令和2年度

医 学 部

入 学 試 験 問 題

一般（前期）1次試験

1 Read the passage below and answer the questions ☐1☐ – ☐7☐ about it. Choose the most appropriate answers based on what is stated or implied in the passage.

Exercising alone is a practical option for many people. Unless you have health issues that need to be professionally monitored, doing exercise programs all by yourself can be very satisfying. Exercising alone can be done at home, outdoors, or even at health clubs or fitness centers. Many of them are now open 24 hours a day. If your schedule is busy, you may ☐1☐ the freedom of not having to match your schedule with anyone else. The time you spend exercising can be a chance to turn off your mind from the stress of the day and focus on your exercise experience.

An important consideration when exercising alone at home or outdoors is safety. Staying within a level of ☐2☐ appropriate to your current fitness level improves the safety of a home-based program. Exercising outdoors brings up safety issues in terms of people, traffic, and weather conditions. When exercising outdoors, always walk or run on a sidewalk, if available, and face traffic at the edge of the road when a sidewalk is not available. When cycling, ride with traffic in a bike lane, or as far to the left as possible in the outside lane when bike lanes are absent. Avoid exercising in high heat and humidity*, and always wear appropriate clothing and shoes in cold, snowy, and wet weather. ☐3☐ listening to portable music devices is enjoyable, use caution when exercising in places where you will encounter motor traffic because these devices reduce the ability to attend to sounds that may be important for safety. To help prevent accidents and injuries, never assume that others around you are being careful with respect to your safety. If you exercise in and around traffic, wear bright and reflective clothing and be cautious and careful ☐4☐.

Although exercising alone is a great choice for some, many people prefer exercising with others. By involving family members, friends, and coworkers in your activity program, you can help each other make exercise a regular habit. In doing so, you claim health and well-being benefits for yourself while also helping those around you to do the same. You may also find opportunities to expand your social network with others already involved in activities of interest to you.

Exercising in groups can take the form of organized classes in aerobics, indoor cycling, or kickboxing at fitness facilities, or of more informal situations such as shopping mall-walking groups. Most commercial health clubs and community fitness facilities offer a variety of group exercise classes as part of the regular membership package. These classes can be a great way to meet people with similar interests. Be sure to check what is available when deciding where to join.

Community-based programs promote group dynamics that offer support and encouragement, which can be highly beneficial regardless of your level of experience. Examples include cycling clubs, running clubs, and ballroom dance groups. Such groups form within communities either spontaneously*, through the continuous efforts of a group of individuals, or by way of local agencies ☐5☐ to promote physical activity and healthy living.

<<NOTES*>>
   humidity = conditions in which the amount of water in the air is high
   spontaneously = without apparent external causes

1. For ☐1☐ – ☐5☐ in the passage, choose the most appropriate answer from each list.

1	① adjust	② neglect	③ appreciate	④ associate	⑤ estimate
2	① intensity	② stiffness	③ attraction	④ grading	⑤ developing
3	① Apart from	② Besides	③ Not only	④ Just because	⑤ Although
4	① for every way possible		② to every possible way		③ in every way possible
	④ by every way possible		⑤ of every possible way		
5	① hope	② hoping	③ that hopes	④ hoped	⑤ to hope

2. ☐6☐ Which of the following is given as an argument for exercising alone? Choose ONE answer.

① have an existing health problem
② have more flexibility about when to exercise
③ don't need to worry so much about safety
④ easier to create regular exercise habits
⑤ can meet people with similar interests

3. ☐7☐ According to the safety information provided in the passage, which of the following jogging positions and directions are NOT recommended? The numbered arrows show the jogging positions and directions. Choose TWO answers.

《ROAD WITH SIDEWALK》　　　《ROAD WITHOUT SIDEWALK》
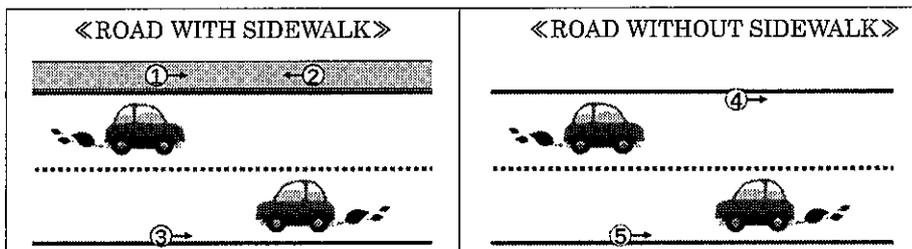
2 Read the passage below and answer the questions ☐8☐ – ☐18☐ about it. Choose the most appropriate answers based on what is stated or implied in the passage.

