KGU 경기대학교

2020학년도 편입학 필기시험 문제지 (A형)

일 반 편 입 학 : 자 연 계

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KGU 경기대학교

◆ 수험생 유의사항 ◆

1. 문제지는 총 **45문항으로** 구성되어 있습니다.

2. 문항배점

   1번~10번 문항(영어) : 1.5점

   11번~15번 문항(영어) : 2.0점

   16번~20번 문항(영어) : 2.0점

   21번~25번 문항(영어) : 3.0점

   26번~35번 문항(수학) : 2.0점

   36번~45번 문항(수학) : 3.0점

3. **문제지의 유형과 답안지의 유형이 동일한지** 확인하고 작성하여야 합니다.

4. 수험번호 표기란과 답안 표기란은 감독관이 지급한 **컴퓨터용 사인펜만을** 사용하여야 합니다.

5. 답안을 표기할 경우 "●" 같이 정확히 마킹하여야 하며, **부정확한 표기로** 인하여 전산 상 더블마킹 및 블랭크로 처리되는 것은 수험생의 책임으로 합니다.

   ▶ 잘못 표기된 예 : ⊙   Ⓥ   Φ

6. **답안을 수정하고자 할 경우 감독관에게 새 답안지를 요청하여 다시 기재** 하여야 합니다.

   ▶ 한번 표기한 답은 "×"표를 하거나 칼로 긁거나 수정액으로 지우는 등 어떠한 방법으로도 고쳐서는 안되며 고친 문항 및 이중마킹한 경우에는 0"점 처리합니다.

(#1-10) Choose the one word that best completes each sentence. (1.5 points for each question)

1. After her breakup, Jane was so _____ for more than a month.
   (1) monotonous   (2) contingent
   (3) heartbroken   (4) upbeat

2. Because of its outspoken support of the president, the news network was accused of being _____ to the government.
   (1) magnanimous   (2) ephemeral
   (3) subservient   (4) conspicuous

3. Author Isaac Asimov worked at a _____ pace, ultimately writing or editing over 500 books.
   (1) frenetic   (2) prosodic
   (3) seminal   (4) centripetal

4. The spending scandal was such a huge _____ with several high ranking politicians being forced to resign over their involvement.
   (1) salvage   (2) debacle
   (3) quarry   (4) twinge

5. Many bright young professionals feel that their talents are _____ with the menial duties required at entry-level jobs.
   (1) incombustible (2) unsympathetic
   (3) unacclimatized (4) incommensurate

6. If you get your head hit hard by a baseball, you should make sure that you have not received a _____.
   (1) confrontation (2) concussion
   (3) conundrum   (4) conflation

7. Jane cleaned the home so thoroughly that she left not a single _____ of dust anywhere.
   (1) speck   (2) powder
   (3) crumb   (4) shard

8. As soon as the bird got stuck in the soccer net, the children ran over to help it out of its _____.
   (1) annihilation   (2) inundation
   (3) impeachment   (4) predicament

9. In the _____ of the disastrous flood, people came together to assist all affected.
   (1) forefront   (2) aftermath
   (3) posterity   (4) residue

10. Students who talk back to their teachers should be reprimanded for their _____.
    (1) counterpoint (2) insolence
    (3) solemnity   (4) diffidence

(#11-15) Choose the one word that is closest in meaning to the underlined part. (2 points for each question)

11. During the Baroque period, European churches were **adorned** with rich decorative elements, such as twisting columns covered in carvings.
    (1) swaddled   (2) dangled
    (3) embellished   (4) draped

12. The public was so **indifferent** to the outcome of the soccer match that few even bothered to read about it in the news the next day.
    (1) amenable   (2) apathetic
    (3) congenial   (4) cogent

13. Realizing that the book was not displayed **saliently** enough to attract customers' attention, the manager decided to move some copies to the front of the shop window.
    (1) prominently   (2) robustly
    (3) copiously   (4) venerably

14. After nearly 20 seasons with the Dragons, Pete Webster was one of the team's most **seasoned** players, capable of passing on a wealth of knowhow to younger members.
    (1) sizzling   (2) experienced
    (3) tractable   (4) tempered

15. When patients have access to diagnosis and treatment, the **prognosis** for tuberculosis sufferers is quite good, with most expected to make a full recovery.
   (1) prospect   (2) symptoms
   (3) deterioration   (4) operation

(#16-20) Identify the one underlined expression that must be corrected in each sentence. (2 points for each question)

16. The invention of writing, **which** took place around
   (1)
   3,400 BC, was a pivotal event **in** human history,
   (2)
   since it allowed important information to **preserve**.
   (3)   (4)

17. As a freshman, I found **it** very helpful to talk
   (1)
   with older students, **as** they helped me form
   (2)
   reasonably expectations regarding the amount of
   (3)
   work needed for one **to achieve** academic
   (4)
   success.

