

[배점 1-8: 각 2점; 9-10: 각 3점; 11-12: 각 4점; 13-20: 각 5점; 21-25: 각 6점. 총 100점]

[1~8: 2 points each]

[1-3] Choose the one that best completes the sentence.

- To be sure, the nation's economic ability to _____ its expansionism is questionable.
① sustain ② stall ③ relinquish ④ subdue
- The unethical researchers used a tool that they knew would _____ the results of the safety test and make the cars look safer than they really were.
① transcend ② skew ③ compile ④ refrain
- Getting an A+ in English is not an easy _____ for a student who has never resided in an English-speaking nation.
① attribute ② training ③ example ④ feat

[4-6] Choose the one that best replaces the underlined word.

- His postwar policies brought criticism upon him which could have tarnished his popularity.
① tainted ② regained ③ perished ④ stabilized
- Some young people consider their nation's traditional values obsolete in this fast-changing age.
① outdated ② absolute ③ meritorious ④ variable
- The recent surge in airfares came as a shock to international travelers.
① strike ② ebb ③ hike ④ recess

[7-8] Choose the one that is closest in meaning to the CONTEXTUAL meaning of the underlined word.

- Fried chicken smothered in hot sauce presents the sport of trying to eat it with anything fewer than four paper napkins.
① athletics ② mockery ③ companion ④ entertainment
- The violent movie received an adult-only rating from the film review board.
① plank ② group ③ stage ④ meal

[9~10: 3 points each]

[9] Choose the one that is closest in meaning to the given sentence.

- There were many students marching in the parade and a lot of people watching them, myself among others.
① I marched with many students in the parade and people watched us.
② Many students marched in the parade and I watched them with many others.
③ There were many people either marching with me in the parade or watching it.
④ Many students marched in the parade with many people watching them, but I wasn't there.

[10] Choose the one that best completes the sentence.

- Now that _____, the province is advising that people be fully vaccinated before traveling.
① have travel rules loosened ② travel have loosened rules
③ travel have rules loosened ④ travel rules have loosened

[11~12: 4 points each]

[11] Choose the one that makes the sentence grammatically INCORRECT.

- ① Creating a *hwagak* artifact is a ② complicated process ③ involved a great deal of time and ④ effort.

[12] Choose the one that is grammatically INCORRECT.

- ① The house will be ready for you to inspect in a few days.
② The thesis includes a rather difficult argument to refute.
③ The report was far too long to read in one evening.
④ Her new book is definitely worth looking at it.

[13~20: 5 points each]

[13-25] Read the following passages and answer the questions.

[13-14] Why do mosquitoes buzz in your ears? The sound comes from the mosquito's wings, which make the annoying buzzing sound when they circle your head, looking for a place to land. Both male and female mosquitoes buzz, but you probably won't notice the male mosquito's buzzing sound, because they don't want to drink your blood. So they stay away from your ear, feeding on nectar instead. It's the female mosquitoes that come to annoy you. Scientists have discovered that the buzz of mosquitoes is more than just a way to annoy you. It's actually how they find suitable mates. Since female mosquitoes are larger, they flap their wings slower than males, creating a buzzing sound lower in pitch. Males use the (A)_____ pitch of the female mosquitoes' buzz to recognize them. Male mosquitoes will (B)_____ females when they are quietly resting, but when the females are flying, and therefore buzzing, they want to mate with them. Some people believe that mosquitoes that buzz don't bite. Well, that's true. As long as they're buzzing, they're flying, so they can't bite you. But as soon as they stop buzzing, (C) look out!

13. Which of the following ordered pairs best fits into (A) and (B)?

- | | | |
|---------------|---|---------|
| ① attractive | - | lure |
| ② peculiar | - | bother |
| ③ distinctive | - | ignore |
| ④ annoying | - | attract |

14. Which of the following does (C) imply?

- ① It is a male mosquito.
- ② It has landed to bite you.
- ③ It is looking for a mate.
- ④ It has gone to look for nectar.

