# 단국대학교 2021학년도 편입생 모집 필기고사

| 고사시간 | 오전 |
|---|---|
| 문제유형 | 자연계열 |

# 자연계열 문제지

| 지원학부(과) | |
|---|---|
| 수험번호 | |
| 성 명 | |

# 영어 [자연계열] < 오전 >

※ 밑줄 친 부분과 뜻이 가장 가까운 것을 고르시오. (1-8) **[각3점]**

1. Warm winds make many people feel <u>enervated</u> and depressed; that is why the folks here are lethargic during this period.
   ① energized ② refreshed ③ unsatisfied ④ tired

2. There is too much crime and <u>gratuitous</u> violence on TV, which gives bad influence on the adolescents and the young.
   ① potent ② unnecessary ③ uncivilized ④ disastrous

3. The <u>gargantuan</u> corruption scandal within the ruling party was first disclosed by a righteous young reporter of a small newspaper company.
   ① huge ② putrid ③ abominable ④ suspicious

4. Whilst the social and political conditions of humans have changed, we too, their <u>progeny</u>, find ourselves facing a situation where we have to struggle for our very survival as human beings.
   ① posterity ② legacy ③ property ④ ancestor

5. His grief, which has abated for a short while, returns and <u>rends</u> his heart with greater force.
   ① fills ② tears ③ packs ④ reminds

6. Americans separated by <u>scourges</u> more than a century apart share the same fear, the same worry, the same loneliness in lock-down and grief for lost loved ones.
   ① benefactions ② bastions ③ benedictions ④ blights

7. The presidential campaign has also moved online, where its presence, like its candidate, is more <u>sedate</u> and traditional.
   ① uproarious ② sporadic ③ serene ④ sullen

8. I don't think the Prime Minister would ever countenance a referendum on the constitution.

① disavow ② obviate ③ sanction ④ terminate

※ 어법상 빈칸에 가장 적절한 것을 고르시오. (9-11) **[각3점]**

9. We _____ late or we'll miss our connecting flight to New York and be over three hours late arriving at our final destination.

① had better not be ② had be better not
③ had not be better ④ had not better be

10. By the time the landlord needed his apartment, most shelter residents _____ to hotels.

① had been moved ② have been moved
③ would move ④ would be moved

11. We admire the ambition of one _____ means to be a manly man, to be a kindly friend, to get on in the world himself and to help others get on in it.

① who ② which
③ whose ④ what

※ 밑줄 친 부분 중 어법에 맞지 않은 것을 고르시오. (12-14) **[각3점]**

12. Concerns ①are mounting over South Korea's fiscal soundness as this year's three supplementary budgets ②are worth a total of 60 trillion won are leading to ③an increase in government debt of ④no less than 111 trillion won in just six months.

13. The baseball fan ①which arrived ②earliest at the stadium to buy World Series tickets camped ③on the sidewalk by the box office for two days ④before the first game.

14. Related research ①conducted in the EU suggests that students who ②learn a second language early on are ③more aware of other cultures and, overall, are stronger in ④its own first language.

※ 다음 글을 읽고 물음에 답하시오. (15-17) **[각3점]**

For a basketball official, (A)_____ proves the highest form of praise. Paradoxically, the official shows the greatest expertise when his actions go unnoticed. To

work effectively under trying conditions, the official must know the rules—not only the major ones but also the technicalities that occur when least expected. There is nothing more embarrassing, more destructive to a career, than ignorance of the rules. Second, the official must show good judgment. Legalistic officials have ruined many a game. Only contact resulting in an advantage should be called a foul; many coaches, players, and spectators fail to understand this and howl every time that a bump occurs or someone falls to the floor. Third, the official must maintain good physical condition—relatively speaking, the players remain the same age, while the official does not—and hustles perpetually to get in proper position for his calls. The unpopular "long-distance call" ruins an official's credibility. Fourth, and perhaps most important, an official must have a strong personality to work at peak efficiency. This is no profession for the thin-skinned; grace under pressure is quality that all officials seek, but not all attain. When an official exhibits all of these criteria, then he may well achieve his greatest reward: to work in a packed arena before howling spectators, vigilant coaches, and intense players and then be able to leave (B)_____ anyone recognizing that he was there.

