

2017학년도 송실대학교 편입학 시험 문제



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2017학년도 송실대학교 편입학 시험 문제 (자연계)

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지망학과(부) :

수험번호 :

성명 :

문항배점 : [1-10] 1점 / [11-20] 2.5점 / [21-25] 3점 / [26-31] 1.7점 / [32-44] 2점 / [45-50] 2.3점

[1-2] Choose the one that is grammatically NOT correct. (각 1점)

[1] The next difficulty was to get a contractor who could understand the specifications and ① do the work. Chinese contractors ② could have been found who could read English, but I desired to let the Koreans have an opportunity of ③ bidding on the college building. In order to let them know ④ what they were bidding, it was necessary to translate the specifications into Korean.

[2] Functionalists generally maintain that sex differentiation

① contributes to overall social stability, but conflict theorists charge that the relationship ② between females and males is ③ one of unequal power, with ④ men dominate women.

[3-6] Choose the expression that is closest in meaning to the underlined part. (각 1점)

[3] The restaurant industry is the second largest employer in the U.S., providing jobs for nearly 11 million Americans. It's also one of the country's fastest-growing industries; revenues have risen every year since 2010.

- ① the number of people that has visited restaurants
- ② the expenses that have been spent by restaurants
- ③ the amount of money that has been paid to restaurants
- ④ the level of reputation on restaurants by the customers

[4] It's a testament to antibullying curriculums in elementary schools that none of the girls would use words like *fat* in front of an adult, which wasn't true even three or four years ago.

- ① a Bible ② an evidence ③ a question ④ a will

[5] We have drones that record videos, fight fires and even deliver packages. This new drone aims to one-up them all—by transporting a human.

- ① downgrade ② imitate ③ outperform ④ succeed

[6] More than three-quarters of Korean greengrocers in New York, those so-called paragons of bootstrap entrepreneurialism, came to America with a college education. Engineers, teachers, or administrators while in Korea, they became shopkeepers after their arrival. For many of them, the greengrocery represents dashed dreams.

- ① accomplished ② broken ③ rushed ④ transformed

[7-10] Choose the most appropriate word(s) for the blank(s). (각 1점)

[7] Facebook allows users to search for other users on their own campus and elsewhere. Some users allow anyone to look at their profiles, while others restrict _____ to those on their list of friends.

- ① access ② benefits ③ friendship ④ registration

[8] What lies behind the voter _____ among the young? The popular explanation is that people—especially young people—are alienated from the political system, turned off by the shallowness and negativity of candidates and campaigns.

- ① advocacy ② anxiousness ③ apathy ④ asymmetry

[9] The lessons of after-school specials replay in my mind. If the decent kid (DK) befriended the troubled kid (TK), which way did it go? Was DK a good influence on TK, or did TK lead DK _____?

- ① astray ② kindly ③ onto the mark ④ to college

[10] "Promise—large promise—is the soul of advertising," wrote Dr. Samuel Johnson in the eighteenth century. His dictum has remained remarkably accurate during the last two hundred and fifty years. Advertisements tell the viewer much more than the merits of a particular _____. From the glossy and colorful pages of magazines, catalogues,

and newspaper supplements, the reader can extract _____ of how to live the perfect life.

- ① society - ways ② company - styles
- ③ promise - pictures ④ product - image

[11-13] Read the following passage and answer the questions. (각 2.5점)

Have you ever turned down your vacation days at work in an effort to impress your boss? If so, you've got it all wrong! Researchers recently determined that vacationing more is actually an overall positive career move.

The study found that more than half of the American workers surveyed intentionally left their vacation days unused. The study's author suspects workers worry that they'll look lazy or fall behind on the job, or they think that by leaving the days unused they'll impress the boss.

But the truth is, taking time off is far better for productivity than slaving away and putting your brain into overdrive. A day off here and a day off there from the office can improve your concentration, while long breaks boost your motivation. "The impact that taking a vacation has on one's mental health is profound," said Francine Lederer, a clinical psychologist. "Most people have better life perspective and are more motivated to achieve their goals after a vacation, even if it is a 24-hour time-out."

