«Утверждаю»
И.о. декана механико-математического факультета
МГУ имени М.В.Ломоносова
_______________ проф. В.Н. Чубариков
«26» сентября 2014 г.

Рабочая программа дисциплины «Иностранный язык»

1. Код и наименование дисциплины: Иностранный язык.

2. Уровень высшего образования – подготовка научно-педагогических кадров в аспирантуре.

3. Направления подготовки: 01.06.01 – Математика и механика, 02.06.01 – Компьютерные и информационные технологии, 09.06.01 – Информатика и вычислительная техника, 10.06.01 – Информационная безопасность.

4. Место дисциплины в структуре ООП: базовая часть блока 1 «Дисциплины (модули)», 1-й год обучения.

5. Планируемые результаты обучения по дисциплине, соотнесенные с планируемыми результатами освоения образовательной программы (компетенциями выпускников):

Формируемые компетенции *(код компетенции)*	**Планируемые результаты обучения по дисциплине (модулю)**
УК-4	З1 (УК-4) ЗНАТЬ: методы и технологии научной коммуникации на государственном и иностранном языках. З2 (УК-4) ЗНАТЬ: стилистические особенности представления результатов научной деятельности в устной и письменной форме на государственном и иностранном языках. У1 (УК-4) УМЕТЬ: следовать основным нормам, принятым в научном общении на государственном и иностранном языках. В1 (УК-4) ВЛАДЕТЬ: навыками анализа научных текстов на государственном и иностранном языках.

	В2 (УК-4) ВЛАДЕТЬ: навыками критической оценки эффективности различных методов и технологий научной коммуникации на государственном и иностранном языках. В3 (УК-4) ВЛАДЕТЬ: различными методами, технологиями и типами коммуникаций при осуществлении профессиональной деятельности на государственном и иностранном языках.

6. Объем дисциплины в зачетных единицах с указанием количества академических часов, выделенных на контактную работу обучающихся с преподавателем (по видам учебных занятий) и на самостоятельную работу обучающихся:
Объем дисциплины составляет 5 зачетных единиц, всего 180 часов, из которых 140 часов составляет контактная работа аспиранта с преподавателем (100 часов – занятия семинарского типа (семинары), 10 часов индивидуальные консультации, 25 часов – мероприятия текущего контроля успеваемости, 5 часов – мероприятия промежуточной аттестации), 40 часов составляет самостоятельная работа аспиранта.

7. Входные требования для освоения дисциплины, предварительные условия.
Обучающийся, приступивший к освоению программы аспирантуры по дисциплине «Иностранный язык», должен:
ЗНАТЬ: виды и особенности письменных текстов и устных выступлений; понимать общее содержание сложных текстов на абстрактные и конкретные темы, в том числе узкоспециальные тексты.
УМЕТЬ: подбирать литературу по теме, составлять двуязычный словник, переводить и реферировать специальную литературу, подготавливать научные доклады и презентации на базе прочитанной специальной литературы, объяснять свою точку зрения и рассказывать о своих планах.
ВЛАДЕТЬ: навыками обсуждения знакомой темы, делая важные замечания и отвечая на вопросы, а также навыками создания простого связного текста по знакомым или интересующим его темам, адаптируя его для целевой аудитории.

8. Формат обучения: очная форма, аудиторные занятия семинарского типа.

9. Содержание дисциплины, структурированное по модулям, с указанием отведенного на них количества академических часов и виды учебных занятий.

	Всего	В том числе

Наименование и краткое содержание разделов и тем дисциплины (модуля), **форма промежуточной аттестации по дисциплине (модулю)**	**(часы)**	**Контактная работа (работа во взаимодействии с преподавателем), часы** из них						**Самостоятельная работа обучающегося, часы** из них		
		Занятия лекционного типа	Занятия семинарского типа	Групповые консультации	Индивидуальные консультации	Учебные занятия, направленные на проведение текущего контроля успеваемости коллоквиумы, практические контрольные занятия и др.)	**Всего**	Выполнение домашних заданий	Подготовка рефератов и т.п.	**Всего**
Модуль 1: чтение (просмотровое, ознакомительное и изучающее чтение; работа со словарями; анализ научного текста на лексическом и грамматическом уровнях).	40		30				30	10		10
Модуль 2: перевод (особенности стиля научного изложения в русском и английском языках; разные типы перевода; переводческие трансформации, компенсации потерь при переводе, контекстуальные замены, многозначность слов, словарное и	48		20		10	8	38	10		10

