

단국대학교 2021학년도 편입생 모집 필기고사

고사시간	오전
문제유형	자연계열

자연계열 문제지



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영어 [자연계열] < 오전 >

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

1. Warm winds make many people feel enervated and depressed; that is why the folks here are lethargic during this period.
① energized ② refreshed ③ unsatisfied ④ tired
2. There is too much crime and gratuitous violence on TV, which gives bad influence on the adolescents and the young.
① potent ② unnecessary ③ uncivilized ④ disastrous
3. The gargantuan corruption scandal within the ruling party was first disclosed by a righteous young reporter of a small newspaper company.
① huge ② putrid ③ abominable ④ suspicious
4. Whilst the social and political conditions of humans have changed, we too, their progeny, find ourselves facing a situation where we have to struggle for our very survival as human beings.
① posterity ② legacy ③ property ④ ancestor
5. His grief, which has abated for a short while, returns and rends his heart with greater force.
① fills ② tears ③ packs ④ reminds
6. Americans separated by scourges more than a century apart share the same fear, the same worry, the same loneliness in lock-down and grief for lost loved ones.
① benefactions ② bastions ③ benedictions ④ blights
7. The presidential campaign has also moved online, where its presence, like its candidate, is more sedate and traditional.
① uproarious ② sporadic ③ serene ④ sullen

8. I don't think the Prime Minister would ever countenance a referendum on the constitution.

- ① disavow ② obviate ③ sanction ④ terminate

※ 어법상 빈칸에 가장 적절한 것을 고르시오. (9-11) [각3점]

9. We _____ late or we'll miss our connecting flight to New York and be over three hours late arriving at our final destination.

- ① had better not be ② had be better not
③ had not be better ④ had not better be

10. By the time the landlord needed his apartment, most shelter residents _____ to hotels.

- ① had been moved ② have been moved
③ would move ④ would be moved

11. We admire the ambition of one _____ means to be a manly man, to be a kindly friend, to get on in the world himself and to help others get on in it.

- ① who ② which
③ whose ④ what

※ 밑줄 친 부분 중 어법에 맞지 않은 것을 고르시오. (12-14) [각3점]

12. Concerns ①are mounting over South Korea's fiscal soundness as this year's three supplementary budgets ②are worth a total of 60 trillion won are leading to ③an increase in government debt of ④no less than 111 trillion won in just six months.

13. The baseball fan ①which arrived ②earliest at the stadium to buy World Series tickets camped ③on the sidewalk by the box office for two days ④before the first game.

14. Related research ①conducted in the EU suggests that students who ②learn a second language early on are ③more aware of other cultures and, overall, are stronger in ④its own first language.

※ 다음 글을 읽고 물음에 답하십시오. (15-17) [각3점]

For a basketball official, (A) _____ proves the highest form of praise. Paradoxically, the official shows the greatest expertise when his actions go unnoticed. To

27. According to the passage, which is true?

- ① Science education should not give children ready-made answers.
- ② American science education is too advanced for children.
- ③ Geology can only be understood with the high level of memorizing capability.
- ④ Students can endure science education with curiosity.

28. Which is the main idea of the passage?

- ① To persevere with science education is the duty of scientists.
- ② Science is very important for understanding human world.
- ③ The professional terms of science should be memorized.
- ④ Science education should teach how to make questions and find answers.

※ 다음 글을 읽고 물음에 답하시오. (29-30) [각5점]

It is important to remember that reading involves images as well. For when the reader sees the word “dog” and understands the idea of “dog,” an image representing a dog is conjured up as well. The precise nature of this “reading image” is little understood, nor is there agreement about what relation it bears to visual images taken in directly by the eyes. Nevertheless images necessarily color our reading, or else we would perceive no meaning, merely empty words. The great difference between these “reading images” and the images we take in when viewing television is this: we *create* our own images when reading, based upon our own life experiences and reflecting our own individual needs, while we must accept what we receive when watching television images. This aspect of reading, which might be called “creative” in the narrow sense of the word, is present during all reading experiences, regardless of *what* is being read.

Television images do not go through a complex symbolic transformation. The mind does not have to decode and manipulate during the television experience. Perhaps this is a reason why the visual images received directly from a television set are strong, stronger, it appears, than the images conjured up mentally while reading. But ultimately they satisfy less. A ten-year old child reports on the effects of seeing television dramatizations of books he has previously read: “The TV people leave a stronger impression. Once you’ve seen a character on TV, he’ll always look like that in your mind, even if you made a different picture of him in your mind before, when you read the book yourself.” And yet, as the same child reports, “the thing about a book is that you have so much _____. You can make each character look exactly the way you want him to look. You’re more in control of things when you read a book than when you see something on TV.”