Giving up your vacation days might even be the reason you haven't been promoted. In the Project: Time Out study, one interesting realization was that employees who take 10 or less days of vacation time are less likely to have received a raise or bonus in the last three years than those who took 11 days or more. This is likely because your work performance suffers the fewer days off your take, and the more likely you have been noticeably burning out. Instead of skipping out on vacation days, try these smart strategies to build trust with your boss.

The takeaway here: Vacationing is not only great for your personal health and wellness, it also plays an important role in making you a better employee. And the great news is, you don't have to book a week off and worry about getting behind. Instead, take single days off throughout the year to go to your kid's recital, relax at home, or spend a day at the park. You'll quickly realize that taking time off makes all the difference.

[11] What would be the main reason for employees not to use their vacation?

- ① to earn more money ② to please their supervisor
- ③ to make more products ④ to enjoy their job

[12] Which of the following is true?

- ① Vacation is closely related with productivity.
- ② Vacationing less is better for promotion.
- ③ Vacation does not promote motivation.
- ④ Vacation is not important for mental health.

[13] Which of the following is NOT true?

- ① Short vacation is still worthwhile.
- ② Vacationing is necessary for everybody.
- ③ The length of vacation is not crucial.
- ④ Long vacation hinders work performance.

[14-16] Read the following passage and answer the questions. (각 2.5점)

An actor's only job is to enter the lives of people who are different from us and let you feel what that feels like. And there were many powerful performances this year that did exactly that—breathtaking, compassionate work.

But there was one performance this year that stunned me. It sank its hooks in my heart, not because it was good, it was—there's nothing good about it. But it was effective and it did its job. It made its intended audience laugh and show their teeth.

It was that moment when the person asking to sit in the most respected seat in our country imitated a disabled reporter, someone he outranked in privilege and power and the capacity to fight back. It broke my heart when I saw it and I still can't get it out my head because it wasn't in a movie. It was real life. And this instinct to humiliate when it's modeled by someone in the public platform, by someone powerful, it filters down into everybody's life because it gives permission for other people to do the same thing.

Disrespect invites disrespect. Violence incites violence. When the powerful use their position to bully others, we all lose. OK, go on with that thing. OK, this brings me to the press. We need the principled press to hold power to account, to call them on the carpet for every outrage.

That's why our founders enshrined the press and its freedoms in our constitution. So I only ask the famously well-heeled Hollywood foreign press and all of us in our community to join me in supporting the Committee to Protect Journalists, because we're going to need them going forward and they'll need us to safeguard the truth.

Once one of my friends said to me: "Isn't it such a privilege just to be an actor?" Yeah, it is. And we have to remind each other of the privilege and the responsibility of the act of (A) empathy. We should be very proud of the work Hollywood honors here tonight,

[14] What is the author's profession?

- ① musician ② actor ③ politician ④ guide

[15] Which of the following is NOT true?

- ① Freedom of the press is important.
② An actor has a privilege.
③ Reporters make frequent mistakes.
④ Disrespect should be rejected.

[16] Which of the following does (A) mean?

- ① discord ② sympathy
③ contention ④ ethos

[17-19] Read the following passage and answer the questions. (각 2.5점)

Nicole Moore was walking around in waist-deep water at a beach. She pivoted toward the beach and began to wade in. She felt a bump. What was that? Then realization. Before she could react, the shark ripped into her left thigh, its barbed teeth tearing into her flesh, down to the bone. The water was instantly ablaze with billowing, bright red blood.

Nicole was left flailing in a sea of blood, suffering from shock and trauma and in danger of losing consciousness. Her left arm was hanging, barely there. Her left leg wouldn't move.

Then a siren blared.