контекстуальное значение слова, «ложные друзья» переводчика).										
Модуль 3: аудирование и говорение (стилис-тические особенности устной научной речи; монологическая речь (устная презентация прочитанного, услы-шанного, результатов собственного исследо-вания) и диалогическая речь (в виде пояснений, определений, аргументации, выводов, возражений, сравнений, вопросов, просьб и т.д.).	42		30			12	42			
Модуль 4: письмо (стилистические особенности письменной научной речи; письменные формы общения: план или конспект к прочитанному, изложение содержания прочитанного (реферат и аннотация); доклад, научная статья.	45		20			5	25		20	20
Промежуточная аттестация: экзамен	5									

Итого:	180		100		10	30	140	20	20	40

Обучение всем формам устного и письменного общения ведется комплексно с учетом фонетических, лексических и грамматических норм английского языка. В качестве учебных текстов используется аутентичная монографическая и периодическая литература по широкому профилю факультета и по узкой специальности аспиранта.

10. Перечень учебно-методического обеспечения для самостоятельной работы аспирантов по дисциплине.
Основная и дополнительная учебная литература.

11. Фонд оценочных средств для промежуточной аттестации по дисциплине.

- Перечень компетенций: УК-4.
- Описание шкал оценивания: экзамен с оценкой по пятибалльной шкале.
- Критерии и процедуры оценивания результатов обучения по дисциплине, характеризующих этапы формирования компетенций.

РЕЗУЛЬТАТ ОБУЧЕНИЯ по дисциплине (модулю)	**КРИТЕРИИ ОЦЕНИВАНИЯ РЕЗУЛЬТАТА ОБУЧЕНИЯ по дисциплине (модулю) и ШКАЛА оценивания**					**ПРОЦЕДУРЫ ОЦЕНИВАНИЯ***
	1	2	3	4	5	
З1 (УК-4)	Отсутствие знаний	Фрагментарные знания методов и технологий научной коммуникации на государственном и иностранном языках	Неполные знания методов и технологий научной коммуникации на государственном и иностранном языках	Сформированные, но содержащие отдельные пробелы знания методов и технологий научной коммуникации на государственном и иностранном языках	Сформированные и систематические знания методов и технологий научной коммуникации на государственном и иностранном языках	Тестирование Экзамен
З2 (УК-4)	Отсутствие знаний	Фрагментарные знания стилистических особенностей представления результатов научной деятельности в устной и	Неполные знания стилистических особенностей представления результатов научной деятельности в устной и письменной форме на	Сформированные, но содержащие отдельные пробелы знания основных стилистических особенностей представ-	Сформированные систематические знания стилистических особенностей представления результатов	Тестирование Экзамен

		письменной форме на государственном и иностранном языках	государственном и иностранном языках	ления результатов научной деятельности в устной и письменной форме на государственном и иностранном языках	научной деятельности в устной и письменной форме на государственном и иностранном языках	
У1 (УК-4)	Отсутствие умений	Частично освоенное умение следовать основным нормам, принятым в научном общении на государственном и иностранном языках	В целом успешное, но не систематическое умение следовать основным нормам, принятым в научном общении на государственном и иностранном языках	В целом успешное, но содержащее отдельные пробелы умение следовать основным нормам, принятым в научном общении на государственном и иностранном языках	Успешное и систематическое умение следовать основным нормам, принятым в научном общении на государственном и иностранном языках	Тестирование Экзамен
В1 (УК-4)	Отсутствие навыков	Фрагментарное применение навыков анализа научных текстов на государственном и иностранном языках	В целом успешное, но не систематическое применение навыков анализа научных текстов на государственном и иностранном языках	В целом успешное, но сопровождающееся отдельными ошибками применение навыков анализа научных текстов на государственном и иностранном языках	Успешное и систематическое применение навыков анализа научных текстов на государственном и иностранном языках	Тестирование Экзамен
В2 (УК-4)	Отсутствие навыков	Фрагментарное применение навыков критической оценки эффективности различных методов и технологий научной коммуникации на государственном и иностранном языках	В целом успешное, но не систематическое применение навыков критической оценки эффективности различных методов и технологий научной коммуникации на государственном и иностранном языках	В целом успешное, но сопровождающееся отдельными ошибками применение навыков критической оценки эффективности различных методов и технологий научной коммуникации на государственном и иностранном языках	Успешное и систематическое применение навыков критической оценки эффективности различных методов и технологий научной коммуникации на государственном и иностранном языках	Тестирование Экзамен
В3 (УК-4)	Отсутствие навыков	Фрагментарное применение различных методов, технологий и типов коммуникаций при осуществлении профессиональной деятельности на государственном и иностранном языках	В целом успешное, но не систематическое применение различных методов, технологий и типов коммуникаций при осуществлении профессиональной де-	В целом успешное, но сопровождающееся отдельными ошибками применение различных методов, технологий и типов коммуникаций при осуществлении профессиональной дея-	Успешное и систематическое применение различных методов, технологий и типов коммуникаций при осуществлении профессиональной дея-	Тестирование Экзамен

