

4. $y = x$ 와 $y = 2x^2$ 로 둘러싸인 영역의 넓이는? [1.5점]

- ① $\frac{1}{24}$ ② $\frac{1}{12}$ ③ $\frac{1}{6}$ ④ $\frac{1}{3}$

5. 좌표평면 상의 점 $A = (4, 2)$ 를 원점을 중심으로 반시계방향으로 30° 회전하였을 때, 대응하는 점 B 의 좌표는? [2점]

- ① $(2\sqrt{3}+1, \sqrt{3}-2)$
 ② $(\sqrt{3}+2, -2\sqrt{3}+1)$
 ③ $(2\sqrt{3}-1, \sqrt{3}+2)$
 ④ $(-\sqrt{3}+2, 2\sqrt{3}+1)$

6. 네 점 $A = (1, 2, 1)$, $B = (4, 3, 1)$, $C = (2, 6, 3)$, $D = (1, 2, 3)$ 을 꼭짓점으로 가지는 평행육면체의 부피는? [2점]

- ① 22 ② 24 ③ 26 ④ 28

7. 함수 $f(x) = \cos x(1 - \sin x)$ ($0 \leq x \leq 2\pi$)
에서 최댓값과 최솟값은? [2점]

- ① $0, -\frac{3\sqrt{3}}{4}$ ② $1, 0$
③ $\frac{3\sqrt{3}}{4}, 0$ ④ $\frac{3\sqrt{3}}{4}, -\frac{3\sqrt{3}}{4}$

8. 곡선 $y^2 + xy - 3x^3 = 3$ 위의 점 $(1, 2)$
에서의 접선의 기울기는? [2점]

- ① $\frac{3}{5}$ ② 1 ③ $\frac{7}{5}$ ④ $\frac{9}{5}$

9. 평면 $-2x + 2y + z = a$ 와 직선

$$\frac{x+1}{2} = y+2 = \frac{z-5}{b}$$

사이의 거리가 2일 때,

두 양의 상수 a 와 b 의 합 $a+b$ 는? [2점]

- ① 1 ② 2 ③ 9 ④ 11

10. 정적분 $\int_{-2}^1 \frac{2x}{\sqrt{x+3}} dx$ 의 값은? [2점]

- ① $-\frac{16}{3}$ ② $-\frac{8}{3}$ ③ $\frac{8}{3}$ ④ $\frac{16}{3}$

11. $g(x) = e^{x+2f(x)}$ 이고, $g'(0) = 1$, $f'(0) = \frac{1}{2}$ 이다. $f(0)$ 의 값은? [2점]

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

12. $\vec{F}(\vec{r}) = x \hat{i} + xy \hat{j} + x \hat{k}$ 이고 경로 C 는 $\vec{r}(t) = x \hat{i} + y \hat{j} + z \hat{k} = \cos t \hat{i} + \sin t \hat{j} + t \hat{k}$ ($0 \leq t \leq \pi$)으로 주어진다.

주어진 경로에서의 선적분 $\int_C \vec{F}(\vec{r}) \cdot d\vec{r}$ 의

값은? (여기서 \hat{i} , \hat{j} , \hat{k} 는 각각 x , y , z 축 방향의 단위벡터이다.) [2.5점]

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

13. 미분방정식 $x^2y'' + 7xy' + 9y = 0$ 의
경계조건이 $y(x)|_{x=1} = 1$, $y(x)|_{x=e} = 0$ 일
때, $y(x)|_{x=2e}$ 의 값은? [2.5점]

- ① $-\frac{\ln 2}{8}e^{-3}$ ② $-\frac{\ln 2}{8}e^3$
③ $\frac{\ln 2}{8}e^{-3}$ ④ $\frac{\ln 2}{8}e^3$

14. 곡선 $\vec{r}(t) = \cos^3 t \hat{i} + \sin^3 t \hat{j}$ 의
경로($0 \leq t \leq \frac{\pi}{2}$)상의 전체길이는? (여기서
 \hat{i} , \hat{j} 는 각각 x , y 축 방향의 단위벡터이다.)
[2.5점]

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

15. $F(s) = \frac{1}{(s+3)^2}$ 일 때, 라플라스 역변환
관계식 $f(t) = L^{-1}\{F(s)\}$ 을 이용하여 구한
 $f(t)$ 는? [2.5점]

- ① te^{-3t} ② te^{3t}
③ $\frac{t}{3}e^{-3t}$ ④ $\frac{t}{3}e^{3t}$

2. 영 어 (35문항)

[16-19] Read the following and answer the questions.

