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고사시간	오후
과 목	영어, 수학

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영어 [자연계열] < 오후 >

※ 밑줄 친 부분과 뜻이 가장 가까운 것을 고르시오. (1-8) **[각 3점]**

1. Many Korean analysts say that the detailed guidelines for subsidies for electric vehicles under the IRA are not much different from what they expected.
   ① accessories ② fixtures ③ grants ④ securities

2. Observational studies that track disease incidence in different populations suggest that garlic use in the diet may act as a cancer-fighting agent, particularly for prostate and stomach cancer.
   ① anticipation ② control ③ impediment ④ occurrence

3. If you put a rusty nail in soda, the acid in the soda will react with the rust on the nail.
   ① dyed ② corroded ③ lumbered ④ stooped

4. Stephen Suomi at the National Institute of Child Health and Human Development works with rhesus monkeys that possess the same genetic predisposition to shyness that affects humans.
   ① alteration ② extortion ③ heredity ④ inclination

5. With no stable source of income, H. M. panhandles all day long with uncertainty, never knowing whether he will have a bite to eat this day.
   ① begs ② hurtles ③ plods ④ rampages

6. His weary face brought tears to my eyes when his frail body walked into my room.
   ① peppy ② fatigued ③ robust ④ scowled

7. He was giving me the same treatment which he used to whip horses into submission, and I suffered a lifelong sense of resentment.
   ① compensation ② wretchedness ③ indignation ④ sacrifice

8. You thought it would be quite simple; it is extraordinarily complicated. You thought it would be terrible; it is merely squalid and boring.
   ① filthy ② splendid ③ monotonous ④ wrathful

※ 어법상 빈칸에 가장 적절한 것을 고르시오. (9-11) **[각 3점]**

9. Students of her class were assured that ____ questions they asked would be answered as soon as possible.

① any of ② every ③ whose ④ whichever

10. When Mary saw the picture in the art gallery, she realized that it was exactly what she _____.

① has been searching for ② has searched for
③ had been searching for ④ is searching for

11. Wu Wenguang's daughter, Wu Ye is carrying on the family tradition of playing the instrument and is keen _____ new music for it.

① to compose ② on composing
③ composed ④ to be composed

※ 밑줄 친 부분 중 어법에 맞지 않은 것을 고르시오. (12-14) **[각 3점]**

12. When my father left ①to drive home to Connecticut after the party, he assumed I ②will join, ③offering to drop me at the apartment I ④shared with my friend Kristina in Village.

13. Inevitably, these companies don't trust their frontliners to do ①a good job, and they design the jobs for interchangeable ②pairs of hands ③rather than humans with brains, wasting so ④many talent and potential along the way.

14. The 38-year-old serial entrepreneur has lately become known ①for talking ②up the risks of AI, but he is most animated ③in talking about ④their possibilities.

※ 다음 글을 읽고 물음에 답하시오. (15-16) **[각 3점]**

Just as *Brown V. Board of Education** resulted in the desegregation of more than just public schools, legal experts say, the affirmative action cases the court is considering now are bound to set a new precedent that calls into question any place in American life where laws or policies protect, boost or deny people based on racial representation.

"Today, we're ostensibly talking about education. But there is a spillover effect, for example, in government contract set-asides for minority businesses because they exclude whites who want to participate. It's an example of (A)_____. So we need to

review and overturn all public contracts. Same thing with employment. A white plaintiff says, 'Well, yeah, I didn't get the job. You're considering race and that's (B)_____.' I see a whole onslaught of more emboldened plaintiff's articulating (C)_____ claims," University of Howard's Powell says.

There'll also be a certain amount of excess caution on the parts of private businesses and public entities that, say, provide scholarships exclusively to specific racial groups. "There will be negative repercussions for things like financial aid and for scholarships that are given out with a race-conscious component to them," the University of Maryland's Park says. Whether the Supreme Court goes as far in scrubbing race preferences from American life as so many legal experts predict remains, of course, an open question until a decision comes down.

