
2026학년도
재외국민과 외국인 특별전형 수강능력시험

자연계열



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Directions for Questions 1 - 25: In this part, you will read a selection of English texts, followed by one or more questions. Choose the best answer for each question and mark ①, ②, ③, ④, or ⑤ on your answer sheet.

[Question 1]

____ [1] ____ cultural diversity has become an important initiative for enhancing cultural identity, social unity, and harmony in today's globalized world. By welcoming people from diverse backgrounds, societies enrich their culture and create stronger community bonds, providing the value of mutual respect and understanding.

1. Which best fits into the blank [1]? **[1.5점]**

- ① Embracing ② Harnessing ③ Rendering ④ Separating ⑤ Undemining

[Question 2]

Every winner begins as a loser. Winners and losers both try a similar number of times, but what sets them apart is learning from failure and making smart changes. Working smarter, not just harder, and improving based on past mistakes bring on success. Failure is a(n) ____ [2] ____ step toward success and achievement.

2. Which best fits into the blank [2]? **[1.5점]**

- ① immediate ② imminent ③ pivotal ④ subsidiary ⑤ transcending

[Question 3]

While population growth pushes societies to confront the hard limits of growth and resource availability, population decline often results in challenges such as labor shortages, economic downturns, and aging populations. Without adaptive policies or innovation, this demographic shift can ____ [3] ____ social systems, weaken economic stability, and threaten long-term sustainability.

3. Which best fits into the blank [3]? **[1.5점]**

- ① abort ② defer ③ foster ④ restore ⑤ strain

[Question 4]

As mobile technology becomes more prevalent, its tendency to ____ [4] ____ users' attention is drawing concern. Social scientists argue that constant phone alerts and program usage pull individuals away from meaningful, in-person exchanges, eroding the quality of face-to-face interactions and altering everyday social dynamics.

4. Which best fits into the blank [4]? **[1.5점]**

- ① allocate ② divert ③ exert ④ regress ⑤ trigger

[Question 5]

Emerging threats such as climate change, epidemics, military conflict have shaken global confidence and revealed system flaws. These risks pose a(n) ___[5]___ danger to human security, compelling nations and organizations to strengthen cooperation, develop new technologies, and rethink policies for a world facing challenges beyond borders.

5. Which best fits into the blank [5]? **[1.5점]**

- ① cardinal ② eccentric ③ fomidable ④ peculiar ⑤ vulnerable

[Question 6]

Self-driving cars rely on sensors and artificial intelligence to ___[6a]___ navigate roads and adjust to real-time traffic conditions. While experts believe these vehicles could reduce accidents and improve safety, others question whether they are ready for the ___[6b]___ challenges of unfamiliar driving environments. Though companies continue testing them under various conditions, many agree that further development is needed before self-driving cars become a common sight on public roads.

6. Which pair of expressions best completes blanks [6a] and [6b]? **[1.5점]**

- | [6a] | | [6b] |
|---------------|---|---------------|
| ① baldly | — | acute |
| ② cautiously | — | imaginable |
| ③ comfortably | — | relentless |
| ④ efficiently | — | unpredictable |
| ⑤ randomly | — | varied |

[Question 7]

Anybody, somebody, or nobody is ever going to make your life ___[7a]___ what you are willing to make it for yourself. You can hope for help, but waiting for others to open doors for you often brings about disappointment. Success is not something handed out by others; it is something you build through hard work and persistence. Instead of standing still, you must ___[7b]___ and take responsibility for your growth. The sooner you act, the sooner you will realize that achievement depends not on chance, but on the choices you make and the effort you invest.

