

단국대학교 2021학년도 편입생 모집 필기고사

고사시간	오후
문제유형	자연계열

자연계열 문제지



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영어 [자연계열] < 오후 >

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

1. Mary suggests that you should first assess your outgoings and make financial plans accordingly.
① dividends ② dependents ③ drafts ④ expenditures
2. Due to the official parsimony of the company only one machine was built inside the compound.
① prodigality ② policy ③ regulation ④ stinginess
3. What degree of danger? Did the word “present” allude to the proximity of the danger, or just the fact that the danger was there at all—that it wasn’t an anticipated danger?
① representation ② vicinity ③ absence ④ probability
4. The nature of the inquiry is more abstruse and every step has to be most carefully watched, so that there may not be a single crack or flaw in your hypothesis.
① recondite ② subjective ③ analytic ④ comprehensible
5. Although always genial and fair, he never attempted to make the students like him. He did not act as if he were a perennial contestant in a popularity contest.
① industrious ② willing ③ lasting ④ indulgent
6. Machines have made jobs obsolete for centuries.
① facile ② eclectic ③ antiquated ④ complex
7. It’s a dangerous mix and has left many minority communities with scant reason to view the police as allies.
① inadequate ② opulent ③ lavish ④ eloquent
8. One reviewer wrote of her incomparable calamity: “You will find it hard to forget this material of human erosion.”
① acuity ② discernment ③ mishap ④ prospect

Adolescents who are low in the motive to achieve also see themselves as largely controlled rather than in control of themselves. They are not only more _____ to feel that effort is not a primary characteristic of success but also that lack of success is equated with lack of ability.

15. Which is the most appropriate for the blank?

- ① likely ② fortunate ③ blessed ④ qualified

16. According to the passage, which is true?

- ① Usually accomplishments are made without efforts.
 ② Success is usually followed by failure.
 ③ Feelings of achievement and pride are interconnected.
 ④ Those with little motivation to achieve feel that they have control power.

※ 다음 글을 읽고 물음에 답하시오. (17-19) [각3점]

The demise of baseball as our national pastime reflects a change in national character. The change does not mean the disappearance of baseball, merely its relocation to a position as just another game rather than *the game*. Professor John Finlay of the Univ. of Manitoba, writing in *Queen's Quarterly*, compares baseball to an acting out of the robber baron stage of capitalism, whereas football more clearly reflects a more mature capitalism into which we are now moving. Hence, the rise in popularity of football and apparent decline in baseball. He notes that Japan, still in the early stages of capitalism, has taken avidly to baseball but not to football. It is not a question of Japanese physique serving as a determinant since rugby has a large Asian following. He predicts that when their capitalism moves into a higher stage, the Japanese will move on to _____ as have Americans.

Baseball is a game of a quieter age when less action was needed to hold interest, when going to the park was enjoyable (baseball is still played in ball parks while football is played in stadiums), when aggression was subservient to finesse. Baseball players did not need exposure as college players to succeed as football players do; they play a relatively calm game almost daily instead of a bruising gladiatorial contest weekly. Baseball has room for unique and colorful characters, while football stresses the more anonymous but effective team member. Baseball is a game in which any team can win at any given contest and there are no favorites; only football has real “upsets.” Football’s careful concern with time adds a tension to the game that is lacking in the more leisurely world of baseball.

23. Which is the primary mode of composition of the passage?

- ① historical narration ② process analysis
③ comparison and contrast ④ cause and effect

24. In the first paragraph, which is NOT described as the two hostile pairs?

- ① severalty and history ② imagination and reason
③ romances and essays ④ poetry and philosophy

25. Which is the purpose of the second paragraph?

- ① To argue for the superiority of historical romances and what they can offer
- ② To describe what historical romances and historical essays each offer
- ③ To explain the process of making “the past present” and bringing “the distant near”
- ④ To evaluate which type of history is superior, leaving the answer up to the reader

※ 다음 글을 읽고 물음에 답하시오. (26-27) [각5점]

A major drive to find a cure for AIDS was announced last week by Donna Shalala, President Obama's Secretary of Health and Human Services. Researchers from the private sector, gay activists and government officials were teamed up to accelerate the search for an effective treatment. Yet even highly optimistic observers do not expect a cure to be found in the near future. Still, as the Shalala announcement's exclusive focus on cure shows indirectly, it is not acceptable to explore publicly the measures that could curb the spread of the disease by slowing the transmission of HIV, the virus that causes it. Indeed, before you can say "What about prevention?" the politically correct choir chimes in: "You cannot call it a plague! You are feeding the fires of homophobia!"

Case in point: a panel of seven experts fielded questions from 4,000 personnel managers at a conference in Las Vegas. “Suppose you work for medical records. You find out that Joe Doe, who is driving the company’s 18-wheeler, is back on the bottle. Will you violate confidentiality and inform his supervisor?” The panel stated unanimously, “I’ll find a way.” Next question: “Joe Smith is HIV positive; he is intimate with the top designer of the company but did not tell; will you?” “No way,” the panel agreed _____.

