

2017학년도
아주대학교 편입학 수강능력시험

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Questions 1-5: Choose the one word or phrase that best completes the sentence.

1. (0.8 points) Only when the skill is repeated with consistently correct outcomes _____.
- ① has it truly been learned
 - ② has been it truly learned
 - ③ it has truly been learned
 - ④ has it truly been learning
 - ⑤ it has been truly learning
2. (0.8 points) The ability to control the calendar could have provided a source of power _____ the ancient city.
- ① who has ruled
 - ② whoever ruled
 - ③ for whom ruled
 - ④ for who has ruled
 - ⑤ for whoever ruled
3. (1.0 points) He believes that sharks are eating _____ calories because of the boats and snorkelers.
- ① less and taking less
 - ② less and taking fewer
 - ③ fewer and taking fewer
 - ④ less and taking in fewer
 - ⑤ fewer and taking in less
4. (0.8 points) If sales had not improved, we _____ to consider selling the company last year.
- ① have
 - ② will have
 - ③ will have had
 - ④ would have had
 - ⑤ would have been had

5. (0.8 points) _____, the answer to many kinds of pain, from sore joints and back pain to headaches and stomachaches, may be in the kitchen rather than in the medicine cabinet.

- ① As may it sound surprising
- ② Surprising as it may sound
- ③ Sound surprising as it may
- ④ May sound surprising as it
- ⑤ It may sound surprising as

Questions 6-10: Choose the underlined word or phrase that must be changed for the sentence to be correct.

6. (1 points) The early nineteenth century ①was constituted a period of massive migration in the U.S. as white settlers ②moved westward in droves. The American government enacted ③the forced relocation of Native American tribes to government-established reservation, but continued settlement ④further raised the demand for land. However, the Native American practice of communal use of land made it nearly impossible ⑤to acquire reservation land from tribes.

7. (0.8 points) Plants are experts in survival and can control the direction of their roots to ①maximize the use of resources around them. ②Using specialized cells, they can sense gravity and redistribute hormones, ③called auxins, to stimulate growth and allow vital features of the plant ④develop. However, a big puzzle is ⑤how this transport process occurs at a cellular level.

8. (0.8 points) Acute stress is ①the most common form of stress. It ②comes from demands and pressures of ③the recent past and ④anticipated demands and pressures of the near future. Acute stress is thrilling and exciting in small doses, but ⑤too many is exhausting.

9. (0.8 points) Artificial intelligence (AI) is part of our global culture, and ①their impact on our everyday lives ②is growing. Searching for news ③about AI presents a deluge of information. Why not ④use a little AI of our own ⑤to better handle the task?

10. (1.0 points) Architecture in colonial times in North America ①was greatly influenced by European styles. ②The English settlers modeled their private houses and buildings ③at English styles. The Swedes in Delaware ④introduced the log cabin. ⑤The French influenced architecture in Quebec and Louisiana.

Questions 11-12: Choose the number with a correct set of statements that can be restated or inferred from the original sentence. (1.2 points for each question)

11. Although a human infant is ill equipped for independent survival in the first years of its life compared to lower order life forms, as it grows it will become far more adept at survival than other organisms thanks to its brain with an astonishing memory capacity.

- (a) Human infants are largely helpless when first born.
 (b) Lower order life forms are to be born ready-made.
 (c) Human beings are the products of better evolutionary processes.
 (d) Human infants are better prepared to participate in life with a minimum of learning.

- ① (a) & (b)
 ② (a) & (d)
 ③ (b) & (c)
 ④ (b) & (d)
 ⑤ (a), (b) & (c)

12. Research has shown that aggressive behavior can be acquired through a combination of modeling and positive reinforcement of the aggressive behavior; children are influenced by the combined forces of observing aggressive behavior in live or fictional role models and of noting either positive reinforcement for the aggressive behavior, or a lack of negative reinforcement for the aggressive behavior.

- (a) Aggression can be viewed as a learned behavior.
- (b) Children will learn aggression even when the aggression is negatively reinforced.
- (c) Aggression of a fictional role model can be more influential than that of a live role model.
- (d) Children can learn aggressive behavior by seeing aggressive behavior that is rewarded or is not punished.

- ① (a) & (b)
- ② (a) & (d)
- ③ (b) & (c)
- ④ (b) & (d)
- ⑤ (a), (c) & (d)

Questions 13-25: Read each passage and answer the corresponding questions for each.

※ Questions 13 through 16 are based on the following passage.

