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УЧЕБНОЕ ПОСОБИЕ
ПО АНГЛИЙСКОМУ ЯЗЫКУ
ДЛЯ АСПИРАНТОВ ТЕХНИЧЕСКИХ СПЕЦИАЛЬНОСТЕЙ

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Данное пособие предназначено для работы с аспирантами технических факультетов. Направлено на совершенствование навыков говорения, чтения, реферирования, перевода и письма. Состоит из 5 блоков, каждый из которых посвящен определенному виду работы. Рассчитанона 18 часоваудиторнойработы.

UNIT 1. ACADEMIC DEGREES

Ex.1 Read the text and say if it contains some information, which was unknown for you.

An academic degree is a qualification awarded to students upon successful completion of a course of study in higher education, normally at a college or university. These institutions commonly offer degrees at various levels, typically including the *bachelor's, master's* and *doctorate*, often alongside other academic certificates and professional degrees.

A ***doctorate*** or ***doctor's degree*** (or ***doctoral degree***) is an academic degree awarded by universities that is, in most countries, a research degree that qualifies the holder to teach at the university level in the degree's field, or to work in a specific profession. There are a variety of doctoral degrees, with the most common being the Doctor of Philosophy (PhD), which is awarded in many different fields, ranging from the humanities to the scientific disciplines. The word comes from Latin *doceo* ("*I teach*") appeared in medieval Europe as a license to teach (Latin: licentia*docendi*) at a medieval university. Its roots can be traced to the early church when the term "*doctor*" referred to the Apostles, Church fathers and other Christian authorities who taught and interpreted the Bible. The right to grant a licentiadocendi was originally reserved to the Church, which required the applicant to pass a test, to take oath of allegiance and pay a fee. This right remained a bone of contention between the Church authorities and the slowly emancipating universities, but was granted by the Pope to the University of Paris in 1231 where it became a universal license to teach (*licentiaubiquedocendi*). However, while the licentia continued to hold a higher prestige than the bachelor's degree (baccalaureus), it was ultimately reduced to an intermediate step to the magister and doctorate. Doctoral training was a form of apprenticeship to a guild. The traditional seven-years term of study before new teachers were admitted to the guild of "master *of arts*" was the same as the term of apprenticeship for other occupations. Originally the terms "*master*" and "*doctor*" were synonymous, but over time the doctorate came to be regarded as a higher qualification than the master degree. The earliest doctoral degrees (theology – Divinitatis doctor (DD), law – Legum doctor (LlD., later DcL.) and medicine – Medicinæ doctor (MD, DM.)) reflected the historical separation of all higher university study into these three fields Studies outside theology, law, and medicine were then called "***philosophy***", due to the renaissance conviction that real knowledge could be derived from empirical observation. The degree title of *doctor of philosophy* is a much later time and was not introduced in England before 1900. Studies in what once was called philosophy are now classified as *sciences and humanities*.The university of Bologna in Italy, regarded as the oldest university in Europe, was the first institution to confer the degree of doctor in civil law in the late 12th century; it also conferred similar degrees in other subjects, including medicine.

In the United States and some other countries, there are also some types of vocational, technical, or *professional degrees* that are referred to as *doctorates* in their home countries, though they are not technically doctoral level as they are not research degrees and no defense of any dissertation or thesis is performed. Internationally, however, the use of *doctor* to refer to these degrees is not universally accepted. Many universities also award *honorary doctorates* to individuals who have been deemed worthy of special recognition, either for scholarly work or for other contributions to the university or to society.

Academic degrees in Russia and some former USSR academic environment

The first level academic degree is called "*kandidatnauk*" (that could be translated verbatim as a "*candidate of sciences*"). This degree requires extensive research efforts, taking some classes, publications in peer-reviewed academic journals (not less than five publications in Ukraine or three publications in Russia), taking three or more exams (one or more in their speciality, one in a foreign language and one in the history and philosophy of science) and writing and defending an in-depth thesis (80-200 pages) called a "*dissertation*".
Finally, there is a "*doktornauk*" (that could be translated verbatim as a "*doctor of sciences*") degree. This degree is granted for contributions in a certain field. It requires discovery of new phenomenon, or development of new theory, or essential development of new direction, etc. There is no equivalent of this "doctor of sciences" degree in US academic system. It is roughly equivalent to *habilitation* in Germany, France, Austria, and some other European countries.
In countries with a two-tier system of doctoral degrees, the degree of kandidatnauk should be considered for recognition at the level of the first doctoral degree. In countries with only one doctoral degree, the degree of kandidatnauk should be considered for recognition as equivalent to this degree.
According to Guidelines for the Recognition of Russian Qualifications in the other countries in countries with a two-tier system of doctoral degrees, the degree of doktornauk should be considered for recognition at the level of the second doctoral degree. In countries in which only one doctoral degree exists, the degree of doktornauk should be considered for recognition at the level of this degree.

