

2023학년도 재외국민과 외국인 특별전형 필기고사 문제

- 자연계열 -



| | |
|------|--|
| 모집단위 | |
| 수험번호 | |
| 성명 | |

※ 감독자의 지시가 있을 때까지 다음 장으로 넘기지 마시오.

영어(1~20번) [100점 만점]

※ 1 ~ 20번 : 각 5점

[1~7] 다음 빈칸에 들어갈 가장 적절한 것은?

1. Being indifferent is not a bad act in itself. But more often than not, when _____ joins hands with ignorance, prejudice is born.

- ① compassion ② sympathy
- ③ apathy ④ affection
- ⑤ attachment

2. If we _____ the cost of producing coins and bills by adopting e-payment systems, we can allocate the money we save toward other programs, like improving social welfare for people.

- ① demand ② eliminate
- ③ amplify ④ maintain
- ⑤ augment

3. Rather than destroy the plant's buildings or _____ the entire facility, they decided to give it new meaning as a series of useful public structures.

- ① expand ② preserve
- ③ abandon ④ adorn
- ⑤ construct

4. A lot of _____ urban areas were entirely wiped out in favor of massive redevelopment that would meet the demands of the modern city, for housing, transport, office or commercial space.

- ① run-down ② well-planned
- ③ start-up ④ short-stay
- ⑤ trade-in

5. Since the late twentieth century, athletes have been _____ the progress in science and technology to achieve their goals.

- ① blamed for ② putting off
- ③ taken over by ④ taking advantage of
- ⑤ showing off

6. In fact, it also includes the living traditions of people such as oral storytelling, performing arts, rituals, and festivals. These are a country's _____ cultural heritage.

- ① trivial ② intangible
- ③ conservative ④ aboriginal
- ⑤ concrete

7. These types of fungi cannot photosynthesize in the dark, so they have to obtain carbon for survival. Meanwhile, carbon is provided by the tree roots in exchange for nutrients and water the fungi bring to the tree. It's a(an) _____ relationship between fungi and roots of a plant.

- ① competitive ② defensive
- ③ autonomous ④ symbiotic
- ⑤ absurd

[8~10] 다음 글의 밑줄 친 부분 중, 어법상 틀린 것은?

8.

Hardships should not make us give up our dreams. We should all have a dream and follow it no matter what ① happens. If we do our best to make the dream ② come true, we will surely be able to achieve it. Remember what Paulo Coelho says in his novel *The Alchemist*, "There is only one thing ③ that makes a dream impossible to achieve: the fear of failure." Let us ask ourselves, though, whether the achievement of our dream can contribute to ④ making the world a better place. if it can, it is ⑤ worth of our time and commitment.

9.

The island of Yap, located in the Pacific Ocean between Guam and Palau, had been untouched by modern civilization ① until the 1800s. You may think that they shouldn't have had their own monetary system because they were not modernized. However, the people of Yap had a very advanced and well-developed system of money. They used rai—large, thick round stone wheels with a hole cut in the middle in ② which they could insert a pole to help transport them. Some rai were very big and weighed about 7 tons! These huge stones were not native ③ to the island. Instead, they were ④ mining on the Palau Islands, 460 km away from Yap. Because Yap islanders used narrow boats, the stones often fell overboard and got lost in the sea. ⑤ What is interesting is that even when rai fell into the sea, people agreed that the incident didn't change either the value of the stone or its owner's ownership.

10.

On getting off the plane at Amsterdam's Schiphol Airport, I am struck, only a few steps inside the terminal, ① by the appearance of a sign, which announces the way to the arrivals hall, the exit and the transfer desks. It is a bright-yellow sign, one meter high and two ② meters across, simple in design. Despite its simplicity, the sign delights me, a delight ③ for which the word exotic, though unusual, seems appropriate. If the sign provokes in me genuine pleasure, it is in part because it offers the first conclusive evidence of my ④ having arrived somewhere else. Putting it in other words, it is a symbol of being abroad. Although it may not seem ⑤ distinctively to the casual eye, such a sign would never exist in precisely this form in my own country.

