第１問　次の英文を読んで、後の問いに答えなさい。

Mr. Reynolds has a heart problem. An angiogram shows that 《A》a short section of one of the main arteries supplying the left ventricle of his heart is narrowed, restricting blood flow to his heart muscle. His doctor tells him that he is at serious risk of a heart attack. The doctor explains that there are at least three techniques that could be used to restore blood flow to his heart: 1) balloon angioplasty, 2) placement of a coronary artery stent, or 3) a coronary artery bypass graft (CABG). Which would be best for Mr. Reynolds? 《B》They go over the options together, but to Mr. Reynolds it seems like comparing apples to oranges, and he isn't sure he understands. He leaves the decision to his physician, whom he has known for 25 years. In the end the physician chooses the technique that has worked best for his previous patients.

The body of medical literature is now so vast and expanding so rapidly that even the best physicians can't know it all. This is where a relatively new field of medical science called "Comparative Effectiveness Research" (CER) comes in. CER focuses solely on analyzing the medical literature already available, in order to reach scientifically sound judgments about the value (or lack of value) of specific medical tests, treatments, and disease prevention strategies. In essence, CER seeks to determine the best practices in medicine based on our current knowledge.

Consider how CER might benefit Mr. Reynolds' physician (and Mr. Reynolds, of course). By reviewing CER data, Mr. Reynolds' physician might learn that a stent is considered most effective for a middle-aged white male, but that there's an age-related tipping point; if the patient is over 55, balloon angioplasty is the better option. (Hmmm, how old *is* Mr. Reynolds this year?) CER might also be able to tell the physician whether the treatment of choice depends on the severity of the narrowing — if the degree of narrowing of a coronary artery is greater than 80%, for example, then the best option (again, for a middle-aged white male) would be a coronary artery bypass graft rather than balloon angioplasty. (What is the degree of narrowing in Mr. Reynolds, anyway?) Toss in other factors like gender, race, physical condition, body weight, smoker-versus-nonsmoker, and you can begin to see the full power of CER. In theory, CER could analyze multiple factors at once to 《C》arrive at the best treatment option for patients who are 《D》described by a particular combination of factors. Even the most experienced physicians don't carry *that* much information around in their heads!

Some politicians believe that little investment in CER now could pay for itself in reduced health care expenditures in the future. To jump-start a national CER program, Congress passed the "Comparative Effectiveness Research Act of 2009" and funded it with $1.1 billion as part of the economic stimulus package. To keep the program free of bias, the prestigious Institute of Medicine of the National Academies of Science was asked to 《E》come up with a list of 100 top priority topics for CER funding. Among the topics are comparisons of the most effective practices to treat or prevent a number of cardiovascular diseases and risk factors, 《F》including high blood

pressure, coronary artery disease, heart failure, and abnormalities of heart electrical rhythm. This is not surprising, since cardiovascular diseases are the number one cause of death in the United States (cancer is second).

CER could [　あ　] a powerful tool for improving health care quality and lowering costs. Nevertheless, the CER Act of 2009 has stirred strong feelings among physicians, patients, politicians, and the health care industry because of the ways it could [　い　] how medicine is practiced. Physicians and patient advocacy groups worry that if "best practices" become defined by CER, doctors and patients could begin to [　う　] the right to [　え　] decisions regarding treatment options. They fear that health care decisions may be dictated primarily by bureaucrats and insurance companies.

Michael D. Johnson, *Human Biology: Concepts and Current Issues* 6th ed., 2012

注 angiogram：血管造影図　artery：動脈　ventricle：心室
heart attack：心臓発作　angioplasty：血管形成術　coronary artery stent：冠動脈ステント
bypass graft：バイパス移植　tipping point：転換点　economic stimulus package：景気刺激策
cardiovascular：心血管系の　heart failure：心不全　advocacy group：支援団体

問１．下線部《A》を日本語にしなさい。

問２．下線部《B》の 'They' を、それが指しているものを明示する英語に書き換えなさい。

問３．CER とは何かについて本文で述べられていることと合致するものを２つ選び、その番号を答えなさい。

(1) CERは、患者本人やその病状に関するデータに基づいて、個々の医師の知識や経験に頼ることなく治療法を選択できるようにするものである。

(2) CERは、限定された目標に向かって先進的研究を集中的に行うことによって最善の治療法を見つけだそうとするものである。

(3) CERは、治療法を決定しようとするものであって、予防法までは視野に入れていない。

(4) CERは、独自の新しい研究をするのではなく、すでにある研究成果から総合的に判断して最適な治療法を決定できるようにするものである。

問4. Reynolds さんが次の α または β のような患者であった場合、CER に従えば次の (1)〜(3) のうちどれが適切な治療法だと考えられるか。それぞれ1つ選び、その番号を答えなさい。

