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서울캠퍼스 자연(영어, 수학) A



자 연

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[1-8] 밑줄 친 단어의 뜻과 가장 가까운 것을 고르시오.

1. Unsubstantiated claims often suggest that internet memes related to psychiatric symptoms visually depict and promote aversive behaviour (e.g., self harm), leading to an exacerbation of symptoms. [2점]

- ① abatement ② alleviation ③ aggravation
④ ambivalence ⑤ amelioration

2. The diplomat's perspicacity in navigating complex international negotiations was complimented. His keen insight to discern underlying intentions and nuances proved invaluable in securing advantageous agreements. [2점]

- ① obtuseness ② sagacity ③ ineptitude
④ credence ⑤ verbosity

3. For most of the twentieth century, the evolutionary origin of feathers had been a classic but intractable problem. Decades of efforts to explain feathers as adaptations for flight derived from elongated scales had failed to yield any significant empirical support. [2점]

- ① stubborn ② enervating ③ debilitating
④ preventable ⑤ counterproductive

4. The company's nefarious activities were eventually exposed, revealing a series of unethical and illegal practices. These actions, under the guise of legitimacy, had caused significant harm to customers and the environment. [2점]

- ① mundane ② sedentary ③ altruistic
④ subversive ⑤ malevolent

5. The industrialization of food in the nineteenth century was a major impetus for the introduction of salt into human diets. The dramatic expansion of the vegetable and fruit canning industry in the late nineteenth and early twentieth centuries saw the increasing use of salt, and sugar, for their preservative qualities. [2점]

- ① disclosure ② dealbreaker ③ inducement
④ impediment ⑤ compromise

6. Advocates of reducing animal agriculture have proposed the names "slaughter-free," "cruelty-free," "animal-free" and "clean meat." But traditional meat producers have rejected these as pejorative to conventional products. [2점]

- ① abrogative ② denigratory ③ congenial
④ dispassionate ⑤ inviolable

7. The professor's lectures were known for their abstruse content, often delving into subjects that were obscure and beyond the comprehension of the average student. His expertise in these arcane topics, while impressive, sometimes alienated those not well-versed in the field. [2점]

- ① recondite ② malicious ③ flamboyant
④ substantive ⑤ pedagogical

8. Her penchant for veracity made her a standout journalist. Her dedication to the truth was unwavering, ensuring that her reports were always factual and reliable. [2점]

- ① mendacity ② honesty ③ artifice
④ falsity ⑤ erudition

[9-15] 빈칸에 들어갈 가장 적절한 것을 고르시오.

9. Isaac Newton defined the mass of a body as 'the quantity of matter' it contains, which begs the question of what matter is or how its 'quantity' can be measured. The problem is that, though we can define some quantities in terms of more fundamental quantities (e.g., speed in terms of distance and time), some concepts are so fundamental that any such attempt leads to a(n) _____ definition like that just stated. To escape from this, we can define such quantities 'operationally', by which we mean that we describe what they do—i.e., how they operate—rather than what they are. [3점]

- ① figurative ② empirical ③ circular
④ hypothetical ⑤ lexical

10. In the heated debate, his arguments were marked by _____. Each point was delivered with a harshness and severity that seemed to go beyond mere disagreement. His tone was not just critical, but also biting and caustic, indicating a deep-seated frustration and irritability with the opposing viewpoints, which added a layer of tension to the discussion. [3점]

- ① languor ② geniality ③ asperity
④ subterfuge ⑤ contrition

11. Today we live with calendars at hand but, at the same time, we live with the feeling that everything in history occurs without particular regard for its chronology, and that even music is a sort of warehouse of samples, whose shelf life—whose relative permanence or oblivion, whose chronological placement—is ultimately _____ because, when we get down to it, it can be pushed around according to our inner needs and desires as listeners, performers, and composers. [3점]

- ① irrelevant ② elucidating ③ miscellaneous
④ circumscribed ⑤ self-explanatory

12. Throughout the entire Charlie Chan film series one finds a constant return to the problems and solutions posed by modern technology, such that Chan's solving of the mystery in film after film depends on his ability to utilize (or else uncover the criminal use of) technological devices: microscopes, phonographs, picture wires, photoelectric cells, radiographs, laboratory experiments, ultraviolet film projection, and so on. It is important to note here that these moments of gadgetry are not _____ to the narratives; indeed, they routinely constitute the most distinctive parts of each film. [3점]

- ① intrinsic ② favorable ③ conducive
④ peripheral ⑤ consequent

13. Though I have read so much, I am a bad reader. I read slowly and I am _____. I find it difficult to leave a book, however bad and however much it bores me, unfinished. I could count on my fingers the number of books that I have not read from cover to cover. [3점]

- ① an efficient scroller
② a choosy bibliophile
③ a poor skipper
④ a rapid peruser
⑤ a thoughtful perceiver

14. The evolution of jazz music, from its roots in the early 20th century to its myriad contemporary forms, reflects the dynamic nature of this genre. Originating within African American communities, jazz combined elements of blues, ragtime, and European music to create a unique and expressive sound. Improvisation is a defining characteristic of jazz, allowing musicians to spontaneously create and vary melodies, harmonies, and rhythms during performances. This element of improvisation makes each jazz performance a unique experience. Over the decades, jazz has evolved to include influences from other genres such as funk, rock, and even classical music. The enduring appeal of jazz lies in its ability to _____. [3점]

