

平成31年度 東北医科薬科大学入学試験問題

医学部 一般・外国語

《 注 意 事 項 》

1. 解答用紙左部に氏名、フリガナ、その下部に受験番号を記入し、例にならって○にマークしなさい。

(例) 受験番号10001の場合

フリガナ	
氏 名	

受 験 番 号				
万	千	百	十	一
1	0	0	0	1
	●	●	●	○
●	①	①	①	●
②	②	②	②	②
⑨	⑨	⑨	⑨	⑨

2. この問題冊子は、15ページまであります。
3. 試験中に問題冊子の印刷不鮮明、ページの落丁・乱丁等に気付いた場合は、手を高く挙げて監督者に知らせなさい。
4. 解答方法は次のとおりです。


(1) 次の例にならって解答用紙の解答欄にマークしなさい。

(例) 問1 東北医科薬科大学のある都市は次のうちどれか。

- ① 札幌市 ② 青森市 ③ 仙台市 ④ 秋田市
⑤ 山形市 ⑥ 盛岡市 ⑦ 福島市 ⑧ 横浜市

③と解答する場合は解答用紙の③をマークしなさい。

解答 番号	解 答 欄									
	1	2	3	4	5	6	7	8	9	10
1	①	②	●	④	⑤	⑥	⑦	⑧	⑨	⑩

- (2) 解答の作成にはH、F、HBの黒鉛筆を使用し、○の中を塗りつぶしなさい。シャープペンシル等、黒鉛筆以外のものを使用した場合には、解答が読み取れず、採点できない場合があります。
- (3) 答えを修正する場合は、プラスチック製の消しゴムであとが残らないように**完全に消しなさい**。鉛筆のあとが残ったり、のような消し方などした場合は、修正または解答したことにならないので注意しなさい。
- (4) 解答用紙は折り曲げたり、メモやチェック等で汚したりしないよう、特に注意しなさい。

(試験終了後、問題冊子は持ち帰りなさい。)

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【 I 】 次の英文を読み、問い（問 1～4）に答えよ。

The big news right now in the medical world is the development of anti-cancer drugs that use the body's natural immune system to fight off tumors. In Japan, the most famous of these drugs is probably Opdivo, created by the relatively minor Ono Pharmaceutical Co. in collaboration with Bristol-Myers Squibb Co.

Opdivo was approved for treating a certain type of lung cancer by the Ministry of Health, Labor and Welfare, which means national health insurance will pay for treatments. That's very important, since the drug costs a staggering ¥1.33 million per dose.

Under normal conditions of care for a lung cancer patient weighing 60 kilograms, the cost of using Opdivo would come to ¥2.55 million a month. However, an insured individual would only pay about ¥650,000 a year thanks to a special exception for "high-priced medicines" that reduces a patient's payment depending on their income. And if the patient is aged 70 or older, the amount (ア) even further, since the elderly only have to pay 10 percent of their medical costs out of pocket to begin with, rather than the 30 percent that most people pay through national health insurance.

Consequently, Opdivo, which was originally developed to treat skin cancer, is giving hope to lung cancer patients in Japan, though it may be too (イ) to celebrate it as the miracle drug some media are calling it.

A recent report on a TV news program outlined the problems with Opdivo and, by extension, other expensive new drugs that are being put on the market. After telling the story of one 74-year-old lung cancer sufferer who saw no positive results from chemotherapy but whose tumors shrank after beginning treatment with Opdivo, the program presented a physician, Dr. Hideo Kunito of the Red Cross Hospital, who warned that widespread use for such expensive drugs will "destroy Japan's medical system."

(1)What most media are not pointing out is that Opdivo so far has only proven effective for 20-30 percent of the patients who have taken it. Right now, drugs cost the Japanese government ¥8.5 trillion a year, and Kunito estimates that if 50,000 people—the number of lung cancer patients for whom Opdivo would be used—went on the new drug, it would add another ¥1.75 trillion, thus bankrupting not only the health insurance system but the

country with it. And that, he says, is the minimum estimate. Some patients have reported side effects that require supplemental treatment, which means the bill related to just this one drug would increase in other indirect ways.