15. Which is the topic of the passage?

① The personality traits of a good basketball official
② How to become a famous basketball official
③ The ways for a basketball official to make more money
④ The qualifications of a good basketball official

16. Which is closest in meaning to the underlined part?

① attempting ② difficult
③ amicable ④ negating

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

① anonymity — without ② laudability — besides
③ complimenting — except ④ self-showing — despite

※ 다음 글을 읽고 물음에 답하시오. (18-20) **[각3점]**

One of the most fascinating of all the sciences is (A)_____, the study of weather. Although people have always been interested in weather to some extent, the science has received a great deal of attention in recent years. One reason for this is that today people are depending more and more on weather forecasts.

In the past, people worked near their homes, and did little traveling. They stored food for winter, and stayed at home when blizzards came. If they lived in an area where tornadoes or cyclones occurred, they dug special cellars, and hid in them whenever heavy black clouds appeared.

Because people lived as they did, they could afford to rely on folk rules about weather, (B)_____ we still hear of today. Everyone knows the one about the groundhog that is supposed to come out of its hole on the second of February. If the groundhog sees its shadow, there will be six more weeks of winter.

Today, most people must travel to work. Many depend on accurate weather forecasts to tell them what kind of clothing to wear or what kind of driving condition to expect. Today, a severe storm can snarl transportation and sometimes cut people off from contact with stores and jobs.

18. Which is the most appropriate for the blank (A)?

① astrology ② meteorology
③ zoology ④ geology

19. According to the passage, why has weather information become more important today?

① An increase in farming and farmers
② An increase in natural disasters
③ More frequent travelling
④ Advancement in automobile manufacturing

20. Which is the most appropriate for the blank (B)?

① many of which ② few of which
③ few of what ④ many of what

※ 다음 글을 읽고 물음에 답하시오. (21-23) **[각3점]**

From 1910 to 1930, more than ten percent of the African-American population in southern American states moved northward, presumably to meet the increased labor demand in many northern cities. It had been widely assumed that most of these workers came from rural areas, but in fact more than a third of them were engaged in skilled trades before they left the South. It may seem curious that such a significant percentage of securely employed people would migrate northward, but in truth workers' conditions in the South were declining rapidly at the time. _____, most of these

participants in the Great Migration were not enticed by the opportunity to live a more urban lifestyle, but rather by the simple promise of higher wages and a more secure standard of living.

21. Which is the most appropriate for the blank?

① For example ② However
③ Nevertheless ④ Therefore

22. Which is closest in meaning to the underlined part?

① dawdled ② lured
③ nauseated ④ surmounted

23. Which is the main purpose of the passage?

① To challenge a widely accepted explanation
② To introduce a recently unearthed data source
③ To urge readers to reassess an unjustly discarded theory
④ To explain away the data that the author feels are irrelevant

※ 다음 글을 읽고 물음에 답하시오. (24-25) **[각3점]**

The power to counter physical fatigue and increase alertness is part of the reason caffeine ranks as the world's most popular mood-altering drug. It is found not only in sodas, energy drinks, coffee, and tea, but in diet pills, pain relievers, and chocolate bars. Many societies around the world have also created entire rituals around the use of caffeine. (A)_____, there is the cafe culture of France, the tea ceremony in Japan, and the morning cup of coffee or tea that marks the start of the day in many cultures.

Caffeine is present in many of the foods and drinks we consume, but is it good for us? Charles Czeisler, a scientist and sleep expert at Harvard Medical School, believes that caffeine causes us to lose sleep, which he says is unhealthy. "Without adequate sleep—the typical eight hours—the human body will not function at its best, physically, mentally, or emotionally." Too often, Czeisler says, we consume caffeine to stay awake, which later makes it impossible for us to get the rest we need.

Health risks have also been tied to caffeine consumption. Over the years, studies have attributed higher rates of certain types of cancer and bone disease to caffeine consumption. To date, (B)_____, there is no proof that caffeine actually causes these diseases.

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

① Nonetheless — thus ② For example — however
③ Therefore — however ④ On the other hand — therefore

25. Which is the closest to the Charles Czeisler's argument in this passage?

① It's a good idea to consume caffeine if you want to maintain your energy.
② How caffeine affects your sleep depends on the type of caffeine you consume.
③ Frequent consumption of caffeine will make it difficult for you to get enough rest.
④ Caffeine can help you get an adequate amount of sleep if consumed in moderation.