Academic degrees in the United Kingdom

The title '*degree*' is protected under UK law. All valid degrees are awarded by universities or other degree-awarding bodies whose powers to do so are recognised by the UK government; hence they are known as “recognised bodies”.

Doctoral degrees or doctorates such as the doctor of philosophy degree (PhD or DPhil) or doctor of education (EdD or DEd) are awarded following a programme of original research that contributes new knowledge within the context of the student's discipline. Doctoral degrees usually take three years full-time. Therefore, in the UK it may only take seven years to progress from undergraduate to doctoral level – in some cases six, since having a master's is not always a precondition for embarking on a doctoral degree. This contrasts with nine years in the United States, reflecting differences in the educational systems.
Some doctorates, such as the doctor of clinical psychology (DClinPsy) qualification, confirm competence to practice in particular professions. There are also higher doctorates – doctor of science (DSc) and doctor of letters/literature (DLitt) that are typically awarded to experienced academics who have demonstrated a high level of achievement in their academic career; for example they may have published widely on their subject or become professors in their field.
UK post-secondary qualifications are defined at different levels, with levels 1-3 denoting further education and levels 4-8 denoting higher education. Within this structure, a foundation degree is at level 5; a bachelor's at level 6; a master's at level 7; and a doctoral degree at level 8 (full information about the expectations for different types of UK degree is published by the Quality Assurance Agency for Higher Education.

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***Ex.2. Answer the questions**:*

1.*What academic degrees are mentioned in the text?*
2.What is the word "doctorate" derived from?
3.What can you say about the history of the doctorate?
4.Can you name the earliest doctoral degrees?
5.What did the word "philosophy" mean?
6.When and where was the degree title of Doctor of philosophy introduced?
7.What are the requirements for granting academic degrees in Russia?
8. *Say a few words about recognition of Russian degrees in other countries.*
9.What have you found out about academic degrees in the UK? 10.What other types of degrees are there in the USA?

Ex.3. Make a summary of the text and retell it.

***Ex.4. Compose a short story about your scientific supervisor**.*
The following words may help you:
vice-rector, dean, sub-dean, head of department, professor, associate/assistant professor, senior lecturer.

***Ex.5. Tell the fellow students about yourself and your research work. You may use the phrases and the plan given below**:*

To conduct/to do/to carry out research in the field of…
To study/to examine/to investigate/to explore…
To put forward an idea/theory/hypothesis…
Field of science/research
The subject of research
A new area of research
The purpose/aim/goal of research
To predict/to forecast/to foresee
To be concerned with/ to be engaged in the problem of…
To be the subject of special/particular interest
To deal with/ to consider the problem of…
To take up the problem
To work on the problem
To follow/ to stick to the theory/ hypothesis/ concept
To be of special/ great/ little/no interest/importance/value
To conclude/to come to conclusions
To succeed in/to make progress in
To be consistent with/to coincide
To obtain/to receive results/data/findings

The plan you may use while composing your story:

-Your biography-Your education, degrees that you have got/ are planning to get-Activities you are engaged in-Your research (experiments, theoretical basis of your work)-Outstanding scientists who worked in your field of science- Your scientific supervisor, main ideas and trends in his/her scientific school-Foreign scientists who work in the same field of knowledge with you-Your participation in scientific conferences- Reading scientific literature and writing your own articles and research papers- Plans for the future

UNIT 2. SUMMARIZING SCIENTIFIC LITERATURE

Ex.1 Read the text and answer the question:“What is the difference between an abstract and a summary of a research text?”

Summarizing a journal article is the process of presenting a focused overview of a completed research study that is published in a peer-reviewed, scholarly source.

A journal article ***summary*** provides potential readers with a short descriptive commentary, giving them some insight into the article's focus.

As a general rule of thumb, you can probably make one paragraph per main point, ending up with no more than 500-1000 words, for most academic articles. For most journal summaries, you'll be writing several short paragraphs that summarize each separate portion of the journal article.