- ① embrace diversity and innovation
② sustain a connection to its socio-political origins
③ selectively exclude contemporary components of music
④ explore commercial trends while retaining its essence
⑤ adhere to traditional components of African American music

15. We have a tendency to think that people who agree with us are brilliant and insightful, and that those who disagree with us could use a little help in seeing reality for what it is. As George Carlin put it, "Have you ever noticed that anybody driving slower than you is an idiot, and anyone going faster than you is a maniac?" This propensity to believe that we see the world accurately, while anyone who has a different opinion is benighted, _____. As psychologist Lee Ross has argued, if I see the world as it is and you disagree with me, then I have only a few possible interpretations of your behavior: You might be incompetent, you might be irrational, or you might be mistaken. Whatever the case, I can't reason with you. [3점]

- ① fuels conflicts
② relieves stress
③ minimizes risk
④ inspires action
⑤ triggers delusions

16. 다음 글에 드러난 'I'의 심경 변화로 가장 적절한 것은? [2점]

After years of meticulous research and relentless fieldwork, the discovery I had been chasing seemed to elude me. I sat in my office surrounded by piles of data, the red numbers on the digital clock glaring at me, a reminder of another day slipping by. The weight of expectation bore down on my shoulders, my ambition turning into an oppressive shadow. My breathing was shallow, my focus scattered. The university had invested heavily in my work, and here I was about to admit that my theory was incorrect. I decided to take a walk to clear my head. As I wandered through the empty campus, the words of my mentor came to mind: "Science is not a pursuit of affirmation, but an exploration of the unknown. Each wrong turn is a step towards the truth." Suddenly, it all made sense. The pressure dissipated as I realized that my "failure" was actually a valuable finding. A sense of liberation replaced the anxiety. With renewed vigor, I understood that acknowledging my theory's flaws would contribute to the greater body of knowledge. I returned to my office not with a sense of defeat, but with the satisfaction of contributing a piece to the ever-expanding puzzle of science.

- ① hopeful → disillusioned
- ② frustrated → enlightened
- ③ confident → hesitant
- ④ impatient → contented
- ⑤ curious → resigned

17. 다음 글의 요지로 가장 적절한 것은? [4점]

Organized work, and the customs, practices and institutions, along with the tightly woven affective fabric of wishes, dreads and ambitions, that sustain it, provides the means for societies to maintain themselves continuously in being, maintaining themselves through the maintenance of exertion itself. Societies may project aims for themselves through five-year plans and vaguer ambitions for ever-greater dominion over the natural and human world, but this imperial expansiveness is not really projective in that it must in fact remain open and incomplete, since completion of a society's aim would produce exhaustion, inertia and dissipation. Societies bound by the mythos of work as collective striving grow in order to remain the same, or not to decay and disappear. By the same token, they remain in being through exerting themselves. Work always aims at some kind of completion, cessation or remission: keeping a society 'working' in the way that projects of work do aims at ongoing incompleteness, or the work only of keeping itself at work in being.

- ① Societies are sustained by the open-ended incompleteness of work.
- ② The importance of work-life balance cannot be overemphasized.
- ③ Civilization was achieved thanks to myths about the value of work.
- ④ Goals must be set realistically to minimize overexertion and burnout.
- ⑤ A productive society accounts for the long-term effects of its policies.

18. 주어진 글 다음에 이어질 순서로 가장 적절한 것은? [4점]

In craftsmanship we are able to judge how well someone performs by looking at the concrete results of their labors. To displaced or discarded workers, those results at least make legible why they have been cast aside; the quality of Indian software programs and Chinese manufactured goods are solid facts.

(A) But in fact the bureaucratic machinery chases after something quite intangible; one can quantify what kinds of work seem autonomous, for example, but not what specifically an autonomous act is. Craftsmanship requires mastering and owning a particular domain of knowledge; this new version of talent is not content-specific or content-determined.

(B) Cutting-edge firms and flexible organizations need people who can learn new skills rather than cling to old competencies. The dynamic organization emphasizes the ability to process and interpret changing bodies of information and practice.

(C) It might seem that the meritocracy machinery of testing and on-the-job evaluation is equally solid. The measures, after all, are standardized, with numbers often taking the place of names on tests to assure objectivity.

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

[19-20] 다음 글의 제목으로 가장 적절한 것을 고르시오.