[15-16] The concept of leadership has evolved through the ages. And this evolution has given birth to (A)many counterproductive theories and myths. For some people, leadership means assuming responsibility for everything at the workplace. Such leaders feel compelled to do everything themselves since they feel they are not good leaders otherwise. Others feel that since they are in a leadership position, they have to prove over and over that they are smarter than everyone else, thus justifying their presence at the helm of the team or organization. This is a common misconception about leadership. Intelligent leaders have learned to accept that they do not have to know everything to lead well. Leadership coaching holds in high regard skills such as the ability to (B)_____ tasks in order to tap into the unique abilities of employees and peers. An intelligent leader understands that every meaningful relationship is a unique resource and treats employees accordingly.

15. According to the passage, which of the following is **NOT** an example of (A)?
- ① Leaders assume responsibility for everything at work.
 - ② Leaders value meaningful relationships.
 - ③ Leaders do everything themselves.
 - ④ Leaders are smarter than others.
16. Which of the following best fits into (B)?
- ① dictate
 - ② disown
 - ③ diminish
 - ④ delegate

[17-18] Since the 1960s, there has been a group of musicians who have been serious about finding a breakthrough for *gugak* to make it more appealing to music fans. Their ceaseless work to entice modern listeners to Korea's traditional music finally materialized five decades later, in the mid-2010s, with the advent of what is being called '*Joseon pop*', a term coined both by industry experts and the media that implies a 'meeting of old and new'. *Gugak* musicians had been wrestling for a long time with the idea of how (A)_____. There was a consensus among musicians, as well as among the public, that *gugak* was archaic, like cultural heritage that had remained the same for centuries and had nothing to offer contemporary listeners. This negative perception of *gugak* had to be changed to make it into riveting pop music and broaden its fanbase. The unique combinations of *Joseon pop* create an irresistibly hip, new form of music. It encompasses all types of music performed by Korean fusion bands based on traditional music while adopting contemporary elements from various genres.

17. According to the passage, which of the following is **NOT** true?
- ① The fanbase for *gugak* was limited in the past.
 - ② *Gugak* has become more appealing through fusion with other genres.
 - ③ The media has partly contributed to the public impression of *Joseon pop*.
 - ④ *Joseon pop* is an overnight sensation thanks to adopting contemporary elements.
18. According to the passage, which of the following best fits into (A)?
- ① to make their music relevant to the public
 - ② to remain on the margins of the industry
 - ③ to return to their musical origins
 - ④ to resist contemporary challenges

[19-20] Historians credit repeated locust invasions in the nineteenth century with reshaping United States agriculture west of the Mississippi River. Advised by government entomologists, farmers began to diversify. Wheat had come to nearly monopolize the region, but it was particularly vulnerable to the locusts. In 1873, just before the locusts' most withering offensive, nearly two thirds of Minnesota farmland was producing wheat. By the last year of the invasions, the fraction had dropped to less than one sixth. Farmers learned that peas and beans were far less vulnerable to the insects, and corn was a more robust grain than wheat. In addition to planting alternative crops, many farmers turned to dairy and beef production. Although pastures were often damaged by the locusts, these lands were almost always left in better shape than the crops were.

19. According to the passage, which of the following is **NOT** true?
- ① Pastures were not as badly damaged as crops by the locusts.
 - ② Farmers focused primarily on growing wheat before the recommendation by the government officials.
 - ③ Peas and beans were devastated by the locusts' invasions so that farmers began to focus on the dairy industry.
 - ④ Farmers realized that wheat was more vulnerable to the locusts than corn.
20. Which of the following best describes the flow of information in the passage?
- ① Fragility then loss
 - ② Challenge then adaptation
 - ③ Fluctuation then despair
 - ④ Dreariness then invigoration

[21~25: 6 points each]

[21-22] The word 'glamping' was added to the *Oxford English Dictionary* in 2016. The word is new, but the concept that glamping denotes, that of staying in luxurious tents, recreational vehicles, or other camping accommodations, is not. In the 16th century, the Scottish Earl of Atholl prepared a lavish experience in the Highlands for the visiting King James V and his mother. The Earl pitched lavish tents and filled them with all the provisions of his home. Probably the most extravagant example of palatial tent-living in history was the Field of the Cloth of Gold, a diplomatic summit in 1520 between Henry VIII of England and Francis I of France. Some 2,800 tents were erected, and fountains ran with red wine. Some 400 years later, in the 1920s, an African safari became 'the thing to do' among wealthy Europeans. But wealthy travelers, even those in search of adventure, were not willing to sacrifice comfort or luxury. From electric generators to folding baths to cases of champagne, travelers were afforded every domestic luxury while on adventure.