Sustainable living deals with the practice of decreasing your demand on natural resources by ensuring you recycle what you use to the best of your ability. Sometimes that can mean not choosing to (A)_____ a product that is made using practices that don't promote sustainability, and sometimes it means altering how you do things so that you can start playing more of an active part in the cycle of life.

People know that global warming, climate change, damaging the ozone layer, and losing resources are real and their (B)_____ on human and animal lives can be catastrophic. It is time for individuals to adopt actions for sustainable living by changing their lifestyle. For example, basic measures such as using public transportation more frequently, reducing energy consumption, and becoming more eco-friendly can go a long way in minimizing your environmental impact and making this planet a safe and clean place.

16. Which one is NOT TRUE? [2 points]

- ① Sustainable living involves changing your lifestyle to minimize your environmental impact.
- ② Sustainable living involves using more natural resources by buying more products.
- ③ Sustainable living involves trying your best to recycle what you use.
- ④ Sustainable living involves using less energy.

17. Which one CANNOT be inferred from the passage? [2.5 points]

- ① You can help promote sustainability by walking or biking to work more often.
- ② You can reduce your energy consumption by using more natural light than light bulbs.
- ③ You can become eco-friendly by reusing items.
- ④ You can help reduce your environmental impact by increasing your imprint on the world.

18. Choose the best word for (A) and (B). [2 points]

- | | (A) | (B) |
|---|---------|---------|
| ① | consume | compact |
| ② | consult | compact |
| ③ | consume | impact |
| ④ | consult | impact |

19. Choose the best title. [2 points]

- ① Ways to Recycle
- ② Benefits of Public Transportation
- ③ Harming the Ozone Layer
- ④ How to Live a Sustainable Life

[20-23] Read the following and answer the questions.

(A) After the Irish and the Germans, the Chinese immigrants came to the U.S. between 1870 and 1900. Many worked in the minefields and railroad construction sites. Others worked as cooks, laundrymen, or servants. However, the Chinese faced harsh racial prejudice. In 1882, the U.S. Congress passed the Chinese Exclusion Act, banning nearly all Chinese from coming into the country.

(B) The United States is a nation of immigrants. Before the 1840s, about 60,000 immigrants arrived each year. During the 1840s and 1850s, the number of people coming to the United States increased dramatically. Over three million Irish and Germans crossed the Atlantic for America at this time.

(C) Most Irish immigrants lived in extreme poverty. Most settled in the slums of Boston and New York and worked in low-paying jobs. For example, Irish women worked as kitchen maids while men took dangerous jobs at low wages. (D)_____, most German immigrants came with more money and training than the Irish. They were able to buy land in the Midwest.

20. Which one is the right order? [2 points]

- ① (C)-(A)-(B)
- ② (B)-(A)-(C)
- ③ (B)-(C)-(A)
- ④ (C)-(B)-(A)

21. Which one is NOT TRUE? [2.5 points]

- ① The number of immigrants increased significantly in the decades after 1840 in the U.S.
- ② Most Irish immigrants lived in the poor sections of cities.
- ③ All Chinese immigrants have been banned since 1882.
- ④ Most German immigrants came with greater wealth than Irish immigrants.

22. Choose the best expression for (D).

[1.5 points]

- ① Similarly
- ② In contrast
- ③ As a result
- ④ As such

23. Choose the best topic. [2 points]

- ① Immigrants to the U.S. during the second half of the 19th century
- ② Banning Chinese immigrants
- ③ How the Irish became Americans
- ④ Immigrants from Europe to the U.S.

[24-27] Read the following and answer the questions.