7. Which pair of expressions best completes blanks [7a] and [7b]? **[2.1점]**

- | [7a] | | [7b] |
|------------------|---|-----------------|
| ① any less than | — | grow up |
| ② any more than | — | take initiative |
| ③ much less than | — | push yourself |
| ④ other than | — | speak volumes |
| ⑤ rather than | — | step forward |

[Questions 8 - 9]

A truly wise teacher does not merely provide answers or tell students what to believe. [I]■ Such a teacher understands that genuine learning occurs when students use their own minds to seek understanding. [II]■ The teacher's role is not to demand ___ [8a] ___ agreement, but to guide students so they can develop both knowledge and insight. [III]■ Rather than banking students with facts or opinions, the wise teacher empowers students to explore, discover, and reflect, helping them reach their own ideas. [IV]■ In this way, students grow stronger in thinking and more confident in learning. [V]■ The teacher who is indeed wise does not bid you to enter the house of his or her wisdom but rather leads you to the ___ [8b] ___ of your mind.

8. Which pair of expressions best completes blanks [8a] and [8b]? [1.5점]

- | [8a] | | [8b] |
|-----------------|---|-----------|
| ① deep | — | battle |
| ② mutual | — | border |
| ③ preliminary | — | pillar |
| ④ substantial | — | state |
| ⑤ unquestioning | — | threshold |

9. Where is the sentence below best placed in the above passage? [1.5점]

Instead, a wise teacher encourages them to ask meaningful questions and engage deeply with ideas.

- ① [I] ② [II] ③ [III] ④ [IV] ⑤ [V]

[Question 10]

In many classic novels, the setting does more than simply provide a background for the story. It often reflects the mood of the narrative or mirrors the emotions of the characters. The setting surrounding the characters helps readers grasp deeper meaning and connect with the events. Writers use setting as a tool to express ideas, shape atmosphere, and hint at what lies ahead. For example, a dark and stormy night may create fear or mystery, warning of danger, while a peaceful countryside might suggest calm, hope, or new beginnings. Through crafting settings, authors heighten the impact of their stories, spark imagination, and guide readers' emotional responses throughout the plot.

10. The passage is primarily concerned with _____. [2.1점]

- ① how authors build tension in classic literature
- ② the evolution of narrative structures throughout the plot
- ③ the significance of natural settings in sequencing events in literary works
- ④ the impact of setting on readers' understanding and emotions in classic novels
- ⑤ the differences between character development and plot structures in classic works

[Questions 11 - 12]

According to Aristotle, every person naturally seeks happiness. Unlike pleasure, wealth, or honor—often [a]mistaken for happiness—true happiness is not something temporary or given by others. It is the lasting result of living well and practicing virtue. Aristotle called happiness “the highest good” and “the end [b]which all our actions aim.” People desire wealth, success, or friendship because they believe these will lead to happiness. However, Aristotle emphasizes that happiness is not found in moments of fun or random fortune. Instead, it comes from living a life of purpose, making wise choices [c]guided by reason, developing good character, and [d]contributing to the community with courage. These virtues are not inborn but built through daily habits and choices. For Aristotle, happiness is a lifelong achievement. It depends on how we live, not on [e]what we have. It is something we work for—by becoming the best version of ourselves.

11. Which of the underlined parts [a]—[e] contains an error in grammar and usage? [1.5점]

- ① mistaken for ② which ③ guided by ④ contributing to ⑤ what

12. The passage is primarily concerned with _____. [2.8점]

- ① explaining why we pursue wealth and fame for happiness
 ② arguing that happiness rests on others' beliefs and insights
 ③ discussing the nature of happiness and the way it is attained
 ④ comparing different philosophical views on the sources of happiness
 ⑤ describing how happiness is achieved by personal traits and random chance

[Questions 13 - 14]

Is the Internet changing our habits of thinking? In one sense, it works as a(n) ____ [13a] ____ a weight-training machine for the brain, as compared with the free weights of libraries and books. Each has its advantage, but one works you harder. Weight machines are directive and enabling: They encourage you to think that you have worked hard without necessarily challenging yourself. The Internet can be the same: It often tells us what we think we know, spreading misinformation and nonsense. It can substitute surface for depth, prioritize imitation over originality, and its passion for recycling would impress the most committed environmentalist. ____ [13b] ____ deepening our understanding, it passes off shallow familiarity for true knowledge.

