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필답고사 문제지 (T2-2)

A형

출제문항 : 영어 25문항, 수학 20문항 - 90분

지망학부(과)	수험번호	성명

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

[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]

[1~8: 2 points each]

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

- Vines threatened to engulf the buildings in greenery, and grass to _____ on the flower plots.
① condense ② encroach
③ embark ④ ponder
- The malicious rumors were spread deliberately to _____ the band's reputation and harm their recording company's bottom line.
① ascertain ② debut
③ scathe ④ amputate
- A confused defense left an attacker wide open for an easy goal—which felt, in some ways, _____ of the two teams' difference in caliber.
① enigmatic ② emblematic
③ systematic ④ pragmatic

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

- The court personnel perceived that the presence of cameras in the courtroom made the participating attorneys' actions more flamboyant than usual.
① soporific ② refined
③ ostentatious ④ inconspicuous
- This adds credence to the argument that mastery of certain sentence structures is not wholly a function of age or language exposure.
① temerity ② scruple
③ imprudence ④ reassurance
- Looking at the new calendar, it's that time of year to speculate what awaits this tired world in the New Year.
① irradiate ② prognosticate
③ arraign ④ ameliorate

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

- Poor external rotation in the shoulder is a good index of whether or not the rotator cuff muscles need rehabilitation.
① list ② sign
③ finger ④ number
- Until 1949, nearly everyone with a close connection to the United Kingdom was classified as a British subject.
① topic ② citizen
③ proposition ④ participant

[9~10: 3 points each]

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

- Hardly had they reached Edinburgh than they were ordered to return to London.
① As soon as they were told to come back to London, they had not reached Edinburgh.
② It was not long before they were ordered to return to London that they had left for Edinburgh.
③ Shortly after they were ordered to come back to London, they had to reach Edinburgh.
④ The moment they had arrived at Edinburgh, they had to come back to London.

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

- Excessive engine oil burning is often the consequence of _____.
① a more severe engine performance issue
② more performance issue a severe engine
③ a severe issue engine more performance
④ performance issue a more severe engine

[11~12: 4 points each]

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

11. I was not ①surprising that the writer was feeling ②discouraged after ③all the criticism he ④had received on his new novel.

[12] Choose the one that is grammatically INCORRECT.

12. ① At that time, my partner objected to taking the trash out.
 ② When it comes to playing computer games, he's the best.
 ③ Plastics are often used to making a wide range of materials.
 ④ What do you say to joining us for supper in a couple of days?

[13~20: 5 points each]

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

[13-14] Known as the "Sun King" for the magnificence of his fashions, Louis XIV made the wig an essential accessory at his court for men and women alike. Once established at court, wigs became standard among high-ranking professional groups, such as judges, priests, and the like. To meet growing demand, the number of master wigmakers boomed in France during Louis XIV's reign. In Paris, it increased from 200 in 1673 to 945 in 1771. In the provinces, journeyman wigmakers traveled around the country as well, and soon ordinary people began wearing wigs, to the consternation of the upper classes. At the heart of wig economics was the hair itself. Higher priced wigs used women's hair because of its length and the belief that it was of higher quality than men's. Traders at fairs would buy hair from peasant girls. Blond or silver-gray hair was often in high demand, followed by black. Naturally curly hair was the most valuable of all. With so many wigs to make, French artisans bought hair from all around Europe. This continued until the profound social changes that took place as a result of the French Revolution brought the fashion for wigs to an end.

13. According to the passage, which of the following is true?
- ① Louis XIV called for simpler hairstyles at court.
 - ② In Paris, the number of journeyman wigmakers reached 945 in 1771.
 - ③ Wealthy French women favored imported wigs with straight hair the most.
 - ④ The upper classes disliked the fact that ordinary people began wearing wigs.

14. According to the passage, which of the following CANNOT be inferred?

- ① The price of wigs differed depending on hair color.
- ② Peasant girls could earn money by selling their hair.
- ③ The styles of wigs were different between men and women at court.
- ④ Attitudes toward wigs altered drastically after the French Revolution.