29. Which is the most appropriate for the blank?

- ① obligation
- ② freedom
- ③ responsibility
- ④ restriction

30. According to the passage, which is true?

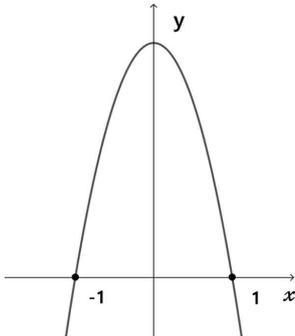
- ① Television gives us more insight than reading.
- ② Reading bears no relation to visual images.
- ③ Television is a deep source of imagination.
- ④ Reading stimulates our imagination more than TV.

수학 [자연계열] <오전> [문항별 5점]

31. $\lim_{x \rightarrow -2} \frac{1 - \sqrt{x+a}}{x+2} = b$ 를 만족시키는 상수 a, b 에 대하여 ab 의 값은?

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

32. 삼차함수 $f(x)$ 의 도함수 $f'(x)$ 의 그래프가 아래 그림과 같이 $f'(-1) = f'(1) = 0$ 이다. 함수 $f(x)$ 의 극솟값이 -4 이고 극댓값이 0 일 때, $f(3)$ 의 값은?



- ① -16 ② -18 ③ -20 ④ -22

33. $\lim_{n \rightarrow \infty} \sum_{k=n+1}^{2n} \frac{3\sqrt{k}}{n\sqrt{n}}$ 의 값은?

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

34. 다음 중 수렴하는 특이적분의 개수는?

㉠. $\int_0^3 \frac{1}{x-3} dx$	㉡. $\int_1^\infty \frac{1}{\sqrt{x}} dx$
㉢. $\int_1^\infty \frac{2+e^{-x}}{x} dx$	㉣. $\int_0^{\frac{\pi}{2}} \sec x dx$

- ① 0 ② 1 ③ 2 ④ 3

35. 다음 중 수렴하는 급수의 개수는?

㉠. $\sum_{n=2}^\infty \frac{1}{n \ln n}$	㉡. $\sum_{n=1}^\infty (-1)^n \frac{3^n}{n!}$
㉢. $\sum_{n=1}^\infty \frac{n^n}{n!}$	㉣. $\sum_{n=1}^\infty \frac{\ln n}{n}$
㉤. $\sum_{n=1}^\infty \frac{\cos(n!)}{n^2}$	

- ① 1 ② 2 ③ 3 ④ 4

36. 극곡선 $r = 3 \cos \theta$ 의 내부와 $r = 1 + \cos \theta$ 의 외부로 둘러싸인 영역의 넓이는?

- ① π ② 2π ③ 3π ④ 4π

37. 3차원 공간에서 세 점 $P(2,8,12)$, $Q(-2,5,-2)$, $R(2,-2,2)$ 를 꼭짓점으로 하는 삼각형 PQR의 넓이는?

- ① $12\sqrt{17}$ ② $15\sqrt{17}$ ③ $12\sqrt{19}$ ④ $15\sqrt{19}$

38. 점 $(1,-1)$ 에서 벡터 $\vec{v}=\langle a,b \rangle$ 방향으로 함수 $f(x,y)=x^2y^4-4xy^2$ 의 방향도함수가 2일 때, $\frac{b}{a}$ 의 값은? (단, a,b 는 0이 아닌 실수이다.)

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

39. 곡면 $x=y^2$ 과 세 평면 $x=z$, $z=0$, $x=1$ 로 둘러싸인 입체의 부피는?

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

40. 함수 $f(x,y)=e^y(y^2-x^2)$ 에 대한 다음 설명 중 옳은 것은 모두 몇 개인가?

- ㄱ. 점 $(0,0)$, $(0,-2)$ 는 임계점이다.
 ㄴ. 2개의 극값을 갖는다.
 ㄷ. 극솟값은 0이다.
 ㄹ. 극댓값은 $4e^{-2}$ 이다.

- ① 1 ② 2 ③ 3 ④ 4

41. 네 꼭짓점 $(0,0)$, $(1, \frac{1}{3})$, $(\frac{4}{3}, \frac{1}{9})$, $(\frac{1}{3}, -\frac{2}{9})$ 로 이루어진 사각형 영역 D 에 대하여, 이중적분 $\iint_D (x-3y-1)e^{2x+3y}\cos(x-3y)dA$ 의 값은?