The main problem is that doctors are still learning how to use the drug, and at present the dosages are mostly guesswork. Sometimes the tumor shrinks and sometimes it gets bigger, which means doctors may increase dosages. But since the drug is only effective 30 percent of the time at most, it makes it even more difficult to determine how much to administer.

On July 22, 2016, the health ministry warned doctors who prescribe Opdivo that when used with other anti-cancer drugs, the side effects can be particularly deadly. Obviously, there is still a lot more research to be done, and in the meantime, as Kunito points out, more of these types of very expensive drugs will be entering the market, and people who suffer from the ailments they treat will demand them from their doctors.

Kunito recommends that use of Opdivo (a) limited in accordance with age. (2)At one point in the program he said that people after the age of 75 should acknowledge that their life is essentially complete, a statement that will surely meet with a great deal of controversy. His point is that the government should not have to spend "millions of yen" to extend a life by only a year at most. Japanese over 65 (b) 25 percent of those with health insurance, and they account for 60 percent of all medical costs. Drugs themselves are 20 percent of all medical expenditures, or ¥40 trillion in 2015, a 9 percent increase over 2014.

Other possible solutions to the cost-of-care problem will be equally controversial: revoke or reduce the special exclusion for expensive drugs, raise taxes and/or insurance premiums to address rising drug expenses or get pharmaceutical companies to push down the price. As it stands, the prices of all prescription drugs in Japan are set by the health ministry in accordance with drug company data.

What most consumers want to know is: Why are these drugs so expensive? The main reason is the cost of research. For every successful drug that (c) it to market, 20,000 do not. Most of the expense goes into animal and human testing. An increasing portion of new drugs today are developed using biotechnology, meaning a living organism is involved in their

manufacture. This adds considerably to the cost when compared to conventional factory-made pharmaceuticals.

As with many things in our world, the main culprit is the market. Drug companies naturally look for treatments that are in demand, which is why so many companies make medications to treat high blood pressure and diabetes, conditions that more and more people are developing. Likewise, cancer is a huge money maker, even if an increasing number of doctors are questioning the widespread use of chemotherapy, since they believe the treatment is often (ウ) than the disease. But these drugs are in high demand, so pharmaceutical companies work hard to develop them.

Rarer cancers and other diseases are not addressed as much, so when drugs are developed for them, they can be very expensive. That's why the health ministry doesn't set the price too low. If it did, Japanese companies might stop developing drugs for certain conditions because there would be no incentive. Opdivo's price is expected to (エ) in the future, since it was developed for melanoma, which relatively few people suffer from in Japan. There are many more lung cancer patients.

On July 27, 2016, the ministry said it would draw up new guidelines for expensive drugs aimed at making their use by doctors and hospitals more cost-effective and "mitigating side effects." The guidelines will likely specify what sort of patients will use these expensive drugs and which doctors and hospitals will be able to prescribe them. (オ) expensive drugs are used outside of these guidelines, national health insurance may not pay for them.

問 1 次の文(1)～(6)において、本文に書かれている内容と一致する場合は①を、一致しない場合は②をマークせよ。

(1)

1

Opdivo was originally developed to treat lung cancer and became popular because national health insurance would pay for treatments using the drug.

(2)

The patients aged 70 or older only have to pay 10 percent of their medical costs whereas most patients pay 30 percent through national health insurance.

(3)

It was warned by the health ministry that Opdivo has serious side effects, especially when used with other anti-cancer drugs.

(4)

The cost of research being high, most consumers are aware of the fact that new drugs are developed through biotechnology.

(5)

At present, the prices of some of the prescription drugs available in Japan are determined by the health ministry according to drug company data.