When Nicole regained consciousness, she was lying in bed. She was on a breathing machine and had a tube down her throat. Nicole would learn that the chunk the shark had ripped from her thigh had been found on the beach, brought to the hospital by her friends, and surgically reattached to her leg. But the procedure had been completed without attaching the flesh to a vein that could provide blood flow, which meant it would inevitably die off. Her arm was also badly torn, and on the second day, her hand was beginning to turn black.

Nicole was in bad shape, and Dr. Snell was surprised that she was able to sit up and talk soon after the operation. More impressive, Nicole's mood was extremely positive. No matter what bad news Dr. Snell threw at her, she'd reply, "OK, what do we do next?"

And yet, as beat up as she was, Nicole has not stopped moving. Today, she works with several organizations, both

to support survivors of shark attacks and to conserve the world's dwindling shark populations. She is back at work as a nurse, and she has run in the Warrior Dash, a challenging obstacle course race through swamps and across mud-caked back roads.

"I believe that we have the choice as to how we face life. Live it or sit back and let it pass you by," she says. "I, for one, say bring it on."

[17] Which is Nicole Moore's attitude toward her injury?

- ① grateful ② disappointed ③ optimistic ④ regretful

[18] What would be the message of the article?

- ① Life is so risky. ② Life depends on luck.
③ Life is too fragile. ④ Life depends on how you live.

[19] What is Nicole Moore's occupation?

- ① medical doctor ② nurse ③ athlete ④ lifeguard

[20-22] Read the following passage and answer the questions. (20번 2.5점, 21번~22번 각 3점)

Research indicates that many people who begin a new exercise program see little if any improvement in their health and fitness even after weeks of studiously sticking with their new routine.

Among fitness scientists, these people are known as (A) "-----." Their bodies simply don't respond to the exercise they are doing. And once discouraged, they often return to being nonexercisers.

But a new study suggests that (A) ----- to one form of exercise can probably switch to another exercise regimen to which their body will respond. And a simple test you can do at home will help you determine how well your workout is working for you.

Age, sex and ethnicity had not mattered, the researchers noted. Young people and old had been outliers, as had women and men, black volunteers and white. Interestingly, nonresponse to endurance training ran in families, the researchers discovered, suggesting that genetics probably plays a significant role in how people's bodies react to exercise.

And a study concentrating on intense interval training concluded that some people barely gained endurance with this type of workout, while others flourished, greatly augmenting their fitness.

These studies, however, were not generally designed to tell us whether someone who failed to benefit from one form of exercise might do well with another.

But, importantly, no one had failed to respond at all. Every man and woman had measurably improved his or her fitness in some way after one of the sessions, if not the other.

Those who had shown little response to endurance training generally showed a robust improvement after the interval sessions, and vice versa.

These data suggest that "there is no one-size-fits-all approach to exercise," says Brendon Gurd, who oversaw the study. "But it does seem as if there is some size that fits everyone."

The question is how to determine which form of exercise best fits you.

The answer, Dr. Gurd says, is simple trial and error.

The message "is not that you shouldn't bother exercising because exercise might not help you," Dr. Gurd says. "It does help everyone, once you find your own best exercise."

[20] Which of the following best fits in (A)?

- ① beginners ② nonresponders
③ trainers ④ practitioners

[21] Which of the following is NOT true?

- ① There is a universal form of exercise for everybody.
② Everybody has one's own best exercise.
③ Trial and error is a way to find one's best fitness.
④ Some people do not respond to endurance training.

[22] What would be an important factor for reacting to exercise?

- ① genetics ② personality ③ gender ④ culture

[23-25] Read the following passage and answer the questions. (각 3점)

Those carrot tops you've lopped off are not garbage. Your snapped-off green-bean stems are not scraps. They are what Thomas McQuillan, sustainability director for Baldor, calls sparcs—"scraps" spelled backward and pronounced like "sparks." And sparcs, despite popular assumption, are often just as edible as the rest of the fruit or vegetable.

It's already working at Baldor. For the company's Fresh Cuts program, which offers pre-sliced, diced or otherwise prepared vegetables, Baldor saves all of its sparcs for human or animal consumption. Previously, these edible and nutritious pieces of fruits and vegetables would have been discarded.

