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Ⓐ형

출제문항 : 영어 20문항, 수학 20문항 - 90분

지망학과/전공	수험번호	성명

<영어>

▣ [1-2] Choose the answer that has the closest meaning to the word underlined in each sentence below.

1. The reason is that many scientists had argued that Martian soil was probably too acidic, or salty, to support life. [1점]

- Ⓐ acquiesce Ⓑ explicate Ⓒ flare
 Ⓓ skim off Ⓔ sustain

2. An extensive study of ancient DNA suggests that a wave of newcomers – and perhaps the first Celtic languages – crossed the English Channel three millenniums ago. [1점]

- Ⓐ voluminous Ⓑ exhilarating Ⓒ exhausted
 Ⓓ sparse Ⓔ hereditary

▣ [3-4] Identify the LEAST acceptable expression underlined in each passage below.

3. The 64th annual ceremony, which Ⓐ had set for Jan. 31 in Los Angeles, Ⓑ will be rescheduled, Ⓒ according to a joint statement on Wednesday from the Recording Academy and CBS, Ⓓ as the Omicron variant Ⓔ has led to a surge in cases nationwide. [1점]

4. High blood pressure remains a Ⓐ leading cause of death and disability in America today. Nearly Ⓑ half of adults have high blood pressure, and only a quarter of them Ⓒ has their blood pressure under control, Ⓓ putting them at increased risk of heart attack, stroke, dementia, kidney disease and Ⓔ other

ills. [2점]

▣ [5-8] Complete each passage with the best expression.

5. The leak links Russian President Vladimir Putin to secret assets in Monaco, and shows the Czech Prime Minister Andrej Babis failed to () an offshore investment company used to purchase two villas for £12m in the south of France. [2점]

- Ⓐ abuse Ⓑ contend Ⓒ declare
 Ⓓ prohibit Ⓔ save

6. David Unaipon was the first Aboriginal author () after he was commissioned in the early 1920s by the University of Adelaide to assemble a book on Aboriginal legends. [1점]

- Ⓐ publish Ⓑ published Ⓒ to publish
 Ⓓ to have published Ⓔ to be published

7. For decades, Linda Larson has been trying to distance herself from the diagnosis she was given as a teenager: schizophrenia. She accepts that she has the mental disorder but deeply resents the term's stigma. People hear it and think, "violent, amoral, unhygienic," she said. Ms. Larson, 74, is part of a group trying to remove that association – by (). The idea is that replacing the term "schizophrenia" with something less frightening and more descriptive will not only change how the public perceives people with the diagnosis, but also how these people see themselves. [3점]

- Ⓐ founding more mental clinics
 Ⓑ funding medical researchers
 Ⓒ awakening the dormant humanism of the public

- Ⓓ making more scientific diagnosis
- Ⓔ changing the name of the illness

8. The capacity for language, perhaps more than any other attribute, distinguishes humans from other animals. According to the philosophy expressed in many myths and religions, language is the source of human life and power. To some people of Africa, a newborn child is a *kintu*, a “thing,” not yet a *mntu*, a “person.” It is only by () that the child becomes a human being. To understand our humanity, we must understand the nature of language that makes us human. [2점]

- Ⓐ parental care and love
- Ⓑ the act of learning language
- Ⓒ getting educated exclusively in Africa
- Ⓓ making early medical checks
- Ⓔ learning more myths and religions

■ [9-20] Read each passage below and answer the questions that follow.

Health and fitness experts have long described “weekend warriors” in a mildly negative way. They used the term for individuals who exercised irregularly, perhaps in weekend pickup games. They warned of muscle strains, or much worse – something akin to the heart attacks suffered by those who occasionally shovel snow. Weekend warrior meant, more or less, (A) “knucklehead.” But no more. A large new study in JAMA Internal Medicine has revealed large mortality benefits for all manner of weekend warriors. Those who worked out once or twice a week had a 30 percent lower mortality rate (during the study period, from 1994 to 2012) than those who didn’t exercise at all. Despite their infrequent workouts, these individuals exceeded the 150 minutes a week of moderate to vigorous exercise advocated by U.S. and world health organizations. In that regard, their good results might have been expected. The study was based on more than 63,000 British and Scottish adults with an average age of 58. A research team from the United Kingdom, Australia and Harvard University collaborated on the analysis.