[15-16] In recent decades, discussions about the shortcomings of traditional education have led to various reforms and alternative approaches. The advent of technology has further revolutionized schooling, through the integration of digital tools, online learning platforms, and personalized education plans. While the goals of schooling have remained (A)_____—to impart knowledge, foster critical thinking, and prepare individuals for societal roles, the methods and structures continue to (B)_____. The ongoing dialogue surrounding education highlights the importance of adaptability and innovation in meeting the diverse needs of learners in the 21st century. Understanding the historical context of schooling systems provides insight into the challenges and opportunities faced by educators today. As we navigate the complexities of a rapidly changing world, the quest for effective and inclusive education remains a constant, driving force in shaping the future of schooling.

15. Which of the following is the best title for the passage?

- ① The Ceaseless Quest for Better Schooling
- ② A Historical Lens on School Educators
- ③ Integration of Technology in Education
- ④ The Revolution of Alternative Schooling

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

- ① versatile – reverse
- ② consistent – evolve
- ③ sterile – transform
- ④ static – stagnate

[17-18] One of the most impressive differences across languages is the ways that they locate things in space. Some languages, like English, tend to prefer to use an egocentric frame of reference. For instance, if you're taking a tour of a model home, the realtor might motion toward the bay windows and say, "And on your right is one of the most delightful features of this home." The phrase "on your right" has to be interpreted from your perspective. If you were facing another way or if you were in another place, it would refer to a totally different region in space, which is why it's called egocentric. However, not all languages work like this. Some languages use geocentric systems, which don't refer to your position, for locating things in space. There are different types of geocentric systems; the cardinal directions we use (north, south, east, west) are one example, but others include "uphill" versus "downhill" or "uptown" versus "downtown."

17. Which of the following is the best title for the passage?

- ① How Languages Express Directions Differently
- ② Why Different Languages are Perspectivized Differently
- ③ How Geocentric Systems Work in Different Languages
- ④ Where Egocentric and Geocentric Systems Come From

18. According to the passage, which of the following is true?

- ① Egocentricity is the default system among languages.
- ② "Uphill" and "downhill" are examples of egocentric expressions.
- ③ Geocentric perspectives refer to different directions depending on your position.
- ④ Cardinal directions are one type of geocentric system that some languages use.

[19-20] Voting for a loser isn't just mentally taxing. The day before and the day of the 2008 general election, researchers gathered multiple saliva samples from voters. (A) Among men, but not women, who voted for a losing candidate, testosterone plummeted once the election results were announced, to a degree expected of actual contestants in a competition, rather than vicarious participants. Backing a losing candidate can also damage (B) _____. An analysis of surveys from 1964 to 2004 found that over time, voters who supported losers were less likely than others to see the electoral process as fair. They also tended to be less satisfied with democracy generally. Notably, in 2004, the loser's supporters rated their satisfaction with democracy 0.55 on a scale of 0 to 1, compared with the winner's supporters' 0.77 rating. This disaffection is magnified when voters are startled by a loss. Among voters who backed losing candidates in Canada's 1997 federal election, 72 percent of those who weren't surprised remained satisfied with democracy, versus just 57 percent of those who were surprised.

19. Which of the following is closest in meaning to (A)?

- ① Men backing a losing candidate experienced a testosterone drop similar to active competitors.
- ② The testosterone levels of men and women increased to that of actual contestants.
- ③ The relationship between voters and candidates is similar to that of participants and observers of a competition.
- ④ After the election, voters' testosterone levels reached as high as those of contest observers.