[A] A quarter century after scientists proposed an idea that profoundly influenced the arc of Alzheimer's research, they might finally find out whether they are correct. A new antibody drug called aducanumab appears to sweep the brain clean of sticky amyloid-beta (A-beta) protein. ❶ The drug may or may not become a breakthrough Alzheimer's treatment, but either way it will probably answer a key question: Have researchers been aiming at the right target? ❷

[B] According to the proposal, called the amyloid hypothesis, Alzheimer's disease, estimated to affect more than 5 million people in the United States alone, is caused by abnormal buildup of A-beta protein in the brain. The buildup chokes vital brain areas and destroys nerve cells. Despite (a) _____ much support in recent decades, the proposal hasn't managed to shake off its detractors. ❸

[C] Aducanumab offers a seemingly reliable and safe way to lower A-beta levels and thus test the amyloid hypothesis. Over the course of a year, aducanumab entered the brains of people with early Alzheimer's disease and cleared out the A-beta, scientists reported in September in the academic journal *Nature*. ❹ The trial was small including only 165 people. Yet in these people's brains, A-beta clearly declined. The higher the dose, the more A-beta cleanup.

[D] There were hints that people on higher doses of the drug had cognitive improvements, too. If confirmed in larger studies, those cognitive benefits would be a game changer for the field. ❺

[E] There is already strong evidence that A-beta is a disease culprit: Rare genetic mutations in genes related to A-beta almost always come with Alzheimer's, an observation that has been confirmed in mice. A-beta is toxic to nerve cells in dishes, damaging their communication abilities before eventually killing the cells outright. Yet contradictions exist. Cognitively healthy people have been found with A-beta accumulation in their brain. And so far, scientists have found only a weak correlation between A-beta plaques and cognition, results that have led some scientists to look elsewhere.

13. (1 points) What does the above passage mainly discuss?

- ① A promising Alzheimer's drug
- ② Causes of Alzheimer's disease
- ③ The history of Alzheimer's studies
- ④ Devastating results of Alzheimer's disease
- ⑤ The difficulty of diagnosing Alzheimer's disease

14. (1.2 points) The following is removed from the passage. In which parts may it be inserted to support the argument made by the author?

However, those results need to be treated with caution for now at least until the larger studies currently under way are completed.

- ① **1**
- ② **2**
- ③ **3**
- ④ **4**
- ⑤ **5**

15. (1.2 points) Which of the following is TRUE about the above passage?

- ① Alzheimer's has been studied for almost 25 years.
- ② Aducanumab is proved to increase A-beta protein.
- ③ The reported experiment is carried out on a large scale.
- ④ Genetic mutations related to A-beta are rarely observed in Alzheimer's patients.
- ⑤ The amyloid hypothesis claims that the cause of Alzheimer's is A-beta protein in the brain.

16. (1 points) Which of the following can best fill in the blank (a) in paragraph [B]?

- ① abiding
- ② amassing
- ③ arranging
- ④ alleviating
- ⑤ abandoning

※ Questions 17 through 20 are based on the following passage.

[A] Business and business schools have a symbiotic relationship; the former looks to the latter to provide a steady stream of suitably qualified graduates into their companies year upon year. The connection between schools and companies is close but generally informal. That is, firms suggest areas in which they feel the latest crop of graduates are lacking in knowledge, and schools sometimes take action to improve their tuition in that area. That arm's length relationship, however, might be changing.

[B] "We have these conversations already with employers, but we wanted to formalize it," explains Joyce Russell, dean at Villanova School of Business. The school is working together with KPMG, one of the four largest accounting firms, to provide a specialized business program. A task force from Villanova is holding meetings with KPMG to discuss the curriculum that will be taught next year. Though it is early days, Ms. Russell is keen to see other organizations become more involved with drawing up tuition.

[C] Such an arrangement, she reasons, benefits all parties; businesses can **(a) take on** students who are "the finished product", rather than have to invest time teaching them additional skills that individual firms require. Students gain job security, need not pay for tuition themselves and become more employable as a result. At the same time, business schools can claim to teach more relevant skills to employers, and to place graduates in jobs more easily than before.

[D] Yet at the heart of this decision is a **(b) _____** that business schools have wrestled with since their inception. On the one hand, they long to be taken seriously as independent academic institutions. Tell them they are mere vocational training centers and they will smart. On the other hand, they aspire to be relevant to real world businesses. Judging what firms need and adapting the curriculum is one thing; having firms help directly to design a degree program, some will feel, is a step too far.

