

2016학년도 송실대학교 편입학 시험 문제



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2016학년도 송실대학교 편입학 시험 문제 (자연계)

영 어, 수 학(A형)

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] Every year, ① hundreds of people leave important jobs in the government to take more lucrative positions in private industry. ② Some go to work as lobbyists, ③ another as consultants to business, ④ still others as key executives in corporations, foundations and universities.

[2] ① Despite a series of serious crashes in recent months, traffic deaths fell in New York ② for the second year in a row as the city continued to focus ③ on improving street safety. ④ A number of people who died in traffic accidents fell to 230 last year, from 257 in 2014, according to preliminary data from the city.

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

[3] Finally, toward the end of second grade, my teacher contacted my mother and told her that I was having real trouble reading. She said that they were considering holding me back.

- ① having me repeat the grade ② keeping me at school
③ offering a counseling ④ providing extra help

[4] My wife and I are not helicopter parents. My son is 5, and I'm fine letting him go alone to the park, attend birthday parties by himself, make his own dinner or fly his own helicopter. Unfortunately, however, we have a helicopter child.

- ① a child who likes a helicopter
② a child who flies a helicopter
③ a child who likes to be always with his or her parents
④ a child who takes constant care of his or her parents

[5] France utterly rejected the notion that being French could include women covering their heads. Enshrined in its laws is the concept of secularization. France has banned Muslim girls from wearing headscarves to school. To level the playing field, it also banned Christian and Jewish symbols.

- ① To control the situation ② To be fair to all parties
③ For sports activities ④ For a better performance

[6] "The euphemism of the coming year will be cooperation," warns Guttenberg, who was Defense Minister of Germany under Merkel. Europe will see a "manifestation of a culture of the least common denominator."

- ① effective collaboration ② willing participation
③ equal enthusiasm ④ reluctant agreement

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

[7] In spite of the objectively proven inaccuracy of a referee's decision, the decision will not be overturned; it is set in stone. In other words, football contains the possibility of _____, and this possibility sometimes becomes real in the most dramatic fashion.

- ① irreversible injustice ② human dignity
③ divine revenge ④ democratic principle

[8] Forty-nine percent of smartphone owners ages 18 to 29

use messaging apps such as WhatsApp, Kik or iMessage, according to a research group report published in August. The activity appeals to _____ as well. Some 37% of smartphone owners age 30 to 49, and 24% of those ages 50 and older use mobile messaging apps, they found.

- ① adolescents ② adults
③ older generations ④ rich people

[9] Most computer users who have e-mail addresses are familiar with spam--unwanted e-mail messages advertising a product or service. Spam includes offers for everything. It's the electronic version of the "_____" delivered to mailboxes.

- ① express mail ② junk mail
③ post card ④ quick service

[10] Teenagers being teenagers, they are full of anxiety and contradictions. They love Instagram, the photo-sharing app, but are terrified their posts will be ignored or mocked. They feel less pressure on Snapchat, the disappearing-message service, but say Snapchat can be annoying because disappearing messages make it hard to follow a continuing conversation. They do not like advertisements but also do not like to _____.

- ① be ignored ② pay for things
③ exchange photos ④ engage in conversation

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

If those fibbers truly believe that they are younger than what it says on their birth certificate, a new study shows they are among a group of people who have a lower death rate. That is compared with those who felt older than their age. The study looked at data from 6,489 people with an average age of 65.8 years who reported that they felt a little less than 10 years younger. What's interesting is most people in the study didn't feel like their actual age. Most said they felt about three years younger. Only a tiny percent, some 4.8%, felt at least a year older than their actual age.

When University College London researchers followed up on these people over the next eight years, the scientists found only a little over 14% of those who felt younger than their years had died. That was compared with the more than 24% of the people who reported feeling older or feeling their age who had died. Some 18% of the people who felt like their (A) _____ age died in that same time period.