The "landfill can no longer be an option for any food, for any reason," McQuillan said.

It's also better for Baldor's business.

"There is a substantial benefit to the bottom line in two ways: If you are able to sell the sparcs, now you have revenue generation. You're also saving whatever it would cost to eliminate it," he said.

So if it's good for the planet and good for the company, why isn't every produce processor doing this? It's partly because it can be hard to convince people that it is a good idea.

After all, it's easier to just send thousands of pounds of garbage away in a truck. It's harder to turn them into sparcs and find a second use for them. But McQuillan hopes that more food producers will find a way to use these remnants in their products, whether to feed the needy or just to sell to everyday consumers.

And even though corporate changes could have a huge effect, McQuillan hopes to see sparcs-based cooking at the consumer level, too. The easiest step is that time-old trick of throwing vegetable odds and ends into a plastic bag in the freezer and using them to make a big pot of broth at the end of the week. According to the Natural Resources Defense Council, we throw away 25 percent of the food we purchase. The average family of four spends an average \$1,560 each year on food they never eat.

[23] Which of the following is NOT true about "sparcs"?

- ① They are pronounced like sparks.
② They are usually edible like normal food.
③ They are often misconceived.
④ They are only for animal consumption.

[24] What would be the main idea of the passage?

- ① Sparcs could be one of the possible solutions for the landfill.
② Sparcs are the most nutritious food for humans.
③ Sparcs are the favorite services among food companies.
④ Sparcs are the established social service programs.

[25] How much money does the average family of four spend for food each year?

- ① \$6,240 ② \$4,680 ③ \$3,120 ④ \$1,560

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[26] $f(x) = (x^2 + 2x)e^{-x}$ 의 모든 극값의 곱은? (1.7점)

- ① -4 ② -2 ③ $-2e$ ④ $-e$

[27] 곡선 $y^2 = x^3 + x + 2$ 위의 점 $(1, 2)$ 에서의 접선의 기울기는? (1.7점)

- ① 0 ② 1 ③ 2 ④ 4

[28] $a_n = \sum_{k=1}^n \frac{\pi}{2n} \sin\left(\frac{k\pi}{n}\right)$ 일 때, $\lim_{n \rightarrow \infty} a_n$ 의 값은? (1.7점)

- ① 0 ② 1 ③ $\frac{\pi}{2}$ ④ π

[29] $\sum_{n=1}^{\infty} |a_n| < \infty$ 일 때, 다음 중 수렴하는 급수를 모두 고른 것은? (1.7점)

(가) $\sum_{n=1}^{\infty} a_n$	(나) $\sum_{n=1}^{\infty} (a_n - a_n)$
(다) $\sum_{n=1}^{\infty} (a_n)^2$	(라) $\sum_{n=1}^{\infty} (-1)^n a_n$

- ① (가) ② (가), (라)
③ (가), (나), (라) ④ (가), (나), (다), (라)

[30] 극한 $\lim_{x \rightarrow 1} \frac{(\ln x)^2}{x-1}$ 의 값은? (1.7점)

- ① -1 ② 0 ③ 1 ④ e

[31] 매개방정식 $x = t^2$, $y = t^3$ 에서 $t = 6$ 일 때, $\frac{d^2y}{dx^2}$ 의 값은? (1.7점)

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

[32] 함수 $f(x)$ 를 아래와 같이 정의할 때, 다음 중 옳은 것은? (2.0점)

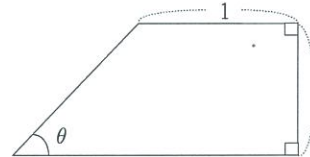
$$f(x) = x^4 - \frac{5^{-x}}{(\ln 5)^2} + \log_{(x+1)^2}(x+1)^{2017}, \quad x > 0$$

- ① $f''(1) = \frac{59}{5}$ 이고, f 의 변곡점이 존재한다.
② $f''(1) = \frac{59}{5}$ 이고, f 의 변곡점이 존재하지 않는다.
③ $f''(1) = \frac{61}{5}$ 이고, f 의 변곡점이 존재한다.
④ $f''(1) = \frac{61}{5}$ 이고, f 의 변곡점이 존재하지 않는다.