20. Which of the following best fits into (B)?

- ① the integrity as citizens in a democracy
- ② the satisfaction of voters with the candidate
- ③ voters' trust in the political system
- ④ the emotional health of the voters

[21~25: 6 points each]

[21-22] The battery pack of a Tesla Model S is a feat of intricate engineering. Thousands of cylindrical cells with components sourced from around the world transform lithium and electrons into enough energy to propel the car hundreds of kilometers, again and again, without tailpipe emissions. But when the battery comes to the end of its life, its green benefits fade and problems begin. If it ends up in a landfill, its cells (A)_____, including heavy metals. And recycling the battery can be a hazardous business, warn materials scientists. If you cut too deep into a Tesla cell, or in the wrong place, it can short-circuit, combust, and release toxic fumes. That's just one of the many problems confronting researchers who are trying to tackle an emerging problem: how to recycle the millions of electric vehicle (EV) batteries that manufacturers expect to produce over the next few decades. Current EV batteries are really not designed to be recycled. That wasn't much of a problem when EVs were rare. But now the technology is taking off. Several carmakers have said they plan to phase out combustion engines within a few decades, and industry analysts predict at least 145 million EVs will be on the road by 2030, up from just 11 million last year. So, now people are starting to realize this is an issue.

21. According to the passage, which of the following is true?

- ① To make an EV battery requires predominantly locally sourced items.
- ② Last year, 11 million EV batteries were recycled.
- ③ Some car companies are planning to stop making combustion engines.
- ④ Slicing a Tesla cell open is a relatively safe process.

22. Which of the following best fits into (A)?

- ① can be replaced with core materials
- ② will need recharging and repair
- ③ absorb pollutants from the landfill
- ④ can release problematic toxins

[23-25] Sometimes we see things as human because we're lonely. In one experiment, people who reported feeling isolated were more likely than others to attribute free will and consciousness to various gadgets. (A)_____, feeling kinship with objects can reduce loneliness. When college students were reminded of a time they'd been excluded socially, they compensated by exaggerating their number of Facebook friends—unless they were first given tasks that caused them to interact with their phone as if it had human qualities. The phone apparently stood in for real friends. At other times, we personify products in an effort to understand them. One US study found that three in four respondents cursed at their computer—and the more their computer gave them problems, the more likely they were to report that it had “its own beliefs and desires.” When we personify products, they become harder to cast off. After being asked to evaluate their car's personality, people were less likely to say they intended to replace it soon. And anthropomorphizing objects is associated with a tendency to hoard. So how do people assign traits to an object? In part, we rely on looks. On humans, wide faces are associated with dominance. Similarly, people rated cars, clocks, and watches with wide faces as more dominant-looking than narrow-faced ones, and preferred them—especially in competitive situations. An analysis of car sales in Germany found that cars with grilles that were upturned like smiles and headlights that were slanted like narrowed eyes sold best. The purchasers saw these features as increasing a car's friendliness and aggressiveness, respectively.

23. Which of the following is the major topic of the passage?

- ① The importance of psychology in an industry
- ② The tendency of humans to personify objects
- ③ Positive effects of personification on marketing
- ④ The problems of people's attachment to products

24. According to the passage, which of the following is true?

- ① According to a study, those who experienced problems with computers were not likely to treat them as humans.
- ② After evaluating their cars' personalities, the owners decided to replace them.
- ③ People prefer narrow-faced products to wide-faced ones.
- ④ In Germany, cars with human-looking features sold the most.

25. Which of the following best fits into (A)?

- ① In turn
- ② Otherwise
- ③ To make matters worse
- ④ This notwithstanding

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26. 점 $P(2a,a)$ 에서 원 $x^2+y^2-2x-4y=-1$ 에 그은 두 접선의 접점을 A,B 라 하자. 삼각형 PAB 가 정삼각형이 되는 실수 a 들의 합은? [4점]

- ① $\frac{4}{5}$

② $\frac{6}{5}$
- ③ $\frac{8}{5}$

④ 2
- ⑤ $\frac{12}{5}$

27. 방정식 $x^2-3|x-k|=0$ 의 근이 정확히 3개가 되는 실수 k 의 최댓값과 최솟값의 곱은? [4점]

- ① $-\frac{16}{9}$

② $-\frac{9}{16}$
- ③ $-\frac{9}{4}$

④ $-\frac{4}{9}$
- ⑤ 0

28. 밑면의 반지름이 r 이고 높이가 h 인 원기둥 모양의 뚜껑이 없는 용기를 만들고자 한다. 이 용기의 부피가 2π 이면서 겉넓이가 최소가 될 때, r 과 h 의 합은? [4점]