			ятельности на государственном и иностранном языках	тельности на государственном и иностранном языках	тельности на государственном и иностранном языках	

Для оценивания результатов обучения в виде <u>знаний</u> используются следующие типы контроля:
- тестирование лексико-грамматического характера;
- индивидуальное собеседование со специалистом.

Для оценивания результатов обучения в виде <u>умений</u> и <u>владений</u> используются следующие типы контроля:

- индивидуальные письменные работы по переводу и реферированию научных текстов из индивидуального списка литературы, рекомендованной аспиранту для самостоятельной подготовки к кандидатскому экзамену по иностранному языку, и научная статья по специальности, написанная аспирантом на иностранном языке.
- Методические материалы, определяющие процедуры оценивания результатов обучения: экземпляры тестов лексико-грамматического характера, тексты для перевода и реферирования, аудио- и видеоматериалы для аудирования.

Пример теста по общенаучной лексике

I. Fill in the gaps.
From the following list use each word only once to complete the sentences below. Remember that you may need to change the form of nouns and verbs:

Conceive (v) academic (adj) equilibrium (n) rational (adj) compute (v)
pendulum (n) series (n) section (n) stable (adj) speculate (v)

1. Reports are usually divided into separate ________ with headings such as ‘Findings’ and ‘Conclusions’.
2. In addition to the regular lectures, we have a ________ of public lectures given by guest speakers from other universities.
3. The price of a product will not change if there is ________ between the supply and the demand for that product.
4. After a very difficult night, his blood pressure became ________ again and his family were allowed to visit him.
5. The Internet was first ________ of as a way of linking computers in the USA together.
6. Although there is very little evidence, many scientists ________ that life may exist on other planets.
7. Most economic theories assume that people act on a __________ basis, but this doesn’t take account of the fact that we often use our emotions instead.
8. Students at university are encouraged to play sports or join clubs in addition to following their ____________ studies.

9. We can make machines which can ________________ huge numbers of mathematical problems, but it is still too early to claim that machines can actually think for themselves.
10. Periods of high economic growth tend to be followed by low growth, followed by more high growth again, like a ________.

II. Choose the right word.

In each of the sentences below, decide which word is more suitable.

1. A new moon *occurs/ takes* place every 28 days.
2. Most universities need to earn money from private sources, but the *important/ major* part of their funding still comes from the government.
3. The main *concentration/ focus* of the paper is on the problems concerning air pollution.
4. Although it is not very big, the library has an excellent *range/ variety* of books, journals and other resources for study.
5. It is now possible to *infer / imply* a link between using mobile phones and contracting some forms of cancer.