19. We should see death as it really is: the limit that gives form to our lives. It's both wrong and unhelpful to see death as a confinement, as an unfair stoppage of our projects. Things that go on endlessly lose their value. An Epicurean tip for getting through difficulties is to remember that pain comes to an end. Well, death is "this too shall pass" taken to its logical conclusion. Another Epicurean tip for getting through tough times is to remember the goods of life, like friendship and conversation. Well, death provides the shapeliness to time that makes these pleasures substantial. The sooner we stop thinking of death as a mere transition and come to terms with it as an absolute end, the sooner we can start enduring our temporary bouts of suffering and enjoying our precious encounters with beauty. Without a container, life could never be full, let alone overflowing. [3점]

- ① Why Death is the Great Equalizer
- ② Strategies to Reduce Anxiety about Death
- ③ Embrace the Grim Reaper: Death Improves Life
- ④ How to Cope with the Meaninglessness of Life
- ⑤ Lessons from Epicure: The Beauty of Uncertainty

20. The difficulty in discussing ownership as one of the major factors of human existence and experience is that little data exist. Most of those who have examined economics, whether they were concerned philosophically with man, or materialistically with property, have had many of their thoughts molded by written history. But written history does not encompass the experience of man. At best, it plunges into the past only briefly. The written record is confined to the last five or six thousand years of human experience. By the time we find learned men examining property and property relationships, we are in the historic period and these men are dealing with the findings of the historians. Nearly all the early historians were men who looked at government and war as the major factors which mold human social order. They entered the story at a point where the fundamental guidelines were disappearing in a welter of working relationships already aged and warped with custom. [3점]

- ① The Epic Saga of Property Wars
- ② Oral Histories of Ownership: Tales of Social Order
- ③ The Illusion of Ownership: How History Shapes Economic Thought
- ④ Ownership: A Historical Perspective Limited by Written Records
- ⑤ An Interdisciplinary Approach to Ownership Through the Ages

[21-26] 다음 글의 내용과 가장 가까운 것을 고르시오.

21. Emotions have a big influence on how we process the information coming in through our senses. We all have the experience of being in a good mood and noticing sunny skies and chirping birds, or being in a bad mood and noticing dark clouds and pigeon crap all over the place. Our emotions color what we notice and how we experience them. Emotions are housed deep in the brain below its surface. These regions are called limbic areas. The limbic brain is responsible for our joys and fears, our happiness and sadness, our delights and disgusts. It is closely linked with the autonomic nervous system. This part of the brain is "autonomic" because it does its work tirelessly behind the scenes without our even being aware that it is humming along. The autonomic nervous system controls our heart rate and blood pressure and sweating responses, and links our brain and body in emotional experiences. [3점]

- ① Positive moods highlight the unpleasant darker aspects of things.
- ② Sweating responses are mainly controlled by the conscious part of the brain.
- ③ The limbic areas of the brain are located on the outer layer of the brain.
- ④ The limbic system in the brain is primarily responsible for logical reasoning.
- ⑤ The autonomic nervous system regulates responses like heart rate in relation to emotional experiences.

22. The city of Rome first became the seat of a republic governed by a senate with members drawn from notable families and by elected magistrates or consuls. As the Roman armies conquered more and more of Italy and beyond, the populace struggled to maintain a governmental system that could administer efficiently and that could satisfy both the landed aristocracy (patricians) and the general class of free citizens (plebs). A crisis eventually arose in the first century B.C.E. that resulted in the assumption of dictatorial power by the military leader Julius Caesar. Although he was assassinated, his rule ushered in the Roman Empire and a succession of emperors beginning with Augustus Caesar in 27 B.C.E. The breadth and complexity of the Empire demanded new construction practices capable of producing very large buildings relatively quickly and economically. [3점]

- ① The Roman Empire started immediately after the city of Rome was founded.
- ② The Roman Republic was initially led by a senate, elected consuls and the common plebeians.
- ③ The Roman Republic successfully managed the needs of both patricians and plebeians throughout its expansion without much internal conflict.
- ④ After Julius Caesar's assassination, there was a long period without an emperor before the Roman Empire began.
- ⑤ Roman architecture evolved as their political system changed from a republic to an empire.

23. Van Gogh was right in saying that the method he had chosen could be compared to that of the caricaturist. Caricature had always been 'expressionist', for the caricaturist plays with the likeness of his victim, and distorts it to express just what he feels about his fellow man. As long as these distortions of nature sailed under the flag of humour nobody seemed to find them difficult to understand. Humorous art was a field in which everything was permitted, because people did not approach it with the prejudices they reserved for Art with a capital A. But the idea of a serious caricature, of an art which deliberately changed the appearance of things not to express a sense of superiority, but maybe love, or admiration, or fear, proved indeed a stumbling block as Van Gogh had predicted. Yet there is nothing inconsistent about it. It is the sober truth that our feelings about things do colour the way in which we see them and, even more, the forms which we remember. Everyone must have experienced how different the same place may look when we are happy and when we are sad. [3점]

- ① Van Gogh claimed that his method was entirely distinct from that of a caricaturist.
- ② Van Gogh had anticipated that serious caricature was readily accepted without much skepticism.
- ③ Caricature, according to Van Gogh, strictly adheres to realistic portrayals without distortion.
- ④ Caricature is described as 'expressionist' because it distorts likenesses to express the artist's feelings.
- ⑤ Van Gogh believed that altering appearances in art to convey emotions like love or fear was generally accepted without controversy.

