福島県立医科大学

平　成　29　年　度
医学部前期入学試験問題

英　　語

(時間：100 分)

注　意　事　項

1　試験開始の合図があるまで，この問題冊子の中を見てはいけません。

2　試験中に問題冊子の印刷不鮮明，ページの落丁・乱丁および解答用紙の汚れ等に気付いた場合は，手を挙げて監督者に知らせなさい。

3　解答は，すべて解答用紙の所定の欄に記入しなさい。

4　試験終了後，解答用紙のみを回収します。

〔1〕 次の文章を読み，問いに答えよ。

Most people know *Watson* as IBM's answer to [1]*Jeopardy* star Ken Jennings. But IBM's ambitions for its artificially intelligent supercomputer are now less quiz show champion and more medical genius.

Watson, the supercomputer that is now the world Jeopardy champion, basically went to medical school after it won Jeopardy. MIT's Andrew McAfee, coauthor of *The Second Machine Age*, said recently in an interview with *Small Planet*, "I'm convinced that if it's not already the world's best [2]diagnostician, it will be soon."

Watson is already capable of storing far more medical information than doctors, and unlike humans, its decisions are all evidence-based and free of cognitive biases and overconfidence(1). It's also capable of understanding natural language, generating hypotheses, evaluating the strength of those hypotheses, and *learning* — not just storing data, but finding meaning in it.

As IBM scientists continue to train Watson to apply its vast stores of knowledge to actual medical decision-making, it's likely just a matter of time before its diagnostic performance surpasses that of even the sharpest doctors.

Back in 2011, McAfee wrote on his blog about why a diagnosis from "Dr. Watson" would be a gamechanger(2):

(A) It covers all available medical knowledge. Human doctors can't possibly hold this much information in their heads, or keep up with it as it changes over time. Dr. Watson knows it all and never overlooks or forgets anything.

(B) It's accurate. If Dr. Watson is as good at medical questions as the current Watson is at game show questions, it will be an excellent diagnostician indeed.

(C) It's consistent. Given the same inputs, Dr. Watson will always output the same diagnosis. Inconsistency is a surprisingly large and common mistake among human medical professionals, even experienced ones. And Dr. Watson is always available and never annoyed, sick, nervous, hungover, upset, sleep-deprived, or so on.

(D) It has very low running costs. It'll be very expensive to build and train Dr. Watson, but once it's up and running, the cost of doing one more diagnosis with it is essentially zero, unless it orders tests.

(E) It can be offered anywhere in the world. If a person has access to a computer or mobile phone, Dr. Watson is on call for them.

Watson has read dozens of textbooks, all of *PubMed* and *Medline* (two massive databases of medical journals), and thousands of patient records from Memorial Sloan Kettering Cancer Center. Altogether, "Watson has analyzed 605,000 pieces of medical evidence, 2 million pages of text, 25,000 training cases and had the assistance of 14,700 [3]clinician hours [4]fine-tuning its decision accuracy," *Forbes* reported in 2013.

And it's getting "smarter" every year. So how would Dr. Watson work in practice? Here's how IBM describes the process:

> First, the physician might describe [5]symptoms and other related factors to the system. Watson can then identify the key pieces of information and analyze the patient's data to find relevant facts about family medical history, current [6]medications and other existing conditions(3). It combines this information with current findings from tests, and then forms and tests hypotheses by examining a variety of data sources(4). From here, Watson can provide potential treatment options.

The supercomputer's potential is huge, but — as *The Wall Street Journal* reported earlier this year — currently "just a handful of customers are using Watson in their daily business," and it's far from performing at the level and in the range of domains that should be possible in the future.

So far, IBM's most high-profile AI (Artificial Intelligence) partnerships are with MD Anderson Cancer Center, where Watson helps recommend [7]leukemia treatments, and [8]WellPoint, where Watson helps the [9]insurer evaluate doctors' treatment plans. WellPoint claims that the system is already significantly better than human doctors at diagnosing lung cancer.

Watson is not yet able to use all the information it has absorbed, so it still has a long way to go before it catches up with our best human diagnosticians, whose [10]versatility and [11]agility are difficult to match. But Watson's ability to learn, analyze, and apply knowledge suggests that it will get there — eventually.

(*Business Insider*, April 22, 2014, modified)

Notes:

[1]Jeopardy: a quiz show televised in the United States in which Ken Jennings appears

[2]diagnostician: a specialist or expert who identifies the medical condition of an illness

[3]clinician: a doctor having direct contact with patients

[4]fine-tuning: delicately adjusting

[5]symptoms < symptom: a sign which shows a condition of disease

[6]medications < medication: medical treatment using drugs

[7]leukemia: a serious disease in which too many white blood cells are produced, causing weakness and sometimes death

[8]WellPoint: a health network company in the United States

[9]insurer: a company that provides people with insurance

[10]versatility: the capability of doing many things competently

[11]agility: the ability to think and draw conclusions quickly

問 1　下線部(1)の内容を本文に即して日本語で具体的に説明せよ。

問 2　下線部(2)に対する理由が(A)～(E)において記述されている。そのことを踏まえて，(A)～(E)の冒頭にある英文の要旨を 15 字以内の日本語にまとめて答えよ。(なお，「ワトソンは・・・」という主部の書き出しは必要ない。句読点は字数に含める。)