III. Finish the sentences.

Choose the best ending for each of the sentence extracts below from the list underneath:

1. In 1905, Einstein published the first part of his theory…
2. Environmentalists point out that electric cars just shift …
3. Most metals expand…
4. The new grading machine has the function…
5. In some universities, there is a café adjacent…
6. After studying for three hours, it becomes difficult to concentrate…
7. In the 17th century, Galileo demonstrated…
8. Fifty years ago, most smokers were not aware…
9. The letters L, E and C on the map correspond…
10. The negotiations went on through the night, but the eventual…

a. …of the dangers of smoking.
b. … outcome was agreement on all the main points.
c. … of relativity, which completely changed our ideas of time and space.
d. … on your work, and so it's a good idea to take a break.
e. … when they are heated.
f. … of separating the larger pieces of metal from the smaller pieces.
g. … to the library where students can take a break.
h. … that all objects (heavy or light) fall at the same speed.
i. … the pollution problem from the car itself to the electricity station.
j. ... to London, Edinburgh and Cardiff.

IV. Word substitution.

From the list below, choose one word which could be used in place of the words in italics without changing the meaning of the sentence. Remember that you may need to change the form or in some cases the grammatical class of the word:

Emphasize (v) *generate (v)* *pertinent (adj)* *undergo (v)* *notion (n)*

1. Lecturers often speak more loudly and more slowly when they want to *stress* an important point.
2. The new computer system *created* a lot of interest among potential customers.
3. One difficult aspect of writing an essay is selecting material which is *relevant* to the topic and excluding irrelevant information.
4. The company has *experienced* a number of significant changes in the last two years.
5. Until the 16th century, the idea that the Earth moves around the Sun was ridiculous. Today we accept this *concept* as completely normal.

V. Choose the best word.

For each of the sentences here, choose the best word from a, b or c:

1. After you have submitted your application, the university will attempt to _____________ that the information you have supplied is correct.
   a. verify b. certify c. investigate

2. In some countries, there is no tax on books on the _______________ that education should not be taxed.
   a. principle b. idea c. concept

3. Further information can be ______________ from the company's office.
   a. obtained b. found c. got

4. Good theories are important, of course, but we must have _______________ evidence to support them.
   a. empirical b. true c. realistic

5. A simple everyday example of the _______________________ is the standard postcard.
   a. triangle b. square c. rectangle

6. According to the _______________________, the building should be ready for use by the end of the year.
   a. timing b. schedule c. time

7. When you hit a drum, the movement of the drum causes the air molecules to ________________, which we hear as sound.
   a. reverberate b. vibrate c. shake

8. Although we now believe this to be impossible, early scientists tried to produce ________________ motion machines, that is, machines which would never stop.
   a. perpetual b. everlasting c. undying

9. The atmospheres of most planets are not ________________, making it difficult for us to see the surface.
   a. transparent b. lucid c. clear

10. In a nuclear power station, ________________ of uranium are split into smaller particles, releasing huge amounts of energy.
    a. atoms b. chunks c. elements

Пример лексико-грамматического теста

Practise scanning by reading straight through this extract from the article The Shape of Space by Graham P. Collins (Scientific American, 2004) and answering the following question: Has a proof of the Poincaré conjecture come with the work of Grigori Perelman? (Yes/ No/ Probably)

Mathematicians know a lot about 3-manifolds, yet some of the most basic questions have proved to be the hardest. The branch of mathematics that studies manifolds is topology. Among the fundamental questions topologists can ask about 3-manifolds are: What is the simplest type of 3-manifold, the one with the least complicated structure? Does it have many cousins that are equally simple, or is it unique? What kinds of 3-manifolds are there?

The answer to the first of those questions has long been known: a space called the 3-sphere is the simplest compact 3-manifold. (Noncompact manifolds can be thought of as being infinite or having an edge. Hereafter I consider only compact manifolds.) The other two questions have been up for grabs for a century but may have been answered in 2002 by Grigori ("Grisha") Perelman, a Russian mathematician who has most probably proved a theorem known as the Poincaré conjecture.

First postulated by French mathematician Henri Poincaré exactly 100 years ago, the conjecture holds that the 3-sphere is unique among 3-manifolds; no other 3-manifold shares the properties that make it so simple. The 3-manifolds that are more complicated than the 3-sphere have boundaries that you can run up against like a brick wall, or multiple connections from one region to another, like a path through the woods that splits and later rejoins. The Poincaré conjecture states that the 3-sphere is the only compact 3-manifold that lacks all those complications. Any three-dimensional object that shares those properties with the sphere can therefore be morphed into the same shape as a 3-sphere; so far as topologists are concerned, the object is just another copy of the 3-sphere. Perelman's proof also answers the third of our questions: it completes work that classifies all the types of 3-manifolds that exist.