If you moved from Japan to Germany as a child, you'd likely become fluent in German in a short period, but if you moved to Germany as an adult you might never become fluent. This difference in the capacity for learning language ☐8☐ because there are sensitive periods in development when the brain is particularly plastic and able to receive and retain information with greater effectiveness.

≪ ① ≫

A well-established field of sensitive-period biology ☐9☐ to explain how people learn to speak, how birds learn to sing, and how our sensory systems wire up, among other things. The field has been particularly successful in explaining how the brain coordinates the information streaming in from the two eyes to allow binocular* vision, useful for depth perception. In the last century, it was discovered that when a person had their vision clouded in one eye by some eye disease, their binocular vision would be weakened and reduced for life. However, if a correction was made in early life, then the brain and binocular vision could recover to develop normally. This human phenomenon can be modeled in mice by closing one eye in early life. Extensive study of this model ☐10☐ the basis for our understanding of the cellular mechanisms regulating sensitive periods across some regions of the brain.

≪ ② ≫

You might ☐11☐ that early experiences are simply the most powerful; the young brain is, in general, more plastic than the adult brain. However, the often ☐12☐ or disregarded details show that the younger brain is not always more sensitive to experience than the older brain. When the biology can be studied in carefully controlled laboratory experiments, we find that periods of greater sensitivity are often delayed, perhaps even timed, until the incoming experience is appropriate to form the brain. For example, the peak of sensitive-period plasticity* for the development of binocular vision occurs about a month after birth in mouse brains, which is more than a week after eye opening. Scientists are still working on the why and how. Nevertheless, it's clear that the brain can and does hold highly sensitive plasticity under wraps and then reveals it when appropriate. It's thought that years of evolution have ☐13☐ brain development to be not only experience-dependent but also carefully timed, such that it is experience-expectant—that is, inactive or asleep until needed.

≪ ③ ≫

What this means for the big picture is that human development probably involves an amazing sequence of undiscovered sensitive periods stretching late into the second or even third decade of life. Consequently, we should be on the lookout for "sleeper" sensitive periods. For example, there may be teenage social-sensitive periods when we learn to ☐14☐ with peers, or cognitive-sensitive periods when we create our decision-making style. These sensitive periods might be timed to overlap with important transitions, as when we ☐15☐ our parents' protection to explore the world, or go through puberty*, or become a parent. The boundaries may be sharp, triggered by events like puberty onset, or gradual slopes that rise and fall with age and experience. We don't yet know when, where, and how these more subtle cognitive- and emotion-sensitive periods may work.

≪ ④ ≫

Sensitive-period biology may in future provide important insights into understanding and preventing mental illness. Sensitive-period plasticity enables adaptation to experience, but this adaptation doesn't ensure an optimal or even favorable outcome. For example, negative experience during a sensitive period could ☐16☐ a persistent negative bias in the processing of events, potentially leading to mental illness.

≪ ⑤ ≫

<<NOTES*>>
binocular = using both eyes
plasticity = the capacity for being formed or developed
puberty = the period of a person's life during which their body and organs mature and become capable of having children

1. For ☐8☐ – ☐16☐ in the passage, choose the most appropriate answers from ① – ⑫. Choose ONE answer for each question. Use each word only once.

| ① conclude | ② interact | ③ fails | ④ borrow | ⑤ consist | ⑥ generate |
| ⑦ provides | ⑧ overlooked | ⑨ exists | ⑩ leave | ⑪ seeks | ⑫ formed |

2. ☐17☐ The following paragraph was taken from the passage. Which location was it taken from? Choose ONE answer from ≪ ① ≫ – ≪ ⑤ ≫.

≪ It may be easier to see evidence of complex sensitive periods in development in other species. Life-history ecologists have identified a wide array of nonhuman species that adapt their characteristics according to the sampled statistics of their particular environment. For example, if developing crickets are exposed to spiders in the environment, then the adult crickets are better at surviving where there are spiders. If food is scarce during development for a species of some bugs, then an alternate body type and hunting strategy may be used in adulthood. ≫

3. ☐18☐ What is the main finding presented in this passage? Choose ONE answer.

① Children learn languages much quicker than adults because their brains retain information better.
② The field of science known as sensitive-period biology was created to study how the brain learns.
③ The brain has periods of sensitivity that activate only when we are experiencing deep sleep.
④ There are multiple sensitive periods that may only become active at certain periods of a lifetime.
⑤ Previously held beliefs about when decision-making styles develop may not be correct.