9. The underlined word (A) “knucklehead” means _____. [2점]

- Ⓐ addict Ⓑ dumbbell Ⓒ hotspur
- Ⓓ patient Ⓔ time-saver

10. According to the passage, which of the following is true about “weekend warriors”? [3점]

- Ⓐ Health and fitness experts still look at them through negative eyes.
- Ⓑ They got the name because they exercised

regularly in the weekend.

- Ⓒ They were warned of having muscle injuries or serious health problems.
- Ⓓ A new study found an increase in mortality rates among them.
- Ⓔ Despite their infrequent workouts, they had a 30 percent higher mortality rate than those who didn’t exercise at all.

11. Which of the following sayings can be inferred from the passage? [2점]

- Ⓐ A bird in the hand is worth two in the bush.
- Ⓑ Don’t put all your eggs in one basket.
- Ⓒ Anything is better than nothing.
- Ⓓ Haste makes wastes.
- Ⓔ Time is money.

Adidas’s partnership with Parley for the Oceans, a group that promotes awareness about the oceans, shows how ecodesign can be (A). In 2016, Adidas began selling a running shoe manufactured with recycled ocean plastic and fishing nets. The idea caught on, and the company is now offering more Earth-friendly products. “A running shoe is an object that people can relate to,” the shoe’s designer, Alexander Taylor, told TFK. “I never expected [it] to have the impact it has had.” Recycled deep-sea fishing nets and about 16 plastic bottles are used to make each shoe. Parley for the Oceans collects the plastic from coastal areas around Maldives, an island nation in the Indian Ocean.

12. What is the main purpose of this article? [2점]

- Ⓐ to say the importance of partnership
- Ⓑ to explain the usefulness of ecodesign
- Ⓒ to show how to increase sales
- Ⓓ to ensure more traditional products
- Ⓔ to emphasize the importance of being creative

13. Which of the following is NOT true? [3점]

- Ⓐ Adidas formed a partnership with an environmental organization.
- Ⓑ Adidas rolled out its green shoe of recycled plastics in 2016.
- Ⓒ Earth-friendly products sell well in the market.
- Ⓓ Each shoe can be made with recycled fishing nets and nearly 16 plastic bottles.
- Ⓔ Collected plastics are recycled and made into shoes in Maldives.

14. Choose one that best fits into the underlined (A). [2점]

- Ⓐ cheap Ⓑ difficult Ⓒ expensive
- Ⓓ profitable Ⓔ meaningless

While the federal government does not recognize a medical use for most of the psychedelic drugs and says they have potential for abuse, some of the most prominent universities in the world are studying four substances in particular: psilocybin, ketamine, MDMA and LSD. The bulk of available research suggests that these substances hold promise as part of larger treatment plans. There is also growing evidence that psychedelic drugs operate differently in the brain than addictive drugs, and advocates have been consistently calling for (A). But psychedelics remain expensive and difficult to gain access to legally, unless you are part of a research study for mental health purposes. These drugs are not all the same and do come with risks. One quality they share is the ability to create an altered state of consciousness, commonly referred to as a trip. That effect can either provide a sense of perspective – or be downright terrifying. “You’re not likely to overdose on them, but you can have life-changing negative experiences,” Katharine Neill Harris, a drug policy researcher at Rice University in Texas, said. To avoid these experiences, while receiving the benefits these drugs can offer, people have started microdosing smaller amounts at regular intervals – but they are often doing so without professional guidance, and some remain uninformed about significant downsides with very little evidence of benefits.