A summary should be accurate and while 100% objectivity isn't possible, the summary writer should strive to stay as close as possible to this position. Most importantly, the summary writer should save their own ideas and interpretations for the response, rather than including these things in the summary. A key skill to be developed for writing a summary is the ability to paraphrase (to express the author's ideas using the summarizer's own words)

There are three types of a summary*: Main Point Summary, Key Points Summary and Outline Summary.*

A main point summary is much similar to an article abstract, giving the most important "facts" of the text. It should identify the title, author, and main point or argument. When relevant, it can also include the text's source (book, essay, periodical, journal, etc.). As in all types of summary, a main point summary uses author tags, such as "In his (her) article, the author (Mr./Ms. X) states /argues/ explains /says/asks/suggests." These tags will make it clear which ideas are those of the author and the text being summarized, not the summarizer. This type of summary might also use a quote from the text, but the quote should be representative of the text's main idea or point. A main point summary is often used when writing academic papers as a way to introduce the reader to a source and to place the main point of that source into the context of an argument or discussion of an issue.

A key points summary has all the same features as a main point summary, but also includes the reasons and evidence (key points) the author uses to support the main idea of the text. This type of summary would also use direct quotes of key words, phrases, or sentences from the text. This summary is used when it is necessary for the summary writer to fully explain an author's idea to the reader. The key points summary involves a full accounting and complete representation of the author's entire set of ideas. One reason to use this sort of summary would be if the writer intended to respond to the author's argument using an agree/disagree response model. In such a case, there may be some of the author's

ideas that the writer agrees with, but others with which the writer disagrees.
An outline summary mimics the structure of the text being summarized. It includes the main points and arguments in the same order they appear in the original text. This is an especially effective technique to use when the accompanying response will be analytic, such as an evaluation of the logic or evidence used in the text.

Abstracts are short paragraphs written by the author to summarize research articles.Abstracts are usually included in most academic journals. Typical length ranges from 100 to 500 words, but very rarely more than a page and occasionally just a few words. It is generally no more than 100-200 words. An abstract is a brief summary of a research article. The abstract can convey the main results and conclusions of a scientific article but the full text article must be consulted for details of the methodology, the full experimental results, and a critical discussion of the interpretations and conclusions. The purpose of an abstract is to allow researchers to quickly scan a journal and see if specific research articles are applicable to the work they are doing.An academic abstract typically outlines four elements relevant to the completed work: 1. The research focus (i.e. statement of the problem/research issue addressed);2. The research methods used (experimental research, case studies, questionnaires, etc.);3. The results/findings of the research;4. The main conclusions and recommendations.

There are two types of abstracts: informational and descriptive.

1. *Informational or complete abstracts* usually follow a similar order to a scientific paper. Theyprovide communicative contents of reports,include purpose, methods, scope, results, conclusions, and recommendations and highlight essential points. They are 10% or less of the report. The purpose of these abstracts is to allow readers to see if specific research articles are applicable to the work they are doing.

2.*Descriptive or indicative (limited) abstracts* describe the publication itself (e.g. surveys, review articles, book chapters, etc.), rather than report particular findings. They tell what the report contains and include purpose, methods, scope, but not results, conclusions and recommendations. Theyare always very short - usually less than 100 words. These abstracts introduce subject to the readers, who need then read the report to learn results.

When used, an abstract is placed at the beginning of a manuscript or typescript, below the title, acting as the point-of-entry for any given academic paper or patent application. Abstracting and indexing services for various academic disciplines are aimed at compiling a body of literature for that particular subject.

Whichever type of abstract you write, follow the suggestions given below:

Do not repeat the information given in the title.
Do not include in the abstract any facts or ideas that are not in the text; eliminate unnecessary background information.Decide the degree of detail you include (especially for informational abstracts).
Use direct, straightforward English; reduce wordy phrases; avoid jargon.Use the past simple tense when describing what was done.
Use the present simple tense when you discuss the results or mention established knowledge. Finally, revise the opening statement to emphasize the new information contained in the paper.
It is a good idea to write the list of key words below the abstract.

If you write your own research article, provide an abstract in English. It will give your work a much higher profile outside your own country and make it much more accessible to international workers in the same field.

The terms **précis** or **synopsis** are used in some publications to refer to the same thing that other publications might call an "abstract". In management reports, an **executive summary** usually contains more information (and often more sensitive information) thanthe abstract does.

One should remember that an abstract and an article summary are two different things, so an article summary that looks just like the abstract is a poor summary. An abstract is highly condensed and cannot provide the same level of detail regarding the research and its conclusions that a summary can.

Ex.2.Answer the following questions:
1.How many types of summary are described in the text?
2.What type is the most common in summarizing the text?
3.What is the purpose of an abstract?
4.What recommendations for writing abstracts are given in the text?

Ex.3.Read an excerpt from the lecture by Prof. Ernst Rovinovitsof MIT, which is entitled «How to Write a Technical Report». The part, offered to your attention, is called «Abstract Writing».