13. Which pair of expressions best completes blanks [13a] and [13b]? [2.1점]

- | [13a] | | [13b] |
|--------------------|---|----------------|
| ① alternative to | — | Besides |
| ② analogy to | — | Far from |
| ③ association with | — | In addition to |
| ④ mirror of | — | Relevant to |
| ⑤ stimulus to | — | Otherwise |

14. According to the passage, the Internet _____ . [2.1점]

- ① serves the same function as traditional libraries and books
- ② effectively shields users from misinformation and misleading content
- ③ often spreads superficial ideas rather than encouraging deep thinking
- ④ ensures that people challenge themselves intellectually whenever they use it
- ⑤ consistently provides users with accurate knowledge and reliable information

[Questions 15 - 16]

The changes in routine that commonly occur during holidays—like sleeping in or staying up late—come at a biological cost. Such habits can disrupt the body’s internal clock, which regulates sleep, mood, and energy levels. When this rhythm is thrown off, people may feel out of sorts, much like singing slightly off-key.

Experts warn that typical indoor lighting is too dim for the body to recognize as real daylight. “Light indoors is ___ [15a] ___ biological darkness. You can see everything, but your body does not register it as daylight,” said Jeff Brian of New York University. Though indoor light seems bright, it fails to provide the kind of light needed to maintain healthy biological rhythms.

The tendency to drift from regular schedules is worsened by modern lifestyle: Many people don’t get enough sleep on workdays and try to catch up on weekends or holidays. However, this irregular sleep pattern disrupts the body clock’s rhythm even further. Tom Bulls notes that, on average, people now sleep about an hour less per night than a decade ago.

Factors such as travel, shift work, screen time, or underlying health issues can upset your biological clock and negatively impact sleep and overall well-being. These disruptions may cause fatigue, nervousness, and even depression. ___ [15b] ___ disturbs natural rhythms can affect mood. Especially during seasons with longer nights, insufficient daylight may prevent the body clock from adjusting properly, increasing the risks of mood disturbances.

15. Which pair of expressions best completes blanks [15a] and [15b]? [2.1점]

- | [15a] | — | [15b] |
|-------------------|---|----------|
| ① comparable to | — | Who |
| ② contrasted with | — | Whoever |
| ③ distinct from | — | What |
| ④ equivalent to | — | Whatever |
| ⑤ made up of | — | Which |

16. Which of the following is **LEAST** likely to be inferred from the passage? [2.8점]

- ① People are more likely to feel agitated during the summer season.
- ② People today do not get as much sleep as they did ten years ago.
- ③ Trying to catch up on sleep over weekends may have negative consequences.
- ④ Healthy biological rhythm can be restored by regular exposure to natural daylight.
- ⑤ Staying indoors is not enough for our biological clocks to set on a healthy schedule.

[Questions 17 - 19]

Mobile phones have transformed the way we live, work, and communicate. Yet, this convenience has created a growing concern—electronic waste, or e-waste. [I]■ Discarded phones do not simply disappear; instead, they become part of a mounting pile of waste that endangers the environment. [II]■ If not recycled properly, these materials can leak into the soil and water, polluting the environment. Toxic substances from e-waste can accumulate in nature, causing long-term damage that is difficult to reverse. These harmful effects make responsible actions all the more necessary.

To address this issue, recycling programs have been introduced to collect and safely process old phones. These efforts recover valuable materials and help reduce the environmental harm by preventing improper disposal. [III]■ Another option is to sell used phones in second-hand markets, which helps extend their life and cut down on e-waste. However, many people still fail to take advantage of these programs, and countless phones continue to end up in landfills.

One reason the problem persists is that many people replace their phones every few years, adding to the growing volume of e-waste. [IV]■ However, we can help reduce this impact by keeping devices longer, repairing them when possible, and recycling them responsibly. Supporting environmentally friendly brands and buying fewer products can make a difference as well. [V]■ Mobile phones are powerful tools, but their environmental impact depends on how we use and dispose of them.