It takes some mental gymnastics to imagine what a 3-sphere is like — it is not simply a sphere in the everyday sense of the word. But it has many properties in common with the 2-sphere, which we are all familiar with: If you take a spherical balloon, the rubber of the balloon forms a 2-sphere. The 2-sphere is two-dimensional because only two coordinates – latitude and longitude — are needed to specify a point on it. Also, if you take a very small disk of the balloon and examine it with a magnifying glass, the disk looks a lot like one cut from a flat two-dimensional plane of rubber. It just has a slight curvature. To a tiny insect crawling on the balloon, it would seem like a flat plane. Yet if the insect traveled far enough in what would seem to it to be a straight line, eventually it would arrive back at its starting point.

Similarly, a gnat in a 3-sphere — or a person in one as big as our universe! — perceives itself to be in "ordinary" three-dimensional space. But if it flies far enough in a straight line in any direction, eventually it will circumnavigate the 3-sphere and find itself back where it started, just like the insect on the balloon or someone taking a trip around the world.

Spheres exist for dimensions other than three as well. The 1-sphere is also familiar to you: it is just a circle (the rim of a disk, not the disk itself). The n-dimensional sphere is called an n-sphere.

Proving Conjectures

After Poincaré proposed his conjecture about the 3-sphere, half a century went by before any real progress was made in proving it. In the 1960s mathematicians proved analogues of the conjecture for spheres of five dimensions or more. In each case, the n-sphere is the unique, simplest manifold of that dimensionality. Paradoxically, this result was easier to prove for higher-dimensional spheres than for those of four or three dimensions. The proof for the particularly difficult case of four dimensions came in 1982. Only the original three-dimensional case involving Poincaré's 3-sphere remained open.

A major step in closing the three-dimensional problem came in November 2002, when Perelman, a mathematician at the Steklov Institute of Mathematics at St. Petersburg, posted a paper on the www.arxiv.org Web server that is widely used by physicists and mathematicians as a clearing-house of new research. The paper did not mention the Poincaré conjecture by name, but topology experts who looked at it immediately realized the paper's relevance to that theorem. Perelman followed up with a second paper in March 2003, and from April to May that year he visited the U.S. to give a series of seminars on his results at the Massachusetts Institute of Technology and Stony Brook University. Teams of mathematicians at nearly a dozen leading institutes began poring over his papers, verifying their every detail and looking for errors.

At Stony Brook, Perelman gave two weeks of formal and informal lectures, talking from three to six hours a day. "He answered every question that arose, and he was very clear," says mathematician Michael Anderson of Stony Brook. "No one has yet raised any serious doubts." One more comparatively minor step has to be proved to complete the result, Anderson says, "but there are no real doubts about the validity of this final piece." The first paper contains the fundamental ideas and is pretty well accepted as being verified. The second paper contains applications and more technical arguments; its verification has not reached the level of confidence achieved for the first paper.

The Poincaré conjecture has a \$1-million reward on offer for its proof: it is one of seven such "Millennium Problems" singled out in 2000 by the Clay Mathematics Institute in Cambridge, Mass. Perelman's proof has to be published and withstand two years of scrutiny before he becomes eligible for the prize. (The institute might well decide that its posting on the Web server qualifies as "published" because the result is undergoing as rigorous a peer review as any paper gets.)

Perelman's work extends and completes a programme of research that Richard S. Hamilton of Columbia University explored in the 1990s. The Clay Institute recognized Hamilton's work with a research award in late 2003. Perelman's calculations and analysis blow away several roadblocks that Hamilton ran into and could not overcome.

If, as everyone expects, Perelman's proof is correct, it actually completes a much larger body of work than the Poincaré conjecture. Launched by William P. Thurston — now at Cornell University — the Thurston geometrization conjecture provides a full classification of all possible 3-manifolds. The 3-sphere, unique in its sublime simplicity, anchors the foundation of this magnificent classification. Had the Poincaré conjecture been false — that is, if there were many spaces as "simple" as a sphere — the classification of 3-manifolds would have exploded into something infinitely more complicated than that proposed by Thurston. Instead, with Perelman's and Thurston's results, we now have a complete catalogue of all the possible shapes that three-dimensional space can take on — all the shapes allowed by mathematics that our universe (considering just space and not time) could have.