- ① $\frac{e^2-1}{9}(\cos 1-1)$ ② $\frac{e^2-1}{9}\sin 1$
 ③ $\frac{e^3-1}{9}(\cos 1-1)$ ④ $\frac{e^3-1}{9}\sin 1$

42. 곡선 C 를 직선 $y=x$ 와 곡선 $y=x^2$ 으로 둘러싸인 영역의 경계라 하자.

벡터장 $\vec{F}(x,y)=\langle xy^2, x+y \rangle$ 에 대하여, 선적분 $\int_C \vec{F} \cdot d\vec{r}$ 의 값은?

(단, 방향은 시계 반대 방향이다.)

- ① $\frac{1}{3}$ ② $\frac{1}{6}$ ③ $\frac{1}{12}$ ④ $\frac{1}{24}$

43. 곡면 S 의 매개변수표현이

$$x = u \cos v, \quad y = u \sin v, \quad z = u^2 + v^2$$

일 때, S 위의 점 $(1,0,1)$ 에서의 접평면의 방정식은?

- ① $x-y+2z=3$ ② $x-2z=-1$
 ③ $-x+y+2z=1$ ④ $2x-z=1$

44. 곡선 C 는 평면 $y+z=2$ 와 원기둥 $x^2+y^2=1$ 의 교선일 때, 벡터장 $\vec{F}(x,y,z)=\langle -y^2, x, z^2 \rangle$ 에 대하여, 선적분 $\int_C \vec{F} \cdot d\vec{r}$ 의 값은?

(단, C 의 방향은 위에서 내려다봤을 때 시계 방향이다.)

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

45. 행렬 $A = \begin{pmatrix} 3 & -4 \\ -2 & 4 \end{pmatrix}$ 에 대하여 $AB = A^2 - A - 4E$ 를 만족시키는 행렬 B 의 모든 성분의 합은?
(단, E 는 단위행렬이다.)

- ① -14 ② -10 ③ -6 ④ -2

46. 선형변환 $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$ 가 각 점을 직선 $y = -x$ 에 대하여 반사(reflection)시키고 그 점을 y 축에 대하여 반사시키는 변환일 때, T 에 대한 표준행렬은?

- ① $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$ ② $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$
 ③ $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$ ④ $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$

47. 행렬 $\begin{pmatrix} 5 & 0 & 0 & -5 \\ 4 & -3 & -3 & 1 \\ 2 & 3 & -1 & 2 \\ -2 & 1 & 0 & 3 \end{pmatrix}$ 의 행렬식(determinant)은?

- ① 15 ② 20 ③ 25 ④ 30

48. $y = y(x)$ 가 미분방정식 $x^2y'' - 5xy' + 9y = 2x^3$, $y(1) = 2$, $y(e) = e^3$ 의 해일 때, $y(e^2)$ 의 값은?

- ① e^6 ② $2e^6$ ③ $3e^6$ ④ $4e^6$

49. $y = y(x)$ 가 미분방정식 $y'' - y = e^{-2x} \sin(e^{-x})$, $y\left(-\ln\frac{\pi}{2}\right) = -1 + \frac{1}{\pi}$, $y(-\ln\pi) = \frac{2}{\pi}$ 의 해일 때, $y(-\ln 2\pi)$ 의 값은?

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

50. 역라플라스변환(inverse Laplace transform) $\mathcal{L}^{-1}\left\{\frac{s+4}{s^2+4}\right\}$ 를 $f(t)$ 라 할 때, $f\left(\frac{\pi}{8}\right)$ 의 값은?

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

영어 정답표 [자연계열] < 오전 >

문제번호	1	2	3	4	5	6	7	8	9	10
정답	④	②	①	①	②	④	③	③	①	①
배점	3	3	3	3	3	3	3	3	3	3

문제번호	11	12	13	14	15	16	17	18	19	20
정답	①	②	①	④	④	②	①	②	③	①
배점	3	3	3	3	3	3	3	3	3	3

문제번호	21	22	23	24	25	26	27	28	29	30
정답	④	②	①	②	③	④	①	④	②	④
배점	3	3	3	3	3	5	5	5	5	5

수학 정답표 [자연계열] < 오전 >

문제번호	31	32	33	34	35	36	37	38	39	40
정답	①	③	④	①	②	①	②	③	④	②
배점	5	5	5	5	5	5	5	5	5	5

문제번호	41	42	43	44	45	46	47	48	49	50
정답	③	③	④	①	①	②	③	②	④	③
배점	5	5	5	5	5	5	5	5	5	5