The researchers say they want to better understand what made the difference with this group. "Possibilities include a broader set of health behaviors than we measured (such as maintaining a healthy weight and adherence to medical advice), and greater resilience, sense of mastery and will to live among those who feel younger than their age," the study concludes. "Self-perceived age has the potential to change, so interventions may be possible. (B) Individuals who feel older than their actual age could be targeted with health messages promoting positive health behaviors and attitudes toward aging." Dr. Sharon Bergquist, a physician who specializes in healthy aging, isn't surprised by the results. "Research is showing us that personality can be tied to your destiny," Bergquist said.

New research into the link between personality and aging

- ① He showed a great talent on music at the very early age.
- ② His biological father was a direct influence on his musical education.
- ③ His teacher's death led him to the Stern Conservatory of Berlin.
- ④ The slow and deliberate playing style began early in his career.

Haiti is the country in the Western Hemisphere most vulnerable to the effects of natural disasters. Hurricanes and (A) floods are common. The first recorded earthquake hit in 1562. Quakes aren't nearly as frequent as hurricanes and (B) floods, but since the early 1900s concrete block and reinforced-concrete construction--which hold up better than wood against wind, fire, and rushing water--has been used for houses, hospitals, and schools. Yet when the ground shakes, concrete buildings crack and collapse easily.

With each disaster, in an effort to help, foreign nongovernmental organizations (NGO) and missionaries (C) flood the country with such predictability that some locals call the period in the aftermath of hurricanes “missionary season.” Of course, not all do-gooding is created equal. Though many foreigners stay for only a few days, in what amounts to a mercy vacation, others remain for years of grueling, often vital, work in a country that lacks basic services. Haiti has more than 4,000 registered NGOs, but there is no effective oversight of foreign aid institutions, no formal impartial measure of the efficacy of the aid, not even a tally of how many missionaries are in the country. All anyone knows is that there are thousands.

[20] Which of the following is NOT the cause of Haitians' displacement?

- ① dictators ② foreign NGOs
③ natural disasters ④ slavery

① (A) ② (B) ③ (C) ④ (D)

- ① The earth's Western Hemisphere is most vulnerable to natural disaster.
- ② Quakes are the most frequent natural disaster in Haiti.
- ③ Haitian government does not have a firm grip on foreign volunteers.

Praying for the Virgin Mary's intercession and being devoted to her are a global phenomenon. As a universal symbol of maternal love, as well as of suffering and sacrifice, Mary is often the touchstone of our longing for meaning, a more accessible link to the supernatural than formal church teachings. Her mantle offers both security and protection. Pope Francis, when once asked what Mary meant to him, answered, "She is my mama."

Mary is everywhere: Marigolds are named for her. Hail Mary passes save football games. The image in Mexico of Our Lady of Guadalupe is one of the most reproduced female likenesses ever. Mary draws millions each year to shrines such as Fatima in Portugal and Knock in Ireland, sustaining religious tourism estimated to be worth billions of dollars a year and providing thousands of jobs. She inspired the creation of many great works of art and architecture as well as poetry, liturgy, and music. Muslims as well as Christians consider her to be holy above all women, and her name “Maryam” appears more often in the Koran than “Mary” does in the Bible.

[23] Which of the following best fits in (A) _____ and (B) _____?

- ① Yet Because ② Since Still
- ③ However Still ④ As Since

① maternal love ② mysterious appearances
③ universality ④ biography

- ① She is a worldwide symbol of motherly love and care.
- ② Her appearances accompany natural phenomena like rain or storm.
- ③ She has inspired a great many artists.
- ④ Her universality encourages a variety of projection of her.