Each year, I look ahead at what’s new in consumer technology to guide you through what you might expect to buy – and what will most likely be a fad. Many of the same “trends” appear again and again because, to put it simply, technology takes a long time to mature before most of us actually want to buy it. That applies this year as well. Some trends for 2022 that tech companies are pushing are things you will have heard of before. A chief example is virtual reality, the technology that involves wearing goofy-looking headgear and swinging around controllers to play 3-D games. That is expected to be front and center again this year, remarketed by the Facebook founder Mark Zuckerberg and other techies as “the metaverse.” Another buzzy category will be the so-called smart home, the technology to control home appliances by shouting voice commands at a speaker or tapping a button on a smartphone. The truth is, the tech industry has tried to push this kind of technology into our homes for more than a decade. This year, these products may finally begin to feel practical to own. Another recurring technology on this list is digital health gear that tracks our fitness and helps us diagnose possible ailments. And automakers, which have long talked about electric cars, are beginning to accelerate their plans to meet a nationwide goal to phase out production of gas-powered cars by 2030. Here are four tech trends that will invade our lives this year.

15. What is the best title of the above passage? [2점]

- (A) The Best Strategies to Buy Good Psychedelics
- (B) The Inconsistent Government Policies towards Drugs
- (C) The Emergent Necessity to Prevent Psychedelic Use
- (D) The Promises and Perils of Psychedelic Drugs
- (E) The Medical Research on Overdosing and Microdosing

16. Which of the following best fills in the blank (A)? [1점]

- (A) legalization
- (B) metabolism
- (C) repudiation
- (D) psychiatry
- (E) prohibition

17. According to the passage, which of the following is true? [3점]

- (A) The federal government acknowledges the medical use of the drugs.
- (B) The psychedelic drugs are cheap enough to be available to poor people.
- (C) The US federal government plans to legalize some psychedelic drugs.
- (D) Psychedelic drugs are known to operate in the same way with addictive drugs in the brain.
- (E) In spite of their vulnerabilities the psychedelic drugs are in demand.

18. What is the best title of the above passage? [3점]

- (A) The Tech That Has Invaded Our Lives in History
- (B) The Inconsistent Trends in Home Economy
- (C) The Conservative Investment in Automobile Industry
- (D) The Gradual Evolution of New Technologies
- (E) The Overwhelming Effects of 3-D Games

19. What will be followed after the above passage? [2점]

- (A) more detailed elaborations of four tech trends
- (B) the marketability of computer games
- (C) the priority of technologies in food economy
- (D) the disadvantages of starting tech business
- (E) the reasons why Mark Zuckerberg turned to the smart home

20. Which is not a dominant trend in 2022? [2점]

- (A) the metaverse
- (B) gas-powered cars
- (C) the smart home
- (D) digital health gear
- (E) electric cars

1. 다음 보기 중 극한이 존재하는 것을 모두 고르면?

A. $\lim_{x \rightarrow 1^+} \frac{\sqrt{x-1}}{2x+1}$	B. $\lim_{x \rightarrow 0} \frac{\sin x}{x}$
C. $\lim_{x \rightarrow 0} \frac{x}{ x }$	D. $\lim_{x \rightarrow 2^+} \frac{(x^2+1)[x]}{(3x-1)^2}$

단, $[x]$ 는 x 를 넘지 않는 최대 정수이다. [2점]

- | | |
|-----------|--------|
| ① A, B | ② B |
| ③ B, C | ④ A, D |
| ⑤ A, B, D | |

2. 다항식 $P(x)$ 로 정의된 함수 $f(x) = \frac{P(x)}{x^2+x-2}$ 가

$\lim_{x \rightarrow 1} f(x) = 1, \lim_{x \rightarrow \infty} f(x) = 2$ 를 만족할 때, $f(0)$ 의 값은? [2점]

- ① -2 ② $-\frac{1}{2}$ ③ 0 ④ $\frac{1}{2}$ ⑤ 2

< 수학 >

*문제풀이는 문제사이의 여백을 이용할 것.