[E] The problem is that academic bureaucracy slows down the pace at which business schools adapt. For that reason, KPMG has had to step in to speed up the process. Business schools' inability to prepare students well enough for the workplace is particularly acute for employers

17. (1.2 points) Which of the following is the best title of the above passage?
- ① Academic bureaucracy
 - ② Alliance between school and business
 - ③ Traditional kinds of business education
 - ④ Business schools preparing for the future
 - ⑤ Blurry lines between academia and business
18. (0.8 points) Which of the following can the underlined expression (a) take on in paragraph [C] be best replaced with?
- ① assign
 - ② secure
 - ③ employ
 - ④ guarantee
 - ⑤ implement
19. (1 points) Which word best fits the blank (b) in paragraph [D]?
- ① riddle
 - ② breach
 - ③ dilemma
 - ④ rationale
 - ⑤ proposition
20. (1 points) Which of the following is NOT included in the benefits of the project mentioned in the above passage?
- ① Students can save money.
 - ② Students' employability will be enhanced.
 - ③ Students can be taught more relevant skills.
 - ④ Business schools can choose students more easily.
 - ⑤ Businesses can reduce time spent training graduates further.

※ Questions 21 through 25 are based on the following passage.

[A] Prior to 1914 the dominant mood in Europe was one of pride in the accomplishments of Western civilization and confidence in its future progress. Advances in science and technology, the rising standard of living, the spread of democratic institutions and the expansion of social reforms all contributed to a sense of optimism. Another reason for optimism was that since the defeat of Napoleon, Europe had avoided a general war, and that since the Franco-Prussian War, the Great Powers had not fought each other.

[B] Few people recognized that these achievements masked an inner turbulence that was propelling Western civilization toward a cataclysm. The European state system was failing. ❶ In the early nineteenth century, liberals had believed that the redrawing of the political map of Europe on the basis of nationality would promote peaceful relations among nations. But quite the reverse occurred. ❷ By 1914, national states, answering to no higher power, were fueled by an explosive nationalism, and were grouped into alliances that faced each other with ever-mounting hostility. Nationalist thinkers propagated pseudoscientific racial and Social Darwinist doctrines that glorified conflict and justified the subjugation of other peoples. Committed to enhancing national power, statesmen lost sight of Europe as a community of nations sharing a common civilization. (a) Caution and restraint gave way to belligerency in foreign relations.

[C] A cultural crisis also occurred. ❸ Many European intellectuals attacked the rational tradition of the Enlightenment and celebrated the primitive, the instinctual, and the irrational. Increasingly young people grew attracted to philosophies of action that ridiculed liberal bourgeois values and viewed war as a purifying and ennobling experience. ❹ These “splendid” little wars helped fashion an attitude that made war acceptable, if not laudable. Yearning to break loose from their ordinary lives and to embrace heroic values, (b) _____

[D] While Europe was seemingly progressing in the art of civilization, the mythic power of nationalism and the primitive appeal of conflict were driving European civilization to the abyss. ❺ Few people recognized the potential crisis, including the statesmen whose blunders and recklessness allowed the Continent to stumble into war.

21. (1.2 points) What is the best title for the above passage?
- ① the West in despair
 - ② the drift toward war
 - ③ the European system of alliances
 - ④ the downside of Western civilization
 - ⑤ the failure of the European state system
22. (1.0 points) Which of the following is NOT relevant to the proposition (a) in paragraph [B]?
- ① Nationalism prevailed in most European states.
 - ② The idea of glorifying conflict was spread by nationalists.
 - ③ Politicians revised the European map based on nationality.
 - ④ Groups of European nations stood in opposition to each other.
 - ⑤ Political leaders abandoned the idea of Europe as a single community.
23. (1.2 points) In paragraph [C], which of the following would best fit in the blank (b)?
- ① people found heightened agitation among the several nationalities, which created terrible anxiety among political leaders.
 - ② most thinkers emphasized their concern for individual liberty and social reform.
 - ③ many Europeans regarded violent conflict as the highest expression of individual and national life.
 - ④ scientists expected the advance of science and technology to make mankind richer.
 - ⑤ people tried to solve the problem of the irrational in a scientific manner.
24. (1 points) According to the passage, which of the following did NOT contribute to the sense of optimism in Europe before 1914?
- ① the increase of social reforms
 - ② the awareness of the lack of wars
 - ③ the progress in science and technology
 - ④ the improvement in the standard of living
 - ⑤ the avoidance of general wars and conflicts

25. (1.2 points) The following is removed from the passage. In which parts may it be inserted to support the argument made by the author?

Colonial wars, colorfully portrayed in the popular press, ignited the imagination of bored factory workers and daydreaming students and reinforced a sense of duty and an urge for gallantry among soldiers.