11. 다음 글의 목적으로 가장 적절한 것은?

When people state opinions in articles, speeches, debates, or advertisements, they often give some statistics to support or reinforce their point. If these statistics are found through proper research methods, then they are objective facts. However, many statistics that you see and hear could just be numbers that are meant to convince you of a certain view. Therefore, the next time you come across some statistics, don't blindly accept any data that is presented. Look at the statistics in detail with a critical eye, and then judge whether or not they are convincing.

- ① to explain how to be a competent statistician
- ② to advise readers to look at statistics cautiously
- ③ to demonstrate the use of statistics in various fields
- ④ to criticize statisticians for using research methods
- ⑤ to emphasize the importance of using valid evidence

12. 다음 글의 제목으로 가장 적절한 것은?

Most soda contains several types of acids. Acid is a chemical substance with a sour taste. When added to water, it produces a sharp flavor. Acid also delays the growth of bacteria, which extends the expiration date of a product. However, acid interferes with the body's ability to absorb calcium, and as a result, bone softening occurs. Also, the acid in sodas interacts with stomach acid, slowing digestion and blocking nutrient absorption. Furthermore, it can damage tooth enamel, the hard substance that protects your teeth. If you drink sodas regularly, your teeth decay more easily.

- ① Beneficial Effects of Sodas to Health
- ② Effects of the Acid in Sodas on the Body
- ③ Why Sodas Contain Several Types of Acids
- ④ The Role of Tooth Enamel and Its Weakness
- ⑤ A Formula for Sodas Using Chemical Substances

13. 다음 글의 빈칸 (A), (B), (C)에 가장 적절한 것은?

Big Data is frequently characterized and defined by volume, variety, and velocity: huge amounts of data collected from many different sources in real time. (A), the total accumulation of data from the past two years alone is greater than all of the information ever recorded before that. (B), data comes in various forms, ranging from texts, pictures, and sound files to GPS-based location information and credit card transaction records. (C), such data is gathered and stored at a remarkable speed: as soon as you use your library card, a record of your visit can be sent to the web and may contribute to expanding the pool of data.

- | | (A) | (B) | (C) |
|---|---------|----------------|--------------|
| ① | In fact | -- In addition | -- Moreover |
| ② | In fact | -- As a result | -- Therefore |
| ③ | However | -- Meanwhile | -- Moreover |
| ④ | However | -- In addition | -- Otherwise |
| ⑤ | However | -- As a result | -- Otherwise |

14. 주어진 대화 다음에 이어질 대화 순서로 가장 적절한 것은?

A: How can we put “Always give others heartfelt praise” into a picture?

B: Well, I have an idea. How about this? We draw a hand with the thumb up.

- (A) I think we should include a heart image.
- (B) That could mean just “praise” because the meaning of a thumb-up is “Good job.”
- (C) Now, we just need to put the two images together.
- (D) Good idea. That fits perfectly.
- (E) Right. So how can we symbolize “heartfelt praise”?

- ① (A) - (B) - (C) - (E) - (D)
- ② (A) - (C) - (B) - (E) - (D)
- ③ (B) - (E) - (A) - (D) - (C)
- ④ (B) - (E) - (D) - (C) - (A)
- ⑤ (E) - (C) - (A) - (D) - (B)

[15~16] 다음 글의 내용과 일치하는 것은?

15.

Born in Germany in 1647, Maria Sibylla Merian became one of the most respected scientific illustrators in the world for the way she combined science and art. In the 1600s, people considered insects evil and knew little of the relationship between caterpillars and butterflies. Merian, however, observed insects carefully and illustrated the different stages of their lives. In 1679, she published a book on metamorphosis, which showed the life cycle of insects and the relationships between living things. At the age of 52, Merian went on an expedition to Surinam. There she documented various insects and plants despite the extreme heat and dangerous animals. Based on her observations, her greatest book, *Metamorphosis of the Insects of Surinam*, was published in 1705. Not only has Merian’s work helped scientists understand and classify insects, but the detailed illustrations have continued to impress people to this day.