24. My principal objection to the refusal to call history a science is that it justifies and perpetuates the rift between the so-called 'two cultures'. The rift itself is a product of this ancient prejudice, based on a class structure of English society which itself belongs to the past; and I am myself not convinced that the chasm which separates the historian from the geologist is any deeper or more unbridgeable than the chasm which separates the geologist from the physicist. But the way to mend the rift is not, in my view, to teach elementary science to historians or elementary history to scientists. This is a blind alley into which we have been led by muddled thinking. After all, scientists themselves do not behave in this way. I have never heard of engineers being advised to attend elementary classes in botany. [3점]

- ① The rift between history and science, in the author's view, can be bridged by incorporating more science into history education.
- ② The division between 'two cultures' for the author is a product of the contemporary class structure of English society.
- ③ According to the author, the gap between historians and geologists is significantly greater than that between geologists and physicists.
- ④ The author argues that the refusal to recognize history as a science reinforces an outdated divide between history and science.
- ⑤ The author's main objection to classifying history as a science is that it would create a larger divide between different academic disciplines.

25. Pythagoras, as everyone knows, said that "all things are numbers." This statement, interpreted in a modern way, is logically nonsense, but what he meant was not exactly nonsense. He discovered the importance of numbers in music, and the connection which he established between music and arithmetic survives in the mathematical terms "harmonic mean" and "harmonic progression." He thought of numbers as shapes, as they appear on dice or playing cards. We still speak of squares and cubes of numbers, which are terms that we owe to him. He also spoke of oblong numbers, triangular numbers, pyramidal numbers, and so on. These were the numbers of pebbles required to make the shapes in question. He presumably thought of the world as atomic, and of bodies as built up of molecules composed of atoms arranged in various shapes. In this way he hoped to make arithmetic the fundamental study in physics as in aesthetics. [3점]

- ① Pythagoras's statement "all things are numbers" aligns perfectly with modern logical interpretations.
- ② Pythagoras believed that numbers had no practical application beyond their mathematical properties.
- ③ Pythagoras's view of the atomic structure of the world suggested that bodies were composed of molecules arranged in various shapes.
- ④ The idea of shaping numbers into oblong, triangular, and pyramidal forms was developed by mathematicians after Pythagoras.
- ⑤ Pythagoras's teachings primarily targeted philosophical concepts, leaving arithmetic's integration into physics and aesthetics to others.

26. The greatest minds in the physics community are probably those working on the unresolved problem of how quantum physics can be applied to the extremely powerful forces of gravity that are believed to exist inside black holes, and which played a vital part in the early evolution of our universe. However, the fundamental ideas of quantum physics are really not rocket science: their challenge is more to do with their unfamiliarity than their intrinsic difficulty. We have to abandon some of the ideas of how the world works that we have all acquired from our observation and experience, but once we have done so, replacing them with the new concepts required to understand quantum physics is more an exercise for the imagination than the intellect. Moreover, it is quite possible to understand how the principles of quantum mechanics underlie many everyday phenomena, without using the complex mathematical analysis needed for a full professional treatment. [4점]

- ① The principles of quantum mechanics cannot be understood without complex mathematical analysis.
- ② Quantum physics has little relevance to the powerful gravitational forces in black holes and the early universe.
- ③ The greatest minds in physics focus mainly on the application of quantum physics to everyday phenomena.
- ④ Quantum physics is about the intellectual challenge usually associated with complex scientific theories like “rocket science.”
- ⑤ Quantum physics is less about complexity and more about reimagining familiar concepts.

27. 다음 글의 내용과 거리가 가장 먼 것은? [3점]

One of the things that made most Italians finally accept that they were unified, and gradually made them feel as if they belonged to the same people, was that they began eating the same thing. It was a process in which pasta—and to some extent pizza—played a central role. In the mid-1800s, pasta and pizza were mostly regional specialties, poor man’s food from Naples and the surrounding area. After Italy’s unification, immigrants from the country’s poor south flocked to cities in the north searching for work. They took their favorite food with them—and poor man’s food soon became everyone’s favorite. As John Dickie writes in his book *Delizia*, one of the most remarkable traits of the Italians’ love of food today is how democratic it is. In the past, the rich and the poor, the people living in the cities and the countryside, lived on completely different diets; today it’s likely that their children and grandchildren share the same knowledge and appreciation of tasty cooking. Everyone dreams about the same bowl of pasta, although the sauce varies slightly from region to region.

- ① Food was crucial to the formation of Italian national identity.
- ② Pasta and pizza were once associated with specific regions.
- ③ Pasta went national when rural labor moved to the cities.
- ④ Diet remains an important marker of class origin in Italy.
- ⑤ Local differences in pasta sauces can still be found across Italy.

[28-29] 다음 글을 읽고 물음에 답하시오.

The sense of balance was ignored in the treatises of antiquity, as well as in the dozens of Renaissance and Baroque representations and allegories of the senses. For centuries the body's relationship to the world was thought to be mediated only by our ability to smell, see, hear, taste or touch. The claim that we have five senses, and only those, was prevalent in Europe, America, and much of Asia. This is partly owing to the fact that the distinction between up and down and right and left seems so obvious to us that we appreciate its importance only when we feel dizzy or lose ground. As with friends we speak of well only after they are dead, we recognize the goodness of our more integrative senses when we miss them. We do not do so on a whim, but because the regulating principle of our vital clock, like that of our internal compass, cannot be perceived except through the intervention of a dissonance, through the natural or artificial production of an unbalancing bodily phenomenon.