※ 다음 글을 읽고 물음에 답하시오. (26-28) **[각5점]**

Last year my sixth-grade daughter was subjected to science. Her education, week after week, consisted of mindless memorization of big words like "batholith" and "saprophyte"—words that an average Ph. D. scientist wouldn't know. She recited the accomplishments of famous scientists who did things like "improved nuclear fusion"—never mind that she hasn't the vaguest notion of what nuclear fusion means. She did very well (she's good at memorizing things). And now she hates science. My eighth-grade son was also abused by science education. Week after week he had to perform canned laboratory experiments—projects with preordained right and wrong answers. He figured out how to guess the right answers, so he got good grades. Now _____, too.

Science can provide an exhilarating outlet for every child's curiosity. Science education should teach ways to ask questions, and create a framework for seeking answers. In elementary school, because of jargon and mathematical abstraction, my children got the mistaken impression that science is difficult, boring and irrelevant to their everyday interests. Year by year, class by class across America, the number of students who persevere with science education shrinks.

As a professional geologist who has tried to convey some of the wonder and excitement of science to nonscientists, I am saddened and angered to see "the great science turnoff." I know that science is profoundly important in our lives. Informed decision can't be made about where we live, what we eat and how we treat our environment without basic knowledge about our physical world, the knowledge that constitutes scientific literacy.

26. Which is the most appropriate for the blank?

① he has much interest in science ② he hopes to be a scientist
③ he is good at science ④ he hates science

27. According to the passage, which is true?

① Science education should not give children ready-made answers.
② American science education is too advanced for children.
③ Geology can only be understood with the high level of memorizing capability.
④ Students can endure science education with curiosity.

28. Which is the main idea of the passage?

① To persevere with science education is the duty of scientists.
② Science is very important for understanding human world.
③ The professional terms of science should be memorized.
④ Science education should teach how to make questions and find answers.

※ 다음 글을 읽고 물음에 답하시오. (29-30) **[각5점]**

It is important to remember that reading involves images as well. For when the reader sees the word "dog" and understands the idea of "dog," an image representing a dog is conjured up as well. The precise nature of this "reading image" is little understood, nor is there agreement about what relation it bears to visual images taken in directly by the eyes. Nevertheless images necessarily color our reading, or else we would perceive no meaning, merely empty words. The great difference between these "reading images" and the images we take in when viewing television is this: we *create* our own images when reading, based upon our own life experiences and reflecting our own individual needs, while we must accept what we receive when watching television images. This aspect of reading, which might be called "creative" in the narrow sense of the word, is present during all reading experiences, regardless of *what* is being read.

Television images do not go through a complex symbolic transformation. The mind does not have to decode and manipulate during the television experience. Perhaps this is a reason why the visual images received directly from a television set are strong, stronger, it appears, than the images conjured up mentally while reading. But ultimately they satisfy less. A ten-year old child reports on the effects of seeing television dramatizations of books he has previously read: "The TV people leave a stronger impression. Once you've seen a character on TV, he'll always look like that in your mind, even if you made a different picture of him in your mind before, when you read the book yourself." And yet, as the same child reports, "the thing about a book is that you have so much _____. You can make each character look exactly the way you want him to look. You're more in control of things when you read a book than when you see something on TV."

29. Which is the most appropriate for the blank?

① obligation ② freedom
③ responsibility ④ restriction

30. According to the passage, which is true?

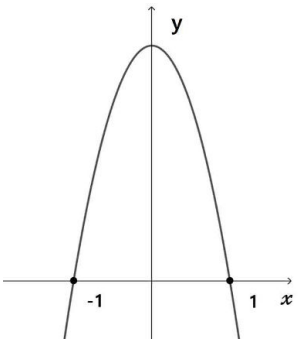
① Television gives us more insight than reading.
② Reading bears no relation to visual images.
③ Television is a deep source of imagination.
④ Reading stimulates our imagination more than TV.