26. Which is the most appropriate for the blank?

- ① in unison ② in disbelief
③ to no avail ④ by comparison

27. According to the passage, which is true?

- ① The Obama Administration did not pay attention to gay rights.
- ② The cure for AIDS is certain to be found soon.
- ③ There was a conference for general affairs managers in Las Vegas.
- ④ The issue of HIV and the disease caused by it is politically sensitive.

※ 다음 글을 읽고 물음에 답하시오. (28-30) [각5점]

It has been 100 years since an infectious disease pushed the entire world's population into hiding to the extent that COVID-19 has. And the primary approaches we take to combatting emerging microbes today are likewise centuries old: quarantine, hygiene and social distancing. We may never learn exactly where SARS-CoV-2, the coronavirus that causes COVID-19, came from, and it's clearly too late to prevent it from becoming a global tragedy. But extraordinary advances in scientific knowledge have given us new tool, like genetic sequencing, for a more comprehensive understanding of this virus than anyone could have imagined even a decade or two ago. These are already providing clues about how emerging viruses like SARS-CoV-2 operate and, most important, how they can be thwarted with more effective drugs and vaccines.

This knowledge can save millions of lives—as long as science leads over politics. As unprecedented as this pandemic seems, in both scope and speed, it shouldn't have caught the world by surprise. For decades, scientific experts have been warning that emerging zoonotic viruses are a threat to humanity of the greatest magnitude. “People keep using the term *unprecedented*. I will tell you, biologically, there is nothing unprecedented about this virus really,” says Holmes, the evolutionary biologist. “It’s behaving exactly as I would expect a respiratory virus to behave.” It’s simply how viruses work, have always worked and will continue to work. The sooner we accept that, the sooner we can act on that knowledge to control outbreaks more quickly and efficiently.

28. Which is true about extraordinary advances in scientific knowledge?

- ① They revealed where the coronavirus came from.
- ② They can prevent COVID-19 from becoming a global tragedy.
- ③ They can save lots of people as politics leads over science.
- ④ They are providing clues about how emerging viruses operate.

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

- ① underestimated ② unexampled
③ unabated ④ unsanctioned

수학 [자연계열] <오후> [문항별 5점]

31. 미분가능함수 $f(x)$ 와 $g(x)$ 가

$$\lim_{x \rightarrow 1} \frac{f(x) - 3}{x - 1} = 1, \quad \lim_{x \rightarrow 1} \frac{g(x) + 2}{x - 1} = 2$$

를 만족시킬 때, 함수 $h(x) = f(x)g(x)$ 에 대하여 $h'(1)$ 의 값은?

- ① 0 ② 1 ③ 2 ④ 4

32. 두 상수 a, b 에 대하여

함수 $f(x) = -2x^3 + ax^2 - 12x + b$ 가 $x = 2$ 에서 극댓값 6을 가질 때, $a + b$ 의 값은?

- ① 19 ② 20 ③ 21 ④ 22

33. 직선 $y = -x$, $y = x + 6$ 과 곡선 $y = x^3$ 으로 둘러싸인 영역의 넓이는?

- ① 17 ② 18 ③ 19 ④ 20

34. 곡선 $x = \sqrt{1 - y^2}$ 과 y 축으로 둘러싸인 영역을 직선 $x = -1$ 을 중심으로 회전시켜 얻은 입체의 부피는?

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

35. 멱급수 $\sum_{n=1}^{\infty} (-1)^n \frac{(2x-3)^n}{7^n \sqrt{n}}$ 이 수렴하는 모든 정수 x 의 개수는?

- ① 5 ② 6 ③ 7 ④ 8

36. 극곡선 $r = 2 + 2\sin\theta$ 의 둘레의 길이는?

- ① 12 ② 16 ③ 20 ④ 24

37. 3차원 공간에서 네 점 $P(-2, 1, 0)$, $Q(2, 3, 2)$, $R(2, 4, -2)$, $S(3, 6, 0)$ 을 꼭짓점으로 하는 사면체 PQRS의 부피는?

- ① 5 ② 7 ③ 9 ④ 11

38. 점 $P(2, 0)$ 에서부터 점 $Q(\frac{1}{2}, 2)$ 까지의 방향으로 점 $P(2, 0)$ 에서 함수 $f(x, y) = xe^y$ 의 방향도함수는?

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

39. 양의 실수 a 에 대하여, E 를 곡면 $z = \sqrt{x^2 + y^2}$ 과 평면 $z = a$ 로 둘러싸인 입체라 하자. 삼중적분 $\iiint_E (x^2 + y^2) dV$ 의 값이 $\frac{16}{5}\pi$ 일 때, a 의 값은?

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

40. 세 점 $(0,0)$, $(3,3)$, $(-3,3)$ 을 꼭짓점으로 하는 삼각형 영역을 D 라 하자. D 위에서 정의된 함수 $f(x,y) = 4y - x^2 - y^2$ 의 최댓값을 M , 최솟값을 m 이라 할 때, $M+m$ 의 값은?

- ① -6 ② -4 ③ -2 ④ 0

41. 영역 $D = \{(x,y) \mid x^2 - xy + y^2 \leq 2\}$ 에 대하여, 이중적분 $\iint_D (x^2 - xy + y^2) dA$ 의 값은?