II. Read the text again more slowly to complete the following tasks.

1. Write the comparative and superlative forms of the following adjectives: ***little, difficult, easy***.

2. Consider the following sentences:
   a) *The answer to the first of those questions has long been known ... (line 5)*
   b) *Paradoxically, this result was easier to prove for higher-dimensional spheres than for those of four or five dimensions. (line 31)*

   Identify where ***those*** replaces a noun. What is the noun? Translate the sentences into Russian.

3. What does ***one*** mean *(line 3, line 11, line 19, line 22)*?

4. Look at the following sentences containing relative clauses:
   a) *But it has many properties in common ......,* ***which we are all familiar with****. (line 17)*
   b) *...... but topology experts* ***who looked at it*** *realized the paper's relevance to that theorem. (line 36)*

   Explain why there is a comma before one of the relative clauses. Could we omit the information it supplies if we wanted to?

5. Show how the sentence below could begin in a different way.
   Had the Poincare conjecture been false that is, if there were many spaces as "simple" as a sphere, the classification of 3-manifolds would have exploded into something infinitely more complicated that proposed by Thurston. (line 54)

   What type of sentence is it? Find other examples of the same type in the text and translate all the sentences into Russian.

6. Compare the uses of ***just***. What is the difference? Translate into Russian.
   a) *... the object is just another copy of the 3-sphere. (line 14)*
   b) *It just has a slight curvature. (line 19)*
   c) *..., just like the insect on the balloon ... (line 23)*
   d) *... it is just a circle ... (line 25)*

7. Give Russian equivalents of:
   a) *... yet some of the most basic questions have proved to be the hardest. (line 1)*
   b) *Noncompact manifolds can be thought of as being infinite or having an edge. (line 5)*
   c) *The other two questions have been up for grabs for a century but may have been answered in 2002 ... (line 6)*
   d) *... no other 3-manifold shares the properties ... (line 10)*
   e) *... the only compact 3-manifold that lacks all those complications. (line 12)*
   f) *... a gnat in a 3-sphere ... perceives itself to be in "ordinary" three-dimensional space. (line 22)*
   g) *... the rim of a disk, not the disk itself. (line 25)*
   h) *The first paper ... is pretty well accepted as being verified. (line 42)*
   i) *... its verification has not reached the level of confidence achieved for first paper. (line 44)*
   j) *One more comparatively minor step has to be proved to complete the result ... (line 41)*

8. ***A clearinghouse*** is a) an organization which collects, sorts, and distributes information, b) a central bank which deals with all transactions between the banks that use its services. (*BBC English Dictionary).* What does it mean in the text *(line 35)*? Think of Russian translation.

9. ***Identify the words used by the author as equivalent to:***
   a) потребуется некоторое воображение для того, чтобы представить
   b) ответить на вопрос
   c) ответ на вопрос
   d) одинаковые свойства
   e) ровно 100 лет назад
   f) как все ожидают
   g) искать ошибки

h) особенно сложный случай
i) свойства, которые мы все знаем
j) по прямой линии в любом направлении
k) в начальной точке
l) теорема утверждает
m) провести ряд семинаров по
n) тщательно проверить
o) завершить классификацию
p) теорема, известная под названием «гипотеза Пуанкаре»

10. Add adverbs to these sentences.

a) Topology experts who looked at the paper realized its relevance to that theorem. (immediately)
b) Poincaré created the branch of mathematics called algebraic topology. (largely)
c) It turns out that 3-manifolds are more complicated than 2-manifolds. (far)
d) Was the 3-sphere unique? An answer to that question and completion of the Thurston programme have come with Perelman's papers. (only)
e) Beware: the three-dimensional sphere is not what you think it is! (probably)