* 흑인 학교 분립은 불법이라는 연방 대법원의 판례

15. Which is the topic of the passage?

① Racial problems and their solutions in a society
② Racial prejudice in college admission in America
③ Controversal issues on affirmative action in America
④ Positive effects of affirmative action in a society

16. Which is the most commonly appropriate for the blanks (A), (B), and (C)?

① minority to priority
② democratic action
③ race-conscious admission
④ reverse discrimination

※ 다음 글을 읽고 물음에 답하시오. (17-18) **[각 3점]**

Plane crashes rarely happen in real life the same way they happen in the movies. Some engine part does not explode in a fiery bang. The rudder doesn't suddenly snap under the force of takeoff. The typical commercial jetliner—at this point in its stage of development—is about as dependable as a toaster. Plane crahses are much more likely to be the result of _____ of minor difficulties and seemingly trivial malfunctions.

In a typical crash, for example, the weather is poor—not terrible, necessarily, but bad enough that the pilot feels a little bit more stressed than usual. In an overwhelming number of crashes, the plane is behind schedule, so the pilots are hurrying. In 52 percent of crashes, the pilot at the time of the accident has been awake for twelve hours or more, meaning that he is tired and not thinking sharply. And 44 percent of the time, the two pilots have never flown together before, so they're not comfortable with

each other. Then the errors start—and it's not just one error. The typical accident involves seven consecutive human errors. One of the pilots does something wrong that by itself is not a problem. Then one of them makes another error on top of that, which combined with the first error still does not amount to catastrophe. But then they make a third error on top of that, and then another and another and another *and another*, and it is the combination of all those errors that leads to disaster.

These seven errors, furthermore, are rarely problems of knowledge or flying skill. It's not that the pilot has to negotiate some critical technical maneuver and fails. The kinds of errors that cause plane crashes are invariably errors of teamwork and communication. One pilot knows something important and somehow doesn't tell the other pilot. One pilot does something wrong, and the other pilot doesn't catch the error.

17. Which is the most appropriate for the blank?

① an exaggeration ② a distinction
③ an arrangement ④ an accumulation

18. According to the passage, which is true about airplane crashes?

① Disastrous plane crashes are mostly due to serious mechanical problems of jetliners.
② The weather condition is the most influential cause for a typical crash.
③ Seven successive human errors can cause a plane crash.
④ The two pilots who are so comfortable with each other could cause a plane crash.

※ 다음 글을 읽고 물음에 답하시오. (19-21) **[각 3점]**

There is little information available about the legendary blues guitarist Robert Johnson, and the information that is available is as much rumor as fact. What is undisputable, however, is Johnson's impact on the world of rock and roll. Some consider Johnson the father of modern rock; his influence extends to artists from Muddy Waters to Led Zeppelin, from the Rolling Stones to the Allman Brothers Band. Eric Clapton, arguably the greatest living rock guitarist, has said that "Robert Johnson to me is the most important blues musician who ever lived.... I have never found anything more deeply soulful than Robert Johnson." While the impact of Johnson's music is evident, the genesis of his remarkable talent remains (A)_____ in mystery.

For Johnson, born in 1911 in Hazelhurst, Mississippi, music was a means of escape from working in the cotton fields. As a boy he worked on the farm that belonged to Noel Johnson—the man rumored to be his farther. He married young, at age 17, and

lost his wife a year later in childbirth. That's when Johnson began traveling and playing the blues.

Initially Johnson played the harmonica. Later, he began playing the guitar, but apparently he was not very good. He wanted to learn, however, so he spent his time in blues bars watching the local blues legends Son House and Willie Brown. During their breaks, Johnson would go up on stage and play. House reportedly thought Johnson was so bad that he repeatedly told Johnson to get lost. Finally, one day, he did. For six months, Johnson mysteriously (B)_____. No one knew what happened to him. When Johnson returned half a year later, he was suddenly a first-rate guitarist. He began drawing crowds everywhere he played.