(6)

Many pharmaceutical companies work hard to develop cancer drugs because they are in high demand, even though they cannot make an enormous amount of money.

問 2 本文中の空欄(a)～(c)に入る最も適切な語句を①～⑤の中から一つ選び、その番号をマークせよ。

(1) 空欄(a)

① be ② must be ③ should ④ to be ⑤ was

(2) 空欄(b)

① are made up with ② are made up of ③ is making up
④ make up ⑤ making up

(3) 空欄(c)

① brings ② faces ③ makes ④ reaches ⑤ takes

問 3 文脈から判断すると、本文中の空欄(ア)～(オ)には次の①と②のどちらを入れるのが適当か。その番号をマークせよ。

- (1) 空欄(ア)
① comes down ② goes up
- (2) 空欄(イ)
① late ② soon
- (3) 空欄(ウ)
① better ② worse
- (4) 空欄(エ)
① come down ② go up
- (5) 空欄(オ)
① If ② Unless

問 4 本文中の下線部(1)、(2)の意味として最も適当なものを①～④の中から一つ選び、その番号をマークせよ。

- (1) 下線部(1)
- ① ほとんどのメディアが指摘していないのは、オブジーボが、これまで投与された患者の 20～30%に効果があったことが証明されていることだ。
- ② ほとんどのメディアが指摘していないのは、オブジーボが、それが投与された患者のうち 20～30%にしか効果がないことがこれまでに判明していることだ。
- ③ ほとんどのメディアが指摘していないのは、オブジーボだけが、それが投与された患者の 20～30%に効果を発揮してきたことが最近になって証明されていることだ。
- ④ ほとんどのメディアが指摘していないのは、オブジーボの効果が、それが投与された患者全体のわずか 20～30%に関してはこれまで証明されていないということだ。

(2) 下線部(2) 16

- ① 彼は番組の中で、75 歳になった人たちは自分の人生が基本的に完璧だと認識すべきだと言ったが、それは確実に多くの論争に発展するであろう。
- ② 75 歳を超えた人たちは基本的にそれが人生の終末であることを認識すべきだと彼は番組の中で話したが、その発言により、議論は確実に大部分において収束に向かうであろう。
- ③ 番組の中で、75 歳を過ぎた人たちは基本的に寿命に達していると認識すべきだと彼は言ったが、その発言は確実に多くの論争に発展するであろう。
- ④ 番組の中で、75 歳を過ぎた人たちは基本的に人生の終末期について理解を深めるべきだと彼は言ったが、その発言は確実に多くの論争に発展するであろう。

【Ⅱ】 次の英文を読み、問い（問 1～4）に答えよ。

To reduce your impact on air quality, you might expect to trade in your gas-guzzling clunker of a car — but you can also unplug those air fresheners.

In urban areas, emissions from consumer goods such as paint, cleaning supplies and personal care products now contribute as much to ozone and fine particulate matter in the atmosphere as do emissions from burning gasoline or diesel fuel.

The finding is largely a sign of success, Brian McDonald said during a news conference at the annual meeting of the American Association for the Advancement of Science. [A] Steps taken to clean up car exhaust over the past few decades have had a huge effect, and as a result, “the sources of air pollution are now becoming more (1)diverse in cities,” said McDonald, a chemist at Cooperative Institute for Research in Environmental Sciences in Boulder, Colorado.

“When you have a big mountain in front of you, it's difficult to know what lies behind it,” says Spyros Pandis, a chemical engineer at Carnegie Mellon University in Pittsburgh who wasn't part of the study. Now, other sources of air pollution are becoming more visible.

The new study focused on volatile organic compounds, or VOCs, that

are derived from petroleum. These are a diverse array of hundreds of chemicals that easily (2)vaporize and make their way into the atmosphere. Some VOCs can be harmful when directly inhaled. [B]

(1) their immediate effects, VOCs react with other molecules in the air, such as oxygen and nitrogen oxides, to generate ozone as well as fine particulate matter. (Those nitrogen oxides come, in large part, from vehicle exhaust.) High levels of fine particulate matter make it hard to breathe and contribute to (3)chronic lung problems. And (ㄗ)while ozone high in the atmosphere helps shield Earth from the sun's ultraviolet radiation, at ground level, it mixes with fine particulates to form breath-choking smog.