My next-door neighbor had a pure-bred corgi that he was planning to breed from, but a fox terrier got into the act, and before long a litter of five corgi-fox terriers were born. I was fortunate enough to be offered one of the pups, and when I went to view them, one came over and laid its head (A)squarely on my foot. This was the one I wanted. I decided to name him Max.

Max became an (B)integral part of the family in no time. He gave my wife and two boys years of happiness and excitement, but in later years developed arthritis, which made moving extremely painful. The vet prescribed pills, which proved to be of no use, so as hard as it was to deal with losing him, I decided that it was time to put Max to sleep forever to prevent (C)_____ the pain. However, the vet recommended that we try another set of pills, to which I agreed. The new pills proved to be amazing and in about two weeks, Max was back to running and playing with no sign of pain. Initially, it was a challenge to give Max his pills, but he soon realized that they were doing him some good. I only had to say, "Come on Max, pill time" and he would come over, lay down and roll onto his back, open his mouth and swallow the pills when I dropped them in. Then he would stand up with a huge grin.

24. Which can best replace (A) and (B).
[2 points]

- | (A) | (B) |
|--------------|-----------|
| ① indirectly | essential |
| ② indirectly | potential |
| ③ directly | essential |
| ④ directly | potential |

25. Choose the best word for (C). [2 points]

- ① curtailing
- ② shortening
- ③ minimizing
- ④ prolonging

26. Which one is NOT TRUE? [2 points]

- ① Max is a pure-breed corgi.
- ② Max enjoys running and playing.
- ③ Giving Max his pills has not always been easy.
- ④ Putting Max to sleep for good was an option Max's owner pondered.

27. Choose the best title. [2 points]

- ① Recovering from a Cold
- ② How to Adopt Pure-Breeds
- ③ Max's Second Chance at Life
- ④ Choosing the Right Dog

[28-31] Read the following and answer the questions.

The ability to make fun of yourself is a priceless gift. People who brag about their accomplishments are boring, but the ones who invite you to laugh with them at their mistakes are a joy to be around. Self-deprecating humor prevents jealousy and envy. When life becomes stressful, (A)it helps you keep your perspective and sense of humor. (B)It's often the necessary ingredient in becoming charming. If you work at (C)it full-time, it can even make you rich: ask Bob Hope!

Year after year, the charming Mr. Hope went on happily making fun of himself—to the (D)_____ of millions. Audience members loved him. When he appeared as a guest on a recent television program, the subject of boxing came up. Mr. Hope said, “I did some boxing in my younger days. I was the only fighter in my home town who had to be carried both ways—into the ring and out of (E)it!”

28. Which one can be inferred from the passage?
[2.5 points]

- ① Bob Hope was wealthy.
- ② Self-deprecating humor is offensive.
- ③ People who brag about their accomplishments are a joy to be around.
- ④ Making fun of yourself invites jealousy and envy.

29. Which refers to a different one? [1.5 points]

- ① (A)
- ② (B)
- ③ (C)
- ④ (E)

30. Which one is NOT appropriate for (D)?

[1.5 points]

- ① delight
- ② amusement
- ③ joy
- ④ chagrin

31. Choose the best topic. [2 points]

- ① Bragging about your accomplishment
- ② Benefits of self-deprecating humor
- ③ Accomplishments of Bob Hope
- ④ How to become a successful boxer

[32-35] Read the following and answer the questions.

The Salingers and their 17-year-old adopted daughter Amy listened to the diagnosis of Dr. Smith, a kidney specialist. He told them that Amy's kidneys were 95 percent destroyed. Amy could not believe it as she heard the horrific news. A few minutes later, Amy (A)composed herself and asked about treatment options. The doctor told her that her kidneys could not recover. In other words, her medical condition was (B)_____. Amy was (C)stunned once again. However, Dr. Smith mentioned there was still a small chance of hope for Amy. A compatible donor would have to be found so that a transplant could be performed.

A short time later, Dr. Smith privately consulted with Mr. and Mrs. Salinger and told them that the wait for a transplant kidney was over three years. (D)_____, Mr. and Mrs. Salinger are far from being compatible, and they had no idea where Amy's birth parents were. Dr. Smith told them that it was important that they find Amy's birth parents as soon as possible if Amy was to have any chance of surviving.