# 수학 [자연계열] <오전> [문항별 5점]

**31.** $\lim_{x\to -2}\dfrac{1-\sqrt{x+a}}{x+2}=b$ 를 만족시키는 상수 $a, b$ 에 대하여 $ab$의 값은?

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

**32.** 삼차함수 $f(x)$의 도함수 $f'(x)$의 그래프가 아래 그림과 같이 $f'(-1)=f'(1)=0$이다. 함수 $f(x)$의 극솟값이 $-4$이고 극댓값이 $0$일 때, $f(3)$의 값은?




① $-16$ ② $-18$ ③ $-20$ ④ $-22$

**33.** $\lim_{n\to\infty}\sum_{k=n+1}^{2n}\dfrac{3\sqrt{k}}{n\sqrt{n}}$ 의 값은?

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

**34.** 다음 중 수렴하는 특이적분의 개수는?

ㄱ. $\int_0^3\dfrac{1}{x-3}dx$ ㄴ. $\int_1^\infty\dfrac{1}{\sqrt{x}}dx$

ㄷ. $\int_1^\infty\dfrac{2+e^{-x}}{x}dx$ ㄹ. $\int_0^{\frac{\pi}{2}}\sec x dx$

① 0 ② 1 ③ 2 ④ 3

**35.** 다음 중 수렴하는 급수의 개수는?

ㄱ. $\sum_{n=2}^{\infty}\dfrac{1}{n\ln n}$ ㄴ. $\sum_{n=1}^{\infty}(-1)^n\dfrac{3^n}{n!}$

ㄷ. $\sum_{n=1}^{\infty}\dfrac{n^n}{n!}$ ㄹ. $\sum_{n=1}^{\infty}\dfrac{\ln n}{n}$

ㅁ. $\sum_{n=1}^{\infty}\dfrac{\cos(n!)}{n^2}$

① 1 ② 2 ③ 3 ④ 4

**36.** 극곡선 $r=3\cos\theta$의 내부와 $r=1+\cos\theta$의 외부로 둘러싸인 영역의 넓이는?

① $\pi$ ② $2\pi$ ③ $3\pi$ ④ $4\pi$



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**37.** 3차원 공간에서 세 점 $P(2,8,12)$, $Q(-2,5,-2)$, $R(2,-2,2)$를 꼭짓점으로 하는 삼각형 PQR의 넓이는?

① $12\sqrt{17}$ ② $15\sqrt{17}$ ③ $12\sqrt{19}$ ④ $15\sqrt{19}$

**38.** 점 $(1,-1)$에서 벡터 $\vec{v}=<a,b>$ 방향으로 함수 $f(x,y)=x^2y^4-4xy^2$의 방향도함수가 2일 때, $\frac{b}{a}$의 값은? (단, $a,b$는 0이 아닌 실수이다.)

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

**39.** 곡면 $x=y^2$과 세 평면 $x=z$, $z=0$, $x=1$로 둘러싸인 입체의 부피는?

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

**40.** 함수 $f(x,y)=e^y(y^2-x^2)$에 대한 다음 설명 중 옳은 것은 모두 몇 개인가?

ㄱ. 점 $(0,0)$, $(0,-2)$는 임계점이다.
ㄴ. 2개의 극값을 갖는다.
ㄷ. 극솟값은 0이다.
ㄹ. 극댓값은 $4e^{-2}$이다.

① 1 ② 2 ③ 3 ④ 4

**41.** 네 꼭짓점 $(0,0)$, $\left(1,\frac{1}{3}\right)$, $\left(\frac{4}{3},\frac{1}{9}\right)$, $\left(\frac{1}{3},-\frac{2}{9}\right)$로 이루어진 사각형 영역 $D$에 대하여, 이중적분 $\iint_D (x-3y-1)e^{2x+3y}\cos(x-3y)dA$의 값은?

① $\frac{e^2-1}{9}(\cos1-1)$ ② $\frac{e^2-1}{9}\sin1$
③ $\frac{e^3-1}{9}(\cos1-1)$ ④ $\frac{e^3-1}{9}\sin1$

**42.** 곡선 $C$를 직선 $y=x$와 곡선 $y=x^2$으로 둘러싸인 영역의 경계라 하자.
벡터장 $\vec{F}(x,y)=<xy^2, x+y>$에 대하여, 선적분 $\int_C \vec{F}\cdot d\vec{r}$의 값은?
(단, 방향은 시계 반대 방향이다.)