21. According to the passage, which of the following is true?
- ① Recreational vehicles were more popular than tents on glamping safaris.
 - ② Lavish tents and red wine were provided by James V for the Earl.
 - ③ Luxurious amenities were provided to wealthy glampers.
 - ④ Henry VIII and Francis I enjoyed solitude while glamping.
22. According to the passage, which of the following **CANNOT** be inferred?
- ① Wealthy people prefer luxurious accommodations even in the wild.
 - ② The word 'glamping' is a new way of saying an old idea.
 - ③ Glamping is cheaper than staying at a hotel on safari.
 - ④ Alcoholic beverages are part of the glamping culture.

[23-25] The recent tsunami of ransomware, stealing and locking one's data until a ransom has been paid, has brought to life the fears that cybersecurity experts have long warned about. Attacks on critical infrastructure have wreaked havoc on hospitals, schools, and even pipelines. For the industry specialists who track this threat, the increased frequency, sophistication, and destructiveness of ransomware suggest that businesses still have major gaps in their defenses. (A) A new, multi-layered approach to protection is needed to stem the damage it causes: one centered around embracing new technologies, improving security processes, and ensuring that staff know how to help curb the threat. (B) Even though many new ransomware strains now lurk in an infected computer for weeks, gathering information and stealing data, attackers still rely on old techniques such as phishing to gain access, steal credentials, and inject malware. In fact, 94% of successful malware attacks now begin with phishing, so defense begins with upgraded email filtering. (C) Organizations must use backups and regular testing of those backups to ensure they can restore quickly after an attack. (D) Asking users to think just two more seconds before they click on a suspicious email would prevent many ransomware attacks from getting a toehold in an organization.

23. Which of the following is the main theme of the passage?
- ① Malware is everywhere so organizations must keep from needless emailing.
 - ② Thinking before you click is the least important part of cybersecurity.
 - ③ Cybersecurity professionals are overly concerned about the problem of ransomware.
 - ④ Securing an organization from ransomware requires a variety of techniques.
24. According to the passage, which of the following is true?
- ① The origins of recent ransomware attacks remain similar to earlier cases.
 - ② Phishing is no longer the major source of damage in ransomware attacks.
 - ③ Backing up your systems is a sufficient defense to ransomware attacks.
 - ④ The behavior of staff has little impact on the success of a cyberattack.
25. Which of the following is the best place for the sentence below?

Making people aware of ransomware teaches them to avoid it.

- ① (A)
- ② (B)
- ③ (C)
- ④ (D)

[배점 26-29: 각 4점; 30-31: 각 4.7점; 32: 4.8점; 33-38: 각 5점; 39: 5.2점; 40-41: 각 5.3점; 42-45: 각 6점. 총 100점]

26. $0 < \theta < \frac{\pi}{2}$ 일 때, x 에 대한 이차방정식

$$x^2 - 3x + 1 = 0$$

의 두 근이 $\tan \theta, \frac{1}{\tan \theta}$ 일 때, $\sin \theta + \cos \theta$ 의 값은? [4점]

- ① $\frac{\sqrt{3}}{3}$ ② $\frac{\sqrt{6}}{3}$
- ③ 1 ④ $\frac{2\sqrt{3}}{3}$
- ⑤ $\frac{\sqrt{15}}{3}$

27. 점 P(5, 4)에서 원 $x^2 + y^2 - 2x - 4y = k$ 에 그은 두 접선이 서로 수직일 때, 상수 k 의 값은? [4점]

