was possibly formed long time ago.

(B) Elements making up Earth and where they are from.

(C) The layers inside Earth and their special forms.

(D) Why and how temperatures inside Earth change.

30. Which of the statements about the inner core and the outer core of Earth is **TRUE**?

(A) Radioactive decay causes magnetic field in the outer core.

(B) The inner core does not move because it is simply too dense.

(C) The outer core is in solid form because its temperature is lower.

(D) The size of the inner core is bigger than that of the moon.

31. Which of the following is closest in meaning to "**sizzle**" in the second paragraph?

(A) rise

(B) fry

(C) shine

(D) warm

32. Below are some descriptions about the mantle and the crust of Earth. Please choose the **CORRECT** ones. (There could be more than one correct answer.)

(A) The mantle is a lot thicker than the crust.

(B) The thickness of the crust may change from place to place on Earth.

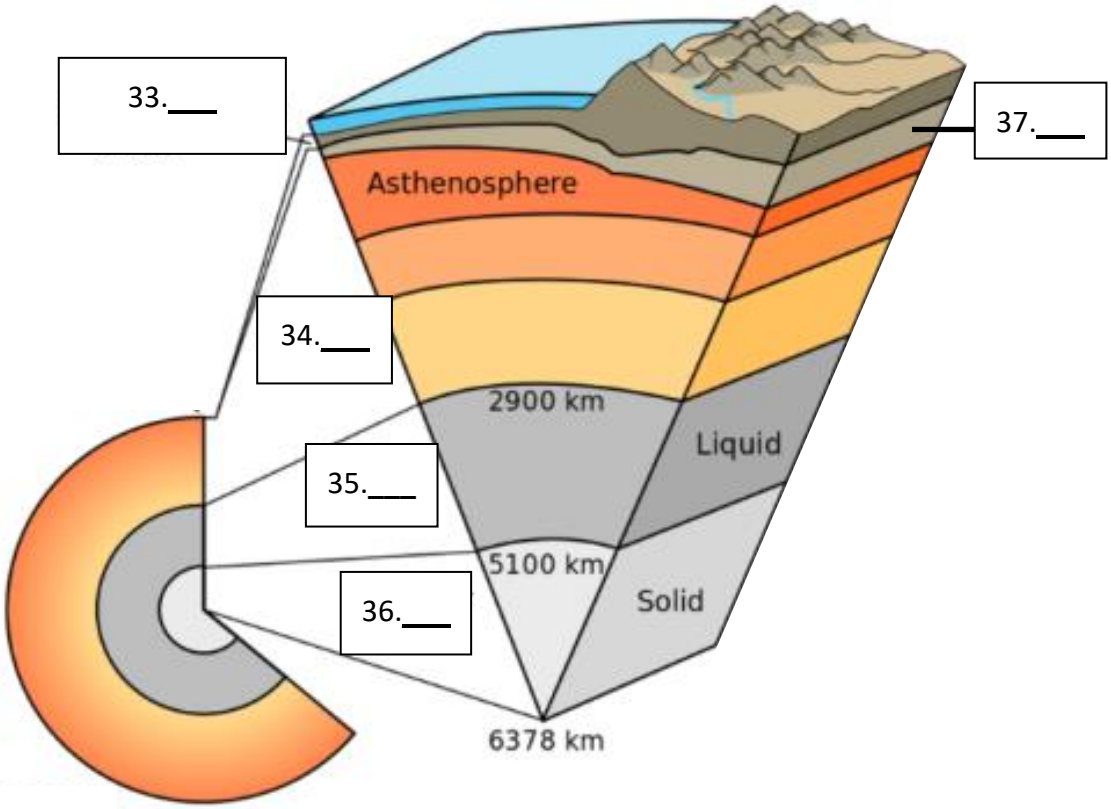
(C) The mantle moves slowly because it rides upon tectonic plates.

(D) The mantle and the crust are made of different elements.

(E) The temperature of the mantle is not high enough to melt rock.

33~45. Please refer to the passage above, and put the given terms into the blanks where they belong in the cut-away of Earth's layers presented below.

(A) Mantle	(B) Tectonic Plate	(C) Outer Core	(D) Inner Core	(E) Crust



2. (Question. 38~45)

WildDISCO is a newly-developed method that can map the internal* structure of an animal's body. The process is a bit like Google Maps for the body. In place of cars driving around to record every street, this mapping system uses antibodies*. They act as streetlamps to light up cellular* landmarks.