17. Which of the following would be the best title for the passage? [2.8점]

- ① How Mobile Phones Changed Our Lifestyle
- ② The Growing Demand for Mobile Phones and Their Impact
- ③ Recycling Programs: How They Tackle e-Waste Around the World
- ④ Inside Mobile Phones: Materials, Manufacturing, and Environmental Risks
- ⑤ The Hidden Environmental Costs of Mobile Phones and What We Can Do

18. Where is the sentence below best placed in the above passage? [1.5점]

This is because mobile phones contain metals, plastics, and harmful chemicals.

- ① [I]
- ② [II]
- ③ [III]
- ④ [IV]
- ⑤ [V]

19. Which of the following is **LEAST** likely to solve the problem above? [2.1점]

- ① Buy eco-friendly mobile phones and limit unnecessary purchases
- ② Resell used phones to second-hand markets as a recycling option
- ③ Support recycling programs that safely collect and process old phones
- ④ Dispose of old phones along with household waste on the regular basis
- ⑤ Use phones for a longer period of time and keep them in good condition

[Questions 20 - 21]

Recent research suggests that animals may react to sounds made by stressed plants, raising the possibility of hidden communication in the natural environment. A team of scientists at Tel Aviv University discovered that female insects avoided laying eggs on tomato plants that produced distress sounds — signals linked to poor plant health. This finding marks the first recorded instance of an animal responding directly to sounds generated by plants.

Two years ago, the same team found that plants emit high-pitched sounds when under stress or in poor condition. Although these “screams” are beyond the range of human hearing, they can be detected by certain insects, bats, and some mammals. The researchers state that this ability could influence animal behavior, affecting choices such as whether to reproduce, seek shelter in, or feed on particular plants.

To make sure the insects were responding only to sound, the experiments were carefully designed to block visual cues. The researchers also plan to investigate whether other animals react in similar ways and how the sounds made by plants differ between species. They hope to find out whether plants might communicate through sound, such as sending signals to nearby plants to conserve water during drought conditions.

The researchers emphasized that while plants may lack sensing system like those of humans, the physical sounds they produce could still play a significant role in ecology. If proven, this may suggest a form of co-evolution between plants and animals, for example, _____ [21] _____. These findings offer new insights that could broaden our understanding of the complex relationships between plants and animals.

20. Which of the following topics is **LEAST** likely to be studied by the team? [2.8점]

- ① How plants and humans differ in their sensing system
- ② How animals respond to sounds produced by stressed plants
- ③ How the sounds made by plants vary across different species
- ④ Whether animals change their behavior when they hear plant sounds
- ⑤ Whether plants send out a different range of sound signals in poor conditions

21. Which of the following best completes [21] in the passage above? [2.1점]

- ① plants using sounds to warn animals of danger
- ② animals helping plants grow by giving off useful sounds
- ③ plants and animals making similar sounds for communication
- ④ animals teaching plants how to protect themselves from harm
- ⑤ plants developing sound signals and animals adapting to them

[Questions 22 - 23]

Tariffs are taxes placed by governments on imported goods and services, typically calculated as a percentage of the item's price. By making foreign products more expensive, tariffs are intended to protect domestic industries from overseas competition. When tariffs are imposed, consumers may turn to locally produced goods, boosting demand for domestic products and potentially stimulating local industries. This measure can help domestic businesses grow and create jobs in the short term.

However, tariffs can also increase production costs for domestic industries that rely on imported raw materials or components. As the prices of these imports rise, local manufacturers may face higher production costs. These costs may be passed on to consumers in the form of higher prices for finished goods. This can trigger inflationary pressures and reduce consumer purchasing power, ultimately dampening overall economic activity.

Tariffs also provoke responses from affected countries, often in the form of retaliatory tariffs. Countries whose exports are targeted by tariffs may see reduced demand for their goods, as their products become more expensive in the importing country. This loss of competitiveness can decrease sales and market share, particularly if consumers easily switch to other suppliers. The actual impact on exporters depends on factors such as demand elasticity and the importance of the target market within the exporting country's economy.