- ① 5 ② 10
- ③ 15 ④ 20
- ⑤ 25

28. 이산형 확률변수 X 의 확률분포가 다음과 같이 주어져 있다.

x	0	1	2	3	합계
$P(X=x)$	$\frac{1}{4}$	a	$\frac{1}{8}$	b	1

이 확률변수 X 의 기댓값이 1일 때, $\frac{a}{b}$ 의 값은? 단, a, b 는 상수이다. [4점]

- ① $\frac{1}{16}$ ② $\frac{1}{9}$
- ③ $\frac{16}{9}$ ④ 9
- ⑤ 16

29. 부등식 $|a+bi| \leq 5$ 를 만족하는 실수 a, b 에 대하여 $|4a|+|3b|$ 의 최댓값은? 단, $i = \sqrt{-1}$ 이고, 복소수 z 에 대하여 $|z| = \sqrt{z\bar{z}}$ 이다. [4점]

- ① 15 ② 20
- ③ 25 ④ 30
- ⑤ 35

30. 함수 $f(x) = {}_{10}C_1x^1 + {}_{10}C_2x^2 + \dots + {}_{10}C_{10}x^{10}$ 에 대하여 $f\left(\frac{1}{2}\right)$ 의 값은? 단, ${}_nC_r = \frac{n!}{r!(n-r)!}$ 이다. [4.7점]

- ① $\left(\frac{1}{2}\right)^{10} - 1$ ② $\left(\frac{1}{2}\right)^{10}$
- ③ $\left(\frac{3}{2}\right)^{10} - 1$ ④ $\left(\frac{3}{2}\right)^{10}$
- ⑤ 1

32. 함수 $f(x) = (n+1)\ln x - nx + \frac{1}{n}\ln n + n$ (단, n 은 자연수)의 극댓값을 a_n 이라 할 때, $\lim_{n \rightarrow \infty} a_n$ 의 값은? [4.8점]

- ① -1 ② 0
- ③ 1 ④ 2
- ⑤ ∞

31. 함수

$$f(x) = \begin{cases} \frac{\tan^2(1 - \cos 2x)}{x^4} & (x \neq 0) \\ a & (x = 0) \end{cases}$$

가 $x=0$ 에서 연속이 되도록 하는 상수 a 의 값은? [4.7점]

- ① 0 ② 1
- ③ 2 ④ 3
- ⑤ 4

33. 곡선 $y = \cos 2x - kx^2$ 이 변곡점을 갖도록 하는 정수 k 의 개수는? [5점]

- ① 0 ② 1
- ③ 3 ④ 5
- ⑤ 7

34. 좌표평면 위를 움직이는 점 P의 시각 t ($t \geq 0$)에서의 위치 (x, y) 가

$$x = 2\sqrt{1+t}, \quad y = t - \ln(t+1)$$

이다. 점 P의 속력이 최소일 때 t 의 값을 a 라 하고, 그때의 속력을 b 라 한다. $a^2 + b^2$ 의 값은? [5점]

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

35. 음함수의 식 $x^2 + 2xy + 4y^2 = 12$ 로 주어진 함수 $y = f(x)$ 는 $f(2) = 1$ 을 만족하고 $x = 2$ 에서 두 번 미분가능하다. $f''(2)$ 의 값은? [5점]

- ① -1 ② $-\frac{1}{2}$
- ③ $-\frac{1}{4}$ ④ $-\frac{1}{6}$
- ⑤ $-\frac{1}{12}$

36. $x > 1$ 에서 정의된 함수

$$g(x) = \int_0^{\infty} u^{x-1} e^{-u} du$$

에 대하여 $\frac{g(2022)}{g(2021)}$ 의 값은? [5점]

- ① $\frac{1}{2022}$ ② $\frac{1}{2021}$
- ③ 1 ④ 2021
- ⑤ 2022

37. 함수 $f(x) = 100x + 2e^x$ 의 역함수를 $g(x)$ 라 하고, 곡선 $y = g(x)$ 위의 점 $(100 + 2e, 1)$ 에서의 접선을 l 이라 하자. 곡선 $y = g(x)$ 와 x 축과 직선 l 로 둘러싸인 영역의 넓이는? [5점]