- ① 3

② $1+\sqrt{2}$
- ③ $\frac{9}{2}$

④ $\frac{5}{\sqrt[3]{2}}$
- ⑤ $2\sqrt[3]{2}$

29. 특정 인구집단에서 남자의 색맹비율은 5%이고, 여자는 0.25%라고 한다. 해당 집단에서 임의로 선택된 사람이 색맹일 경우 여자일 확률이 $\frac{1}{11}$ 이라고 할 때, 여자의 수는 남자의 수의 몇 배인가? [4점]

- ① 20

② 2
- ③ 1

④ $\frac{1}{2}$
- ⑤ $\frac{1}{20}$

30. 좌표평면 위를 움직이는 점 P 의 시각 $t(t \geq 0)$ 에서의 위치 (x, y) 가 $x = \frac{1}{2}e^{-4t} - t^2$, $y = e^{-2t}$ 이다. 점 P 의 가속도의 크기가 최소가 될 때, 점 P 의 y 좌표는? [4.7점]

- ① 1 ② $\frac{1}{\sqrt{2}}$
 ③ $\frac{1}{2\sqrt{2}}$ ④ $\frac{1}{8}$
 ⑤ $\frac{1}{\sqrt[4]{8}}$

31. 어떤 실수 m, k 에 대해 함수

$$f(x) = \begin{cases} mx & (x \leq k) \\ 3\sqrt{x-2} & (x > k) \end{cases}$$

가 모든 실수에서 미분가능할 때, m^2 은? [4.7점]

- ① $\frac{3}{2}$ ② $\frac{9}{4}$
 ③ $\frac{9}{8}$ ④ $\frac{45}{8}$
 ⑤ $\frac{3\sqrt{2}}{4}$

32. 두 사건 A 와 B 에 대한 설명 중 틀린 것은? [4.8점]

- ① $A \supset B$ 이면 $P(A|B) = 1$ 이다. (단, $B \neq \emptyset$ 이다.)
 ② $A \subset B$ 이면 $P(A|B) < P(A)$ 이다. (단, $B \neq \emptyset$ 이다.)
 ③ A 와 B 가 배반사건이면 $P(A|B) = 0$ 이다.
 ④ $P(B) = 1$ 이면 $P(A|B) = P(A)$ 이다.
 ⑤ $P(B) = 0$ 인 사건 B 는 임의의 사건 A 와 독립이다.

33. 자연수 n 에 대해 $\left(\frac{x}{3} + 2\right)^n$ 의 전개식에서 x^{n-1} 의 계수를 a_n 이라

할 때, $\sum_{n=1}^{\infty} a_n$ 은? [5점]

- ① $\frac{11}{6}$ ② $\frac{9}{4}$
 ③ $\frac{11}{3}$ ④ $\frac{9}{2}$
 ⑤ 9

34. $f(x)$ 는 $0 < x < 1$ 에서 정의되고 $1 - x = xe^{-f(x)}$ 을 만족하는 함수이다. $f(x)$ 의 역함수 $g(x)$ 에 대해 $y = g(x)$ 의 접선의 기울기의 최댓값은? [5점]

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

35. 음함수의 식 $x = y^3 - y^2$ 으로 주어진 함수 $y = f(x)$ 의 그래프와 직선 $x + y = 1$ 과 x 축으로 둘러싸인 영역의 넓이는? [5점]

- ① $\frac{5}{12}$ ② $\frac{1}{2}$
 ③ $\frac{7}{12}$ ④ $\frac{13}{12}$
 ⑤ $\frac{25}{12}$

36. 실수 a 에 대해 복소수 $z = a + 2ai$ 를 정의하자. 주어진 정수 n 에 대해 $|(z+n)^2|$ 의 최솟값이 5보다 작거나 같아지는 정수 n 의 개수는? 단, $i = \sqrt{-1}$ 이고, 복소수 z 에 대하여 $|z| = \sqrt{z\bar{z}}$ 이다. [5점]