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

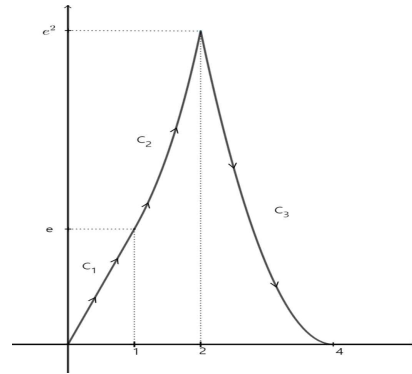
42. 아래 그림과 같이 곡선 C 는

- 점 $(0,0)$ 에서 점 $(1,e)$ 까지 선분 C_1
- 곡선 $y = e^x$ 위의 점 $(1,e)$ 에서 점 $(2,e^2)$ 까지 호 C_2
- 곡선 $y = \frac{e^2}{4}(x-4)^2$ 위의 점 $(2,e^2)$ 에서 점 $(4,0)$ 까지 호 C_3

로 이루어져 있다. 벡터장

$$\vec{F}(x,y) = \langle 3 + 2xy, x^2 - 3y^2 + \cos y^2 \rangle$$

에 대하여 선적분 $\int_C \vec{F} \cdot d\vec{r}$ 의 값은?



- ① $3e^2$ ② 12 ③ $9e^2$ ④ 15

43. 곡면 S 의 매개변수표현이

$$x = r \cos \theta, y = r \sin \theta, z = \theta \quad (0 \leq \theta \leq 2\pi, 0 \leq r \leq 1)$$

일 때, S 의 넓이는?

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

44. 곡선 C 는 평면 $x + y + z = 2$ 와 원기둥 $x^2 + y^2 = 4$ 의 교선이다. 벡터장 $\vec{F}(x,y,z) = \langle -y^3, x^3, -z^3 \rangle$ 에 대하여, 선적분 $\int_C \vec{F} \cdot d\vec{r}$ 의 값은?

(단, C 의 방향은 위에서 내려다봤을 때 시계 반대 방향이다.)

- ① 8π ② 16π ③ 24π ④ 32π

45. 행렬 $A = \begin{pmatrix} 1 & 1 & 5 \\ 0 & -1 & 1 \\ 3 & 4 & 13 \end{pmatrix}$ 에 대하여 $AB = A^2 - 3A + E$ 를 만족시키는 행렬 B 의 행렬식(determinant)은?
(단, E 는 단위행렬이다.)

- ① 1305 ② 1307
- ③ 1309 ④ 1311

46. 벡터공간 $P_2 = \{ax^2 + bx + c \mid a, b, c \in \mathbb{R}\}$ 에 대하여 선형변환 $T: P_2 \rightarrow P_2$ 가
 $T(x^2 - x) = x - 2$
 $T(x - 1) = x^2 - x$
 $T(x^2 + 1) = x^2 - 1$
을 만족시킨다. $T(x^2 - 5x + 2) = \alpha x^2 + \beta x + \gamma$ 일 때,
 $\alpha + \beta + \gamma$ 의 값은? (단, α, β, γ 는 실수이다.)

- ① -2 ② 0 ③ 2 ④ 4

47. 행렬 $A = \begin{pmatrix} 1 & 2 & 1 & 1 \\ 3 & 4 & 2 & 2 \\ -1 & 2 & 2 & 1 \\ 1 & 2 & 3 & -1 \end{pmatrix}$ 에 대하여 $2A$ 의 전치행렬(transpose)의 행렬식(determinant)은?

- ① 8 ② 16 ③ 32 ④ 64

48. $y = y(x)$ 가 미분방정식
 $x^2y'' + xy' - y = x, \quad y(1) = \frac{1}{2}, \quad y(e) = e$
의 해일 때, $y(e^2)$ 의 값은?

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

49. $y = y(x)$ 가 미분방정식
 $y'' - 2y' + y = xe^x \ln x, \quad y(1) = 0, \quad y'(1) = 0$
의 해일 때, $y(2)$ 의 값은?

- ① $\left(\frac{2}{3}\ln 2 - \frac{13}{18}\right)e^2$ ② $\left(\frac{4}{3}\ln 2 - \frac{13}{18}\right)e^2$
- ③ $\left(\frac{2}{3}\ln 2 - \frac{11}{18}\right)e^2$ ④ $\left(\frac{4}{3}\ln 2 - \frac{11}{18}\right)e^2$

50. 역라플라스변환(inverse Laplace transform)
 $\mathcal{L}^{-1}\left\{\frac{3s+4\sqrt{5}}{s^2+5}\right\}$ 를 $f(t)$ 라 하자. $f(t)$ 의
최댓값을 α , 주기를 β 라 할 때, $\alpha\beta^2$ 의 값은?

- ① $2\pi^2$ ② $4\pi^2$ ③ $6\pi^2$ ④ $8\pi^2$

영어 정답표 [자연계열] < 오후 >

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

수학 정답표 [자연계열] < 오후 >

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