Over a period of six weeks, the researchers collected air samples in Pasadena, located in the notoriously smoggy Los Angeles valley. [C] They also evaluated indoor air quality measurements made by other scientists. The team traced the molecules found in these air samples to their original sources using databases that show the specific volatile organic compounds released by specific products.

Consumer products that emit VOCs have an outsized effect on air pollution, the team found. About 15 times as much oil and natural gas is used as fuel that ends up in consumer products ranging from soaps, shampoos and deodorants (2) air fresheners, glues and cleaning sprays. And yet these everyday products were responsible for 38 percent of the VOC emissions, the researchers found, while gasoline and diesel emissions accounted for only 33 percent. Consumer products also contributed just as much as fuels to chemical reactions that lead to ozone and fine particulate matter. The emissions from consumer products also dwarfed those from the production of oil and gas, called upstream emissions.

(4)Regulations on VOCs vary by state, but most consumer products are regulated only for their potential contribution to ground-level ozone, not fine particulate matter. [D] This study makes it clear that (ㄱ)even though most volatile emissions from consumer products happen indoors, that air eventually gets vented outside, where it can contribute to larger-scale atmospheric pollution in multiple ways, McDonald said.

More work needs to be done to see whether other cities show the same pattern, the researchers add, as well as to figure out which kinds of VOCs might be particularly problematic. (3) there are so many VOCs and

they all react differently in the atmosphere, there's still a lot to learn about which might be most likely to form fine particles and therefore be the best targets for reduction.

Part of the challenge with many these volatile-emitting products is that they're specifically designed to evaporate as part of their job, says Jessica Gilman, an atmospheric chemist at the National Oceanic and Atmospheric Administration in Boulder. For some products, like paints, there are low-VOC formulations available. [E] But finding replacements for key ingredients in other products can be hard. (ウ)Picking unscented versions of personal care products when possible and using the minimum amount necessary can help reduce the impact on air quality.

問 1 次の一文は、本文中の空欄[A]～[E]のどこに入れるのが最も適当か。①～⑤の中から一つ選び、その番号をマークせよ。 17

Molecules released by bleach and paint make people lightheaded, for example.

- ① 空欄[A] ② 空欄[B] ③ 空欄[C] ④ 空欄[D]
⑤ 空欄[E]

問 2 本文中の空欄(1)～(3)に入る最も適当なものを①～⑤の中から一つ選び、その番号をマークせよ。

(1) 空欄(1) 18

- ① Against ② Beyond ③ Toward ④ With ⑤ Without

(2) 空欄(2) 19

- ① for ② in ③ of ④ to ⑤ with

(3) 空欄(3) 20

- ① Although ② Because ③ Even if ④ Therefore ⑤ Unless

問 3 本文中の下線部(1)～(4)の語の意味の説明に最も近いものを①～④から一つ選び、その番号をマークせよ。(下線部(4)は複数形だが、単数形を想定して答えよ。)

(1) 下線部(1)diverse 21

- ① likely to cause trouble or problems
- ② difficult to understand or be sure about
- ③ making you feel very unhappy or uncomfortable
- ④ very different from each other and of various kinds

(2) 下線部(2)vaporize 22

- ① turn into gas
- ② flow over the edge of a container
- ③ come or go down from a higher to a lower level
- ④ move steadily and continuously in one direction

(3) 下線部(3)chronic 23

- ① lasting for a long time
- ② causing trouble or difficulty
- ③ quickly becoming severe and dangerous
- ④ that has never happened, been done or been known before