- ① **1**
- ② **2**
- ③ **3**
- ④ **4**
- ⑤ **5**

※ (문제 26 - 50) 다음 물음에 답하라.

26. $\sin\left(\cos^{-1}\frac{3}{5}\right) + \sin\left(\tan^{-1}\frac{1}{4}\right)$ 의 값은?

- ① $\frac{3}{5} + \frac{1}{\sqrt{17}}$ ② $\frac{4}{5} + \frac{1}{\sqrt{17}}$ ③ $\frac{3}{5} + \frac{1}{\sqrt{15}}$ ④ $\frac{4}{5} + \frac{1}{\sqrt{15}}$ ⑤ $\frac{1}{2\sqrt{2}} + \frac{\sqrt{15}}{4}$

27. 실수 전체의 집합에서 정의된 함수 $f(x) = \operatorname{sech} x$ 의 역함수는?

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

28. $\lim_{n \rightarrow \infty} \left(\frac{n-2}{n}\right)^{3n}$ 의 값은?

- ① 1 ② e ③ e^3 ④ e^{-6} ⑤ ∞

29. 실수 전체에서 정의된 함수 $y(x)$ 가 $y(2) = -1$, $y'(x) = xy^3 - 1$ 을 만족한다고 하자. 이 함수의 일차 근사함수를 이용하여 $y(2.2)$ 의 근사값을 구하면?

- ① -1.6 ② -1.5 ③ -1.4 ④ -1.3 ⑤ -1.2

30. 방정식 $x = 2 \cos x$ 은 구간 $[0, \pi]$ 에서 유일 해를 가진다. 근사해를 찾는 고정점반복법 중 뉴턴 방법은?

- ① $x_{n+1} = 2 \cos x_n$ ② $x_{n+1} = \frac{1}{2}(x_n + 2 \cos x_n)$ ③ $x_{n+1} = x_n + \frac{\cos x_n}{\sin x_n}$
 ④ $x_{n+1} = x_n - \frac{x_n - 2 \cos x_n}{1 - 2 \sin x_n}$ ⑤ $x_{n+1} = x_n + \frac{2 \cos x_n - x_n}{2 \sin x_n + 1}$

31. $\lim_{x \rightarrow +\infty} \frac{e^x}{x^{2017}}$ 의 값은?

- ① 0 ② 1 ③ e ④ 2017 ⑤ ∞

32. 실수 전체에서 정의된 함수 f 가 $f(1)=2$, $f'(1)=-1$, $g(1)=\frac{\pi}{2}$, $g'(1)=1$ 일 때, $F'(1)$ 의 값은? 여기서 $F(x)=f(x)\cos(g(x))$ 이다.

- ① -2 ② -1 ③ 0 ④ 1 ⑤ 2

33. $f(x)=xe^{-x^2}$, $I=[-1,1]$ 에서 최솟값과 최댓값은?

- ① $-\frac{1}{e}, \frac{1}{\sqrt{2e}}$ ② $-\frac{1}{e}, \frac{1}{e}$ ③ $-\frac{1}{\sqrt{2e}}, \frac{1}{\sqrt{2e}}$ ④ $-\frac{1}{e}, \frac{2}{\sqrt{e}}$ ⑤ $-\frac{2}{\sqrt{e}}, \frac{2}{\sqrt{e}}$

34. $G(x)=\int_1^{x^2} e^{-t^2} dt$ 일 때, $G'(x)$ 는?

- ① e^{-x^2} ② xe^{-x^2} ③ e^{-x^4} ④ xe^{-x^4} ⑤ $2xe^{-x^4}$

35. $\int_0^{\frac{\pi}{2}} x \cos^3(x^2) \sin(x^2) dx$ 는?

- ① $-\frac{1}{4}$ ② $-\frac{1}{8}$ ③ 0 ④ $\frac{1}{8}$ ⑤ $\frac{1}{4}$

36. 일사분면에서 포물선 $y=x^2$, 포물선 $y=2-x^2$, 그리고 y 축으로 둘러싸인 도형을 y 축으로 회전시킨 회전체의 부피는?

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

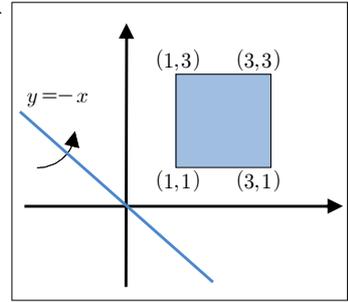
37. 함수 $y=6x$, $0 \leq x \leq 1$ 를 x 축으로 회전하여 생긴 회전체의 표면적은?