① $\frac{1}{3}$ ② $\frac{1}{6}$ ③ $\frac{1}{12}$ ④ $\frac{1}{24}$

**43.** 곡면 $S$의 매개변수표현이
$$x=u\cos v,\quad y=u\sin v,\quad z=u^2+v^2$$
일 때, $S$ 위의 점 $(1,0,1)$에서의 접평면의 방정식은?

① $x-y+2z=3$ ② $x-2z=-1$
③ $-x+y+2z=1$ ④ $2x-z=1$

**44.** 곡선 $C$는 평면 $y+z=2$와 원기둥 $x^2+y^2=1$의 교선일 때, 벡터장 $\vec{F}(x,y,z)=<-y^2, x, z^2>$에 대하여, 선적분 $\int_C \vec{F}\cdot d\vec{r}$의 값은?
(단, $C$의 방향은 위에서 내려다봤을 때 시계 방향이다.)

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



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**45.** 행렬 $A=\begin{pmatrix}3 & -4\\ -2 & 4\end{pmatrix}$에 대하여 $AB=A^2-A-4E$를 만족시키는 행렬 $B$의 모든 성분의 합은?
(단, $E$는 단위행렬이다.)

① $-14$ ② $-10$ ③ $-6$ ④ $-2$

**46.** 선형변환 $T:\mathbb{R}^2\to\mathbb{R}^2$가 각 점을 직선 $y=-x$에 대하여 반사(reflection)시키고 그 점을 $y$축에 대하여 반사시키는 변환일 때, $T$에 대한 표준행렬은?

① $\begin{pmatrix}0 & -1\\ -1 & 0\end{pmatrix}$ ② $\begin{pmatrix}0 & 1\\ -1 & 0\end{pmatrix}$
③ $\begin{pmatrix}0 & 1\\ 1 & 0\end{pmatrix}$ ④ $\begin{pmatrix}0 & -1\\ 1 & 0\end{pmatrix}$

**47.** 행렬 $\begin{pmatrix}5 & 0 & 0 & -5\\ 4 & -3 & -3 & 1\\ 2 & 3 & -1 & 2\\ -2 & 1 & 0 & 3\end{pmatrix}$의 행렬식(determinant)은?

① 15 ② 20 ③ 25 ④ 30

**48.** $y=y(x)$가 미분방정식
$x^2y''-5xy'+9y=2x^3,\quad y(1)=2,\quad y(e)=e^3$
의 해일 때, $y(e^2)$의 값은?

① $e^6$ ② $2e^6$ ③ $3e^6$ ④ $4e^6$

**49.** $y=y(x)$가 미분방정식
$y''-y=e^{-2x}\sin(e^{-x}),$
$y\left(-\ln\frac{\pi}{2}\right)=-1+\frac{1}{\pi},\quad y(-\ln\pi)=\frac{2}{\pi}$
의 해일 때, $y(-\ln 2\pi)$의 값은?

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

**50.** 역라플라스변환(inverse Laplace transform) $\mathcal{L}^{-1}\left\{\frac{s+4}{s^2+4}\right\}$를 $f(t)$라 할 때, $f\left(\frac{\pi}{8}\right)$의 값은?

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



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# 영어 정답표 [자연계열] < 오전 >

| 문제번호 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 정 답 | ④ | ② | ① | ① | ② | ④ | ③ | ③ | ① | ① |
| 배 점 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

| 문제번호 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| 정 답 | ① | ② | ① | ④ | ④ | ② | ① | ② | ③ | ① |
| 배 점 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

| 문제번호 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|
| 정 답 | ④ | ② | ① | ② | ③ | ④ | ① | ④ | ② | ④ |
| 배 점 | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 |

# 수학 정답표 [자연계열] < 오전 >

| 문제번호 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| 정 답 | ① | ③ | ④ | ① | ② | ① | ② | ③ | ④ | ② |
| 배 점 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

| 문제번호 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|
| 정 답 | ③ | ③ | ④ | ① | ① | ② | ③ | ② | ④ | ③ |
| 배 점 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

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