19. Which is the most appropriate purpose of the passage?

① To demonstrate a detailed description of Johnson's music style
② To explain how much Johnson's music affected modern blues musician
③ To demonstrate the mystery of the popularity of blues
④ To provide a brief overview of Johnson's life and influence

20. Which is the most appropriate for the blanks (A) and (B)?

① shrouded — disappeared
② exceptional — transgressed
③ veiled — remained
④ entrapped — disclosed

21. According to the passage, which is true about Johnson?

① He was frustrated because he had a serious breakdown.
② He started playing the harmonica after learning how to play the guitar.
③ He became popular when he returned after six months of absence.
④ He could go up on stage in local blues bars whenever he wanted.

※ 다음 글을 읽고 물음에 답하시오. (22-23) **[각 3점]**

Language frequently serves as an ethnic boundary marker. The native language of an individual is the primary indicator of ethnic group identity in many areas of the world. Like language, religion may serve as an ethnic boundary marker. The major world religions such as Christianity, Islam, and Buddhism encompass numerous distinct ethnic groups, so that religious affiliation does not always indicate ethnic affiliation. But in many cases, religion and ethnic group more or less correspond. The Jews may be categorized as either a religious or an ethnic group. (A)_____, the Sikhs in India

constitute both a religious and an ethnic group. In still other situations, religious differences may be the most important marker of ethnic identity. For example, the Serbs and Croats speak the same language; the most important distinction between these two groups is that the Serbs are Eastern Orthodox and the Croats are Catholic. (B)_____, the Chinese ethnic identity transcends religious differences; a person is still Chinese whether he or she is a Muslim, Christian, Buddhist, Taoist, or Marxist atheist.

22. Which is the most appropriate for the blanks (A) and (B)?

① Similarly – Conversely
② For example – Therefore
③ In addition – Consequently
④ Nevertheless – However

23. Which is the topic of the passage?

① Ethnic identity combined with language and religion
② Ethnic features of language and religion
③ Language and religion as ethnic boundary markers
④ Uniqueness of language and religion in one ethnic group

※ 다음 글을 읽고 물음에 답하시오. (24-25) **[각 3점]**

The Clovis people were a prehistoric Paleoindian group that first appeared in North America around 13,500 years ago at the end of the last ice age. How the Clovis people arrived in North America and where they came from is still highly debated. One theory proposes that they originated in the Alaskan region and migrated south in pursuit of prey. Another hypothesis argues that the ancestors of the Clovis came from South America. Scholars point to pre-Clovis sites in Brazil and Chile which share similar traits with the Clovis culture. A more recent idea is that the Clovis came from Europe to North America by boat, keeping close to the edges of ice sheets that spanned from Greenland to New York. However, none of these theories has been fully accepted by archaeologists.

A variety of well-preserved artifacts provide a glimpse into the Clovis way of life. Evidence unearthed at various sites includes fluted stone points now dubbed Clovis points. They were probably attached to a type of spear and used for hunting big game. The length of most Clovis points found at the sites ranges from one to five inches. Larger points were necessary to hunt big game such as the monstrous mastodon and

mammoth. These giant animals were preferred because meat from a single animal could provide sufficient food for a large tribe for about a month. Besides the meat, the Clovis also used the bones, tusks, and hides to make shelters and fashion, cooking utensils, tools, and other weapons. It is likely that the Clovis used ambush-hunting techniques as their prey congregated as marshy watering locations. The soft terrain would have hindered the movement of the animals.

24. What is the topic of the passage?

① The rise and fall of the Clovis people
② How the Clovis people hunted big game
③ The migration patterns of the Clovis people
④ The origins and way of life of the Clovis people

25. According to the passage, which is true about the Clovis?

① Recent theories show that Greenland is their origin.
② Some scholars say that their ancestors lived in Brazil and Chile.
③ Some scholars say that they used bridges to reach North America.
④ The Clovis point was used as an arrow in hunting big game.

※ 다음 글을 읽고 물음에 답하시오. (26-27) **[각 5점]**

An avalanche is the sudden sliding or movement of a large area of earth down a mountain. It consists of a mixture of materials, such as snow, ice, rock, and soil. Avalanches are usually triggered by changes in temperature, sound vibrations, or vibrations in the earth. The size and force of most avalanches pose serious dangers for both life and property and account for many lives lost each day.