18. DNA testing **has proven** immensely useful in
   (1)
   solving criminal cases, but it is not without its
   (2)
   problems, especially **when** it comes to identifying
   (3)
   the perpetrators of crimes that **occur** long ago.
   (4)

19. **Over** many years, the explorer James Cook
   (1)
   sailed thousands of miles **through** largely
   (2)
   uncharted regions, **ranged** from the coast of
   (3)
   Alaska in the far north **to** the tip of South
   (4)
   America in the far south.

20. One way **for** job seekers to get a jump on **the**
   (1)   (2)
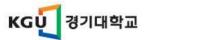   competition is **to write** to employers directly
   (3)
   instead of merely **wait** for ads to appear.
   (4)

(#21-25) Read the following passages and choose the one best answer for each question. (3 points for each question)

Questions 21-23 are based on the following passage.

Birds are everywhere. We see them every day flying over our heads or hopping around our backyards. But scientists say that bird populations are declining rapidly, especially in North America. Approximately 29% of the continent's total bird population has been lost since 1970. __(A)__, it has been found that common bird species, such as sparrows and blackbirds, are disappearing at an alarming rate, even faster than rare bird species. According to a new study, almost every group of birds is facing difficulty. Grassland bird populations have suffered the greatest loss, having declined by 53%. Forest-dwelling birds, which outnumber grassland birds, are also disappearing fast. One billion have been lost. Shorebirds, which migrate over entire hemispheres, are also showing sharp, consistent population losses. Their total population has dropped by 37% within the past 50 years. Even invasive species, which are often able to adapt to different environments, have not been able to escape this fate. As birds are indicator animals, whose well-being can reflect an ecosystem's overall health, scientists say that this massive population loss should be taken as a warning about the state of North American ecosystems in general.

21. Which of the following is most appropriate for blank **(A)**?
   (1) Finally   (2) Therefore
   (3) However   (4) Moreover

22. Which bird group has experienced the largest decline in percentage terms in North America?
   (1) shorebirds   (2) invasive birds
   (3) grassland birds   (4) forest-dwelling birds

23. What can be inferred from the passage?
    (1) The fate of birds points to potential threats posed to other animals.
    (2) Bird species are declining mainly because of invasive species.
    (3) The most common bird species are proving the best able to adapt.
    (4) Bird numbers are falling most along common bird migration routes.

Questions 24-25 are based on the following passage.

Social scientists often use game-like scenarios to study economic decision making. One example is the ultimatum game, in which a person offers to share a certain amount of money with another person. In this scenario, if the offer is accepted, the money is divided accordingly. But, if the offer is rejected, neither person receives any money. When the offer is reasonable—a 50/50 split, say—it is usually accepted. In contrast, grossly unreasonable offers, such as 90/10, are often rejected. This pattern of rejection is puzzling, since it is better to receive 10% than nothing. Seeking an explanation for this type of response to unfairness, behavioral scientists have proposed that it gives people a certain advantage. By rejecting imbalanced offers, even when doing so comes at an immediate personal cost, the person asserts that he or she will not tolerate unfairness. This stance is beneficial because it is a **deterrent** against subsequent attempts at abuse. Interestingly, this same response to unfairness has been found in other primates and has been shown, in humans, to have roots in a part of the brain which plays a role in emotional thinking.

24. According to social scientists, what is the benefit of rejecting unfair offers?
    (1) It reduces sources of emotional stress.
    (2) It allows people to enter into negotiations.
    (3) It results in people keeping more of their resources.
    (4) It lowers the chances of people being mistreated later.

25. Which of the following words is closest in meaning to the underlined word **deterrent**?
    (1) hindrance   (2) interrogation
    (3) reminder   (4) animosity

26. 두 함수 $f, g : \mathbb{R} \to \mathbb{R}$ 에 대하여 다음 중 항상 참인 것을 고르면? [2점]

① 극한 $\lim\limits_{x \to a}[f(x)+g(x)]$가 존재하면 두 극한 $\lim\limits_{x \to a} f(x),\ \lim\limits_{x \to a} g(x)$은 존재한다.