α：57歳の白人男性で、動脈の狭窄率は70%である

β：50歳の白人男性で、動脈の狭窄率は85%である

(1) balloon angioplasty

(2) placement of a coronary artery stent

(3) a coronary artery bypass graft (CABG)

問5. 下線部《C》の 'arrive'、《D》の 'describe'、《F》の 'include' の名詞形を書きなさい。

問6. 下線部《E》の 'come up with' とほぼ同じ意味になる語を1つ選び、その番号を答えなさい。

(1) examine (2) overtake (3) prepare (4) revise

問7. CER の導入について本文で述べられていることと合致するものを2つ選び、その番号を答えなさい。

(1) 2009年に議会はCER導入を決議し、景気刺激策の一環として10億ドルを上回る資金を投入した。

(2) CERへの資金投入を行うと、高額な治療が多用されるようになって医療費はむしろかさむことになるのではないか、と心配する政治家もいる。

(3) 癌がCERの研究対象に含まれていないことに対しては、疑問を感じているひとも多い。

(4) 心血管系の疾患は米国において癌を超える死亡原因であるから、CERにおいても重視されている。

問8. 空所［ あ ］〜［ え ］にはそれぞれ次の4つのいずれかが入る。各空所に入るものの番号を答えなさい。

(1) become (2) change (3) lose (4) make

第2問　次の英文を読んで、後の問いに答えなさい。

The words used the most in everyday language are the ones evolving at the slowest rate, say two new studies published in *Nature*.

In one paper, researchers at Harvard University focused on the evolution of English verb conjugations over a 1,200-year period. In a separate study, a team at the University of Reading in England reviewed cognates (similar sounding words in different languages for the same object or meaning, such as "water" and the German "*wasser*") to determine how all Indo-European tongues progressed from a common ancestor that existed between 6,000 and 10,000 years ago.

"What our frequency effect allows us to do is identify...《A》ultraconserved linguistic elements," says Mark Pagel, an evolutionary biology professor at Reading, about his research. "Namely, they're the words we use all the time."

In their search for cognates, Pagel and his team examined some 200 words in 87 Indo-European languages, including those for "water," "to die" and "where." The number of distinct classes of cognates for each word ranged from one (indicating all the words sound similar) for frequently used concepts such as numbers［ ア ］as many as 46 different basic sounds to describe a single entity such as a bird. The word for the number three in all Indo-European languages, for instance, is similar to the English version: from *tres* in Spanish to *drei* in German to the Hindi *theen*.［ イ ］, the word for bird has several different sounds associated with it like *pajaro* in Spanish and *oiseau* in French.

The researchers then narrowed their focus to the frequency of use of each of the words in just four Indo-European languages—English, Spanish, Greek and Russian. Pagel says the team found that they were used at similar rates across the board even if the words with the same meaning were not cognates. "The high frequency words in Spanish are the same as the high frequency English," he says. "That indicated that we could come up with a kind of Indo-European frequency of use."

By combining their data, the researchers determined that it would take as little as 750 years to replace［ あ ］words and up to 10,000 years for new words to evolve in place of［ い ］ones.

The Harvard researchers specifically studied the roots of English, tracing verb conjugations in the language from the time of *Beowulf* 1,200 years ago through Shakespeare in the 16th century to its current form. Over the years, several past tense forms of verbs have died out in English and now only one persists as a rule: adding "-ed" to the end of verbs. (Verbs that end in "-ed" in their past tense form "regular verbs" in modern English.)

Researchers scoured grammatical texts dating back to the days of Old English,［ ウ ］. Among them: the still irregular "sing" / "sang," "go" / "went" as well as the since-regularized "smite" which once was "smote" in Old English but since has become "smited," and "slink,"

which is now "slinked" but 1,200 years ago was "slunk." They 《B》located 177 verbs that were irregular in Old English and 145 that were still irregular in Middle English; today, only 98 of the 177 verbs have not been "regularized."

After calculating the frequency of use of each of the 177 irregular Old English verbs, researchers determined that the words that evolved most quickly into regular conjugational forms were used significantly less than those that went unchanged over time. In fact, their statistical analysis determined that given two verbs, if one was used 100 times [う] frequently than the other, it would evolve 10 times faster than the verb employed [え] often. They predict the next verb to fall into line will be "wed", the past tense of which will regularize from "wed" to "wedded."

"By being more frequent, a verb is more 《C》stable," says study co-author Erez Lieberman, a graduate student in applied mathematics at Harvard University. He adds that both the Harvard and Reading papers lay out a case for a version of natural selection that acts on linguistic evolution and mirrors biological evolution. "Both studies," he says, "illustrate this profound effect that frequency has in the survival of a word."