From the beginning of the nineteenth century, theories of perception began to deal with sensory qualities other than the classical senses. The sensation of pain, for example, which later became known as nociception, was associated with the sense of touch, while thirst, hunger and the urge to urinate were some of the subjects of endocrinology. To some extent, medicine and physiology began to distinguish between ways of accessing the outside world and the perception of processes occurring, as it were, from the skin inwards. However, when it came to the sense related to the passage of time or that of equilibrium it was not very clear to what extent these sensations referred to 'the outside' or 'the inside.' Nor did it seem obvious that they were purely individual sensations, or that they could vary according to habit or custom.

28. 밑줄의 내용과 가장 거리가 먼 것은? [4점]

- ① For centuries, theories of perception focused on the five senses.
- ② The sense of balance was an object of study since the Renaissance and Baroque periods.
- ③ Theories of perception advanced qualitatively at the beginning of the nineteenth century.
- ④ Nineteenth-century theorists drew connections between the sense of touch and the sensation of pain.
- ⑤ Nineteenth-century theorists were unsure whether sensations related to the sense of balance were completely individual.

29. 밑줄 친 "on a whim"의 뜻과 가장 가까운 것은? [3점]

- ① to make ends meet
- ② as food for thought
- ③ once in a blue moon
- ④ off the top of one's head
- ⑤ by the skin of one's teeth

[30-31] 다음 글을 읽고 물음에 답하시오.

The phenomenon of false memories, a captivating subject in cognitive psychology, explores the fallibility and malleability of human memory. This concept, popularized by Elizabeth Loftus's groundbreaking research, demonstrates that our memories are not always accurate reflections of reality. False memories refer to the psychological instances where people recall events differently from the way they happened or, in some cases, recall events that never occurred at all. Loftus's experiments, particularly the "Lost in the Mall" technique, revealed how suggestible memories can be. In these experiments, subjects were implanted with false memories of being lost in a shopping mall as children. Astonishingly, many subjects recalled this fabricated event with vivid details, demonstrating the ease with which false memories can be created. This research has profound implications, particularly in the legal field, where eyewitness testimonies can be crucial. The formation of false memories involves complex cognitive processes. Factors such as suggestion, social pressure, and the malleability of memory during recall contribute to this phenomenon. These memories can be as detailed and vivid as true memories, making them indistinguishable from actual experiences in the mind of the individual. False memory research highlights the _____ nature of memory. Rather than being a passive storage of facts, memory is an active and dynamic process, susceptible to distortion. This understanding has significant implications for various fields, including psychology, legal studies, and even history, where the reliability of memory is of paramount importance.

30. 밑줄의 내용과 가장 거리가 먼 것은? [3점]

- ① The phenomenon of false memories indicates the potential for memories to be distorted or fabricated.
- ② Memory is a dynamic process that can be influenced by factors like suggestion and social pressure.
- ③ False memories can be as detailed and graphic as true memories.
- ④ Loftus's "Lost in the Mall" experiment involved implanting people with fabricated memories of childhood events.
- ⑤ Loftus's research confirmed the reliability of eyewitness testimonies in many legal scenarios.

31. 빈칸에 들어갈 가장 적절한 것은? [3점]

- ① stable ② reflective ③ submissive
- ④ replicated ⑤ reconstructive

[32-33] 다음 글을 읽고 물음에 답하시오.

Over 8,000 frog and toad species hop and croak around the globe. They are masters of adaptation and have a range of unique survival strategies. However, according to the IUCN Red List, amphibians are the second most threatened group on our planet and undisputedly the most threatened vertebrate class with 40.7% of threatened species. Ongoing habitat loss, climate change and the pandemic chytrid disease are some of the main drivers that contribute to the threat to amphibians. However, why some species are more vulnerable than others remains largely unknown. Frogs and toads are not always brown and green, but exhibit an incredible range of colours, patterns and even textures that did not develop by chance. Some species blend in seamlessly with their surroundings not to be detected, while others use conspicuous colours and patterns (aposematism) as a warning signal to shout: “Don’t touch me, I’m poisonous and inedible!” But colour does not only function as a visual signal as they show.

Beyond camouflage and aposematism, colour and particularly the melanisation measured as lightness plays a crucial role in regulating body temperature. Colour-based thermoregulation is increasingly supported for insect groups, which, like anurans, depend on absorbing sunlight to heat up and maintain their body temperature. The relationship between colour lightness, physiology and distribution is conceptualized in the thermal melanism hypothesis stating that darker coloured organisms are favoured to live in colder regions as they heat up faster whereas lighter coloured ones benefit from the prevention of overheating in warmer regions.

32. 밑줄 친 “conspicuous”의 뜻과 가장 가까운 것은? [2점]

- ① implicit ② unnoticeable ③ unique
④ evident ⑤ vague

33. 윗글의 내용과 가장 거리가 먼 것은? [3점]

- ① Amphibians are the most threatened vertebrate group on Earth.
② The coloring of frogs and toads serves purposes beyond just being a visual cue.
③ Frogs and toads possess a variety of strategies for survival.
④ The reason why certain species are more susceptible to threats than others is still largely a mystery.
⑤ The thermal melanism hypothesis suggests that the colour of mammal groups plays a significant role in their ability to regulate body temperature.