To mitigate the negative effects of tariffs, exporters may try to shift their focus to other markets with lower trade barriers. However, entering new markets is rarely simple. Companies face hurdles like regulatory differences, transport challenges, distribution network setup, and established competition. These factors make trade diversification a costly and time-consuming process, meaning that the short-term impact of tariffs can be severe for both exporters and the overall economy.

22. Which of the following would be the most appropriate title for the passage? [2.8점]

- ① How Consumers' Choices Shift by Tariff Policies and Market Pressures
- ② Tariffs as a Double-edged Sword for Domestic and Global Economies
- ③ How Exporters Respond to Rising Tariff Barriers and Global Competition
- ④ The Trade-offs of Tariff Policy: Domestic Benefits and Foreign Retaliation
- ⑤ The Ripple Effects of Tariff Measures on Domestic Prices and Market Share

23. Which of the following is **LEAST** likely to be affected by tariffs? [2.1점]

- ① the price consumers pay for imported goods
- ② domestic businesses using raw materials from abroad
- ③ consumers' choices when buying imported finished products
- ④ the demand for locally produced goods in the domestic market
- ⑤ the export of goods shipped to countries without trade restrictions

[Questions 24 - 25]

What kind of rule would exist without majority rule? In any society, supreme power must rest either with a single person or with a group. When power is held by one individual—such as a king, dictator, or absolute ruler—decisions are straightforward. The leader’s command becomes law, and the state follows that single will without debates or negotiations.

However, one-person rule entails serious risks. A leader may neglect the needs of people or enforce harmful policies. Even a wise leader, [a]when left unchecked, may fall into abuse, corruption, or injustice—as history often shows. Under such a system, citizens have little freedom or control over their own future.

When power is shared among many, differing opinions [b]naturally arise, making decision-making a major concern. In such cases, two main options exist: complete agreement or majority rule. Though ideal in theory, full agreement is rare and often unrealistic. In large groups, it tends to delay decision-making or even prevent action. Majority rule provides a more practical solution, allowing groups to move forward when total agreement [c]cannot be reached.

Yet, majority rule is not without risks. As John Stuart Mill warned, the “rule of the majority” may suppress minority voices when prevailing opinion dominates. Even in free societies, the will of the majority can become oppressive [d]if it silences disagreement or limits individual rights. Mill argued that freedom can be threatened not only by laws but also by social pressure, especially when majority views control public life. This is why democratic societies must guard against the misuse of majority power.

Majority rule works best when balanced with respect for minority rights and a commitment to open dialogue. A healthy society values both collective decisions and individual freedom. While no system is perfect, majority rule—when combined with protections for minority voices—remains the most effective way to manage differing opinions in a shared community. The real challenge is to ensure that neither one-man rule nor the dominance of prevailing opinion [e]result in oppression or injustice.

24. Which of the underlined parts [a]—[e] contains an error in grammar and usage? [2.1점]

- ① when left unchecked
- ② naturally arise
- ③ cannot be reached
- ④ if it silences
- ⑤ result in

25. The passage is primarily concerned with _____. [2.1점]

- ① the risks and abuses of one-man rule
- ② the safeguards for minority rights against oppression
- ③ the practicality of complete agreement in large groups
- ④ the need to balance majority rule with individual freedom
- ⑤ the advantage of majority-led systems over one-man leadership

26. 다항식 $x^3 + ax^2 + bx + c$ 가 $(x-1)^2$ 로 나누어떨어지고, $x+1$ 로 나누면 나머지가 -4 일 때, 세 상수 a, b, c 에 대하여 $a-b+c$ 의 값은? [1.5점]

- ① -4 ② -3 ③ -1 ④ 0 ⑤ 3

27. 방정식 $x^3 - 1 = 0$ 의 한 허근을 ω 라고 할 때, $(\omega+1)^3 = a\omega + b$ 이다. 실수 a, b 의 값을 차례대로 구하면? [1.5점]