11. Put the verb in brackets into the appropriate form.

Perelman (1) … (*come*) to the U.S. as postdoctoral student in 1992, (2) … (*spend*) semesters at New York University and Stone Brook, (3) … (*follow*) by two years at the University of California at Berkeley. He quickly (4) … (*make*) a name for himself as a brilliant young star, (5) … (*prove*) many important and deep results in a particular branch of geometry. He (6) … (*award*) a prize from the European Mathematical Society, which he (7) … (*decline*), and (8) … (*receive*) a prestigious invitation (9) … (*address*) the International Congress of Mathematicians, which he (10) … (*accept*). In spring 1995 he (11) … (*offer*) positions at a number of outstanding mathematics departments, but he (12) … (*turn*) them all down (13) … (*return*) to his home in St. Petersburg. "Culturally, he (14) … (*be*) very Russian", (15) … (*comment*) one American colleague. "He (16) … (*be*) very unmaterialistic".

III. In a paragraph of between 50 and 70 words, summarize in your own words what is said in the text concerning the significance of Perelman's result.

Содержание экзамена

1. Письменный перевод на русский язык (со словарём) оригинального текста по специальности объёмом 2500-3000 печатных знаков и передача извлечённой информации на английском языке. Время на подготовку – 45-60 минут.
2. Чтение вслух и устный перевод (без словаря и без подготовки) оригинального текста по специальности объёмом 1000-1500 печатных знаков.
3. Беседа с экзаменаторами на английском языке по вопросам, связанным со специальностью и научной работой аспиранта.
4. Устное реферирование на английском языке оригинального текста из периодической печати (газеты, журнала).

Пример текста на письменный перевод со словарем

Accurate Measurement of Time

Increasingly accurate clocks – now losing no more than a second over millions of years – are leading to such advances as refined tests of relativity and improved navigation systems

By Wayne M. Itano and Norman F. Ramsey

Few people complain about the accuracy of modern clocks, even if they appear to run more quickly than the harried among us would like. The common and inexpensive quartz-crystal watches lose or gain about a second a week making them more than sufficient for everyday living. Even a spring-wound watch can get us to the church on time. More rigorous applications, such as communications with interplanetary spacecraft or the tracking of ships and airplanes from satellites, rely on atomic clocks, which lose no more than a second over one million years.

There might not seem to be much room for the improvement of clocks or even a need for more accurate ones. Yet many applications in science and technology demand all the precision that the best clocks can muster, and sometimes more. For instance, some pulsars (stars that emit electromagnetic radiation in periodic bursts) may in certain aspects be more stable than current clocks. Such objects may not be accurately timed. Meticulous tests of relativity and other fundamental concepts may need even more accurate clocks. Such clocks will probably become available. New technologies, relying on the trapping and cooling of atoms and ions, offer every reason to believe that clocks can be 1,000 times more precise than existing ones. If history is any guide, these future clocks may show that what is thought to be constant and immutable may on finer scales be dynamic and changing. The sundials, water clocks and pendulum clocks of the past, for example, were sufficiently accurate to divide the day into hours, minutes and seconds, but they could not detect the variations in the earth's rotation and revolution.

A clock's accuracy depends on the regularity of some kind of periodic motion. A grandfather clock relies on the sweeping oscillation of its pendulum. The arm is coupled to a device called an escapement, which strikes the teeth of a gear in a way that the gear moves in only one direction. This gear, usually through a series of additional gears, transfers the motion to the hands of the clock. Efforts to improve clocks are directed for the most part toward finding systems in which the oscillations are highly stable.

The three most important gauges of frequency standards are stability, reproducibility and accuracy. Stability is a measure of how well the frequency remains constant. It depends on the length of an observed interval. The change in frequency of a given standard might be a mere one part per 100 billion from one second to the next, but it may be larger – say, one part per 10 billion – from one year to the next. Reproducibility refers to the ability of independent devices of the same design to produce the same value. Accuracy is a measure of the degree to which the clock replicates a defined interval of time, such as one second.

Until the early 20^{th} century, the most accurate clocks were based on the regularity of pendulum motions. Galileo had noted this property of the pendulum after he observed how the period of oscillation was approximately independent of the amplitude. In other words, a pendulum completes one cycle in about the same amount of time, no matter how big each sweep is. Pendulum clocks became possible only after the mid-1600s, when the Dutch scientist Christiaan Huygens invented an escapement to keep the pendulum swinging.

