

## 자연계열(영어·수학) 문제지

지원 모집단위	학부(학과)	수험 번호	성 명
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◆ 유 의 사 항 ◆

1. 시험 시간은 100분임
2. 답안지와 문제지에 지원 모집단위, 성명, 수험번호를 반드시 검은색 펜으로 직접 기입하고 마킹을 할 것
3. 답안은 답안지의 해당 문항 번호에 검은색 펜으로 작성할 것
4. 연습은 문제지 여백을 이용할 것

감독위원



【1-2】 다음 글을 읽고 물음에 답하시오.

In the 1990s, it was widely assumed that anonymity would contribute to the democratizing effect of the internet, in that gender, class, race and other social differences would be left behind and participants would communicate on an equal footing. People would be free to say what they liked, and would be judged only by the content of their posts.

The initial optimism regarding online democracy and equality has faded somewhat, partly because of changes in how we use the internet. Ten or fifteen years later, the internet has become ( Ⓐ ) with social media, ( Ⓑ ) by social network sites such as Facebook which work on the basis of existing relationships, and people tend to use them in part to document (and organize) events and activities in their ‘offline’ lives. Increasingly then, self-presentation online is less about creating new identities and more about playing with and foregrounding particular aspects of an ‘authentic’ offline identity.

1. 윗글의 문맥상 ( Ⓐ )와 ( Ⓑ )에 들어갈 가장 적절한 낱말은?

- ① sympathetic — presented
- ② synonymous — epitomized
- ③ synchronous — optimized
- ④ synergetic — organized

2. 윗글의 내용으로 가장 알맞은 것은?

- ① Anonymity does not contribute as much to online democracy and equality as was believed in the 1990s.
- ② The use of social media today contributes greatly to online democracy and equality.
- ③ People tend to use social network sites to create new identities.
- ④ Anonymity helps users document and highlight their offline lives.

【3-4】 다음 글을 읽고 물음에 답하시오.

In the third period, Léger deals with far more complex and variegated subjects—whole groups of figures, figures in landscapes, etc. It is essential to his purpose that these subjects appear unified: the cloud and the woman’s shoulder, the leaf and the bird’s wing, the rope and the arm, must all be seen in the same way, must all be thought to exist under the same conditions. Léger now introduced light into his painting to create this unity of condition. By light I do not mean anything mysterious; I mean simply light and shade. Until the third period Léger mostly used flat local color and the forms were established by line and color rather than by ( Ⓐ ). Now the forms become much more solid and ( Ⓑ ) because light and shade play upon them to reveal their receding and parallel planes, their rises and hollows. But the play of the light and shade does more than this: it also allows the artist to create an overall pattern, regardless of where one object or figure stops and another begins. Light passes into shade and shade into light, alternatively, a little like the black and white squares of chessboard. [A] It is by this device that Léger is able to equate a cloud with a limb, a tree with spring, a stream with hair; and it is by the same device that he can bind a group of figures together, turning them into one unit in the same way as the chessboard can be considered one unit than each square.

3. 윗글의 문맥상 ( Ⓐ )와 ( Ⓑ )에 들어갈 가장 적합한 낱말은?

- ① image — monotonous
- ② shape — contradictory
- ③ tone — sculptural
- ④ perspective — inconsistent

4. 윗글의 내용으로 보아 밑줄 친 [A]에서 유추할 수 있는 내용은?

- ① Léger used a wide range of figures to celebrate commodity goods for their own sake.
- ② Léger used shapes to show the major contradictions in the relationship between people.
- ③ Léger used the element of light to suggest the essential wholeness of human experience.
- ④ Léger used juxtaposition of light and shade to describe the precise features of his subjects.

【5-7】 다음 글을 읽고 물음에 답하시오.

Shakespearean English today requires so many footnotes that only an [A] intrepid few can be expected to read it with anything but broad understanding. We must ask how much any but a few readers would be capable of actually enjoying, coming to love, and sharing under such conditions. Constant interruption of this kind makes it impossible to truly engage a text with our hearts.