3 Read the passage below and answer the questions ☐19☐ – ☐30☐ about it. Choose the most appropriate answers based on what is stated or implied in the passage.

"You can never understand one language until you understand at least two." This statement by the English author Geoffrey Willans feels intuitive to anyone who has studied a second language. The idea is that learning to speak a foreign language certainly conveys deeper understanding of one's native tongue. The German philosopher Goethe, in fact, found this such a powerful concept that he was **<1> moved** to make a similar but more extreme assertion: "He who knows no foreign languages knows nothing of his own."

As compelling as this idea may be, what's surprising is that its essence—that learning or improvement in one skill or mental function can positively influence another—applies not only to human intelligence but also to machine intelligence. The effect is called transfer learning, and besides being an area of fundamental research in machine learning, it has potentially wide-ranging practical applications.

The field of machine learning, which is the scientific study of algorithms* whose capabilities improve with use, has been making **<2> remarkable** advances. Some of these have led to computing systems that are competent* in skills associated with human intelligence, sometimes at levels not just approaching human capabilities but exceeding them— for example, in the ability to understand, process, and even translate languages. In recent years, much of the research in machine learning has focused on the algorithmic concept of deep neural networks (DNNs), which ☐21☐ by inferring patterns, often of amazing complexity, from large amounts of data. A DNN-based machine can be fed many thousands of small pieces of recorded English utterances, each one paired with its text transcription, and from this perceive the patterns of correlation between the speech recordings and the paired transcriptions. These inferred correlation patterns are precise enough that eventually the system "understands" English speech. In fact, today's DNNs are so good that when given enough training examples and a powerful enough computer, **<3> they** can listen to a person speaking and make fewer transcription errors than a human would.

What may surprise some is ☐22☐ computerized learning machines exhibit transfer learning. Consider an experiment involving two machine-learning systems: machines A and B. Machine A uses a brand-new DNN, whereas machine B uses a DNN that has been trained to understand English. Suppose we train both A and B on identical sets of recorded Mandarin utterances, along with **<4> their** transcriptions. What happens? Machine B, the English-trained one, ends up with better Mandarin capabilities than machine A. In effect, the system's prior training in English transferred capabilities to the related task of understanding Mandarin. But there's an even more astonishing outcome: not only does Machine B end up better in Mandarin but also B's ability to understand English is improved! It seems that Willans and Goethe were on to something—learning a second language enables deeper learning about both languages, even for a machine.

The idea of transfer learning is still the subject of basic research, and many fundamental questions remain ☐23☐. For example, not all "transfers" are useful, because, at a minimum, for transfer to work well the learned tasks **<5> apparently** need to be related in ways avoiding precise definition or scientific analysis. Connections to related concepts in other fields, such as cognitive science and learning theory, remain to be explained. It's intellectually dangerous for a computer scientist to humanize computer systems, but we have to **<6> acknowledge** that transfer learning creates a powerful, appealing similarity between learning in humans and machines. Surely if general artificial intelligence is ever to become real, transfer learning will probably be a fundamental factor in its creation. For the more philosophically minded, formal models of transfer learning may contribute new insights and classifications for knowledge and knowledge transfer.

There's also high potential for applications of transfer learning. So much of the practical value of machine learning— for example, in search and information retrieval*—has focused on systems that learn from the huge data sets available on the World Wide Web. But what can Web-trained systems learn about smaller communities, organizations, or even individuals? Can we expect a future in which intelligent machines can learn useful tasks highly specialized to a specific individual or small organization? Transfer learning offers the possibility that all the intelligence of the Web can form the foundation of machine-learned systems, from which more individualized intelligence is learned through transfer learning. Achieving this would be another step toward the democratization of machine intelligence.

<<NOTES*>>
algorithms = a process in calculations or other operations, especially by a computer
competent = having the enough skill, ability or knowledge for doing something well
information retrieval = the techniques of storing and recovering of information, especially in a database stored in a computer

1. For **<1> moved** and **<2> remarkable**, choose ONE answer that is closest in meaning from each list.

| 19 | **<1> moved** | ① advanced | ② inspired | ③ admired | ④ transformed | ⑤ shifted |
| 20 | **<2> remarkable** | ① anticipating | ② famous | ③ sensible | ④ decisive | ⑤ exceptional |

2. For ☐21☐ – ☐23☐ in the passage, choose the most appropriate answer from each list.

21	① learn	② learns	③ learned	④ is learned	⑤ have been learned
22	① unless	② which	③ when	④ if	⑤ that
23	① answered	② under	③ cleared	④ open	⑤ solved