[34-35] 다음 글을 읽고 물음에 답하시오.

Foundation models are large, pre-trained models that act as the basis or initial point for diverse machine learning tasks. These models undergo training on extensive datasets to acquire patterns, features, and representations beneficial for a broad array of downstream applications. Technologically speaking, foundation models are not novel as they rely on self-supervised learning and deep neural networks, concepts that have been around for years. However, the very large scale and scope of foundation models in recent years have pushed the boundaries regarding what is achievable. Their potency stems from scale that requires advancements in computer hardware, and accessibility of a significantly larger pool of training data. This led them to an exceptional level of homogenization. Indeed, researchers and developers can exploit the knowledge acquired by foundation models and adapt it to a diverse range of tasks without training from scratch, thanks to different approaches of transfer learning. Certainly, their robustness to domain shifts and out-of-distribution data remains questionable. Foundational models are transforming the fields of natural language processing and computer vision by exhibiting zero-shot and few-shot generalization capabilities. This can extend their applicability to tasks that go beyond what they were exposed to during their training. When these models are scaled up and trained with vast text datasets, their zero- and few-shot performances match, and in some instances, even surpass that of fine-tuned models.

34. 윗글의 내용과 가장 거리가 먼 것은? [4점]

- ① Foundation models serve as a starting point for various machine learning tasks.
② The mechanisms of foundation models are new, and recent advancements in scale and scope have significantly expanded their capabilities.
③ The effectiveness of foundation models is attributed to their extensive training on large datasets and advancements in computer hardware.
④ Foundation models are altering natural language processing by showcasing zero-shot and few-shot generalization capabilities.
⑤ The very large scale and scope of foundation models allow researchers to apply the knowledge gained from these models to a diverse range of tasks.

35. 윗글의 제목으로 가장 적절한 것은? [3점]

- ① The Evolution and Impact of Foundation Models in Machine Learning
② Exploring the Impact of Fine-tuned Models
③ Can Traditional Methods Surpass Foundation Models?
④ The Declining Significance of Large Datasets in Advanced Machine Learning
⑤ Superiority of Zero- and Few-shot Performances in Unsupervised Models

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	A

36. 다음 등식에서 a^2 의 값은? [4점]

$$\int_0^{\frac{\pi}{4}} x \sec x \tan x \, dx = a\pi - \ln |\sqrt{2}+1|$$

- ① $\frac{1}{2}$ ② $\frac{1}{4}$ ③ $\frac{1}{8}$ ④ $\frac{1}{16}$ ⑤ $\frac{1}{32}$

37. 멱급수 전개 $x \cos 2x = \sum_{n=0}^{\infty} a_n \left(x - \frac{\pi}{6}\right)^n$ 에서 a_1, a_3 에 대해

$$a_1 + 6a_3 = \frac{A}{2} + \frac{\sqrt{3}}{B}\pi \text{ 일 때, } A+B \text{의 값은?}$$

(단, A 와 B 는 정수이다.) [4점]

- ① -9 ② -3 ③ 0 ④ 1 ⑤ 5

38. 함수 $f(x) = x^3 - 3x^2 + 2x$ 가 나타내는 곡선을 C 라 하자.

$f(x)$ 의 임계수(critical number)에서 곡선 C 의 곡률의 값은? [4점]

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

39. 함수 $f(x, y) = -3x^2 + 7xy + 3y^2 - 2y^3$ 의 모든 임계점

(critical point)에서 $|f_{xx}f_{yy} - (f_{xy})^2|$ 의 값들의 합은? [4점]

- ① 88 ② 98 ③ 110 ④ 160 ⑤ 170

40. 변수 x, y, z 와 변수 u, v, w 가

$$x = u \sin v \cos w, \quad y = u \sin v \sin w, \quad z = u \cos v$$

를 만족할 때, $(x, y, z) = \left(\frac{1}{8}, \frac{\sqrt{3}}{8}, \frac{\sqrt{3}}{4}\right)$ 에서

야코비 행렬식 $\frac{\partial(x, y, z)}{\partial(u, v, w)}$ 의 절댓값은? [4점]

- ① $\frac{1}{2}$ ② $\frac{1}{4}$ ③ $\frac{1}{8}$ ④ $\frac{1}{16}$ ⑤ $\frac{1}{32}$

41. 곡면 $z = x^2 + y^2$ 위의 점 $(1, 1, 2)$ 에서 접평면의 방정식이

$ax + by + cz = 2$ 일 때, $a + b + c$ 의 값은? [4점]

- ① 2 ② 3 ③ 4 ④ 5 ⑤ 6

42. $\mathbf{r}(t) = \langle t^3 - 2t, t^3 + 2t \rangle$, $0 \leq t \leq 1$ 로 나타내어지는

곡선 C 와 벡터장 $F(x, y) = \langle 6xy + e^x, 3x^2 \rangle$ 에 대한

선적분 $\int_C \mathbf{F} \cdot d\mathbf{r}$ 의 값에 가장 가까운 정수는? [4점]

- ① 2 ② 4 ③ 6 ④ 8 ⑤ 10

43. 정적분 $\int_0^{2\pi} \cos^4 \theta \, d\theta$ 의 값에 가장 가까운 정수는? [3점]