32. Which can best replace (A) and (C).

[2 points]

- | | | |
|---|-----------|---------|
| | (A) | (C) |
| ① | corrected | bored |
| ② | corrected | shocked |
| ③ | calmed | shocked |
| ④ | calmed | bored |

33. Which one is TRUE? [2 points]

- ① Amy is in her twenties.
- ② Mr. and Mrs. Salinger are not ideal donors.
- ③ Transplant kidneys are readily available.
- ④ Dr. Smith specializes only in liver transplants.

34. Choose the best word for (B) and (D).
[2 points]

- | | | |
|---|--------------|---------------|
| | (B) | (D) |
| ① | irreversible | Unfortunately |
| ② | reversible | Unfortunately |
| ③ | irreversible | Fortunately |
| ④ | reversible | Fortunately |

35. Choose the best title. [2 points]

- ① Adopting Amy
- ② The History of Acute Nephritis
- ③ Waiting for a Diagnosis
- ④ Saving Amy

[36-39] Read the following and answer the questions.

The interesting thing about advice is that we often take it from the wrong people. In other words, we usually undervalue the input of normal people while we overvalue the advice from experts. One reason why taking advice is problematic is that status matters quite a lot. Optimism bias provides most of us with a general hopefulness that things will work out even when the odds are stacked against us. According to researchers, optimism bias increases when the person giving advice is viewed as an expert. The expert's advice enhances the expectation of success if we listen to them even if the expert is often proved to be wrong.

Most of us are not good at taking advice from anyone. We (A)typically place more importance in our own opinions than the opinions of others. This is another cognitive blind spot known as egocentric bias. It is thought to be easier to believe that our critics are just jealous or have some kind of hidden (B)_____, than to admit they may be right. One helpful trick can be found in Eastern philosophy. According to Haemin Sunim, a Korean Buddhist monk, when someone is about to give you advice, that is (C)precisely the time you need to lower your defenses, not raise them.

36. Which one is TRUE? [2 points]

- ① Haemin Sunim believes in egocentric bias.
- ② Monks love raising defenses.
- ③ People usually value the opinions of others more than their own.
- ④ Taking advice can be challenging.

37. Choose the best title. [2 points]

- ① Undervaluing People
- ② Enhancing Expectations
- ③ Taking Advice
- ④ Increasing Optimism

38. Which can best replace (A) and (C). [1.5 points]

- | | | |
|---|--------------|---------|
| | (A) | (C) |
| ① | usually | exactly |
| ② | usually | hardly |
| ③ | occasionally | exactly |
| ④ | occasionally | hardly |

39. Which one is appropriate for (B)? [2 points]

- ① conventions
- ② intentions
- ③ extensions
- ④ expansions

[40-43] Read the following and answer the questions.

A technique used to enhance a person's ability to read text rapidly, yet still comprehend its meaning is known as speed reading. The term "speed reading" was first (A)_____ by Evelyn Wood, a corrective reading teacher for unskilled readers in Utah back in the 1950s. Wood examined the reading habits of naturally fast readers and found that faster readers actually remembered more content. She created a methodology for teaching people to read two to five times faster.

Wood pointed out poor reading habits that could be overcome and good habits that could be attained with practice. She established Evelyn Wood speed-reading schools throughout the United States and other English-speaking countries, and her system met with (B)acclaim.

Ineffective habits that the Evelyn Wood program cites include (C)stumbling on long words. That is, even if readers know the long words, they may be slow to process them. Other ineffective habits include saying words mentally and going back to the words already read. Effective reading habits identified by the program include completely focusing on the reading material, looking at groups of words instead of reading word by word, and setting a purpose for reading.

40. Which one is NOT appropriate for (A)?

[1.5 points]

- ① coined
- ② objected
- ③ created
- ④ devised

41. Which can best replace (B) and (C).

[2 points]

- | | (B) | (C) |
|---|-----------|------------|
| ① | criticism | hesitating |
| ② | criticism | playing |
| ③ | praise | hesitating |
| ④ | praise | playing |

42. Choose the best topic. [2 points]

- ① Evelyn Wood's speed-reading schools
- ② Vocalizing words mentally
- ③ Decreasing reading speed
- ④ Reading groups of words

43. Which one is NOT TRUE of Evelyn Wood?

[2.5 points]

- ① She believed reading speed was unchangeable.
- ② She analyzed the reading practices of quick readers.
- ③ She originally specialized in teaching poor readers.
- ④ She formulated a new term.