Indeed, the irony today is that the Russians, the French, and other people in foreign countries possess Shakespeare to a much greater extent than we Americans do, for the simple reason that unlike us, they get to enjoy Shakespeare in the language they speak. Because Shakespeare is translated into rich, poetic *modern* varieties of these languages, the typical spectator in Paris, Moscow, or Berlin can attend a production of *Hamlet* and enjoy a play rather than an exercise. In Japan, new editions of Shakespeare in Japanese are regularly best-sellers—utterly unimaginable in America, because like the Japanese, we prefer to experience literature in the language we speak, and a new edition of original Shakespeare no longer fits this definition.

The glory of Shakespeare’s original language is manifest. We must preserve it for posterity. ( Ⓐ ), we must not err in equating the preservation of the language with the preservation of the art. In a universe where language never changed, such an equation would be unobjectionable. In our world, however, this equation is allowing [B] blind faith to deprive the public of a monumental treasure.

5. 밑줄 친 [A] intrepid의 뜻과 가장 가까운 것은?

- ① intricate
- ② timid
- ③ comprehensible
- ④ dauntless

6. 윗글의 문맥상 ( Ⓐ )에 들어갈 가장 자연스러운 연결어는?

- ① However
- ② Moreover
- ③ Alternatively
- ④ Furthermore

7. 윗글의 내용상 밑줄 친 [B] blind faith가 의미하는 바와 가장 가까운 것은?

- ① that Shakespeare should be read and performed in modern English
- ② that Shakespeare should be read and performed in foreign languages
- ③ that Shakespeare should be read and performed in the original language
- ④ that the preservation of language should not be equated with the preservation of art

【8-10】 다음 글을 읽고 물음에 답하시오.

【11-12】 다음 글을 읽고 물음에 답하시오.

Historiographic interpretations include knowledge generated by scientific historiography, but also ethical, aesthetic, political and other value judgments. The artistic and rhetorical interpretations of the results of historiographic research, of scientific historiography, ought to be distinguished from the logical structure of historiographic research. Interpretations decide which parts of scientific historiography are sufficiently significant to be included in textbooks, and what kinds of value judgments should be passed on them. Different historiographic interpretations may incorporate an identical core of scientific historiography but [A] “spin” it in different directions. For example, different historiographic interpretations of the New Deal in the United States may agree on what happened, on its causes and effects, the scientific core of interpretation. But one interpretation may consider it a positive development, the creation of a more civilized and moral United States with greater economic security. Another interpretation may consider it a degeneration of American individualism and liberty and its replacement with [B] state paternalism and individual irresponsibility. Accordingly these two interpretations would emphasize different parts of scientific historiography, the first would discuss improvements in the standard of living of unemployed workers and the second would stress the growth in the size of the federal government.

The widespread interest in the World Happiness Reports reflects growing global interest in using happiness and subjective well-being as primary indicators of the quality of human development. “Measuring self-reported happiness and achieving well-being should be on every nation’s agenda as they begin to pursue the Sustainable Development Goals,” said Jeffrey Sachs, director of the Earth Institute at Columbia University. “Indeed the Goals themselves embody the very idea that human well-being should be nurtured through a holistic approach that combines economic, social, and environmental objectives. Rather than taking a narrow approach focused solely on economic growth, we should promote societies that are prosperous, just, and environmentally sustainable.”

In 2016, for the first time, the World Happiness Report gives a special role to the measurement and consequences of inequality in the distribution of well-being among countries and regions. The editors argue that the inequality of well-being provides a broader measure of inequality. They find that people are happier living in societies where there is less inequality of happiness. They also find that happiness inequality has increased significantly (comparing 2012-2015 to 2005-2011) in most countries, in almost all global regions, and for the population of the world as a whole.

As previous reports have done, the World Happiness Report 2016 Update looks at trends in the data recording how highly people evaluate their lives on a scale running from 0 to 10. The rankings, which are based on surveys in 156 countries covering the three years 2013-2015, reveal an average score of 5.1 (out of 10). Seven key variables explain three-quarters of the variation in annual national average scores over time and among countries: real GDP per capita, healthy life expectancy, having someone to count on, perceived freedom to make life choices, freedom from corruption, and generosity.