However, we always provide, or we should provide, an additional mechanism for telling people whether to go ahead, and that is the *abstract.* Now, an abstract, as you know, is something that's about anywhere, between, say fifty and two or three hundred words long, a description of the work, really to supplement the title in telling people whether this is something that they ought to be pursuing further. One mistake that people often make is they don't give the results. They'll tell what was done — an experiment was carried out to measure this, that and the other, and to test some theory — but they'll never mention whether in fact the theory was true or not. So always make sure that your abstract does include the results that you've actually achieved. Don't give afterthoughts. The nature of

things is such that abstracts are usually written right at the end of the paper, and often people who've written the paper and then a couple of days later they think of something they should have said but didn't, will stick it in the abstract. Now that's not appropriate, rewrite the paper but the abstract should correspond to the paper and not be a further extension of it.
Abstracts are frequently published by themselves in Abstracting journals, so that a person may read the abstract who doesn't have the paper before him may. Hence, you can't use undefined symbols like this Greek thing — I don't know, zeta, I don't even know what it is. But often you'll see somebody stick in "a zeta value of 3.8 was obtained". Well, if you don't define what this zeta is — I'm assuming it is a zeta by the way — this doesn't help the reader at all who doesn't have the paper before him. And similarly, often people use some very pompous terms which I'm sure are perfectly well defined in the paper but if you don't have the paper it doesn't help. "A compound beneficientquotient of 3.7 was established in category A". Well, you know, if this isn't the standard term and if the reader doesn't know it, it doesn't help. And the final comment I might make is that often abstracts are read by very simple people — laymen, controllers, lawyers, directors - so try and keep the technical level of the abstract just a notch below that of the paper. I don't mean to say that, you know, make it such that a seven- year-old can read it. But don't make it as fiercely technical as you know-how. I don't think that's appropriate in an abstract.
Well, these are the shorting mechanisms — by these means we reduce the readers down to the number who ought to be reading the paper. It does no good to have a man read your paper who shouldn't be reading it. It just makes him angry and it retards the progress of science. So try and don't use it as a come on so much but make it a device In deter people who've no interest in what follows. However, those who ought to be reading it then are going to be with us and we're going to have to take them further.

Ex.4. Find the sentences which have "wrong' grammar. Correct them.

Ex. 5. Read the text and determine its main points. Why should a traditional city be transformed into a smart city?

Smart cities

Understanding the term 'Smart City' is not completely carved in stone as there are only limited number of studies that investigated this topic. However, with increasing advances in technology, information systems and communications, one can identify several important core components that are required to fully understand and define the concept of a smart city.

There are eight core factors that influence smart city initiatives [10]. These are:

Management and organization: the alignment of management and organizational goals is a necessity for smart city to work effectively and efficiently.
Technology: a smart city relies on a collection of smart computing technologies applied to critical infrastructure components and services. Smart computing refers to a new generation of integrated hardware, software and network technologies that provide IT systems with real time awareness of the real world and advanced analytics to help people make more intelligent decisions.
Governance: it involves the implementation of processes with constituents who exchange information according to rules and standards in order to achieve goals and objectives. Several factors like collaboration, communication, leadership, and data exchange are required for effective smart city governance.
Policy context: the policy context is critical to the understanding of the use of information systems in appropriate ways. It mainly characterizes institutional and non-technical urban issues and creates conditions that enable urban development.
People and communities: smart city initiatives allow members of the city to participate in the governance and management of the city and become active participants. If they are key players they may have the opportunity to engage with the initiative to the extent that they can influence its success or failure.
Economy: it is one of the major drivers of smart city initiatives and a city with a high degree of economic competitiveness is thought to have one of the properties of a smart city. The outcomes are mostly business creation, job creation, workforce development, and improvement in productivity.
ICT infrastructure: the implementation of an ICT infrastructure is fundamental to a smart city development and depends on some factors related to its availability and performance.
Natural environment: one of the core goals of a smart city is to increase sustainability and to enhance natural resource management. In addition, the protection of natural resources and related infrastructure is extremely important.

Why should a city be transformed into a smart city? Conventional cities will face many challenges during the coming decades, which will affect the development and sustainability of these cities. The challenges include:

- The rapidly increasing population
- Polarized economic growth, which requires more areas that are occupied by people
- The environmental emissions and the sustainability requirements.
- The global economy instability

Therefore many countries began transforming some of their cities into smart cities by utilizing the advancements in ICT to increase efficiency, reduce cost and improve the quality of life. But still there are some factors that affect the smart city development such as:

- The scaling of new technologies is unverified.
- Technology challenges the existing status quo in managing and running the city.

- Technology awareness among the city sectors and actors.