- ① $e - 2$ ② e
- ③ $e + 2$ ④ $2e - 2$
- ⑤ $2e + 2$

38. 함수 $f(x) = \frac{x+2}{x^2+5}$ (단, $0 \leq x \leq k$)의 최댓값이 $\frac{1}{2}$, 최솟값이

$\frac{2}{5}$ 가 되도록 하는 양수 k 의 최솟값을 a , 최댓값을 b 라 할 때, $a+b$ 의 값은? [5점]

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

39. 양의 실수에서 정의된 함수 $f(x) = 2^{\ln x} + ax$ (단, $a > 0$)의 역함수를 $h(x)$ 라 하자. $\lim_{x \rightarrow 3} \frac{x-3}{h(x)-1} = b$ 일 때, 두 상수 a, b 의 합 $a+b$ 의 값은? [5.2점]

- ① $\ln 2$
- ② $2 + \ln 2$
- ③ $4 + \ln 2$
- ④ $4 + 2\ln 2$
- ⑤ 4

40. 실수 전체의 집합에서 미분가능한 함수 $f(x)$ 가 모든 실수 x 에 대하여

$$\int_0^x e^{x-t} f(t) dt + f(x) = x e^x$$

를 만족할 때, $f(\ln 2)$ 의 값은? [5.3점]

- ① -1
- ② 0
- ③ 1
- ④ 2
- ⑤ e

41. 수열 $\{a_n\}$ 이

$$a_1 = 1, \quad n a_{n+1} + (\ln 2) a_n = 0 \quad (n = 1, 2, 3, \dots)$$

을 만족할 때, 무한급수 $\sum_{n=1}^{\infty} a_n$ 의 값은? [5.3점]

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

42. $\lim_{n \rightarrow \infty} \frac{1}{n^2} \sum_{k=1}^n k \cos^3 \left(\frac{\pi k^2}{6n^2} \right)$ 의 값은? [6점]

- ① $\frac{11}{10\pi}$ ② $\frac{11}{8\pi}$
- ③ $\frac{11}{6\pi}$ ④ $\frac{11}{4\pi}$
- ⑤ $\frac{11}{2\pi}$

43. 이상적분 $\int_0^{e^\pi} \sin(\ln x^2) dx$ 의 값은? [6점]

- ① $-\infty$ ② $-\frac{2}{3}e^\pi$
- ③ $-\frac{1}{2}e^\pi$ ④ $-\frac{2}{5}e^\pi$
- ⑤ 0

44. 다음 알고리즘의 출력값으로 정의되는 확률변수 X 에 대하여 $P(X \geq 10)$ 의 값은? [6점]

- [1] $r = 0, n = 0$ 으로 설정
- [2] $n \leftarrow n + 1$ 로 설정
- [3] 공정한 동전을 던져 앞면이 나오면 $r \leftarrow r + 1$ 로 설정
- [4] $r = 2$ 이면 단계 [5]로, 그렇지 않으면 단계 [2]로 이동
- [5] n 을 출력 & STOP

- ① $6 \times \left(\frac{1}{2}\right)^9$ ② $7 \times \left(\frac{1}{2}\right)^9$
- ③ $8 \times \left(\frac{1}{2}\right)^9$ ④ $9 \times \left(\frac{1}{2}\right)^9$
- ⑤ $10 \times \left(\frac{1}{2}\right)^9$

45. 자연수 n 에 대하여 함수 $f_n(x)$ 를 열린구간 $(0, \infty)$ 에서

$$f_1(x) = \ln x, \quad f_{n+1}(x) = \ln x + \frac{1}{3} \int_1^e \frac{f_n(t)}{t} dt$$

와 같이 정의할 때, $g(x) = \lim_{n \rightarrow \infty} f_n(x)$ 라 하자. $g(e^2)$ 의 값은? [6점]

- ① $\frac{9}{4}$ ② $\frac{7}{3}$
- ③ $\frac{11}{4}$ ④ 3
- ⑤ $\frac{11}{3}$