In order to understand how avalanches occur, it is important to understand the (A)_____ of snow that enable tons of snow to descend down a mountainside. The most important of the (B)_____ is the shape of the snow crystals. Depending on humidity, temperature, or other atmosphere conditions, snow crystals can appear in many different shapes. The most common shape, and the one that creates the most stable snow layer, is the hexagon. However, the shape of a snow crystal can change due to temperature gradation, or variances in temperature, within an accumulated amount of snow or snowpack. Snow crystals that are closer to the ground's residual heat form facets, or rounded area, which reduce a snow crystal's ability to form a strong layer. Heavily faceted crystals, located deep in the snowpack, make the snow highly unstable, leading to avalanches.

26. Which is the most commonly appropriate for the blanks (A) and (B)?

① commonalities ② quantities ③ assets ④ properties

27. According to the passage, which is true?

① An avalanche consists only of snow, ice, and soil.

② The size and force of snow crystals do not change due to temperature.

③ Weather conditions of a mountain can affect the shape of a snow crystal.

④ Snow crystals that are deeply located in the snowpack make the snow strong.

※ 다음 글을 읽고 물음에 답하시오. (28-30) **[각 5점]**

Memory is not perfect. Most people have experienced forgetting the answer on a test before. People who like to multi-task also tend to forget things more readily. In addition, as people get older, memory capabilities start to increase, and it can become harder to store and recall information. Furthermore, brain damage or medical diseases can cause memory problems. In extreme circumstances, people can lose their memory completely.

(A)_____, there are ways to teach the brain how to remember better and reach its maximum potential via memory techniques. One way to improve memory (other than repetition) is to involve the senses in an experience: seeing, hearing, feeling, tasting, and touching. The more senses that are involved in an experience, the better the brain is able to recall the experience. (B)_____, if a student reads a book while listening to the audio version of that book at the same time, the brain will better understand and recall the contents of that particular book. Another way to improve memory is to use mnemonic devices. These are memory techniques one uses to help remember information. One type of mnemonic is called a music mnemonic, wherein words are put to a song. An example of a popular music mnemonic is the alphabet song in which the letters of the alphabet are sung to help children remember the letter names as well as the order of the letters. Another type of mnemonic is a name mnemonic. For example, knwoing HOMES helps to remember the names of the US Great Lakes because each lake starts with one of the letters in HOMES (Huron, Ontario, Michigan, Erie, and Superior).

One of the best ways to improve one's memory is to take care of the brain. Studies have shown that exercising regularly, sleeping well, and eating a balanced diet all play an important role in the quality of a person's memory.

28. Which is the most appropriate for the blanks (A) and (B)?

① Conversely — However ② In addition — Moreover

③ Similarly — In contrast ④ Nevertheless — For example

29. Which underlined word is NOT appropriate in the context?

① increase ② lose ③ devices ④ role

30. According to the passage, which is true about memory?

① People who have good memory usually have excellent senses.

② Repetition is the best way to remember information better at a given time.

③ The quality of one's memory is dependent on health and condition of the brain.

④ A name mnemonic is a way of remembering the information by putting it into a song.

수학 [자연계열] <오후> [문항별 5점]

31. 곡선 $x^3+y^3=6xy$ 위의 점 $(3,3)$에 접하는 직선의 방정식은?

① $x-y=0$ ② $x+y=6$
③ $3x-y=6$ ④ $3x+y=12$

32. 닫힌구간 $[-3,2]$에서 함수 $f(x)=x^3+3x^2-4$의 최댓값을 a, 최솟값을 b라 할 때 $a+b$의 값은?

① -12 ② -4 ③ 4 ④ 12

33. $f(x)=\int_0^x e^{\sin t}\,dt$ 일 때, $\int_0^{\frac{\pi}{2}} f(x)\sin x\,dx$ 의 값은?

① $e+1$ ② e ③ $e-1$ ④ $e-2$

34. 두 곡선 $y=x$와 $y=x^2$으로 둘러싸인 영역을 직선 $y=a$ $(a>1)$를 축으로 한 바퀴 회전시켜 얻은 입체의 부피가 $\frac{8\pi}{15}$일 때, 실수 a의 값은?