3. 포물선 $y = 2x^2$ 의 위쪽, 포물선 $y = 3 - x^2$ 의 아래쪽 영역을 y 축으로 회전하여 생기는 입체의 부피는? [2점]

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

4. 함수 $f(x) = 2x^3 + x - 3$ 일 때, $(f^{-1})'(0)$ 의 값은?
[2점]

- ① $\frac{1}{7}$ ② $\frac{1}{5}$ ③ $\frac{1}{3}$ ④ 1 ⑤ 3

5. 함수 $f(x) = x + \frac{1}{x}$ 이 구간 $[1, 4]$ 에서 미분의
평균값 정리를 만족하는 c 의 값은? [2점]

- ① $\frac{3}{2}$ ② 2 ③ $\frac{5}{2}$ ④ 3 ⑤ $\frac{7}{2}$

6. 선분 $0 \leq x \leq 10$ 모양 철사의 점 x 에서 질량 밀도
함수가 $\delta(x) = \sqrt{x}$ 일 때, 질량 중심의 위치는?
[3점]

- ① 4 ② 5 ③ 6 ④ 7 ⑤ 8

7. 곡선 $\cos(xy) = x + y$ 위의 점 $P(0, 1)$ 에서 접선의
방정식은? [3점]

- ① $y = -2x + 1$ ② $y = -x + 1$

- ③ $y = \frac{1}{2}x + 1$ ④ $y = x + 1$
 ⑤ $y = 2x + 1$

- ① $-\frac{1}{5}$ ② 0 ③ $\frac{1}{5}$ ④ $\frac{2}{5}$ ⑤ $\frac{3}{5}$

8. 정적분의 미분 $\frac{d}{dx} \left(\int_x^{2x^2} \sqrt{t^2 + 2} dt \right)$ 을 구하면?
 [3점]

- ① $\sqrt{4x^4 + 2} - \sqrt{x^2 + 2}$
 ② $2x \sqrt{4x^4 + 2} - \sqrt{x^2 + 2}$
 ③ $4x \sqrt{4x^4 + 2} - \sqrt{x^2 + 2}$
 ④ $2x^2 \sqrt{4x^4 + 2} - \sqrt{x^2 + 2}$
 ⑤ $4x^2 \sqrt{4x^4 + 2} - \sqrt{x^2 + 2}$

10. 3차원 공간에서 원점과 곡면 $x^2 - yz^2 - 4 = 0$ 사이의 거리는? [3점]

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

9. 함수 $f(x, y) = x^2 + xy - 2y^2$ 에 대하여 점 $P(1, 1)$ 에서 벡터 $\vec{v} = \left(\frac{4}{5}, \frac{3}{5} \right)$ 방향으로 방향도함수는? [3점]

11. $x^2 + y^2 \leq 1$, $y \geq 0$ 으로 정의된 영역 S 에서 적분 가능한 함수 $f(x, y)$ 에 대해 다음 보기 중 이중적분

$\iint_S f(x,y)dA$ 와 같은 것을 모두 고르면? [3점]

A. $\int_{-1}^1 \int_0^{\sqrt{1-x^2}} f(x,y) dy dx$

B. $\int_0^1 \int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} f(x,y) dx dy$

C. $\int_0^\pi \int_0^1 f(r \cos \theta, r \sin \theta) dr d\theta$

- ① A ② B
 ③ A, B ④ B, C
 ⑤ A, B, C

12. 3차원 공간에서 점 $P(3,0,-1)$ 과 직선

$x-2 = \frac{y-1}{2} = z$ 사이의 거리는? [3점]

- ① $\sqrt{\frac{2}{3}}$ ② $\sqrt{\frac{4}{3}}$ ③ $\sqrt{\frac{5}{3}}$
 ④ $\sqrt{\frac{7}{3}}$ ⑤ $\sqrt{\frac{8}{3}}$