問 3　下線部(3)と(4)を日本語に訳せ。

問 4　次の 2 点について簡潔に日本語で述べよ。

① WellPoint において Watson が果たしている役割は何か。

② Watson が人間の医師よりも優れていると WellPoint が主張している点は何か。

〔2〕 次の文章を読み，（ 1 ）～（ 10 ）の部分に入る最も適切な語句をそれぞれア～エのうちから１つずつ選び，記号で答えよ。

People with serious illness have priorities besides simply (1) their lives. Surveys find that their top concerns include avoiding suffering, strengthening relationships with family and friends, being mentally aware, not being a (2) on others, and achieving a sense that their life is complete. Our system of technological medical care has totally failed to meet these needs, and the cost of this failure is measured in far more than dollars. The question therefore is not how we can (3) this system's expense. It is how we can build a health care system that will actually help people achieve what's most important to them at the end of their lives.

In the past, when dying was typically a more [1]precipitous process, we did not have to think about a question like this. (4) some diseases and conditions had a [2]drawn-out natural history — [3]tuberculosis is the classic example — without the help of modern medicine, with its scans to diagnose problems early and its treatments to extend life, the (5) between recognizing that you had a life-threatening illness and dying was commonly a matter of days or weeks. Consider how our presidents died before the modern era. George Washington developed a throat infection at home on December 13, 1799, that killed him (6) the next evening. John Quincy Adams, Millard Fillmore, and Andrew Johnson all suffered strokes and died within two days. Rutherford Hayes had a heart attack and died three days later. Others did have a longer course: James Monroe and Andrew Jackson died from progressive and far longer-lasting (and highly feared) [4]tubercular consumption. Ulysses Grant's [5]oral cancer (7) a year to kill him. But as end-of-life researcher Joanne Lynn has observed, people generally experienced life-threatening illness the way they experienced bad weather — as something that struck with little warning. And you either (8) it or you didn't.

Dying used to be accompanied by a prescribed set of customs. Guides to *ars moriendi*, the art of dying, were extraordinarily popular; a medieval version published in Latin in 1415 was reprinted in more than a hundred editions across Europe. People believed death should be accepted [6]stoically, without fear or self-pity or hope for anything more than the forgiveness of God.

These days, swift catastrophic illness is the (9). For most people, death comes only after long medical struggle with an ultimately unstoppable condition — advanced cancer, [7]dementia, Parkinson's disease, progressive [8]organ failure (most commonly the heart, followed in frequency by lungs, kidneys, liver), or else the accumulated [9]debilities of old age. In all such cases, death is certain, but the (10) isn't. So everyone struggles with this uncertainty — with how, and when, to accept that the battle is lost. As for last words, they hardly seem to exist anymore. Technology can sustain our organs until we are well past the point of awareness and [10]coherence. Besides, how do you attend to the thoughts and concerns of the dying when medicine has made it almost impossible to be sure who the dying even are? Is someone with [11]terminal cancer, dementia, or incurable heart failure dying, exactly?

(Atul Gawande, Being Mortal, modified)

Notes:

[1]precipitous: sudden, rapid, unexpected

[2]drawn-out: lasting a long time

[3]tuberculosis: a highly infectious lung disease that used to kill many people before the development of effective medicines

[4]tubercular consumption: the same as "tuberculosis"

[5]oral cancer: cancer of the mouth

[6]stoically: If someone behaves stoically, he or she endures pain without complaining.

[7]dementia: a loss of brain cells usually in old people, leading to abnormal behavior, and loss of memory and of former identity

[8]organ failure: Organ failure occurs when one or more organs of the body don't function properly or stop functioning.

[9]debilities < debility: weakness, incapacity, inability to function properly

[10]coherence: If a person has "coherence," then that person's speech is understandable.

[11]terminal: If a disease is "terminal," the disease is in its final stage.

(1)
ア. enhancing
イ. prolonging
ウ. relieving
エ. comforting

(2)
ア. stress
イ. burden
ウ. weight
エ. baggage

(3)
ア. pay
イ. manipulate
ウ. afford
エ. cope

(4)
ア. Because
イ. Now that
ウ. Though
エ. As long as

(5)
ア. separation
イ. timing
ウ. interval
エ. meantime

(6)
ア. in
イ. while
ウ. by
エ. until

(7)
ア. endured
イ. lasted
ウ. continued
エ. took

(8)
ア. made over
イ. went through
ウ. passed over
エ. got through

(9)
ア. rule
イ. irregularity
ウ. custom
エ. exception

(10)
ア. timing
イ. conclusion
ウ. struggle
エ. description

〔3〕 次の文章を読み，問いに答えよ。

When a baby is born, its brain is already surprisingly well formed. The majority of the [1]neurons — the billions of cells that provide the main foundation of the brain — are already in (**A**). But at this stage there are very few connections between neurons, and it is these connections that enable us to think and to remember. Connections between neurons are made and broken throughout our life, but 80 per cent of the basic pattern of connectivity will be (**B**) in the first two years of life.