- ① $-1, 1$ ② $-1, 0$ ③ $0, -1$ ④ $1, -1$ ⑤ $1, 0$

28. 원 $x^2 + y^2 = 5$ 와 직선 $y = 2x + k$ 가 서로 다른 두 점에서 만나도록 하는 정수 k 의 최댓값은? [1.5점]

- ① 3 ② 4 ③ 5 ④ 6 ⑤ 7

29. 함수 $f(x) = \frac{ax+b}{x-2}$ 의 그래프와 그 역함수의 그래프가 모두 점 $(3, -2)$ 를 지날 때, 상수 a, b 에 대하여 $a-b$ 의 값은? [2.1점]

- ① -10 ② -6 ③ -4 ④ 6 ⑤ 10

30. 다음의 두 조건 p, q 에 대하여 명제 $\sim p \rightarrow q$ 가 참이 되게 하는 a 값의 범위는? [1.5점]

$$p: |x-a| > 1 \quad , \quad q: x^2 \leq 16$$

- ① $a \leq -5$ ② $-5 < a \leq -3$ ③ $-3 \leq a \leq 3$ ④ $3 < a \leq 5$ ⑤ $a > 5$

31. 두 곡선 $y = \sqrt{x+6}$ 와 $y = x + |x-a|$ 가 서로 다른 두 점에서 만나도록 하는 모든 자연수 a 값의 합은? [2.1점]

- ① 3 ② 4 ③ 5 ④ 6 ⑤ 7

32. 함수 $f(x) = \begin{cases} \sqrt{3x+9} & (x < 0) \\ \frac{x^2}{3} + 3 & (x \geq 0) \end{cases}$ 에 대하여 곡선 $y = f(x)$ 와 $x = 3$ 및 x 축으로 둘러싸

인 도형의 넓이는? [2.1점]

- ① 12 ② 14 ③ 16 ④ 18 ⑤ 20

33. $x \neq -1$ 인 모든 실수 x 에 대하여 다음 등식이 항상 성립할 때, 상수 a, b, c 에 대하여 abc 의 값은? [1.5점]

$$\frac{a}{x+1} + \frac{bx+c}{x^2-x+1} = \frac{x+7}{x^3+1}$$

- ① -24 ② -22 ③ -20 ④ -18 ⑤ -16

34. 이어달리기에 참여하는 남학생 3명과 여학생 3명을 일렬로 세울 때, 남학생끼리 이웃하지 않고, 여학생끼리 이웃하지 않도록 세우는 경우의 수는? [1.5점]

- ① 24 ② 36 ③ 48 ④ 60 ⑤ 72

35. 부등식 $\left(\frac{1}{9}\right)^x < 3^{19-4x}$ 을 만족시키는 자연수 x 의 개수는? [1.5점]

- ① 6 ② 7 ③ 8 ④ 9 ⑤ 10

36. 두 실수 a, b 에 대하여 $\log_3 2 = a$, $\log_2 10 = b$ 일 때, $\log_{30} 18$ 을 a, b 에 대한 식으로 바르게 나타낸 것은? [2.1점]

- ① $\frac{a-3b}{a}$ ② $\frac{4a+b}{b}$ ③ $\frac{a-4b}{ab}$ ④ $\frac{a+3b}{1-ab}$ ⑤ $\frac{a+2}{1+ab}$

37. 부등식 $2\sin x - \sqrt{2} > 0$ 의 해는? (단, $0 \leq x < 2\pi$) [1.5점]

- ① $\frac{\pi}{4} \leq x \leq \frac{3\pi}{4}$ ② $\frac{\pi}{4} < x < \frac{3\pi}{4}$ ③ $\frac{\pi}{2} \leq x \leq \frac{3\pi}{4}$ ④ $\frac{\pi}{4} < x < \frac{\pi}{2}$
- ⑤ $0 \leq x < \frac{\pi}{4}$ 또는 $\frac{3\pi}{4} \leq x < 2\pi$