8. 밑줄 친 [A] spin이 윗글에서 의미하는 가장 적절한 뜻은?

- ① extort
- ② reverse
- ③ explore
- ④ rotate

9. 밑줄 친 [B] state paternalism and individual irresponsibility의 의미로 가장 적절한 것은?

- ① strong initiative of the state
- ② priority of family values
- ③ sacrifice of the state for individual values
- ④ exclusion of irresponsible individuals

10. 윗글의 내용과 다른 것은?

- ① Scientific historiography is an academic discipline which deals with value judgments.
- ② Scientific historiography is an effort to explicate the factual aspects of past events.
- ③ Historiographic interpretation should be based on scientific knowledge of causes and effects.
- ④ Different historiographic interpretations of a single past event still share a common ground of historical facts.

11. 윗글의 내용과 다른 것은?

- ① Subjective well-being is a primary indicator of the quality of human development.
- ② Economic growth is the most important factor in measuring human well-being.
- ③ Inequality of happiness has increased significantly in most countries of the world.
- ④ The inequality of well-being can be a good measure of inequality in general.

12. 윗글의 내용으로 보아 과거의 보고서와 다르게 2016년의 World Happiness Report에서 새롭게 고려된 요소는?

- ① economic growth
- ② level of education
- ③ inequality of well-being
- ④ self-reported happiness

【13-15】 다음 글을 읽고 물음에 답하시오.

As we have moved into this era of transition, the importance of fundamental choice has become more acute even as the meaningfulness of individual contributions to that collective choice has grown immeasurably. In short, to the extent that intellectuals shed the constraints of a false value neutrality, they can in fact play a role that is worth playing in the transition within which we all find ourselves.

I want to make myself quite clear. In saying that value neutrality is both a mirage and a deception, I am not arguing that there is no difference between the analytic, moral, and political tasks. There is indeed a difference, and it is fundamental. The three cannot simply be merged. But they also cannot be separated. And our problem is how to navigate this seeming paradox, of three tasks that can neither be merged nor separated. I would remark in passing that this effort is one more instance of the only kind of epistemology that holds hope for the ( Ⓐ ) of all knowledge.

Of course, this dilemma exists for everyone, not just the intellectual. Is there something special, then, about the role of the intellectual? Yes, there is. What one means by intellectuals are persons who devote their energies and time to an analytic understanding of reality, and presumably have had some special training in how best to do this. This is no small requirement. And not everyone has wished to become a specialist in this more general knowledge, as opposed to the concrete particular knowledge we all need to perform any task competently. Thus, ( Ⓑ ), even if the scope of their expertise is in fact limited to a particular domain of the vast world of knowledge.

13. 윗글의 문맥상 ( Ⓐ )에 들어갈 가장 적절한 것은?

- ① endorsement
- ② reunification
- ③ transmission
- ④ systemization

14. 윗글의 문맥상 ( Ⓑ )에 들어갈 가장 적절한 내용은?

- ① intellectuals should not be intimidated by the demographic demands
- ② intellectuals should reinvent themselves to become generalists
- ③ intellectuals should encourage intensive academic training
- ④ intellectuals should accept the devaluation of their expertise

15. 다음 중 윗글의 내용으로 가장 적절한 것은?

- ① This era is featured by the transition from individual society to collective society.
- ② Intellectuals tend to believe that their disciplinary knowledge is value neutral.
- ③ Analytic understanding of reality is more important than political understanding of reality.
- ④ The importance of individual contributions to society is declining.