13. 연립 일차 방정식

$$\begin{cases} x_1 + 3x_2 - 2x_3 & = 3 \\ 2x_1 + 6x_2 - 2x_3 + 4x_4 & = 18 \\ x_2 + x_3 + 3x_4 & = 10 \end{cases}$$

의 일반해를 매개변수 t 를 이용하여 표현하면? [3점]

- ① $x_1 = 3-t, x_2 = 4-t, x_3 = 6-2t, x_4 = t$
 ② $x_1 = 3+t, x_2 = 4-t, x_3 = 6-2t, x_4 = t$
 ③ $x_1 = 3-t, x_2 = 4+t, x_3 = 6-2t, x_4 = t$
 ④ $x_1 = 3-t, x_2 = 4-t, x_3 = 6+2t, x_4 = t$
 ⑤ $x_1 = 3+t, x_2 = 4+t, x_3 = 6+2t, x_4 = t$

14. 행렬 $A = \begin{pmatrix} 2 & -1 & -2 \\ 2 & -2 & -1 \\ 3 & -2 & -2 \end{pmatrix}$ 의 세 고윳값의 합은?

[3점]

- ① -2 ② -1 ③ 0 ④ 1 ⑤ 2

15. 행렬 $A = \begin{pmatrix} 1 & -1 & 0 & 0 & 1 \\ 2 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3 \\ 0 & 1 & 1 & 0 & 1 \end{pmatrix}$ 의 계수(rank)는? [3점]

- ① 1 ② 2 ③ 3 ④ 4 ⑤ 5

16. 적분 $\int_1^3 \frac{dx}{\sqrt{x^2 - 2x + 5}}$ 의 값은? [4점]

- ① $\ln(\sqrt{2}-1)$ ② $\ln(2+\sqrt{2})$
 ③ $\ln(2-\sqrt{2})$ ④ $\ln(\sqrt{2}+1)$
 ⑤ $\ln(2\sqrt{2}+1)$

17. 부정적분 $\int \frac{3x^2 - x + 4}{x^3 - x^2 - x + 1} dx$ 를 계산하면? [4점]

- ① $\ln(x+1)^2|x-1| + \frac{2}{x-1} + C$
 ② $\ln(x+1)^2|x-1| + \frac{1}{x-1} + C$
 ③ $\ln(x+1)^2|x-1| - \frac{1}{x-1} + C$
 ④ $\ln(x+1)^2|x-1| - \frac{2}{x-1} + C$
 ⑤ $\ln(x+1)^2|x-1| - \frac{3}{x-1} + C$

18. $x = r \cos \theta$, $y = r \sin \theta$ 일 때, 함수

$f(x, y) = \theta + \ln r$ 에 대해 $\frac{\partial f}{\partial x}(x, y)$ 는? [4점]

- ① $\frac{2(x+y)}{x^2+y^2}$ ② $\frac{2(x-y)}{x^2+y^2}$
 ③ $\frac{x+y}{x^2+y^2}$ ④ $\frac{x-y}{x^2+y^2}$
 ⑤ $\frac{x+y}{2(x^2+y^2)}$

19. 영역 $x^2 + 2y^2 \leq 9$ 에서 함수

$f(x, y) = \frac{x^2}{2} + y^2 - 2x - 2y$ 의 최댓값과 최솟값의
합은? [4점]

① $3\sqrt{6} - \frac{3}{2}$

② $3\sqrt{6} - \frac{1}{2}$

③ $3\sqrt{6}$

④ $3\sqrt{6} + \frac{1}{2}$

⑤ $3\sqrt{6} + \frac{3}{2}$

20. 단위원 $x^2 + y^2 = 1$ 을 반시계 방향으로 매개화한
곡선 C 에 대해 선적분

$$\oint_C x^2(x-y) dx + y^2(x-y) dy$$

의 값은? [4점]

① $\frac{\pi}{4}$

② $\frac{\pi}{2}$

③ π

④ 2π

⑤ 4π

[끝]