

단국대학교 2021학년도 편입생 모집 필기고사

고사시간	오후
문제유형	자연계열

자연계열 문제지



지원학부(과)	
수험번호	
성 명	

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 답하십시오. (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.

17. Which is the most appropriate for the blank?

- ① baseball
- ② football
- ③ rugby
- ④ game

18. According to the passage, which is true?

- ① Sport reflects changes of a society.
- ② Football is more primitive than baseball.
- ③ Rugby is the most favorite game for the Japanese.
- ④ Baseball is more radical than football.

19. Which is the topic of the passage?

- ① The popularity of football in America
- ② Sports and national characters
- ③ The popularity of baseball in Japan
- ④ Sports and changes of leisure

※ 다음 글을 읽고 물음에 답하시오. (20-22) [각3점]

Since Hitler's day the armory of technical devices at the disposal of the would-be dictator has been considerably enlarged. As well as the radio, the loud-speaker, the moving picture camera and the rotary press, the contemporary propagandist can make use of television to broadcast the image as well as the voice of his client, and can record both image and voice on spools of magnetic tape. Thanks to technological progress, Big Brother can now be almost as omnipresent as God. Nor is it only on the technical front that the hand of the would-be dictator has been strengthened. Since Hitler's day a great deal of work has been carried out in those fields of applied psychology and neurology which are the special province of the propagandist, the indoctrinator and the brain-washer. In the past these specialists in the art of changing people's minds were empiricists. By a method of trial and error they had worked out a number of techniques and procedures, which they used very effectively without, however, knowing precisely why they were effective. Today the art of mind-control is in process of becoming _____. The practitioners of this science know what they are doing and why. They are guided in their work by theories and hypotheses solidly established on a massive foundation of experimental evidence. Thanks to the new insights and the new techniques made possible by these insights, the nightmare that was "all but realized in Hitler's totalitarian system" may soon be completely realizable.

30. Which is NOT included in the approaches to fight emerging microbes?

- ① herd-immunity
- ② social distancing
- ③ hygiene
- ④ quarantine

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 $\frac{4\sqrt{3}}{3}\pi$

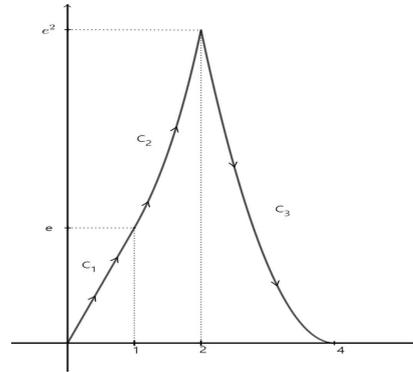
42. 아래 그림과 같이 곡선 C 는

- 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

$$x^2 y'' + xy' - y = x, \quad y(1) = \frac{1}{2}, \quad y(e) = e$$

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)

$$\mathcal{L}^{-1} \left\{ \frac{3s + 4\sqrt{5}}{s^2 + 5} \right\} \text{를 } f(t) \text{라 하자. } f(t) \text{의}$$

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
정답	④	④	②	①	③	③	①	③	②	③
배점	3	3	3	3	3	3	3	3	3	3

문제번호	11	12	13	14	15	16	17	18	19	20
정답	②	④	④	④	①	③	②	①	②	③
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	③	①	②	①	④	④	②	①
배점	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
정답	④	①	③	②	③	②	①	②	④	③
배점	5	5	5	5	5	5	5	5	5	5

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