To develop smart city solutions, the complexity of how smart cities are operated, financed, regulated and planned need to be highly considered. Therefore, any smart city structure consists of four layers :

1. City objectives: social, technological environmental and economic aims and goals.
2. City indicators.
3. City Components.
4. City Contents: solutions and services.

The main goal of any smart city design is to create a sustainable place where people can live, work and play. Therefore, one can divide the smart city development into several elements. These are smart city infrastructure, smart database resources, smart building management systems and smart interface. These elements integrated together make up the smart city.

Ex.6Summarize the text, making both a summary and an abstract.

Ex.7 Read about quantum computers and make a summary of the text.

What are quantum computers and how do they work?

Google, IBM and a handful of startups are racing to create the next generation of supercomputers. Quantum computers, if they ever get started, will help us solve problems, like modelling complex chemical processes, that our existing computers can't even scratch the surface of.

But the quantum future isn't going to come easily, and there's no knowing what it'll look like when it does arrive. At the moment, companies and researchers are using a handful of different approaches to try and build the most powerful computers the world has ever seen. Here's everything you need to know about the coming quantum revolution.

What is quantum computing?

Quantum computing takes advantage of the strange ability of subatomic particles to exist in more than one state at any time. Due to the way the tiniest of particles behave, operations can be done much more quickly and use less energy than classical computers.

In classical computing, a bit is a single piece of information that can exist in two states – 1 or 0. Quantum computing uses quantum bits, or 'qubits' instead. These are quantum systems with two states. However, unlike a usual bit, they can store much more information than just 1 or 0, because they can exist in any superposition of these values.

"The difference between classical bits and qubits is that we can also prepare qubits in a quantum superposition of 0 and 1 and create nontrivial correlated states of a number of qubits, so-called 'entangled states'," says Alexey Fedorov, a physicist at the Moscow Institute of Physics and Technology.

A qubit can be thought of like an imaginary sphere. Whereas a classical bit can be in two states – at either of the two poles of the sphere – a qubitcan be any point on the sphere. This means a computer using these bits can store a huge amount more information using less energy than a classicalcomputer.

How far away are quantum computers?

Until recently, it seemed like Google was leading the pack when it came to creating a quantum computer that could surpass the abilities of conventional computers. In a *Nature* article published in March 2017, the search giant set out ambitious plans to commercialise quantum technology in the next five years. Shortly after that, Google said it intended to achieve something it's calling 'quantum supremacy' with a 49-qubit computer by the end of 2017.

Now, quantum supremacy, which roughly refers to the point where a quantum computer can crunch sums that a conventional computer couldn't hope to simulate, isn't exactly a widely accepted term within the quantum community. Those sceptical of Google's quantum project – or at least the way it talks about quantum computing – argue that supremacy is essentially an arbitrary goal set by Google to make it look like it's making strides in quantum when really it's just meeting self-imposed targets.

Whether it's an arbitrary goal or not, Google was pipped to the supremacy post by IBM in November 2017, when the company announced it had built a 50-qubit quantum computer. Even that, however, was far from stable, as the system could only hold its quantum microstate for 90 microseconds, a record, but far from the times needed to make quantum computing practically viable. Just because IBM has built a 50-qubit system, however, doesn't necessarily mean they've cracked supremacy and definitely doesn't mean that they've created a quantum computer that is anywhere near ready for practical use.

Where IBM has gone further than Google, however, is making quantum computers commercially available. Since 2016, it has offered researchers the chance to run experiments on a five-qubit quantum computer via the cloud and at the end of 2017 started making its 20-qubit system available online too.

But quantum computing is by no means a two-horse race. Californian startup Rigetti is focusing on the stability of its own systems rather than just the number of qubits and it could be the first to build a quantum computer that people can actually use. D-Wave, a company based in Vancouver, Canada, has already created what it is calling a 2,000-qubit system although many researchers don't consider the D-wave systems to be true quantum computers. Intel, too, has skin in the game. In February 2018 the company announced that it had found a way of fabricating quantum chips from silicon, which would make it much easier to produce chips using existing manufacturing methods.

What can quantum computers do that normal ones can't?

Quantum computers operate on completely different principles to existing computers, which makes them really well suited to solving particular mathematical problems, like finding very large prime numbers. Since prime numbers are so important in cryptography, it's likely that quantum computers would quickly be able to crack many of the systems that keep our online information secure. Because of these risks, researchers are already trying to develop technology that is resistant to quantum hacking, and on the flipside of that, it's possible that quantum-based cryptographic systems would be much more secure than their conventional analogues.