<영어 서술형>

【16】 다음 글에 제시된 정보사회 속에서 발생한 소비환경의 변화를 자신의 문장으로 요약하고, 생산자에게는 이런 변화가 어떤 긍정적인 효과를 초래할지 구체적인 예를 들어 서술하시오. (총 200단어 내외)

It's been argued that the welter of information will actually make brands more valuable. As the influential consultancy Interbrand puts it, "in a world where consumers are oftentimes overwhelmed with information, the role a brand plays in people's lives has become all the more important." But information overload is largely a myth. "Most consumers learn very quickly how to get a great deal of information efficiently and effectively," Itamar Simonson says in his new book. "Most of us figure out how to find what we're looking for without spending huge amount of time online." And this has made customer loyalty pretty much a thing of the past. Only twenty-five per cent of American respondents in a recent Ernst & Young study said that brand loyalty affected how they shopped.

For established brands, this is a nightmare. You can never coast on past performance—the percentage of brand-royal car buyers has plummeted in the past twenty years—and the price premium that a recognized brand car charge has shrunk. If you're making a better product, you can still charge more, but, if your product is much like that of your competitors, your price needs to be similar, too. That's clearest indication that the economic value of brands—traditionally assessed by the premium a company could charge—is waning. This isn't true across the board: brands retain value where the brand association is integral to the experience of a product (Coca-Cola, say), or where they confer status, as with luxury goods. But even here the information deluge is transformative; luxury travel, for instance, has been profoundly affected by sites like TripAdvisor.

For consumers this is ideal: they're making better choices, and heightened competition has raised quality and held down prices. And they're not the only beneficiaries; upstarts now find it easier to compete with the big boys. If you build a better mousetrap, people will soon know about it. For much of the twentieth century, consumer markets were stable. Today, they are tumultuous, and you're only as good as your last product. For failing brands, there is only one consolation: make something really great and your past sins will be forgotten.

(※ 주어진 답안지에 글을 쓰시오.)

【17】 전체집합  $U$ 의 두 부분집합  $A, B$ 에 대하여  
 $(A-B) \cup (B-(A-B)^c)$   
 와 같은 집합을 구하시오.  
 ①  $A-B$       ②  $A$       ③  $A \cup B$       ④  $U$

【18】 두 조건  $p: x \neq 1$ ,  $q: x^2 + ax - 2 \neq 0$ 에 대하여  $p$ 가  $q$ 이기 위한 필요조건  
 일 때 실수  $a$ 의 값을 구하시오.  
 ①  $-1$       ②  $0$       ③  $1$       ④  $2$

【19】 다항식  $x^4 + ax^3 + bx - 1$ 이  $(x-1)(x-2)P(x)$ 로 인수분해될 때 이차식  
 $P(x)$ 의 계수의 합을 구하시오.  
 ①  $-1$       ②  $0$       ③  $\frac{1}{2}$       ④  $1$

【20】 이차방정식  $x^2 + kx - k + 5 = 0$ 의 근이 연속인 두 정수가 되는 실수  $k$ 의  
 값의 합을 구하시오.  
 ①  $-7$       ②  $-4$       ③  $-1$       ④  $0$

【21】 이차방정식  $2x^2 - 3x + a = 0$ 의 두 근이  $\sin\theta, \cos\theta$ 일 때 상수  $a$ 의 값을 구하시오.

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

【23】 두 직선  $x + y - 2 = 0, mx - y + m + 1 = 0$ 이 제1사분면에서 만나도록 정수  $m$ 의 합을 구하시오. (단, 좌표축은 사분면에 포함되지 않는다.)

- ① -1                      ② 0                      ③ 1                      ④ 2

【22】  $\omega$ 가  $\omega^2 - \omega + 1 = 0$ 의 근 일 때,  $\sum_{n=1}^{2017} (-\omega)^{n+2}$ 의 값을 구하시오.

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

【24】 두 원  $x^2 + y^2 + 2x - 8y + 13 = 0, x^2 + y^2 - 2x - 4y + 1 = 0$ 이 직선  $ax + by - 2 = 0$ 에 대하여 대칭일 때  $a + b$ 의 값을 구하시오.

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

【25】 양의 실수  $a, b$ 에 대하여 두 개의 원  $(x-a)^2 + (y+b)^2 = a^2 + b^2$ ,  $(x+a)^2 + (y-b)^2 = 3a^2 + 3b^2$ 이 두 점  $A, B$ 에서 만날 때, 선분  $AB$ 의 길이를 구하시오.