- ① In the 1600s, people knew the life cycle of insects well.
- ② Merian’s book on metamorphosis was published at her age of 52.
- ③ Merian went on an expedition to Surinam in 1705.
- ④ The environment in Surinam was agreeable and safe.
- ⑤ Merian’s scientific illustrations have affected scientists and people.

16.

Seeds may seem insignificant, but if they disappear, there will be a food crisis. Because of this, many countries have created seed banks to store seeds of different crop varieties. There are some 1,700 seed banks in the world, but many of them are exposed to natural disasters, diseases, wars, and other risks. For example, the national seed bank of the Philippines was damaged by flooding and later destroyed by a fire. The seed banks of Afghanistan and Iraq were destroyed or severely damaged during recent wars. So we can see that seed samples need to be stored in a very secure place. This realization sparked the idea of building a global seed bank to serve as a backup storage facility. Therefore, in 2008, the Norwegian government and the Crop Trust worked together to establish the Svalbard Global Seed Vault. This seed bank would contain backups of all the world’s seeds. Smaller seed banks around the world would still collect and keep local seeds, but they would also send copies of their seeds to the global bank.

- ① Many countries have created seed banks to preserve crop diversity.
- ② Any seed bank has not been damaged by natural disasters.
- ③ Smaller seed banks send their entire supply of seeds to the global seed bank.
- ④ The global seed bank has backups of specific countries.
- ⑤ Smaller seed banks were shut down with the establishment of global seed bank.

수학(21~35번) [100점 만점]

21. $x^2 - 5x + 1 = 0$ 일 때, $x + \frac{1}{x}$ 의 값은? (5점)

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

22. $\frac{1-i}{1+i} = a + bi$ 를 만족시키는 실수 a, b 에 대하여 $a^2 + b^2$ 의 값은? (단, $i = \sqrt{-1}$) (5점)

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

23. 원 $x^2 + y^2 - 8x + 6y + 21 = 0$ 위의 점 A와 원 $x^2 + y^2 = 1$ 위의 점 B에 대하여 선분 AB의 길이의 최솟값은? (5점)

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

24. $\sum_{k=1}^{99} \frac{1}{k(k+1)} = \frac{n-1}{n}$ 일 때, 정수 n 의 값은? (5점)

- ① 98 ② 99 ③ 100 ④ 101 ⑤ 102

25. 1부터 5까지의 숫자가 각각 하나씩 적힌 5개의 공을 A 주머니에 2개, B 주머니에 3개로 나누어 넣으려 한다. 1이 적힌 공과 2가 적힌 공이 같은 주머니에 들어갈 경우의 수는? (5점)

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

26. 방정식

$$\sin^2(4x+1) = 1$$

을 만족시키는 실수 x 의 개수는? (단, $0 \leq x \leq \pi$) (5점)

- ① 0 ② 2 ③ 4 ④ 6 ⑤ 8

27. 남학생과 여학생을 합하여 모두 10명인 학생들 중 2명의 대표를 임의로 뽑을 때, 남학생이 한 명도 뽑히지 않을 확률이 $\frac{1}{3}$ 이다. 남학생의 수는? (5점)

- ① 1명 ② 2명 ③ 3명 ④ 4명 ⑤ 5명

28. 자연수 n 에 대하여 $a_n > 0$ 이고 $b_n = \log_2 a_n$ 이다. $\{b_n\}$ 은 첫째항이 1이고 공비가 2인 등비수열일 때,

$$\sum_{n=1}^7 \log_{a_n} x = \frac{127}{128}$$

을 만족시키는 실수 x 의 값은? (7점)

- ① $\frac{1}{2}$ ② $\frac{1}{\sqrt{2}}$ ③ 1 ④ $\sqrt{2}$ ⑤ 2

29. 곡선 $y = x^3 - x^2 + 2x + 1$ 과 이 곡선 위의 점 $(0, 1)$ 에서의 접선으로 둘러싸인 영역의 넓이는? (7점)

- ① $\frac{1}{36}$ ② $\frac{1}{12}$ ③ $\frac{1}{4}$ ④ $\frac{3}{4}$ ⑤ $\frac{9}{4}$