38. $0 \leq x < 2\pi$ 일 때, 두 곡선 $y = \cos\left(x - \frac{\pi}{2}\right)$ 와 $y = \sin 2x$ 의 교점의 개수는? [2.8점]

- ① 2 ② 4 ③ 6 ④ 8 ⑤ 10

39. 함수 $f(x) = \sin(\pi + x)\cos\left(\frac{\pi}{2} + x\right) + \cos\left(\frac{\pi}{2} - x\right)$ 의 최댓값과 최솟값의 합은? [2.1점]

- ① -2 ② $-\frac{1}{4}$ ③ 0 ④ $\frac{7}{4}$ ⑤ 2

40. $0 < x < \pi$ 일 때, 부등식 $\cos^2 x - 3\sin x - a + 1 < 0$ 이 항상 성립하도록 하는 정수 a 의 최솟값은? [1.5점]

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

41. 수열 $\{a_n\}$ 이 다음 조건을 만족시킬 때, a_{100} 의 값은? [2.1점]

㉠ $a_1 = 10$
 ㉡ $a_1 + 2a_2 + \dots + na_n = \frac{1}{2}n(n+1)a_{n+1} + 1 \quad (n = 1, 2, 3, \dots)$

- ① 1 ② 3 ③ 5 ④ 7 ⑤ 9

42. 두 다항함수 $f(x), g(x)$ 에 대하여 $\lim_{x \rightarrow 0} \frac{f(x)}{x} = 7$, $\lim_{x \rightarrow 1} \frac{g(x)}{x-1} = 11$ 일 때,

$\lim_{x \rightarrow 2} \frac{f(x-2) + g(3-x)}{x^2 - 4}$ 의 값은? [2.1점]

- ① -2 ② -1 ③ 0 ④ 1 ⑤ 2

43. 실수 k 에 대하여, 직선 $y = 2x + k$ 와 곡선 $y = x^2$ 의 교점의 개수를 $f(k)$ 라 하면, 함수 $f(k)$ 는 $k = a$ 에서 불연속이다. 이때, a 의 값은? [2.1점]

- ① -2 ② -1 ③ 0 ④ 1 ⑤ 2

44. 자연수 n 에 대하여 $a_n = \lim_{x \rightarrow 1} \frac{x^n + 4x - 5}{x - 1}$ 라 할 때, $\sum_{k=1}^{10} a_k$ 의 값은? [2.1점]

- ① 70 ② 75 ③ 85 ④ 90 ⑤ 95

45. 함수 $f(x) = \begin{cases} \frac{x+1}{x-2} & (x \neq 2) \\ 3 & (x = 2) \end{cases}$ 에 대하여, 함수 $(x^2 + ax + b)f(x)$ 가 실수 전체의 집합에

서 연속이다. 두 상수 a, b 에 대하여, $a + b$ 의 값은? [2.8점]

- ① -8 ② -4 ③ 0 ④ 8 ⑤ 16

46. 함수 $f(x) = x^3 - 3x^2 - 9x + 27$ 에 대하여 $\frac{f(4) - f(0)}{4 - 0} = f'(c)$ 를 만족하는 모든 실수 c 값들의 합은? [2.1점]

- ① 2 ② 4 ③ 6 ④ 8 ⑤ 10

47. 함수 $f(x) = x^3$ 의 그래프를 x 축 방향으로 a 만큼, y 축 방향으로 b 만큼 평행 이동시켰더니, 함수 $y = g(x)$ 의 그래프가 되었다. $g(0) = 0$ 이고, $\int_a^{3a} g(x)dx - \int_0^{2a} f(x)dx = 32$ 일 때, $\frac{b}{a}$ 의 값은? (단, $a > 0$) [2.8점]

- ① 2 ② 4 ③ 6 ④ 8 ⑤ 10

48. 지면에 정지해 있던 열기구가 수직 방향으로 출발한 후 t (분)일 때, 속도 $v(t)$ (m/분)가 다음과 같다.