Researchers are also excited about the prospect of using quantum computers to model complicated chemical reactions, a task that conventional supercomputers aren't very good at all. In July 2016, Google engineers used a quantum device to simulate a hydrogen molecule for the first time, and since them IBM has managed to model the behaviour of even more complex molecules. Eventually, researchers hope they'll be able to use quantum simulations to design entirely new molecules for use in medicine. But the holy grail for quantum chemists is to be able to model the Haber-Bosch process – a way of artificially producing ammonia that is still relatively inefficient. Researchers are hoping that if they can use quantum mechanics to work out what's going on inside that reaction, they could discover new ways to make the process much more efficient.

Ex.8 Answer the questions relying on the information given in the text.

1.What companies are engaged in creating a new generation of computers?
2.What is a qubit?
3.What are the fields of application of quantum computers?
4.How far away are these computers?

UNIT 3.GRANTS

Part 1. Applying for Grants

Ex.1. Read this article from The Guardian) and decide how useful these tips are for you.

How to apply for research funding: 10 tips for academics

Grant writing is time-consuming, tedious and the success rates are depressing. How can researchers make the process less stressful?

Decide what you most need the money for – is it your own time, or perhaps the costs of travel to do archival research or fieldwork? Winning funding for your research ideas is tough, and there is growing pressure in all disciplines to get grants. While there's no easy way to write a successful application, there are some steps you can take to make the process less stressful.

1) Become familiar with grant writing early on

It's always worth getting a bit of early experience in grant writing even if it might not be on your mind at the time. As a PhD student or early postdoc you can ask to see drafts of work that is being done in your office, as an observer. That way you can keep getting a sense of the process before you have to do a grant proposal on your own. (*David Crosby, programme manager for methodology and experimental medicine, Medical Research Council*)

It's never too early to think about funding – even during your doctorate there are funding opportunities for travel grants, equipment, public engagement activities and more. It's valuable evidence of your ability to win funding and provides important experience before moving on to writing larger, more complex, grant proposals. *(Traci Wilson, higher education institutions programme manager, Vita, an organisation aimed at developing researchers)*

2) Decide what you most need the money for

Decide what you most need the money for – is it your own time, or perhaps the costs of travel to do archival research or fieldwork, or to hold a workshop to bring experts together to advance a piece of research. Investigate possible funding bodies who give grants or fellowships of the type that support what you need the money for – reading the relevant guidance notes carefully to avoid wasting your time and that of the funding body. Discuss your ideas with relevant colleagues, including university research office or research support colleagues. *(Ken Emond, head of research awards, British Academy)*

3) Signpost your applications according to rigour, value for money, impact, scientific interest

Start by picking the right scheme and reading the guidance for the call thoroughly as they may have particular stipulations that you need to be aware of before you spend any more time on it. Make sure then that you signpost how exactly your idea fits in throughout the application. It's useful to signpost all the aspects of a good proposal that reviewers will be looking for – so they don't miss it – things like: rigour, value for money, impact, scientific interest. *(Matthew Grenby, professor of eighteenth century studies, Newcastle University)*

4) Talk to colleagues who have applied to the same organisation

Talk to people within your institution who have already won funding from the organisation you are applying to. For example, different organisations have different emphasises and priorities, so there are nuances in how you should pitch to them, whether it's Cancer Research UK or the Medical Research Council, it's worth finding out about that first. *(David Crosby)*

5) Stay focused and avoidany jargon

Common mistakes made by applicants include not reading and answering the questions being asked and being over-ambitious in their expectation of what can be achieved in the timescale of an award. Usually you will have less space than you would want, so it is important to focus on what is really important about your proposed research, and to be clear about how you will go about it. Write positively, without relying on unexplained jargon, and with enthusiasm about what you plan to do, and why you are the right person, with the right blend of skills and experience to make a success of it. *(Ken Emond)*

6) Talk over your interdisciplinary proposal with your partner

If you are applying to do an interdisciplinary project and are therefore going to work with a partner from another discipline, you need make sure the partnership is authentic. You need be interested intellectually in what one another is working on and that will show through to reviewers. If you meet someone you might want to work with make sure that you take time over forming an idea and planning an application. You can't just put something together in a brief meeting over a cup of coffee. *(Tony McEnery, professor of English languages and linguistics and director of Lancaster University's Centre for Corpus Approaches to Social Science)*

7) Don't be afraid to ask questions

You can always get in contact with the funder, in fact we thoroughly recommend it. Funding calls will have an email address for you to get in touch. That way any queries you have about the suitability of your idea can be answered. Read the handbook: research councils will have rules early on about font size and spacing that need to be adhered to. *(Avril Allman, head of peer review and grant operations, Natural Environment Research Council)*