[33] A, B, C 가 $n \times n$ 행렬일 때, 다음 중 옳은 명제는? (2.0점)

- ① A^2 이 단위행렬이면, A 또는 $-A$ 가 단위행렬이다.
② AB 가 단위행렬이면, BA 도 단위행렬이다.
③ A^2 이 영행렬이면, A 도 영행렬이다.
④ $AB = AC$ 이고 A 가 영행렬이 아니면, $B = C$ 이다.

[34] 그림과 같이 두 변의 길이가 1이고 한 각이 θ ($0 < \theta < \frac{3\pi}{4}$)인 사다리꼴의 넓이를 A 라고 하자. $\theta = \frac{\pi}{3}$ 일 때, $\frac{dA}{d\theta}$ 의 값은? (2.0점)



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

[35] 다음 함수 중 나머지 셋과 다른 것은? (2.0점)

- ① $\lim_{h \rightarrow 0} \frac{\sin(2x+h) - \sin 2x}{h}$
② $4 \cos^2 x - 2$
③ $\frac{d}{dx}(\sin 2x)$
④ $\lim_{y \rightarrow x} \frac{2 \sin y \cos y - 2 \sin x \cos x}{y - x}$

[36] 삼중적분 $\int_0^1 \int_x^1 \int_0^{\frac{x}{y}} z e^y dz dy dx$ 의 값은? (2.0점)

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

[37] 직선 $y = x$, $y = 0$ 과 곡선 $y = \sqrt{1-x^2}$, $y = \sqrt{4-x^2}$ 에 의해 둘러싸인 영역 중 제1사분면에 놓인 영역을 E 라고 할 때, 이중적분 $\iint_E \tan^{-1}\left(\frac{y}{x}\right) dA$ 의 값은? (2.0점)

- ① $\frac{3\pi^2}{64}$ ② $\frac{9\pi^2}{64}$ ③ $\frac{3\pi^2}{8}$ ④ $\frac{3\pi^2}{4}$

[38] 함수 $f(t)$ 와 상수 a 가 다음 등식을 만족할 때, $a + f(4)$ 의 값은? (2.0점)

$$8 + \int_a^x \frac{f(t)}{t^2} dt = 2\sqrt{x}, \quad x > 0$$

- ① 4 ② 10 ③ 16 ④ 24

[39] $y(x)$ 가 다음 미분방정식의 해일 때, $y(2)$ 의 값은? (2.0점)

$$\frac{dy}{dx} + \frac{2y}{x} = \frac{1}{x^2}, \quad y(1) = 9$$

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

[40] $f(x) = x^2 + ax + b$ 와 $g(x) = cx^2 - x$ 의 그래프가 $(-1, 0)$ 에서 같은 접선을 가질 때, $h(x) = f(g(x))$ 의 $x = -1$ 에서의 미분계수는? (2.0점)

- ① 0 ② 1 ③ 2 ④ 3

[41] $f(x, y) = \sin(xy)$, $\alpha(h) = \frac{h}{\sqrt{2}}$ 일 때, 극한

$$\lim_{h \rightarrow 0} \frac{f(1 + \alpha(h), \pi - \alpha(h)) - f(1, \pi)}{h}$$

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

[42] $z = f(x, y)$, $x = s - t$, $y = s + t$ 일 때, $\left(\frac{\partial z}{\partial x}\right)^2 - \left(\frac{\partial z}{\partial y}\right)^2$ 과 같은 것은? (2.0점)

- ① $-\frac{\partial z}{\partial s} \frac{\partial z}{\partial t}$ ② $-\frac{\partial^2 z}{\partial s \partial t}$ ③ $\left(\frac{\partial z}{\partial s}\right)^2 + \left(\frac{\partial z}{\partial t}\right)^2$ ④ 0