30. 양의 실수 전체 집합에서 정의된 함수 $f(x) = x^2 + a$ 의 그래프와 $f(x)$ 의 역함수의 그래프가 교점을 가지기 위한 실수 a 의 최댓값은? (7점)

- ① 0 ② $\frac{1}{8}$ ③ $\frac{1}{4}$ ④ $\frac{3}{8}$ ⑤ $\frac{1}{2}$

31. n 개의 동전을 동시에 던질 때, 앞면이 $n-1$ 개 이상 나올 확률이 $\frac{1}{10}$ 이하가 되는 자연수 n 의 최솟값은? (7점)

- ① 6 ② 7 ③ 8 ④ 9 ⑤ 10

32. $f(x) = 2^x$, $g(x) = \frac{1}{x+1}$ 이라 할 때, 다음 중 옳은 것을 있는 대로 고른 것은? (7점)

ㄱ. $f(x) = c$ 일 때, $0 < g(c) < 1$
 ㄴ. $g(x) < g(y)$ 이면 $x < y$
 ㄷ. $0 < c < 1$ 에 대하여 $f(x) = g^{-1}(c)$ 를 만족시키는 x 의 개수는 1개이다

- ① ㄱ ② ㄷ ③ ㄱ, ㄴ ④ ㄴ, ㄷ ⑤ ㄱ, ㄷ

33. 다항함수 $f(x)$ 가

$$\lim_{x \rightarrow 0^+} \frac{x \left\{ f\left(\frac{1}{x}\right) - 3 \right\} + 2}{3 - x} = 1$$

을 만족시킬 때, $\lim_{x \rightarrow \infty} \frac{f(x)}{x}$ 의 값은? (10점)

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

34. 서로 다른 두 실수 x, y 에 대하여 조건 p 가

$$p: \{x, y\} = \{|x|, y^2\}$$

일 때, p 이기 위한 필요조건을 다음 <보기>에서 있는 대로 고른 것은? (10점)

<보기>

$q_1: xy > 0$
 $q_2: x > 0$ 또는 $y > 0$
 $q_3: x \neq y^2$

- ① q_2 ② q_1, q_2 ③ q_1, q_3 ④ q_2, q_3 ⑤ q_1, q_2, q_3

35. 이차함수 $f(x)$ 는 $x = a$ 에서 극값을 갖고, 다항함수

$$g(x) = \int_0^x t(t-4)f(t) dt$$

는 극값을 갖지 않는다. 실수 a 의 값은? (10점)

- ① $\frac{1}{4}$ ② $\frac{1}{2}$ ③ 1 ④ 2 ⑤ 4

2023학년도 재외국민과 외국인 특별전형 필기고사 답안지
- 자연계열 -

| 과목 | | 영어 | | 과목 | | 수학 | | |
|------|----|------|------|----|-----|------|----|--|
| 문제번호 | 정답 | 배점 | 문제번호 | 정답 | 배점 | 문제번호 | 정답 | |
| 1 | ③ | 각 5점 | 21 | ⑤ | 5점 | 22 | ① | |
| 2 | ② | | 23 | ② | | | | |
| 3 | ③ | | 24 | ③ | | | | |
| 4 | ① | | 25 | ④ | | | | |
| 5 | ④ | | 26 | ③ | | | | |
| 6 | ② | | 27 | ④ | 7점 | 28 | ④ | |
| 7 | ④ | | 29 | ② | | | | |
| 8 | ⑤ | | 30 | ③ | | | | |
| 9 | ④ | | 31 | ② | | | | |
| 10 | ⑤ | | 32 | ⑤ | | | | |
| 11 | ② | | 33 | ① | 10점 | 34 | ④ | |
| 12 | ② | | 35 | ④ | | | | |
| 13 | ① | | | | | | | |
| 14 | ③ | | | | | | | |
| 15 | ⑤ | | | | | | | |
| 16 | ① | | | | | | | |
| 17 | ③ | | | | | | | |
| 18 | ① | | | | | | | |
| 19 | ④ | | | | | | | |
| 20 | ⑤ | | | | | | | |