8) Ask people outside of academia to read your application

At the panel stage your application won't be reviewed by people who are experts in your specific area. Getting friends and family to review your idea means they can ask questions others might not have thought of. People in your department can give a sense check, and think about whether it is actually possible in research terms. *(Matthew Grenby)*

9) If you get rejected, try-try again

The main advice is to keep trying. Lots of people don't re-submit applications where they can. But responding to suggestions from reviewers can add value to an application and, once adapted, some applications do go on to be funded. Being rejected doesn't mean your idea is completely un-fundable necessarily. It might be that you need to make changes, or it might be that this time there just was not funding available in the round you were in. *(Tony McEnery)*
Don't just send the same thing again, but respond to feedback and then try. It can be disappointing if you have put a lot of effort into something but see it as a learning point, and we don't fund everything, there is around a 20% success rate, so you have to expect some rejection. *(David Crosby)*

10) Always use your right of reply

In the humanities you get a right of reply before the final decisions are made – and people don't take that seriously enough. I would see it as actually part of the application. If they have questions you can defend your answers, and provide explanation. If they say something positive you can reinforce that. It's an opportunity. *(Matthew Grenby)*

Part II. Grants in Russia.

Ex.1. Read the text about RFBR and answer the questions:

1) ***What is the aim of this organisation?***
2) **Who chooses grant winners and how are they chosen?**
3) **What are the main principles of RFBR?**

Russian Foundation for Basic Research (RFBR) was created by decree of the President of the Russian Federation. Being a representative of the state, the Foundation provides targeted diversified support to leading groups of scientists regardless of the organisation they represent. Support of initiative scientific research in all the principal directions of fundamental science is carried out strictly on a competition basis after a comprehensive evaluation.

Decisions on whether to support or to decline projects by RFBR are taken by the scientific community itself represented by the most authoritative and actively working scientists – members of the Foundation expert panels.

In its chartered activities RFBR relies on the following principles:

• openness — announcements of competitions and their results, the Foundation's decisions on financing projects and events, and also other materials are published in paper editions and online;

•targeted financing of groups of scientists (and not organisations as a whole), which perform projects approved by the Foundation experts;

• giving the scientists freedom of choice of subjects in all fields of natural sciences and humanities, of methods of conducting fundamental research, and of creating research groups.

The Foundation sees its mission in developing the powerful intellectual potential of our country, which is becoming a key element in the development of Russia.

Ex.2. Read the text about RFBR competitions and answer the questions:

1) *What scientific directions does the Foundation support?*
2) *How many people can apply for one grant?*
3) *What kind of programmes and competitions are financed?*
4) What programmes can you apply for?
5) What is the maximum duration for a grant?

RFBR COMPETITIONS

The main task of the Foundation is to select on the basis of competitions the best scientific projects among those that were submitted to the Foundation by scientists in an initiative order and subsequently to support the selected projects organisationally and financially.

Scientific directions supported by the Foundation are:

- mathematics, mechanics, and information technology;
- physics and astronomy;
- chemistry and studies of materials;
- biology and medical science;
- Earth science;
- humanities and social sciences;
- information technology and computer systems;

- fundamental basics of engineering sciences.

The principal direction of the Foundation is the competition of initiative projects performed by small (up to ten persons) groups of scientists or by individual researchers.

Overall during the year, the Foundation financed 15 types of competitions and two programmes. These are some of them:

a) competition for initiative scientific projects carried out by small (up to ten persons) groups of scientists or individual researchers;

b) competition for projects of writing analytical reviews;

c) competition for projects of developing the material and technical base of scientific research;

d) competition for publishing projects;

e) competition for projects of participation of Russian scientists in international scientific events abroad;

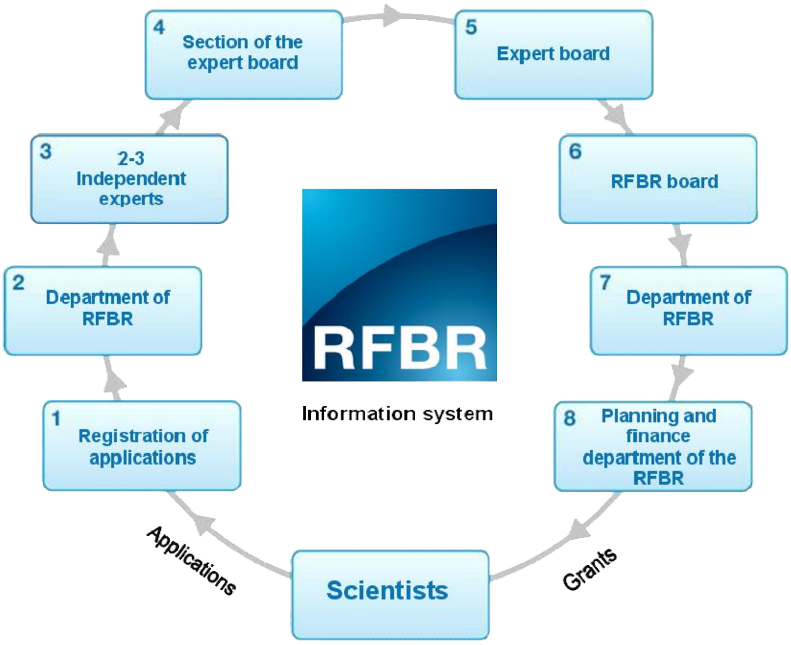
f) competition for projects of organising expeditions (and field trips);