3. What does **<3> they** refer to? Choose ONE answer from the list.

24	① correlation patterns	② the systems	③ English speech	④ today's DNNs
	⑤ training examples	⑥ powerful computers		
	⑦ training examples and a powerful computer	⑧ transcription errors		

4. What does **<4> their** refer to? Choose ONE answer from the list.

| 25 | ① learning machines | ② transfer learning | ③ experiment | ④ two machine-learning systems |
| | ⑤ machines A and B | ⑥ DNNs | ⑦ identical sets | ⑧ Mandarin utterances |

5. In the word **<5> apparently**, which syllable is most stressed? Choose ONE from ① - ④.

| 26 | **<5> apparently** | ap-par-ent-ly |
| | | ① ② ③ ④ |

6. For **<6> acknowledge**, identify the most stressed vowel, and choose ONE word that has the same vowel pronunciation from the list below.

| 27 | **<6> acknowledge** |

① seat ② sit ③ set ④ sat ⑤ pot ⑥ cut ⑦ cool ⑧ home ⑨ pay ⑩ heard

7. | 28 | What is transfer learning? Choose ONE answer.

① a language learning skill that Willans used to teach foreign languages
② using knowledge gained while learning one skill to learn another skill
③ the ability to teach other people how to speak more than one language
④ applying human-based learning skills to improve machine intelligence
⑤ a practical method for doing research into machine learning applications

8. | 29 | In the experiment involving two machine-learning systems, why does Machine B have better Mandarin capabilities than Machine A? Choose ONE answer.

① It is older than Machine A.
② It uses a more advanced DNN.
③ It was trained longer.
④ It learned English first.
⑤ It continues to improve its English.

9. | 30 | What does the author imply about the future of artificial intelligence? Choose ONE answer.

① The connection between learning theory and other fields is unknown.
② It is not safe to think of artificial intelligence as a living thing.
③ Use of transfer learning would likely be needed to create artificial intelligence.
④ Machines will need to learn philosophy to become more intelligent.
⑤ It will become possible for machines to classify and transfer knowledge.

4 Read the passage below and answer the questions | 31 | - | 42 | about it. Choose the most appropriate answers based on what is stated or implied in the passage.

What exactly do we mean when we talk about 'research'? Research is the systematic investigation of a topic or phenomena that allows you to form supported opinions or conclusions about something. Research can be a formal, scientific study of something or an informal, casual questioning. The more strictly applied and scientifically **<1> oriented** your research is, the more likely the results of your research will be a true reflection of the phenomenon you are **<2> investigating**, and the more likely your research is to be taken seriously.

Many of you will conduct research throughout your entire life | 33 | even realizing it. The need to make a decision often drives you to research your options and identify the strengths and weaknesses of the alternatives available to you. Examples include choosing which university to attend or which car to buy. Many new parents conduct countless hours of research to understand which is the best baby bed to buy, which is the best baby carriage or the safest car seat. If you have asked a question and needed to go searching for the answer then, in its purest form, you have conducted research.

Scientific research differs only | 34 | that it involves the researcher applying an objective and systematic method of investigation. In other words, it is a stricter form of inquiry that is held to higher standards than informal non-scientific methods. Scientific research involves testing a theory or prediction about a question of interest and uses an analytical method to test the probability of your theory being correct. **<3> Much of the research you will find in scientific textbooks along with the literature you will often need to read to complete your assessment during your studies is likely to be scientific in nature.**

≪ ① ≫ Let's use some examples to illustrate the difference between research and scientific research. ≪ ② ≫ At this point in your life it is likely that you have known someone who has faced a serious health issue—perhaps cancer or another potentially chronic* disease. ≪ ③ ≫ Perhaps you noticed that some people were very anxious about the diagnosis* yet others seemed to be less anxious and used expressions such as "everything will be all right". ≪ ④ ≫ You might explain these differing reactions by thinking that a person's reaction in this situation probably depends on how close they are to the person who is ill. ≪ ⑤ ≫ Or maybe you think the reaction relates to personality or the way that person copes with difficulty. ≪ ⑥ ≫ While this is a core component of research, observations like those you have made of a small group of people are not sufficient to suggest that your observations are applicable outside your circle of relationships. ≪ ⑦ ≫

| 35 | this with scientific research conducted by Chung, who explored this question of a person's reaction to terrible news with a sample of more than 11,000 people, who represented all demographic groups in the USA. Chung's research was based on theory, used reliable tools of measurement controlled for the potential influence of variables such as age, race, education, income and gender, and used statistics techniques. Chung found that people who are heavy viewers of popular medical dramas were significantly more likely to minimize the seriousness of diagnoses like cancer and heart disease and less likely to think that tackling these issues was important compared to people who watched less medical drama. The viewing time (measured in hours) was related to the perceptions of seriousness over and above all of the other variables they measured. Chung then wrote up the results and sent them to a peer-reviewed journal for 'blind' review.