- ① $6\pi^2$ ② $2\sqrt{37}\pi$ ③ $3\sqrt{37}\pi$ ④ $3\sqrt{37}\pi^2$ ⑤ $6\sqrt{37}\pi$

38. 함수 $y=\sin \pi x$, $(0 \leq x \leq 1)$ 와 x 축으로 둘러싸인 도형의 무게중심의 y 좌표는?

- ① $\frac{1}{2}$ ② $\frac{1}{3}$ ③ $\frac{1}{4}$ ④ $\frac{\pi}{6}$ ⑤ $\frac{\pi}{8}$

39. 오른쪽의 그림에서 정사각형을 선 $y = -x$ 로 회전하여 생긴 회전체의 부피는?



- ① 12π ② $12\sqrt{2}\pi$ ③ $16\sqrt{2}\pi$
 ④ $18\sqrt{2}\pi$ ⑤ $24\sqrt{2}\pi$

40. $\int_0^{\frac{\pi}{4}} \frac{2^{\tan t}}{\cos^2 t} dt$ 의 값은?

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

41. $\lim_{x \rightarrow \pi/2^-} (\tan x)^{\cos x}$ 의 값은?

- ① 0 ② 1 ③ e ④ π ⑤ ∞

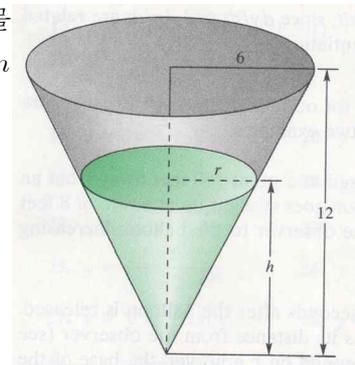
42. $\lim_{x \rightarrow 0} \frac{\tan 2x}{a \sin^{-1} x + b} = 3$ 이 되려면, a 의 값은?

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

43. $\int_2^{\infty} \frac{1}{\sqrt{x+2}-1} dx$ 의 값은?

- ① 1 ② $\frac{1}{3}$ ③ 2 ④ 4 ⑤ ∞

44. 오른쪽의 그림에서와 같이 원뿔형 탱크에 $8m^3/\text{min}$ 의 속도로 물을 넣고 있다. 만약, 탱크의 높이가 $12m$ 이고 윗면의 반경이 $6m$ 이라면 물의 깊이가 $4m$ 일 때 물의 높이의 증가 속도는?



- ① $\frac{\pi}{12}$ ② $\frac{\pi}{3}$ ③ $\frac{\pi}{2}$ ④ $\frac{2}{\pi}$ ⑤ $\frac{3}{\pi}$

45. 포물선 $y = \frac{1}{2}x^2$ 과 점 $(0,5)$ 와의 최단 거리는?

- ① 2 ② $2\sqrt{2}$ ③ 3 ④ 4 ⑤ 9

46. 함수 y 가 미분방정식 $\frac{dy}{dx} = -y^2x(x^2+2)^2$ 를 만족하고 $y(0) = \frac{3}{4}$ 일 때 $y(1)$ 의 값은?

- ① $\frac{2}{9}$ ② $\frac{2}{3}$ ③ $-\frac{2}{3}$ ④ $\frac{3}{4}$ ⑤ $-\frac{3}{4}$

47. x 축 위에 두 꼭짓점을 그리고 반원 $y = \sqrt{9-x^2}$ 위에 두 꼭짓점을 갖는 직사각형의 넓이의 최댓값은?

- ① $\sqrt{18}$ ② $2\sqrt{18}$ ③ 6 ④ 9 ⑤ 18

48. 함수 $f(x) = 3\sqrt{x}$ 에서 구간 $[1,4]$ 에서 평균값 정리를 만족하는 상수 c 의 값은?

- ① $\frac{3}{2}$ ② $\frac{3}{2\sqrt{2}}$ ③ $\frac{9}{4}$ ④ $\frac{9}{8}$ ⑤ 1

49. 다음 중 조건수렴(conditionally converge)하는 무한급수는 몇 개인가?

$\neg. \sum_{n=1}^{\infty} (-1)^{n+1} \frac{n}{10n+1}$	$\sphericalangle. \sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{5n}$
$\sqsupset. \sum_{n=1}^{\infty} (-1)^n \frac{1}{n \ln n}$	$\square. \sum_{n=1}^{\infty} \frac{\cos n\pi}{n}$

- ① 0개 ② 1개 ③ 2개 ④ 3개 ⑤ 4개

50. $2x \tan^{-1}x$ 에 대한 멱급수를 오름차순으로 정리할 때 0이 아닌 세 번째 항의 계수는?

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