The technique first starts out by chemically removing cholesterol* from the tissue* of dead mice. The removal of cholesterol creates sponge-like holes in tissue without destroying it. Those holes allowed better use of chemicals that can color or label the targeted parts of the mice. Antibodies are one of them. After injected*, antibodies slowly move through the holes to reach every corner of the body. They soon combine with proteins* everywhere they reach. Under fluorescent* light, these antibodies can make targeted parts of the body glow. While wildDISCO is not the only way to make see-through mice, it is without a doubt more preferable compared to existing* techniques in terms of* cost and efficiency.

With wildDISCO, researchers have collected images to make several maps. Some show the full network of nerves that runs beneath the skin and around organs. Others highlight the lymph system*, an open network of organs and vessels that helps the human body fight off pathogens* and get rid of cells' wastes. Such maps could enable many types of future studies. They might help researchers train artificial intelligence* programs

to simulate* mouse biology. That might even reduce* the need for animal experiments. Theoretically, wildDISCO might also guide studies on animals other than mice. A similar "**recipe**" is expected to possibly work in fruit flies, frogs or other common lab species. If so, scientists might get clearer snapshots of their interior*, too.

internal 內部的	antibody 抗體	cellular 細胞的	cholesterol 膽固醇
tissue 組織	inject 注射	protein 蛋白質	fluorescent 螢光的
glow 發光	existing 現存的	in terms of 在…方面	lymph system 淋巴系統
artificial intelligence 人工智慧	simulate 模擬	reduce 減少	interior 內部

38. Why does the author mention Google Maps at the beginning of the passage?
(A) To show the similarity between Google Maps and wildDISCO.
(B) To explain how scientists turn Google Maps into wildDISCO.
(C) Because wildDISCO uses technology created by Google.
(D) Because wildDISCO is a science project led by Google.

39. Which one of the following descriptions about wildDISCO is **TRUE**?
(A) It is the first way ever created to make a see-through mice.
(B) Antibodies are the only things needed to make the body of a dead mouse glow.
(C) If done correctly, wildDISCO won't do any harm to the tissue of dead mice.
(D) WildDISCO is more expensive than most of the existing methods of the same kind.

40. Why are antibodies important in the process of wildDISCO?
(A) They create passages in the body of dead mice in a short time.
(B) They help remove unwanted protein and map the tissue of dead mice.
(C) They make dead mice glow under certain lighting situations.
(D) They keep dead bodies fresh for a longer time for experiment purposes.

41. According to the context, which of the following is closest in meaning to the word "**recipe"** in the third paragraph?
(A) ingredient
(B) method
(C) routine
(D) design

42~~45. The following (questions 42~45) are some descriptions about wildDISCO. If a description is **TRUE**, mark the letter **(A)**. If it is **False**, mark the letter **(B)**.

42. WildDISCO helps cells fight off diseases and get rid of wastes.
43. WildDISCO may help develop artificial intelligence programs for future studies.
44. With wildDISCO, scientists get to know more about the body of animals at a lower cost.
45. Thanks to wildDISCO, there may be fewer animal experiments in the future.

3. (Question 46~52)

Cintia Castilho became strongly interested when Robert Hurt, her professor, mentioned at a team meeting that his group had used graphene oxide (GO) in clothing that protects* against chemical vapors* used to fight mosquitoes. Starting from there, Castilho asked herself, "Can graphene oxide keep a mosquito from biting?"

The idea is worth exploring because scientists have been trying very hard to prevent* mosquito-borne disease with protective clothing, chemicals, bed nets — even some drugs. But those drugs are too expensive for most people in poor countries. The same is true for vaccines*. They are difficult and costly to develop. And for many diseases, they don't even exist.

To test GO's effectiveness*, Castilho's team covered a volunteer's* skin with cheesecloth, a light fabric. They let 100 mosquitoes, free of dangerous viruses, fly freely around the volunteer's arm for five minutes. A volunteer would end up with about 10 bites per square inch of exposed skin. Then, the researchers ran the test again. This time they used some cheesecloth to hold the GO film* in place. After another five minutes with the insects, the volunteer would have no mosquito bites. The researchers concluded that the film would be a barrier* — like a wall. Mosquitoes should still land on the arm but just didn't bite. However, the truth was not as what they thought — almost no mosquitoes landed on a GO-protected arm.