[44-47] Read the following and answer the questions.

(A) Developments in computing technologies have allowed scientists to make major advancements in AI even though the simulated reconstruction of a human brain is still unattainable. (B) People expect machines that act human should look human as well. (C) For instance, Honda revealed in 2000, ASIMO, a 130-centimeter humanoid robot. ASIMO, which stands for Advanced Step in Innovative Mobility, was created to assist individuals who have difficulty with mobility complete common everyday tasks. ASIMO can walk, and it can navigate unbalanced terrain like stairs, attaining a top speed of six kilometers per hour. With its two camera “eyes,” the robot is programmed to determine direction and distance, respond to human gestures, and recognize and name up to ten individuals. (D)

However, the prospect of designing machines capable of possessing human qualities has also created many fears and anxieties. In the 1968 dystopian novel by Philip K. Dick entitled, *Do Androids Dream of Electric Sheep?*, androids appear human and have implanted human memories, (E)but are unable to understand others’ feelings. They are forced to do difficult or dangerous work (F)_____ humans. When six of these androids start a rebellion, a bounty hunter is called upon to track them down and destroy them. The novel begs the questions, “What distinguishes machines from humans?” and “Is it moral to destroy a machine that believes that it is human?”

44. Choose the best place for the following. [2.5 points]

To promote interest in the sciences, ASIMO often makes appearances in public in which he performs choreographed dances and displays his understanding of voice commands.

- ① (A)
- ② (B)
- ③ (C)
- ④ (D)

45. Why does the author mention (E)but are unable to understand others’ feelings? [2 points]

- ① To persuade readers that androids possess morals
- ② To claim that emotions are the most important characteristic in androids
- ③ To criticize Philip K. Dick’s depiction of non-human intelligence
- ④ To point out what differentiates humans and androids

46. Which one is TRUE? [2 points]

- ① People generally imagine that machines with human-like abilities also have a human-like appearance.
- ② ASIMO’s design is based on the design of the androids from Philip K. Dick’s novel.
- ③ Implanted human memories are the critical factors dividing robots like ASIMO from humans.
- ④ Philip K. Dick’s anxieties about the creation of ASIMO are due to sympathetic androids.

47. Which one does NOT appropriately replace (F)? [1.5 points]

- ① instead of
- ② in place of
- ③ in hopes of
- ④ in lieu of

[48-50] Read the following and answer the questions.

You can spend your money on medicine which comes with all the side effects such as headaches, or you can feel better for nothing. (A)This may sound too good to be true, but all you may have to do is watch a comedy show on TV. You have heard “Laughter is the world’s best medicine,” and this is turning out to be true.

Professionals at UCLA conducted research to see if laughter really helps people (B)recover from trauma or endure pain. They had a group of kids stand up in front of the television and then (C)places their hands in icy water. The ice-cold water was painful, but the kids who watched funny shows (D)managed to have their hands in it longer than those who didn’t.

This experiment shows that the “fake it until you make it” strategy (E)works. If a person fakes their emotion long enough, eventually their subconscious gets tricked into being happy. However, other researchers argue that (F)_____. According to them, you must let yourself feel sad for a certain amount of time. The more studies we consider, though, the clearer it is that laughter is good medicine.

48. What does (A)This refer to? [2 points]

- ① You can spend your money on medicine.
- ② You can feel better for nothing.
- ③ You have to find humor in life.
- ④ You have two alternatives to choose from.

49. Which one is grammatically WRONG?

[2.5 points]

- ① (B)
- ② (C)
- ③ (D)
- ④ (E)

50. Choose the best expression for (F). [2 points]

- ① it is important not to deny your feelings
- ② you should pretend to be happy all the time
- ③ laughter works up a lot of your muscles
- ④ it is a permanent fix