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

44. 다음 <보기>에서 옳은 것만을 있는 대로 고른 것은? [4점]

< 보 기 >

ㄱ. 벡터공간 V 의 부분공간 U_1, U_2, W_1, W_2 에 대해

$$U_1 \leq W_1, U_2 \leq W_2, U_1 \oplus U_2 = W_1 \oplus W_2 \text{ 이면,}$$

$$U_1 = W_1, U_2 = W_2 \text{ 이다.}$$

ㄴ. 행렬 A 와 $B = \begin{pmatrix} 1 & 2 & 0 & 3 & 5 \\ 0 & 0 & -4 & 2 & 7 \\ 0 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 11 \end{pmatrix}$ 가 행동등

(row equivalent)일 때, 행렬 A 의 2, 3, 4, 5열은
열공간의 기저를 이룬다.

ㄷ. 선형변환 $T: V \rightarrow V$ 에 대해 $V = \text{Ker} T \oplus \text{Im} T$ 이다.

ㄹ. 3×3 행렬 A 의 고윳값이 1, 2, 3이면, A 는 가역행렬

이고, A 의 역행렬의 고윳값은 $1, \frac{1}{2}, \frac{1}{3}$ 이다.

- ① ㄱ, ㄴ, ㄷ, ㄹ ② ㄱ, ㄴ, ㄷ ③ ㄱ, ㄴ, ㄹ
④ ㄱ, ㄷ, ㄹ ⑤ ㄴ, ㄷ, ㄹ

45. 선형변환 $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ 의 기저 $\{(0, 1, 1), (0, 1, 0), (1, 1, 0)\}$ 에

대한 행렬 표현이 $\begin{pmatrix} 1 & -6 & -4 \\ 0 & 3 & 0 \\ 0 & 5 & 2 \end{pmatrix}$ 이고,

$T(3, 3, 1) = (p, q, r)$ 일 때, $|p| + |q| + |r|$ 의 값은? [3점]

- ① 7 ② 9 ③ 11 ④ 13 ⑤ 15

46. 4×4 행렬 A 와 $B = \begin{pmatrix} -1 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 3 \end{pmatrix}$, $P = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 5 & 0 & 0 \\ -4 & 1 & 1 & 0 \\ 2 & -2 & 1 & 3 \end{pmatrix}$ 가

$B = P^{-1}AP$ 를 만족한다. A 의 고윳값 2에 대응하는

고유벡터를 $(a, b, 1, c)$ 라 할 때, $a^2 + b^2 + c^2$ 의 값은? [3점]

- ① 1 ② 5 ③ 13 ④ 21 ⑤ 29

47. 벡터 $(1, 1, 0, 0)$ 과 $(1, 1, 1, 0)$ 이 생성하는 $\mathbb{R}^4$ 의 부분공간을

W 라 하자. W 의 직교 여공간 (orthogonal complement)

$W^\perp$ 로의 벡터 $(4, 3, 2, 1)$ 의 정사영을 (a, b, c, d) 라 할 때,

$10(a^2 + b^2 + c^2 + d^2)$ 의 값은? [4점]

- ① 5 ② 10 ③ 15 ④ 20 ⑤ 25

[48~49] 다음 제시문을 읽고 물음에 답하시오.

5×5 행렬 A 는 다음 조건을 만족한다.

- ㉠ A 와 A^2 은 항등행렬 I 의 상수배가 아니다.
- ㉡ $A^4 - 4A^3 + 5A^2 - 8A + 6I$ 는 영행렬이다.
- ㉢ $A - 3I$ 는 가역행렬이다.

48. A 의 최소다항식을 $m(x)$ 라 할 때, $m(3)$ 의 값은? [4점]

- ① 16 ② 18 ③ 20 ④ 22 ⑤ 24

49. $\mathbb{R}^5$ 의 고유공간 $E(1) = \{v \in \mathbb{R}^5 \mid (A - I)v = 0\}$ 의 차원이 1보다 클 때, A 의 특성다항식 $f(x)$ 에 대하여 $f(2)$ 의 값은? [5점]

- ① 6 ② 8 ③ 10 ④ 12 ⑤ 14

50. 미분방정식 $\frac{dy}{dx} = 4 + 6x + 2y + 3xy$ 의 해 $y(x)$ 가 초기조건

$y(0) = 3$ 을 만족할 때, $y(1)$ 의 값은? [3점]

- ① $4e^{\frac{7}{3}} - 1$ ② $5e^{\frac{7}{3}} - 2$ ③ $6e^{\frac{7}{3}} - 3$
- ④ $4e^{\frac{8}{3}} - 1$ ⑤ $5e^{\frac{8}{3}} - 1$

51. 미분방정식 $y \frac{dy}{dx} = 3x + \frac{y^2}{x}$ 의 해 $y(x)$ 가 조건 $y(1) = 5$ 를 만족할 때, $y(e)$ 의 값은? [4점]

- ① $\sqrt{21}e$ ② $\sqrt{23}e$ ③ $\sqrt{26}e$ ④ $\sqrt{29}e$ ⑤ $\sqrt{31}e$

52. 미분방정식 $(x-1)^2 \frac{d^2y}{dx^2} - 3(x-1) \frac{dy}{dx} + 3y = 0$ 의 해 $y(x)$ 가

$y(2) = 1, y(3) = 14$ 를 만족할 때, $y(0) + y(4)$ 의 값은? [4점]

- ① 33 ② 40 ③ 43 ④ 50 ⑤ 53

53. 미분방정식 $\frac{d^2y}{dt^2} + 24y = \cos 7t - \sin 7t$ 의 특수해(particular

solution) $y_p = A \cos(7t - \alpha)$ 에 대해 $A + \alpha$ 의 값은?