To better understand why, the researchers added water to the film. That simulates* human sweat, which is known to attract mosquitoes. And now mosquitoes did land on the arm, but they also were able to bite. That is, while dry GO was fully protective, wet GO was not.

A microscope showed what happened. Wet GO has a mushy* structure that makes it a less effective shield. To restore its original* protection, the researchers changed GO's chemistry. They applied* a vapor to the film. That removed most of the oxygen molecules*. It was now what chemists call reduced graphene oxide (rGO). Wet rGO doesn't get mushy. And a wet rGO film kept mosquitoes from biting, even when they landed. These results showed that wet rGO was the mechanical barrier the researchers had expected to find. Dry GO, on the other hand, do blocks* some smelly chemicals that a person's skin emits* with sweat, but mosquitoes may find nearby people to bite if they sense any of these chemicals from them.

protect 保護	vapor 蒸氣	prevent 預防	vaccine 疫苗	effectiveness 效果
volunteer 自願者	film 薄片	barrier 屏障	simulate 模擬	mushy 糊爛的
original 原初的	apply 塗抹	molecule 分子	block 掩蓋	emit 釋放

46. What is the main idea of the passage?

(A) A new discovery that can hopefully improve public health.

(B) A study on how mosquito-borne diseases spread and how to stop them.

(C) A creative idea that can possibly keep people safe from mosquito bites.

(D) An experiment studying what type of person gets the least mosquito bites.

47. According to the passage, what makes preventing mosquito-borne diseases difficult? (There could be more than one correct answer.)

(A) In some parts of the world, people don't have money for drugs.

(B) There are no vaccines for some mosquito-carried diseases.

(C) Mosquitoes are hard to kill and can survive even in difficult environments.

(D) The ways people are using to fight against mosquitoes nowadays are not useful at all.

(E) Most people are not giving enough attention to disease prevention.

48. Why was there almost no mosquito landing on the volunteer's arm the first time Castilho tested her GO film?

(A) Because the GO film worked very well.

(B) Because the GO film was too mushy.

(C) Because the volunteer's skin was fully covered.

(D) Because the GO film was not wet.

49. Please rank the following three materials based on their level of protection against mosquito bites from the lowest to the highest.

(A) Cheesecloth → Wet graphene oxide → Dry graphene oxide

(B) Cheesecloth → Dry graphene oxide → Wet graphene oxide

(C) Dry graphene oxide → Cheesecloth → Wet graphene oxide

(D) Wet graphene oxide → Cheesecloth → Dry graphene oxide

50. According to the passage, we can infer that __50__ is what scientists believe to be the most ideal material in preventing the spread of mosquito-borne diseases among populations.

(A) Cheesecloth

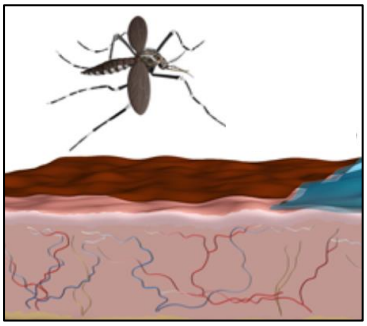
(B) Dry graphene oxide

(C) Wet graphene oxide

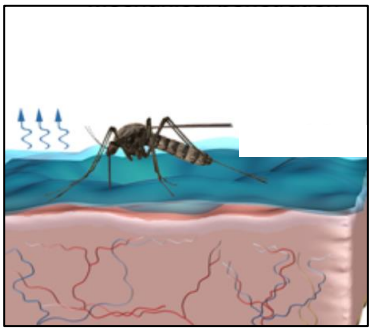
(D) Wet reduced graphene oxide

51~52. A science student did the same set of experiments in a lab, and the two pictures below were his lab reports. What materials did the student use in the two experiments?

(A) cheesecloth	(B) GO	(C) wet GO	(D) wet rGO



Experiment 1./ The material used: __51__
No mosquito was seen landing and not even a bite was found on the volunteer's arm.



Experiemnt 2. / The material used: __52__
Some mosquitoes landed on the arm, but they could not find ways to bite the volunteer.