<뒷면에 계속>

[26] 다음 중 구간 $[-2, 2]$ 에서 가장 많은 해를 갖는 방정식은? (1.7점)

- ① $x^5 + \sqrt{3}x^3 + 2 = 0$ ② $3x - \sin^2 x = 0$
 ③ $\sin 2x - \cos x - 4x = 0$ ④ $3\cos x - 1 = 0$

[27] $2x^2z - 3xy^2 + yz - 8 = 0$ 일 때 $(x, y) = (1, 0)$ 에서 $\frac{\partial z}{\partial y}$ 의 값은? (1.7점)

- ① -4 ② -2 ③ 2 ④ 4

[28] $h(x) = g(x^2 + f(x))$ 이고 $f(-1) = 1$, $f'(-1) = 4$, $g(2) = 5$, $g'(2) = 4$ 일 때 $h'(-1)$ 의 값은? (1.7점)

- ① -20 ② 5 ③ 8 ④ 10

[29] 평면 $x + 2y + z = 4$ 에 수직이고 두 점 $P_1(-1, 0, 1)$ 과 $P_2(0, -2, -1)$ 을 포함하는 평면의 방정식이 $ax + by + cz = 1$ 일 때, $a + b + c$ 의 값은? (1.7점)

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

[30] 초깃값 문제 $\frac{dy}{dt} = \frac{1}{y^3 + 1}$, $y(0) = 1$ 의 해를 $y(t)$ 라고 할 때 $y(T) = 2$ 인 T 는? (1.7점)

- ① $\frac{19}{4}$ ② $\frac{9}{2}$ ③ $\frac{14}{3}$ ④ $\frac{29}{6}$

[31] $y(t)$ 가 초깃값 문제 $\frac{d^2y}{dt^2} - 3\frac{dy}{dt} + 2y = 0$, $y(0) = 1$, $y'(0) = 0$ 의 해일 때 $y(\ln 4)$ 의 값은? (1.7점)

- ① -8 ② $-\frac{1}{6}$ ③ $\frac{31}{6}$ ④ 12

[32] 다음 중 $x = 0$ 에서 미분가능하지 않은 함수는? (2.0점)

- ① $y = |x| \sin x$ ② $y = |x| \cos x$
 ③ $y = |x| \tan x$ ④ $y = |x|x$

[33] 함수 $f(x) = 2x + \sin x + 1$ 의 역함수를 g 라 할 때, 극한 $\lim_{h \rightarrow 0} \frac{g(1+h) - g(1-h)}{h}$ 의 값은? (2.0점)

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

[34] 곡선 $y = \frac{x^3}{3} + \frac{1}{4x}$ ($1 \leq x \leq 3$)의 길이는? (2.0점)

- ① $\frac{53}{6}$ ② $\frac{33}{4}$ ③ $\frac{25}{3}$ ④ $\frac{71}{8}$

[35] $f(x) = \int_0^x \frac{t^2}{t^2 + t + 2} dt$ 일 때 다음 중 곡선 $y = f(x)$ 의 변곡점의 x 좌표에 해당하는 것은? (2.0점)

- ① -4 ② -2 ③ 2 ④ 4

[36] 타원 $x^2 + 4y^2 = 4$ 로 둘러싸인 영역 중 제1사분면에 속하는 부분을 y 축을 중심으로 회전시켜 얻은 입체의 부피는? (2.0점)

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

[37] 극한 $\lim_{x \rightarrow 0} \frac{(1 - \cos x)^2}{3x^4}$ 의 값은? (2.0점)

- ① 0 ② $\frac{1}{2}$ ③ $-\frac{1}{6}$ ④ $\frac{1}{12}$

[38] 다음 무한급수 중 수렴하는 급수의 개수는? (2.0점)

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}, \quad \sum_{n=1}^{\infty} \frac{\sin n}{n^2+1}, \quad \sum_{n=1}^{\infty} \frac{n+1}{\sqrt{n^3+2}}, \quad \sum_{n=2}^{\infty} \frac{1}{n \ln n}$$

- ① 1개
- ② 2개
- ③ 3개
- ④ 4개

[39] 멱급수 $\sum_{n=0}^{\infty} \frac{(x-1)^n}{3^n \sqrt{n^2+1}}$ 에서 수렴하는 모든 정수 값 x 의 합은? (2.0점)