(Scientific American, July 1993)

Пример текста на чтение и перевод без словаря

Fractals are first and foremost a language of geometry. Yet their most basic elements cannot be viewed directly. In this aspect they differ fundamentally from the familiar elements of Euclidean geometry, such as the line and circle. Fractals are expressed not in primary shapes but in algorithms, sets of mathematical procedures. These algorithms are translated into geometric forms with the aid of a computer. The supply of algorithmic elements is inexhaustibly large. Once one has a command of the fractal language, one can describe the shape of a cloud as precisely and simply as an architect might describe a house with blueprints that use the language of traditional geometry.

Language is an apt metaphor for ideas that underlie fractal geometry. Indo-European languages are based on finite alphabet (the 26 letters from which English words are constructed, for instance). Letters do not carry meaning unless they are strung together into words. Euclidean geometry likewise consists of only a few elements (line, circle and so on) from which complex objects can be constructed. These objects, in a sense, only then have geometric meaning.

Asian languages such as Mandarin Chinese are made up of symbols that themselves embody meaning. The number of possible symbols or elements in these languages is arbitrarily large and can be considered infinite. Fractal geometry is constructed much the same way. It is made up of infinitely many elements, each complete and unique. The geometric elements are defined by algorithms, which function as units of 'meaning' in the fractal language.

(from *"The Language of Fractals" by H. Jürgens, H. Peitgen, D. Saupe, Scientific American, August 1990*)

Пример текста из периодической печати на устное реферирование

Sugaring the decision

Do not think on an empty stomach

MOST people have experienced the feeling, after a taxing mental work-out, that they cannot be bothered to make any more decisions. If they are forced to, they may do so intuitively, rather than by reasoning. Such apathy is often put down to tiredness, but a study published recently in Psychological Science suggests there may be more to it than that. Whether reason or intuition is used may depend simply on the decision-maker's blood-sugar level—which is, itself, affected by the process of reasoning.

E.J. Masicampo and Roy Baumeister of Florida State University discovered this by doing some experiments on that most popular of laboratory animals, the impoverished undergraduate. They asked 121 psychology students who had volunteered for the experiment to watch a silent video of a woman being interviewed that had random words appearing in bold black letters every ten seconds along the perimeter of the video. This was the part of the experiment intended to be mentally taxing. Half of the students were told to focus on the woman, to try to understand what she was saying, and to ignore the words along the perimeter. The other half were given no instructions. Those that had to focus were exerting considerable self-control not to look at the random words.

When the video was over, half of each group was given a glass of lemonade with sugar in it and half was given a glass of lemonade with sugar substitute. Twelve minutes later, when the glucose from the lemonade with sugar in it had had time to enter the students' blood, the researchers administered a decision-making task that was designed to determine if the participant was using intuition or reason to make up his mind.

The students were asked to think about where they wanted to live in the coming year and given three accommodation options that varied both in size and distance from the university campus. Two of the options were good, but in different ways: one was far from the campus, but very large; the other was close to campus, but smaller. The third option was a decoy, similar to one of the good options, but obviously not quite as good. If it was close to campus and small, it was not quite as close as the good close option and slightly smaller. If it was far from campus and large, it was slightly smaller than the good large option and slightly farther away.

A drink to decide

Psychologists have known for a long time that having a decoy option in a decision-making task draws people to choose a reasonable option that is similar to the decoy. Dr Masicampo and Dr Baumeister suspected that students who had been asked to work hard during the video and then been given a drink without any sugar in it would be more likely to rely on intuition when making this decision than those from the other three groups. And that is what happened; 64% of them were swayed by the decoy. Those who had either not had to exert mental energy during the showing of the video or had been given glucose in their lemonade, used reason in their decision-making task and were less likely to be swayed by the decoy.

It is not clear why intuition is independent of glucose. It could be that humans inherited a default nervous system from other mammals that was similar to intuition, and that could make snap decisions about whether to fight or flee regardless of how much glucose was in the body.

Whatever the reason, the upshot seems to be that thinking is, indeed, hard work. And important decisions should not be made on an empty stomach.

(The Economist, March 2008)

12. Ресурсное обеспечение:

- Перечень основной и дополнительной учебной литературы:

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  http://dictionary.cambridge.org/
  http://www.pearsonlongman.com/dictionaries/
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