Partha Niyogi, author of the book *The Computational Nature of Language Learning and Evolution* and a professor of computer science and statistics at the University of Chicago, says these empirical findings are consistent with theoretical models on the lexical evolution. "Languages are constantly changing," he notes. "In biological evolution that fact has been given a lot of attention, but the fact is that in languages this is happening all the time, as well. Darwin in *The Descent of Man* commented that languages were evolving over time, and it was just like speciation."

http://www.scientificamerican.com/article.cfm?id=use-it-or-lose-it-why-lan

注 conjugation: 活用　Indo-European: 印欧語族の　Hindi: ヒンディー語の
across the board: 一律に　*Beowulf*: 古英語の叙事詩　scour: 詳しく調べる
Old English: 古英語 (700－1150 年頃の英語)　Middle English: 中英語 (1150－1500 年頃の英語)
empirical: 経験的な　lexical: 語彙の　speciation: 種分化・種形成

問 1. 下線部《A》の ultraconserved linguistic elements とはどのような語か。本文で挙げられている具体例を示し、日本語で説明しなさい。

問 2. 空所［ ア ］に入れるのに最も適当な語を書きなさい。

問 3. 空所［ イ ］に入れるのに最も適当なものを 1 つ選び、その番号を答えなさい。

(1) As a result　(2) For instance　(3) In addition　(4) In contrast

問 4. 空所［ あ ］～［ え ］に入れる語句の組み合わせとして最も適当なものを 1 つ選び、その番号を答えなさい。

(1)	あ: the most frequently used	い: less-used	う: more	え: less
(2)	あ: less-used	い: the most frequently used	う: more	え: less
(3)	あ: the most frequently used	い: less-used	う: less	え: more
(4)	あ: less-used	い: the most frequently used	う: less	え: more

問 5. 空所［ ウ ］には、次の語句をある順序に並べ替えた表現が入る。2 番目と 4 番目に入る語句の番号を答えなさい。

(1) across　(2) all　(3) cataloguing
(4) the irregular verbs　(5) they came

問 6. 下線部《B》とほぼ同じ意味になるものを 1 つ選び、その番号を答えなさい。

(1) added　(2) found　(3) put　(4) set

問 7. 下線部《C》の 'stable' が表す内容を動詞の過去形の事例に則して、20 字以内の日本語で説明しなさい。

問 8. 本文の内容に合致するものを 2 つ選び、その番号を答えなさい。

(1) A team at Harvard University studied the evolution of English verb conjugations to clarify the way in which all Indo-European tongues derived from a common ancestor.

(2) According to Pagel and his team, there are a lot of different basic sounds to refer to bird because we use them all the time to describe this single entity.

(3) Among the four Indo-European languages further studied, there is little difference in the frequency of use of words for the same idea whether they are cognates or not.

(4) In modern English, the rule of adding "-ed" to the end of verbs to use them in the past tense has been applied to 79 of the 177 irregular verbs in Old English.

(5) Frequency has a fatal effect in the survival of a word in linguistic evolution, but the two studies' findings are contradictory to natural selection in biological evolution.

第３問　次の英文の空所 ア～シ に、それぞれ与えられた文字で始まる単語を入れなさい。

The decision to study medicine at university should not be made without a great deal of thought and research into the reality of life as a doctor. At the age of 17 it can be difficult to know (ア: w_____) you want to go to university at all, let alone study for at least 5 years. Your future career ideas should be discussed with family and friends but the (イ: f_____) decision needs to be an individual one. Those around you are likely to have differing views; parents and teachers may feel that (ウ: m_____) is a respected profession and possibly encourage you to take this path but (エ: s_____) doctors may try to dissuade you. Speak to as many students, doctors and (オ: o_____) healthcare professionals as possible in order to gain as many opinions as possible. Ask individuals to justify their reasoning (カ: f_____) choosing medicine as a career and to explain why they would or would not recommend it; (キ: w_____) experiencing life as a doctor, it is difficult to know what it will really be like. We all know friends (ク: w_____) have avoided medicine following their personal experience with one or both parents as doctors. In comparison many students, after experiencing (ケ: t_____) own family life, do decide to follow in their parents' footsteps. Although relatively common, try not to be persuaded or coerced into studying medicine by your family – it is YOUR decision and YOUR career for the (コ: r_____) of your life.

For older candidates, the decision is even more (サ: d_____). A mature student needs to be certain that the decision to study medicine is the right (シ: o_____) as often there is more at stake; each applicant will have their own personal circumstances but returning to student life may involve leaving paid employment and moving a family around the country.

A. Blundell, R. Harrison and B. Turney, *The Essential Guide to Becoming a Doctor*, 3rd ed., 2011

注　dissuade：思い止まらせる　　coerce：強要する