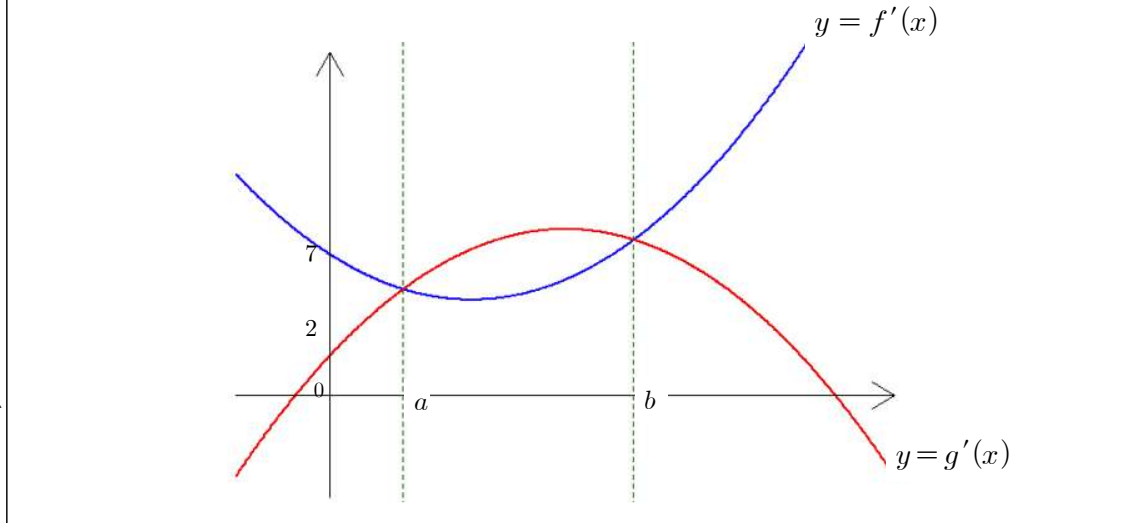
$$v(t) = \begin{cases} 2t & (0 \leq t \leq 10) \\ 40 - 2t & (10 \leq t \leq 30) \end{cases}$$

$t = 25$ (분)일 때, 지면으로부터 열기구의 높이는? (단, 열기구는 수직 방향으로만 움직이는 것으로 가정한다.) [2.8점]

- ① 175 m ② 200 m ③ 225 m ④ 250 m ⑤ 275 m

※ 49번~50번은 세트형 문제입니다. 아래 제시문을 보고 물음에 답하십시오.

두 삼차함수 $f(x), g(x)$ 의 도함수 $f'(x), g'(x)$ 의 그래프가 만나는 서로 다른 두 점의 x 좌표를 각각 a, b ($0 < a < b$)라 하자. 함수 $h(x) = f(x) - g(x)$ 이고, $f'(0) = 7, g'(0) = 2$ 이다.



49. 아래 표에 제시된 각각의 구간에서 함수 $h(x)$ 의 증가 감소를 올바르게 나타낸 것은? [1.5점]

	$x < a$	$a < x < b$	$x > b$
①	감소	감소	감소
②	감소	증가	감소
③	감소	증가	증가
④	증가	감소	증가
⑤	증가	증가	증가

50. 다음 중 함수 $h(x)$ 에 대한 설명으로 옳은 것을 있는 대로 모두 고른 것은? [2.8점]

- ㉠ 함수 $h(x)$ 는 $x = a$ 에서 극솟값을 갖는다.
- ㉡ $h(b) = 0$ 이면, 방정식 $h(x) = 0$ 의 서로 다른 실근의 개수는 2개이다.
- ㉢ $0 < \alpha < \beta < b$ 인 두 실수 α, β 에 대하여 $\frac{h(\beta) - h(\alpha)}{\beta - \alpha} < 5$ 이다.

- ① ㉠ ② ㉠, ㉡ ③ ㉡, ㉢ ④ ㉠, ㉢ ⑤ ㉠, ㉡, ㉢