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

35. 다음 중 수렴하는 급수의 개수는?

㉠ $\sum_{n=1}^{\infty}\frac{(-1)^{n+1}n}{n^2+1}$ ㉡ $\sum_{n=1}^{\infty}\frac{\sqrt{n}}{n^2+1}$
㉢ $\sum_{n=2}^{\infty}\frac{1}{n\ln n}$ ㉣ $\sum_{n=1}^{\infty}\frac{n2^n}{4n^3+1}$

① 0 ② 1 ③ 2 ④ 3

36. 극방정식으로 표현된 곡선 $r=\theta^2$ $(0\le\theta\le\sqrt{5})$의 길이는?

① $\frac{16}{3}$ ② $\frac{19}{3}$ ③ $\frac{22}{3}$ ④ $\frac{25}{3}$

37. 점 $(-2,1,0)$을 지나는 직선이 세 점 $(1,1,-1)$, $(2,-1,0)$, $(3,0,2)$를 지나는 평면과 수직으로 만난다. 이 교점을 (a,b,c)라 할 때, $a+b+c$의 값은?

① $\frac{19}{35}$ ② $\frac{22}{35}$ ③ $\frac{5}{7}$ ④ $\frac{4}{5}$

38. 점 $(2,-1,1)$에서 함수 $f(x,y,z)=x^2+y^2-4z$가 가장 빨리 증가하는 방향은 $a\mathbf{i}+b\mathbf{j}+c\mathbf{k}$의 방향이고 최대변화율은 d이다. $\dfrac{cd}{a+b}$의 값은? (단, a, b, c, d는 실수)

① -6 ② -9 ③ -12 ④ -15

39. $\displaystyle\int_0^1\int_{\sqrt{y}}^1 \sqrt{x^3+1}\,dx\,dy=\frac{2}{9}(a^3-1)$일 때, 실수 a의 값은?

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

40. 다음은 꼭짓점이 $(2,0)$, $(0,2)$, $(0,-2)$인 삼각형과 그 내부를 정의역으로 하는 함수 $f(x,y)=x^2+y^2-2x$에 대한 설명이다.

> (가) 삼각형 내부에 있는 f의 극점의 개수는 a이다.
> (나) f의 최댓값과 최솟값의 차는 b이다.

$a+b$의 값은?

① 6 ② 7 ③ 8 ④ 9

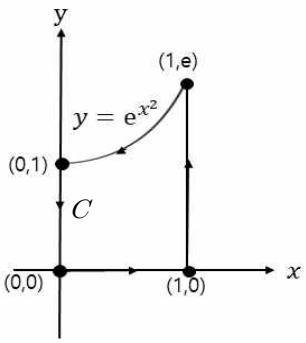
41. 영역 $R=\left\{(x,y)\;\middle|\;1\le xy\le 4,\ \dfrac{1}{4}\le\dfrac{y}{x}\le 2,\ x>0\right\}$일 때, 이중적분 $\displaystyle\iint_R e^{-\frac{xy}{2}}\,dA$의 값은?

① $(e^2-e^{1/2})\ln 4$ ② $(e^{-1/2}-e^{-2})\ln 4$
③ $(e^2-e^{1/2})\ln 8$ ④ $(e^{-1/2}-e^{-2})\ln 8$

42. 세 점 $\mathrm{A}(a,0,0)$, $\mathrm{B}(0,a,0)$, $\mathrm{C}(0,0,a)$를 포함하는 평면에서 삼각형 ABC와 그 내부영역을 T라 하자. $\displaystyle\iint_T x\,dS=\frac{4\sqrt{3}}{3}$일 때, 양의 실수 a의 값은?