[43] 곡면 $f(x, y) = \ln(x^2 + y^2)$ 위의 점 $(1, -1, \ln 2)$ 에서의 접평면과 수직인 벡터는? (2.0점)

- ① $\langle -1, 1, 1 \rangle$ ② $\langle 2, 1, 1 \rangle$
③ $\langle 1, 0, 2 \rangle$ ④ $\langle 1, -2, 1 \rangle$

[44] 함수 $f(x)$ 를 아래와 같이 정의할 때, $(f^{-1})'(0)$ 의 값은? (2.0점)

$$f(x) = x \ln x, \quad x > \frac{1}{e}$$

- ① 0 ② $\frac{1}{2}$ ③ 1 ④ e

[45] 연립 미분방정식 $\begin{bmatrix} y_1' \\ y_2' \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ -1 & 4 \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \end{bmatrix}$, $\begin{bmatrix} y_1(0) \\ y_2(0) \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$ 의 해 y_1, y_2 에 대해 $y_1(1) - y_2(1)$ 은? (2.3점)

- ① $\frac{1}{2}e^2$ ② $6e^3$ ③ $2e^2$ ④ $2e^2 + 2e^3$

[46] 선형사상 $L: \mathbb{R}^3 \rightarrow \mathbb{R}^3$, $L(x, y, z) = (x + y, y + z, z + x)$ 에 대해 $\dim(\text{Ker } L) - \dim(\text{Im } L)$ 의 값은? (2.3점)

- ① -3 ② -1 ③ 1 ④ 3

[47] $f(x)$ 와 $g(x)$ 는 실수 전체에서 정의된 함수이고 a 는 임의의 실수이다. $f(x)$ 가 실수 전체에서 연속일 때, 다음 보기 중 옳은 것을 모두 고른 것은? (2.3점)

(가) $\lim_{x \rightarrow a} |f(x) - f(a)| = 0$ 이다.

(나) $\lim_{n \rightarrow \infty} a_n = a$ 이면, $\lim_{n \rightarrow \infty} f(a_n) = f(a)$ 이다.

(다) $\lim_{x \rightarrow a} g(f(x)) = A$ 이면, $\lim_{x \rightarrow f(a)} g(x) = A$ 이다.

(라) $h(x) = \int_a^x |f(t)| dt$ 는 실수 전체에서 미분 가능하다.

- ① (가), (나) ② (나), (다), (라)
③ (가), (나), (라) ④ (가), (나), (다), (라)

[48] 함수 $f(x, y) = xy - \frac{1}{3}(x^3 + y^3)$ 에 대해 다음 보기 중 옳은 것을 모두 고른 것은? (2.3점)

(가) $(1, 1)$ 에서 최댓값을 갖는다.

(나) $(0, 0)$ 에서 극솟값을 갖는다.

(다) 단 하나의 안장점을 갖는다.

(라) $(0, 1)$ 에서 $< 0, 1 >$ 방향으로 증가상태에 있다.

- ① (가) ② (나), (다) ③ (가), (다) ④ (나), (라)

[49] 다음 보기 중 옳은 것을 모두 고른 것은? (2.3점)

(가) $x > 0$ 일 때 $\ln(1+x) < x$ 이다.

(나) 임의의 실수 c 에 대하여 $x^3 + x + c = 0$ 은 단 한 개의 실근을 갖는다.

(다) 모든 x, y 에 대하여 $|\sin y - \sin x| \leq |y - x|$ 이다.

- ① (가) ② (가), (나)
③ (나), (다) ④ (가), (나), (다)

[50] $y = x^3 + x + 1$, $x = 1$, $y = 1$ 에 의해 둘러싸인 영역을 직선 $x = 2$ 를 중심으로 하여 회전시켜 얻은 회전체의 부피는? (2.3점)

- ① $\frac{89\pi}{15}$ ② $\frac{46\pi}{15}$ ③ $\frac{29\pi}{15}$ ④ $\frac{16\pi}{15}$