- ① 3
- ② 5
- ③ 7
- ④ 9

[40] 반복적분 $\int_0^4 \int_{\sqrt{y}}^2 \frac{1}{1+x^3} dx dy$ 의 값은? (2.0점)

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

[41] 곡면 $2x^2+y^2+3z^2=6$ 위의 점 $(1,-1,1)$ 에서의 접평면과 평면 $3x+2y+z=4$ 의 사잇각은? (2.0점)

- ① $\frac{\pi}{6}$
- ② $\frac{\pi}{4}$
- ③ $\frac{\pi}{3}$
- ④ $\frac{\pi}{2}$

[42] $f(x)=e^{-x} \sin(x^2)$ 일 때, $f^{(5)}(0)$ 의 값은? (2.0점)

- ① $-\frac{1}{6}$
- ② $\frac{1}{24}$
- ③ -20
- ④ 60

[43] 다음 행렬 중 고윳값 λ_1, λ_2 의 합 $\lambda_1+\lambda_2$ 가 가장 큰 것은? (2.0점)

- ① $\begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$
- ② $\begin{bmatrix} 3 & 1 \\ 1 & 4 \end{bmatrix}$
- ③ $\begin{bmatrix} 2 & 2 \\ 3 & 4 \end{bmatrix}$
- ④ $\begin{bmatrix} 4 & 9 \\ 1 & 4 \end{bmatrix}$

[44] 3×3 행렬 A 와 B 의 행렬식이 $\det(A)=2, \det(B)=1$ 일 때 다음 중 옳지 않은 것은? (2.0점)

- ① $\det(AB)=2$
- ② $\det(3A)=6$
- ③ $\det((2B)^{-1})=\frac{1}{8}$
- ④ $\det(BA^{-1})=\frac{1}{2}$

[45] $f(x,y)=\int_{xy}^{x^2-y^2} \frac{1}{\sqrt{1+t^2}} dt$ 일 때 편미분계수 $f_x(1,2)$ 의 값은? (2.3점)

- ① $\frac{1}{\sqrt{10}}-\frac{2}{\sqrt{5}}$
- ② $\frac{2}{\sqrt{10}}-\frac{1}{\sqrt{5}}$
- ③ $\frac{2}{\sqrt{10}}+\frac{2}{\sqrt{5}}$
- ④ $\frac{2}{\sqrt{10}}-\frac{2}{\sqrt{5}}$

[46] 극한 $\lim_{x \rightarrow 0} \frac{x \cos x - x e^{-x^2}}{\sin^3 x}$ 의 값은? (2.3점)

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

[47] 극한 $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{\sqrt{n^2+3kn}}$ 의 값은? (2.3점)

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

[48] 급수 $\sum_{n=1}^{\infty} |a_n|$ 과 $\sum_{n=1}^{\infty} b_n$ 이 모두 수렴할 때, 다음 중 수렴하는 급수를 모두 모은 것은? (2.3점)

$$(가) \sum_{n=1}^{\infty} (a_n + b_n)$$

$$(나) \sum_{n=1}^{\infty} a_n^2$$

$$(다) \sum_{n=1}^{\infty} \sin(|a_n|)$$

$$(라) \sum_{n=1}^{\infty} |a_n| b_n$$

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

[49] 극좌표계에서 곡선 $r=1$ 의 외부 영역 중 $r=2\cos\theta$ 의 내부에 놓이는 부분의 넓이는? (2.3점)

- ① $\frac{\pi}{3} + \frac{\sqrt{3}}{2}$
- ② $\frac{2\pi}{3} - \frac{\sqrt{3}}{4}$
- ③ $\frac{\pi}{2} + \frac{1}{2}$
- ④ $\frac{\pi}{6} + \frac{3}{2}$

[50] 원뿔면 $z=\sqrt{x^2+y^2}$ 위와 구면 $x^2+y^2+z^2=2$ 의 내부에 놓이는 입체의 부피는? (2.3점)

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