During your studies, your instructors | 36 | that you use peer-reviewed research publications when you conduct

your own research for assignments. This means the research that is published has undergone a review process by other people in the area who are considered experts in the field. Academic journals only have so many pages in each edition and they want to make sure that what they publish is the best of the best and free from error or flaws. So, every time a researcher submits a draft of a research paper for publication in a major journal that relates to their area of study, the editors of that journal will send that draft out to a number of people who are already considered to be experts in that area, and will ask them to review it. This process is often done 'blind', which simply means the people doing the reviewing don't know the name of the author of the research paper, to remove any potential for bias to impact on their review. Once the reviewers have completed their assessment of the paper (not unlike lecturers marking a piece of your assessment), they give the journal editors their opinion about whether the research should be published in the journal or not. They also provide a few pages of comments for the author, most often changes or suggestions for how to improve the paper, to support whatever recommendation **‹4› they** have made.

<<NOTES*>>

chronic = long-lasting and difficult to cure

diagnosis = discovery, identification or determination of the cause and nature of a disease, disorder or problem through examination

1. For **‹1› oriented** and **‹2› investigating**, identify the most stressed vowel in each word, and choose ONE word that has the same vowel pronunciation as each word from the list below.

| 31 | ‹1› oriented |
| 32 | ‹2› investigating |

① feet ② fit ③ fell ④ fat ⑤ bay ⑥ boy ⑦ book ⑧ how ⑨ home ⑩ foot ⑪ buy ⑫ bought

2. For ⬚33⬚ – ⬚36⬚ in the passage, choose the most appropriate answer from each list.

33	① without	② since	③ as if	④ although	⑤ during
34	① so	② but	③ in	④ for	⑤ which
35	① Begin	② Survey	③ Provide	④ Regard	⑤ Contrast
36	① are insisting	② have insisted	③ may insist	④ insisted	⑤ will be insisted

3. For the underlined sentence **‹3› Much of the research...,** find the MAIN VERB of the sentence. Choose ONE answer from the list.

| 37 | ① research ② find ③ along ④ need ⑤ read ⑥ complete |
| | ⑦ assessment ⑧ studies ⑨ is ⑩ likely ⑪ be ⑫ nature |

4. ⬚38⬚ The following sentence was taken from the passage. Which location was it taken from? Choose ONE answer from ≪ ① ≫ - ≪ ⑦ ≫.

≪ What you are doing is casually observing the behaviors of others. ≫

5. ⬚39⬚ What does **‹4› they** refer to? Choose ONE answer from the list.

① researchers ② major journals ③ journal editors ④ author of the research paper
⑤ reviewers ⑥ lecturers ⑦ academic journals ⑧ comments ⑨ changes or suggestions

6. ⬚40⬚ Which of the following would the author most likely think is NOT an example of research? Choose ONE answer.

① visiting various universities while you are in high school
② telling your friends that you bought a new, compact car
③ reading reviews about different kinds of baby beds
④ asking a group of people for their opinions on a product
⑤ visiting a new restaurant to write a review
⑥ observing how different people react in a particular situation

7. ⬚41⬚ What did Chung discover in his research? Choose ONE answer.

① Findings based on observations of a small group of people cannot be applied to a larger group of people.
② Eleven thousand people in all demographic groups will experience terrible news across the USA at about the same time.
③ It is possible to control the influence of at most 5 different variables when doing statistical analysis.
④ The amount of time spent watching dramas can be measured more accurately than other variables.
⑤ People who watch a lot of medical dramas are less sensitive to news about serious illnesses.

8. ⬚42⬚ What is a 'blind' review? Choose ONE answer.

① a way of reviewing research that involves not showing the findings to the reviewers until the research process has been checked
② a process to review research which uses only people who are considered experts in the same field
③ a method that academic journals use to limit the number of research papers that can be published in a single edition
④ a review system that aims to reduce or remove bias by not revealing the name of the author to the reviewers
⑤ a feedback system that lecturers use to evaluate papers turned in by students