① 1 ② 2 ③ 3 ④ 4

43. 곡선 C는 그림과 같이 점 $(0,1)$을 출발하여 시계 반대 방향으로 한 바퀴 돌아 다시 점 $(0,1)$로 돌아오는 경로이다. 벡터장 $\mathbf{F}(x,y)=\langle \sin y,\ x^2+x\cos y\rangle$에 대하여, 선적분 $\displaystyle\int_C \mathbf{F}\cdot d\mathbf{r}$의 값은?



① $\dfrac{e}{2}-1$ ② $\dfrac{e-1}{2}$ ③ $e-1$ ④ e

44. 곡면 S는 원기둥 $x^2+y^2=1$과 두 평면 $z=1$, $z=-1$로 둘러싸인 입체의 경계면이다. 벡터장 $\mathbf{F}(x,y,z)=(xy^2+\sin z^2)\mathbf{i}+x^2y\mathbf{j}+e^{x+y}\mathbf{k}$일 때, $\displaystyle\iint_S \mathbf{F}\cdot d\mathbf{S}$의 값은? (단, 곡면의 방향은 점 $(0,0,1)$에서 벡터 $\langle 0,0,1\rangle$의 방향)

① $\dfrac{\pi}{4}$ ② $\dfrac{\pi}{3}$ ③ $\dfrac{\pi}{2}$ ④ π

45. 5차 정사각행렬 A는 대각화가능하고 두 개의 고윳값 1과 2만을 갖는다. 행렬 $A-I$의 랭크(rank)가 4일 때, $A-2I$의 랭크는? (단, I는 단위행렬)

① 1 ② 2 ③ 3 ④ 4

46. 선형변환 $T:\mathbb{R}^3\to\mathbb{R}^2$가 다음을 만족시킨다.

$T(\langle 1,1,1\rangle)=\langle 1,0\rangle$

$T(\langle 1,1,0\rangle)=\langle 2,-1\rangle$

$T(\langle 1,0,0\rangle)=\langle 4,3\rangle$

$T(\langle k,-3,5\rangle)=\langle 9,m\rangle$일 때, $k+m$의 값은?
(단, k, m은 상수)

① 19 ② 21 ③ 23 ④ 25

47. 성분이 모두 실수인 2차 정사각행렬 전체의 집합을 $M(\mathbb{R})$라 하자. 다음 W_1, W_2, W_3, W_4 중 벡터공간 $M(\mathbb{R})$의 부분공간이 되는 것의 개수는?

$W_1=\{A\in M(\mathbb{R})\mid A^2=A\}$

$W_2=\{A\in M(\mathbb{R})\mid \det A=0\}$

$W_3=\{A\in M(\mathbb{R})\mid \mathrm{tr}(A^TA)=0\}$

$W_4=\{A\in M(\mathbb{R})\mid A^T=A\}$

(단, A^T는 A의 전치행렬, $\mathrm{tr}A$는 A의 trace이다.)

① 1 ② 2 ③ 3 ④ 4

48. 미분방정식

$$xdy+(xy+2y-2e^{-x})dx=0,\quad y(1)=0$$

의 해 $y=y(x)$에 대하여 $y(2)$의 값은?

① $\frac{3e^2}{4}$ ② $\frac{3}{4e^2}$ ③ $\frac{3e^2}{2}$ ④ $\frac{3}{2e^2}$

49. 미분방정식

$$x^2y''+xy'+y=0\ \ (x>0)$$
$$y(1)=1,\ y'(1)=2$$

의 해 $y=y(x)$에 대하여 $y(2)-y'(2)$의 값은?

① $\frac{3}{2}\sin(\ln 2)$ ② $\frac{3}{2}\cos(\ln 2)$

③ $\frac{5}{2}\sin(\ln 2)$ ④ $\frac{5}{2}\cos(\ln 2)$

50. 함수

$$F(s)=\frac{s}{(s^2+4)(s+2)}$$

의 역라플라스변환(inverse Laplace transform)은?

① $\cos 2t-\sin 2t-e^{-2t}$

② $\frac{1}{2}(\cos 2t+\sin 2t-e^{-2t})$

③ $\frac{1}{3}(\cos 2t-\sin 2t-e^{-2t})$

④ $\frac{1}{4}(\cos 2t+\sin 2t-e^{-2t})$