- ① 5 ② 4
 ③ 3 ④ 2
 ⑤ 1

37. 자연수 n 에 대해 $\frac{\ln n}{\ln a_n} = 2$ 일 때, $\lim_{n \rightarrow \infty} \left(\frac{a_{n+1}}{a_n} \right)^{a_n a_{n+1}}$ 은? [5점]

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

38. 확률변수 X 의 확률밀도함수 $f(x)$ 가

$$f(x) = \begin{cases} b(a-|x|) & (|x| \leq a) \\ 0 & (|x| > a) \end{cases}$$

이고 분산이 $V(X) = \frac{2}{3}$ 일 때, ab 의 값은? [5점]

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

39. $x > 0$ 에서 정의되고 $1 = f(x) \int_0^\infty te^{-xt}dt$ 를 만족하는 함수 $f(x)$ 에 대해 $f'(2)$ 는? [5.2점]

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

40. 자연수 n 에 대해 $a_n = \sum_{k=1}^n \frac{\ln(n+k) - \ln(n)}{n+k}$ 일 때, $\lim_{n \rightarrow \infty} a_n$ 은?

[5.3점]

- ① $\frac{\ln 2}{2}$
- ② $\ln 2$
- ③ $(\ln 2)^2$
- ④ $\frac{(\ln 2)^2}{2}$
- ⑤ 0

41. 실수 a, b 에 대해 $\lim_{x \rightarrow 2} \frac{x^x - a}{x - 2} = b$ 일 때, $\frac{b}{a}$ 는? [5.3점]

- ① 4
- ② $\ln 2$
- ③ $4\ln 2$
- ④ $\ln(2e)$
- ⑤ $4\ln(2e)$

42. $-\frac{\pi}{4} \leq x \leq \frac{\pi}{4}$ 에서 정의되는 함수 $f(x)$ 가

$$\int_0^x (\sin x - \sin t) f(t) dt = \sin^2 \frac{x}{2}$$

을 만족할 때, $f(x)$ 의 최솟값은? [6점]

- $$\begin{array}{ll} \textcircled{1} \quad \frac{1}{4} & \textcircled{2} \quad \frac{1}{2} \\ \textcircled{3} \quad 1 & \textcircled{4} \quad 2 \\ \textcircled{5} \quad 4 & \end{array}$$

44. 수열 $\{a_n\}$ 이 $a_1 = 1$ 이고 모든 자연수 n 에 대해 $\sum_{k=1}^n a_k = -3a_{n+1}$

을 만족할 때, $\sum_{k=1}^{\infty} a_k^2$ 은? [6점]

- ① 0

③ $\frac{6}{5}$

⑤ 3

② $\frac{1}{5}$

④ $\frac{9}{5}$

43. $f(x) = \cos(2x^3)$ 을 멍급수(거듭제곱급수)로 나타내면

$$f(x) = a_0 + a_1x + a_2x^2 + a_3x^3 + \dots = \sum_{k=0}^{\infty} a_kx^k$$

과 같다. $\sum_{k=0}^{15} a_k$ 의 값은? [6점]

- $$\begin{array}{ll} \textcircled{1} \quad \frac{11}{3} & \textcircled{2} \quad 13 \\ \textcircled{3} \quad -\frac{1}{4} & \textcircled{4} \quad -\frac{1}{3} \\ \textcircled{5} \quad \frac{13}{24} & \end{array}$$

45. 세 변의 길이가 자연수이고 세 변의 길이의 합이 24인 서로 다른 삼각형들 중에서 임의로 하나를 선택할 때, 이등변삼각형이 선택될 확률은? [6점]

- $$\begin{array}{ll} \textcircled{1} \quad \frac{1}{2} & \textcircled{2} \quad \frac{5}{12} \\ \textcircled{3} \quad \frac{2}{5} & \textcircled{4} \quad \frac{1}{3} \\ \textcircled{5} \quad \frac{1}{6} & \end{array}$$