(4) 下線部(4)Regulations 24

- ① the act of watching something carefully for a period of time
- ② a scientific test that is conducted in order to study what happens and to gain new knowledge
- ③ equipment provided for a particular purpose
- ④ an official rule made by a government or some other authority

問 4 本文中の下線部(ア)～(ウ)の意味として最も適当なものを①～④の中から一つ選び、その番号をマークせよ。

(1) 下線部(ア) 25

- ① オゾンは大気中の高い所にあるため、基本的には地球を太陽の紫外線から守るのに役立つ。また、微小粒子状物質と混ざることにより、吸い込むと危険なスモッグからも守ってくれる。
- ② オゾンは、大気中の高い所では地球を太陽の紫外線から守るのに役立ってくれるが、地表面においては、微小粒子状物質と混ざり、息の詰まるようなスモッグを生み出す。
- ③ 大気中で高い割合を占めるオゾンは、地球を太陽の紫外線から守るのに役立ってくれる。またこれが一定の層をなすと、微小粒子状物質と結合し、息の詰まるようなスモッグを吸収するという優れた特性も持つ。
- ④ 大気中で高い割合を占めるオゾン層は、地表付近においては、地球を太陽の紫外線から守る手助けをしてくれるが、その一方で、息の詰まるようなスモッグを形成するために、微小粒子状物質と結合することもある。

(2) 下線部(イ) 26

- ① 揮発性物質のほとんどは屋内の消費者製品から排出されるが、その空気は時として外部へ流れ出てから変化し、さまざま形で、より大規模な大気汚染を未然に防ぐ可能性を持っている
- ② 屋内で使う消費者製品のほとんどから汚染物質が排出されたとしても、その空気はやがて外へ流れ出て薄まり、さまざまな形で、大規模な大気汚染のより良い解決に貢献することができる
- ③ 消費者製品から揮発性物質が排出されるのはほとんど屋内であるとしても、その空気は結局外へ出ていき、さまざまな形で、より大規模な大気汚染の原因となる恐れがある
- ④ ほとんどの汚染物質は、消費者製品から排出されるために屋内に閉じ込められているとはいえ、その空気は最終的にはさまざまな形で外へ排出されるため、より大規模な大気汚染とならないことに寄与することができる

(3) 下線部(ウ) 27

- ① 必要最低限の量を使うことが可能なのであれば、安全でないと言われているパーソナルケア商品を使うことに特に問題はなく、空気の質への影響を防ぐことに役立つ可能性もある。
- ② できれば無香性のパーソナルケア商品を購入するということや、中身を必ず全て使い切るということは、空気の質への影響を最低限にする上で一役買ってくれる。
- ③ さまざまな種類のパーソナルケア商品を可能なときに買い、必要最低限の量しか使わないことは、空気の質を落とさないようにすることに一役買ってくれる。
- ④ できれば無香性のパーソナルケア商品を選ぶといったことや、必要最低限の量を使うということをすれば、空気の質への影響を減らす手助けをすることができる。

【Ⅲ】 次の問い（問 1～10）の英文中の空欄(28)～(37)に入る最も適当なものを①～⑤の中から一つ選び、その番号をマークせよ。

問 1 I thought the Eagles had probably won against the Hawks in last night's game, but I wanted to know (28), so I checked the score online.

- [① by chance ② for sure ③ in the world
④ on and off ⑤ to no effect]

問 2 Road construction is (29) until next week on Vernon Street. Drivers will not be able to use the street at all during this time.

- [① at a loss ② in touch ③ on sale ④ out of date
⑤ underway]

問 3 When I get tired of reading medical book, I switch to poetry by (30) of diversion.

- [① and by ② degrees ③ nature ④ return ⑤ way]

問 4 I, (31), had never made a voyage that started under better conditions.

- [① for my part ② in advance ③ next to nothing
④ safe and sound ⑤ sooner or later]

問 5 The team has rescued more than 100 people, and (32) how many more people are still out there.