② 극한 $\lim\limits_{x \to a} e^{f(x)}$가 존재하고 양수이면 극한 $\lim\limits_{x \to a} f(x)$은 존재한다.

③ 좌극한 $\lim\limits_{x \to a^-} f(x)$과 우극한 $\lim\limits_{x \to a^+} f(x)$이 존재하면 극한 $\lim\limits_{x \to a} f(x)$은 존재한다.

④ 극한 $\lim\limits_{x \to a} \dfrac{f(x)}{g(x)}$가 존재하고 f와 g가 모든 실수에서 미분가능하면 극한 $\lim\limits_{x \to a} \dfrac{f'(x)}{g'(x)}$ 는 존재한다.

27. 극한 $\lim\limits_{x \to 0} \dfrac{x(\cos x - 1)}{\sin x - x}$의 값은? [2점]

① 1   ② 2   ③ 3   ④ 4

28. 이상적분 $\displaystyle\int_1^2 \dfrac{1}{x(\ln x)^p}\,dx$이 수렴하는 양의 실수 p의 범위는? [2점]

① $p > 1$ ② $0 < p < 1$ ③ $p > 2$ ④ $0 < p < 2$

29. 다음 중 $x = 0$에서 미분가능하지 않은 함수를 고르면? [2점]

① $\begin{cases} \dfrac{\sin x}{x}, & x \neq 0 \\ 1, & x = 0 \end{cases}$ ② $\begin{cases} x^2 \cos\left(\dfrac{1}{x^5}\right), & x \neq 0 \\ 0, & x = 0 \end{cases}$

③ $\begin{cases} e^{-1/x^2}, & x \neq 0 \\ 0, & x = 0 \end{cases}$ ④ $\begin{cases} x\tan\left(\dfrac{1}{x}\right), & x \neq 0 \\ 0, & x = 0 \end{cases}$

30. 함수 $f(x,y) = x^2 + y^2$에 대해 점 $(1,1)$에서 함숫값이 가장 빨리 감소하는 방향의 단위벡터를 v라 할 때, 방향 미분 $D_v f(1,1)$의 값은? [2점]

　① $\sqrt{6}$　　　　② $-\sqrt{6}$　　　③ $\sqrt{8}$　　　④ $-\sqrt{8}$

31. $n \times n$ 행렬 A, B에 대하여 <보기>에서 항상 참인 것을 모두 고르면? [2점]

――――――――――― <보기> ―――――――――――

　가. $A \neq 0$이고 임의의 $x \in \mathbb{R}^n$에 대하여 $Ax = 0$인 A가 존재한다.
　나. $AB = 0$이면 $A = 0$ 또는 $B = 0$이다.
　다. $\mathrm{rank}(A) = n$이고 $Ax = 0$이면 $x = 0$이다.
　라. $x = 0$일 때만 $Ax = 0$이면 $\mathrm{rank}(A) = n$이다.

　① 가, 나　　　② 나, 다　　　③ 다, 라　　　④ 가, 라

32. P_5가 5차 이하 다항식의 벡터공간이라 할 때, 선형사상 $T : P_5 \to P_5$를 임의의 $p(x) \in P_5$에 대하여 $T(p(x)) = p(-x)$로 정의하자. T의 고윳값 1에 대응되는 고유공간의 차원은? [2점]

　① 2　　　　　② 3　　　　　③ 4　　　　　④ 5

33. 실수 θ, ψ에 대하여 $A = \begin{pmatrix} \cos\theta & -\sin\theta & 0 & 0 \\ \sin\theta & \cos\theta & 0 & 0 \\ 0 & 0 & \cos\psi & -\sin\psi \\ 0 & 0 & \sin\psi & \cos\psi \end{pmatrix}$ 일 때 $\det(A)$의 값은? [2점]

　① 1　　　　　② -1　　　　③ 2　　　　　④ -2

34. $n \times n$행렬 A, B에 대하여 <보기>에서 항상 참인 것을 모두 고르면? [2점]

───── <보기> ─────

가. $\text{tr}(AB) = \text{tr}(BA)$ 나. $\text{tr}(A+B) = \text{tr}(A) + \text{tr}(B)$