There is good evidence that the effectiveness of the building of this initial framework is strongly (**C**) by the experiences the baby has in these early years.

Some of the earliest links to be made are those involved in the interaction between the senses and body movements. Young babies spend a lot of time not just making movements, but also watching those movements, coordinating vision and the ability to control muscles. There has always been a feeling that (1) giving babies rich sensory experiences they can interact with helps with this development, and this has been borne out by research.

A little later come activities that help the baby's brain cope with the (**D**) of the world. How things move and fall. How something disappears when it goes inside something else. What happens when you touch something or push it. You may get thoroughly (a) fed up with your baby throwing things on to the floor, but one of the reasons they find this such an enjoyable exercise is that they are performing baby science experiments, learning how things move when they (b) let go of them, (2) building an internal 'model' of the world that will help the older brain cope with many kinds of environment.

These developments of the baby's brain continue to a very important stage where they learn to link what they sense with personal experience — so, for instance, realizing that seeing someone else drop something is essentially the same thing as dropping it themselves. This expands the model of the world that is forming in the baby's brain to include other influences than his or her own.

A huge amount of early development, both in physical and social skills, comes from imitation. The baby's carers naturally tend to encourage this with repeated sounds and gestures — all the time the new connections are being made between those neurons to help the baby function independently. The brain is learning how to interact with the world by observing others. This is why social contact, as well as physical [2]stimuli, is so important in this formative period — and why babies brought up in circumstances where they have very little social stimulation can be seriously (**E**).

An obvious example of the way experience builds patterns in the brain is in language development. We are born with an [3]inbuilt 'language ability' but no [4]specifics. It is through social interaction, initially through repetition of noise patterns and later through lots of opportunities to put the sounds of language together with other sensory stimuli, that the baby begins to communicate. It's hardly (c) rocket science, but it really does help to talk to a baby as much as possible.

It is here where one of the few examples of the often-heard idea that (3) TV is 'bad for you' has evidence to back it up. Babies can obviously pick up stimuli from TV; so letting them watch it isn't totally negative, but TV is far behind real-world stimuli because there is no [5]feedback. When the baby drops something on the floor, he or she gets a response. When we talk to the baby and he or she responds, we react. In the real world there is always feedback to reinforce and build those essential brain connections correctly.

TV offers no feedback. So the recommendation is, as much as possible, to avoid unsupported TV viewing in the first couple of years, if only because (4) time spent concentrating on the images on the screen is time that could otherwise have been occupied in building that mental model. There's nothing wrong with babies experiencing TV, but it should always be accompanied by human interaction to provide the feedback.

(Brian Clegg, *Science for Life*, modified)

Notes:

[1]neurons < neuron: a type of cell that makes up the nervous system and carries information within the brain and between the brain and other parts of the body

[2]stimuli < stimulus: something that produces a reaction in a human, an animal or a plant

[3]inbuilt: An inbuilt quality, feature etc. is one that someone has from the time they were born.

[4]specifics: particular details about something

[5]feedback: advice, criticism, praise etc. that you give to someone, telling them how well or badly they are working

問 1　下線部(1)を日本語に訳せ。

問 2　下線部(2)の内容を本文に即して日本語で具体的に説明せよ。

問 3　下線部(3)のように言える理由を本文に即して日本語で説明せよ。

問 4　下線部(4)を日本語に訳せ。

問 5　(　A　)～(　E　)の部分に入る最も適切な語句をそれぞれア～エのうちから１つずつ選び，記号で答えよ。

(A)
ア．advance
イ．decline
ウ．place
エ．trouble

(B)
ア．closed down
イ．found out
ウ．kept up
エ．set up

(C)
ア．evaluated
イ．demonstrated
ウ．influenced
エ．maintained

(D)
ア．concepts
イ．physics
ウ．structures
エ．wisdom

(E)
ア．dependent
イ．disadvantaged
ウ．innocent
エ．neglected

問 6　下線部(a)～(c)に最も近い意味のものをそれぞれ下のア～エのうちから１つずつ選び，記号で答えよ。

(a)
ア．absorbed in
イ．concerned about
ウ．tired of
エ．pleased with

(b)
ア．arrange
イ．drop
ウ．open
エ．push

(c)
ア．something very different
イ．something very difficult
ウ．something very important
エ．something very interesting

〔4〕 次の文章を読み，全て英語にせよ。

(1) イルカは睡眠と覚醒を同時に行うことができる。たとえば，バンドウイルカ(bottlenose dolphin(s))は眠っている間にも泳ぎ，空気呼吸するために海水面に上がっていく。

(池内昌彦・伊藤元己・箸本春樹 監訳『キャンベル生物学』一部改変)

(2) 僕たちは，自分の体さえ自分の思い通りにならなくて，じっとしていることも，言われた通りに動くこともできず，まるで不良品のロボットを運転しているようなものです。

(東田直樹『自閉症の僕が跳びはねる理由』)