- [① as far as I am concerned ② in case
③ it stands to reason that ④ there is no telling ⑤ to some extent]

問 6 We should (33) that it never happens again.

- [① be hard put to it ② count for nothing ③ express gratitude
④ idle away ⑤ see to it]

問 7 The sea is running high (34) of the typhoon in the vicinity.

- [① in due course ② in favor ③ on account
④ taking risks ⑤ taking sides]

問 8 The young man could do (35) but depend on financial support from his parents.

- [① adherence to ② away with ③ nothing ④ up to ⑤ with]

問 9 We should be very careful with (36) to the rights of individuals.

- [① attempt ② coincidence ③ evidence ④ proof ⑤ respect]

問 10 In the country, there is a growing shortage of music teachers to take (37) of the retiring teachers.

- [① advantage ② forth ③ notice ④ part ⑤ the place]

【IV】 次の問い（問 1～5）の英文の下線部の意味に最も近い語句を①～⑤の中から一つ選び、その番号をマークせよ。

問 1 38

I was let down when what I had been counting on fell through.
(① disappointed ② frightened ③ happy ④ induced
⑤ surprised)

問 2 39

You shouldn't look down on him.
(① criticize ② restore ③ tease ④ trouble
⑤ underestimate)

問 3 40

The man who had fainted didn't realize where he was when he came to.
(① changed his position ② hung around ③ moved away
④ regained consciousness ⑤ stood up)

問 4 41

He used to pick on me when we were kids.
(① embrace ② fetch ③ play with ④ take care of ⑤ tease)

問 5 42

In any case, I am going to talk it over with my teacher.
(① As it were ② At any rate ③ By the way ④ First of all
⑤ In addition)

【V】 次の問い（問 1～5）の日本語の文の意味に合うように[]内の語句を並べかえて意味の通る英文を作り、空欄([43])～([52])に入るものを一つ選び、その番号をマークせよ。なお、選択肢の中には、解答に関係のないものも一つ含まれている。

問 1 人間と類人猿はどちらも、環境に関する情報の多くを自分たちの優れた視力に頼っている。

Both human beings and apes () ([43]) () ()
() ([44]) () about the environment.

[① are ② excellent vision ③ for ④ much ⑤ of ⑥ rely on
⑦ their ⑧ their information]

問 2 今日では、インターネットに接続しているいかなるコンピューターも完全にハッキングの心配がないということはない。

Nowadays () () () ([45]) () ()
([46]) () hacking.

[① avoid ② completely immune ③ computer ④ connected
⑤ from ⑥ is ⑦ no ⑧ the Internet ⑨ to]

問 3 人間を他の霊長類と区別する身体的特性の多くは、人間の直立二足歩行の能力と関係がある。

Many of the physical characteristics that () ([47]) ()
() primates are related to the ability of people () ()
([48]) () walk on two legs.

[① and ② distinguish ③ from ④ human beings ⑤ of
⑥ other ⑦ stand ⑧ to ⑨ upright]

問 4 警察官たちは、ハロウィンで騒ぐ人々の多くが渋谷駅の外の有名なスクランブル交差点に群がる中、信号を守るように人々に呼び掛けた。

Police officers () () () () () ()
() () () to the famous scramble crossing outside
Shibuya Station.

- [① as ② called ③ flocked ④ follow ⑤ in ⑥ many of
⑦ on people ⑧ the Halloween revelers ⑨ to
⑩ traffic signals]

問 5 京都の清水寺を何年か前に訪れていた時、観光客が急な斜面に張り出した有名な清水の舞台で自撮りしているのを見て、私は不安でいっぱいになった。

While visiting Kyoto's *Kiyomizudera* some years ago, I was ()
() () () () () on the temple's famed deck
() () () a steep hillside.

- [① anxious ② apprehension ③ a tourist ④ filled with
⑤ juts out ⑥ over ⑦ saw ⑧ taking a selfie ⑨ that
⑩ when I]