- ①  $\frac{\sqrt{2}}{3} \sqrt{a^2 + b^2}$     ②  $\frac{\sqrt{3}}{2} \sqrt{a^2 + b^2}$     ③  $\sqrt{2} \sqrt{a^2 + b^2}$     ④  $\sqrt{3} \sqrt{a^2 + b^2}$

【26】 원  $x^2 + y^2 = 10$  위의 점  $P(1, 3)$ 에서의 접선과 점  $Q(1, -3)$ 에서의 접선의 교점을  $R$ 이라 할 때, 사각형  $OPRQ$ 의 넓이를 구하시오.

- ①  $\sqrt{30}$     ②  $3\sqrt{10}$     ③  $10\sqrt{3}$     ④  $30$

【27】 세 집합

$$\begin{cases} A = \{(x, y) \mid x^3 + y^3 < 0\} \\ B = \{(x, y) \mid x^2 y - y^3 < 0\} \\ C = \{(x, y) \mid x^2 + y^2 - 4 < 0\} \end{cases}$$

에 대하여  $A \cap B \cap C$ 가 나타내는 영역의 넓이를 구하시오.

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

【28】 구에 내접하는 정육면체에 대하여 구의 겹넓이를  $A$ , 정육면체의 겹넓이를  $B$ 라 할 때,  $\frac{A}{B}$ 를 구하시오.

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

【29】 실수  $x, y$ 가  $x+2y-2=0$ 을 만족할 때  $2^x+4^y-3$ 의 최솟값을 구하시오.

- ① 1                      ② 2                      ③ 3                      ④ 5

【31】 다음과 같이 귀납적으로 정의된 수열  $a_n$ 에 대하여  $a_{51}$ 의 값을 구하시오.

$$a_1 = 0, a_2 = 2, a_{n+2} - a_n = 2 \quad (n \geq 1)$$

- ① 50                      ② 51                      ③ 52                      ④ 53

【30】 부등식  $2|x|+|y| \leq 2$ 을 만족하는 점  $(x, y)$ 에 대하여  $(x-1)^2-y$ 의 최댓값과 최솟값의 합을 구하시오.

- ① 0                      ② 1                      ③ 2                      ④ 3

【32】 극한값  $\lim_{n \rightarrow \infty} (\sqrt[3]{n^3+n^2}-n)$ 을 구하시오.

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

【33】 무한급수  $\sum_{n=1}^{\infty} \frac{1}{4n^2-1}$  의 합을 구하시오.

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

【34】 함수  $f(x) = 1 + \frac{x}{1-x} + \left(\frac{x}{1-x}\right)^2 + \left(\frac{x}{1-x}\right)^3 + \dots$  가 구간  $0 \leq x \leq \frac{1}{3}$  에서 최댓값  $M$  과 최솟값  $m$  을 가질 때,  $M+m$  의 값을 구하시오.

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

【35】 첫째항이  $a$  인 등비수열  $a_n$  에 대하여  $\sum_{n=1}^{\infty} a_n = 2a$  일 때, 무한급수

$\sum_{n=1}^{\infty} a_n a_{n+1}$  의 합을 구하시오.

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

【36】  $x$  축과  $y$  축에 접하는 반지름이 1인 원  $C_1$  이 있다. 원  $C_2$  는  $x$  축,  $y$  축과 원  $C_1$  에 외접하는 반지름이 1보다 작은 원이다. 마찬가지로 원  $C_n$  은  $x$  축,  $y$  축과 원  $C_{n-1}$  에 외접하고 반지름이  $C_{n-1}$  의 반지름보다 작은 원이라 할 때, 이 원들의 넓이의 합을 구하시오.

- ①  $\frac{(3\sqrt{2}-4)\pi}{8}$                       ②  $\frac{(3\sqrt{2}-4)\pi}{4}$   
 ③  $\frac{(3\sqrt{2}+4)\pi}{8}$                       ④  $\frac{(3\sqrt{2}+4)\pi}{4}$