다. $\det(AB) = \det(BA)$ 라. $\det(A+B) = \det(A) + \det(B)$

① 가, 나   ② 나, 다   ③ 가, 나, 다   ④ 나, 다, 라

35. 다음 중 함수의 벡터공간 $F(\mathbb{R}) = \{f \mid f : \mathbb{R} \to \mathbb{R}\}$의 부분공간이 될 수 없는 것은? [2점]

① $\{f \in F(\mathbb{R}) \mid f$는 2차 다항식$\}$
② $\{f \in F(\mathbb{R}) \mid f$는 연속함수$\}$
③ $\{f \in F(\mathbb{R}) \mid f$는 우함수$\}$
④ $\{f \in F(\mathbb{R}) \mid f$는 기함수$\}$

36. <보기>에서 수렴하는 급수를 모두 고르면? [3점]

───── <보기> ─────

가. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n}}$ 나. $\displaystyle\sum_{n=1}^{\infty} \tan\frac{1}{n}$ 다. $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{n^n}$ 라. $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{(10^{10})^n}$

① 가, 나   ② 가, 다   ③ 나, 다   ④ 나, 라

37. $\left[\displaystyle\sum_{n=1, n\text{은 홀수}}^{\infty} \frac{1}{n^3}\right] \div \left[\displaystyle\sum_{n=2, n\text{은 짝수}}^{\infty} \frac{1}{n^3}\right]$의 값은? [3점]

① 7   ② 8   ③ 9   ④ 10

38. $4\sqrt{4.01}\,((\ln 0.98)+1)$의 근삿값으로 가장 적절한 것은? [3점]

　① 7.84　　　　② 7.85　　　　③ 7.86　　　　④ 7.87

39. 영역 D가 원 $x^2+(y-1)^2=1$의 내부일 때 이중적분 $\iint_D x\,dA$의 값은? [3점]

　① 0　　　　② 1　　　　③ 2　　　　④ 3

40. 두 포물면 $y=x^2+z^2$ 와 $y=2-x^2-z^2$로 둘러싸인 입체의 부피는? [3점]

　① π　　　　② 2π　　　　③ 3π　　　　④ 4π

41. 3×4행렬 A에 대하여 $A\begin{pmatrix}1\\0\\0\\0\end{pmatrix}=\begin{pmatrix}0\\1\\0\end{pmatrix}$일 때, A의 영공간의 차원으로 가능한 값의 최대와 최소의 합은? [3점]

　① 1　　　　② 2　　　　③ 3　　　　④ 4

42. 주어진 벡터 $v\in\mathbb{R}^3\,(v\neq0)$에 대하여 선형사상 $T:\mathbb{R}^3\to\mathbb{R}^3$를 $T(x)=x\times v+(x\cdot v)v$ 로 정의할 때, T의 위수(rank)는? [3점]

　① 0　　　　② 1　　　　③ 2　　　　④ 3

43. 4×4 행렬 A의 특성(고유)다항식이 $(\lambda-1)(\lambda-2)(\lambda-3)(\lambda-6)$일 때, $\mathrm{tr}(A^{-1})$의 값은? [3점]

   ① 1   ② 2   ③ 3   ④ 4

44. 4×4 행렬 $A = \begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix}(1\,2\,3\,4)$에 대하여 0이 아닌 모든 고윳값의 곱은? [3점]

   ① 10   ② 20   ③ 30   ④ 40

45. $n \times n$ (실)행렬 A에 대하여 <보기>에서 항상 참인 것을 모두 고르면? [3점]

<hr>
<보기>

가. A가 n개의 (실)고유벡터로 이루어진 직교집합을 가지면 A는 대칭행렬이다.

나. $A^T A$는 직교대각화 가능하다.

다. $A + A^T$는 직교대각화 가능하다.

라. A가 대각화 가능하면 직교대각화 가능하다.
<hr>

   ① 가, 나   ② 나, 다   ③ 가, 나, 다   ④ 나, 다, 라

정답 (자연계 A형)	
문항	정답
01	3
02	3
03	1
04	2
05	4
06	2
07	1
08	4
09	2
10	2
11	3
12	2
13	1
14	2
15	1
16	4
17	3
18	4
19	3
20	4
21	4
22	3
23	1
24	4
25	1
26	2
27	3
28	2
29	4
30	4
31	3
32	2
33	1
34	3
35	1
36	2
37	1
38	2
39	1
40	1
41	4
42	4
43	2
44	3
45	3