(단, $-\pi < \alpha \leq \pi$ 이다.) [4점]

- ① $-\frac{\sqrt{2}}{25} - \frac{\pi}{4}$ ② $-\frac{\sqrt{2}}{25} + \frac{\pi}{4}$ ③ $\frac{\sqrt{2}}{25} - \frac{\pi}{4}$
 ④ $-\frac{\sqrt{7}}{25} + \frac{\pi}{4}$ ⑤ $\frac{\sqrt{7}}{25} + \frac{\pi}{4}$

54. 2계 선형 미분방정식 $L[y] = f(x)$ 의 3개의 해가

$$y_1(x) = 2e^x + e^{x^2},$$

$$y_2(x) = 3e^x + e^{x^2},$$

$$y_3(x) = 4e^x + e^{x^2} + 5e^{-x^3}$$

라고 하자. 초기값 문제 $L[y] = f(x), y(0) = -3, y'(0) = 1$

의 해가 $y(x)$ 일 때, $y(1) + y(-1)$ 의 값은? [5점]

- ① $-2e - 4e^{-1}$ ② $-2e - 3e^{-1}$ ③ $-2e - e^{-1}$
 ④ $-e - 3e^{-1}$ ⑤ $-e - 2e^{-1}$

55. 미분방정식 $\frac{d^2y}{dt^2} - 4y = t + te^t$ 의 해 $y(t)$ 가 초기조건

$y(0) = -\frac{2}{9}, y'(0) = \frac{4}{9}$ 를 만족할 때, $y(1)$ 의 값은? [5점]

- ① $\frac{3}{16}(e^2 - e^{-2}) - \frac{4}{9}e - \frac{1}{4}$ ② $\frac{5}{16}(e^2 - e^{-2}) - \frac{4}{9}e - \frac{1}{4}$
 ③ $\frac{5}{16}(e^2 - e^{-2}) - \frac{5}{9}e - \frac{1}{4}$ ④ $\frac{7}{16}(e^2 - e^{-2}) - \frac{4}{9}e - \frac{1}{4}$
 ⑤ $\frac{7}{16}(e^2 - e^{-2}) - \frac{5}{9}e - \frac{1}{4}$

※ 아래 주관식 문제 [56-60]의 정답 표기는 답안지의
「주관식 답란 표기방법」을 참조하십시오.

56. 곡선 $\mathbf{r}(t) = \langle \cos t, \sin t, 4 - \cos t \rangle$ 와

벡터장 $F(x, y, z) = \langle y^6, x^5, z^3 \rangle$ 에 대한

$\int_0^{2\pi} F(\mathbf{r}(t)) \cdot \mathbf{r}'(t) dt$ 의 값이 $\frac{b}{a}\pi$ 일 때,

$a + b$ 의 값은? (단, a 와 b 는 서로소인 자연수이다.) [4점]

57. 구면 $x^2 + y^2 + z^2 = 1$ 을 통과하는

벡터장 $F(x, y, z) = \langle 2x^3 + y, 2y^3, e^x + 2z^3 \rangle$ 의

유량(flux)이 $\frac{b}{a}\pi$ 일 때, $a + b$ 의 값은?

(단, a 와 b 는 서로소인 자연수이다.) [4점]

58. 행렬 $A = \begin{pmatrix} 2 & -4 & 6 \\ 1 & -1 & -2 \\ 4 & -8 & 14 \end{pmatrix}$ 에 대하여 $\text{adj}(\text{adj } A)$ 의

행렬식을 구하십시오. (단, $\text{adj } B$ 는 행렬 B 의 여인자 행렬의
전치행렬인데, 수반행렬이라고도 한다.) [5점]

59. 타원 $4x^2 - 2\sqrt{2}xy + 3y^2 - 20 = 0$ 의 장축의 길이를 a , 단축의 길이를 b 라고 할 때, $a^2 + b^2$ 의 값을 구하시오. [3점]

60. 미분방정식 $y''' - 7y' + 6y = 0$ 의 해 $y(t)$ 가 초기조건 $y(0) = 1$, $y'(0) = 2$, $y''(0) = 3$ 을 만족한다.

$Y'(t) = AY(t)$ 라 하면, 등식

$$20 \times y(1) \times \det A = pe + qe^2 + re^{-3}$$

이 성립한다. $|p + q + r|$ 의 값을 구하시오.

(단, p, q, r 은 정수, $\det A$ 는 3×3 행렬 A 의 행렬식,

$Y(t) = \begin{pmatrix} y(t) \\ y'(t) \\ y''(t) \end{pmatrix}$ 이다.) [5점]

수고하셨습니다.