g) competitions for international projects;

h) competition for projects in the programme "Mobility of young scientists";

i) competitions for projects with CIS countries.

An initiative project can be financed for three years at most.



Ex.3. Read the text and saywhich of the directions might be of interest for you.

COMPETITION FOR ORIENTED FUNDAMENTAL RESEARCH

In 2009 RFBR organised and held for the first time a competition for oriented fundamental interdisciplinary research in 18 directions. The themes of interdisciplinary research were defined by the Foundation Board on the basis of analysing results obtained earlier by research projects supported by RFBR. Look at these directions:. 1.Prognostic modelling on supercomputers of the petaflop class.

2.Cryogenic nanostructures.
3.Coherent interaction of radiations.
4.Cosmomicrophysics.
5.Interaction of electromagnetic fields with matter.
6.Ultraheavy elements.
7.Nanosized systems.
8.Environmentally friendly chemistry.
9.New drugs and vaccines.
10.Eukaryote genomics and proteomics.
11.Resource base of strategic raw materials.
12.Electromagnetic influence on the environment.
13.Cognitive research.
14.New generation information systems.
15.Nanomaterials on metallic, ceramic, and polymer bases.
16.Semiconducting structures for electronics and energy sources.
17.Solid-body wave electronics.
18.Problems of theoretical mathematics.

Results obtained during carrying out projects for the competition for interdisciplinary fundamental research must make a significant contribution to broadening and widening knowledge of nature, the human being, and society, serve the interests of social and economic development and strengthening the security of the Russian Federation, heightened authority of Russian science and its integration into world scientific space.

Ex.4. Read the text and answer the questions:

1.What is the maximum age for young scientists who can apply for this programme?2.What is the structure of this programme?
3.What do winners of this competition receive?
4.What events are financed within this programme?

RFBR PROGRAMME “MOBILITY OF YOUNG SCIENTISTS”

The Foundation also holds competitions for supporting the mobility of young scientists. Young specialists under the age of 35 permanently living and working on the territory of the Russia Federation can take part in the competitions.
The structure of the program:

- Supporting internships of young Russian scientists in Russian scientific centres;
- Providing Providing travel grants for trips abroad;
- Supporting internships of CIS scientists in Russian scientific centres;
- Supporting youth schools, conferences, and scientific workshops;
- International scientific research projects with participation of young scientists.
- travel grants for trips to conferences in Russia;

The following competitions take place in the framework of the programme "Mobility of young scientists":

1. Support for scientific work of young Russian scientists in the leading scientific organisations of the Russian Federation. Winners of the competition receive financial support for paying for the labour, travel expenses, and living expenses of young scientists.
2. Support for scientific work of young scientists from CIS countries in Russian scientific organisations. The primary goals of this competition are engaging young talented scientists from CIS countries in working for Russian scientific organisations, and support and development of international scientific ties.
3. Support for organising youth scientific events (conferences, symposiums, etc.).
4. Support of participation of young scientists in scientific events taking place in the Russian Federation and abroad.

***Ex.5. Now read about international competitions and answer the following questions*:**

1. *What kind of international competitions can Russian scientists take part in?*
2. *How many countries does Russia cooperate with? What do the letters DFG stand for?*
3. *What international programmes does RFBR participates in*?

INTERNATIONAL COMPETITIONS

RFBR is an active participant of the world scientific process.

The foundation organises:

- competitions for projects of joint fundamental research by Russian and foreign scientists;
- competitions for projects for supporting participation of Russian scientists in conferences and meetings abroad.

RFBR activity has received international acclaim and is an effective form of integration of Russian researchers into the world's scientific space.

The geography of international RFBR competitions reflects already active cooperation with 32 foreign partners from 25 countries, among which European countries predominate, along with countries where fundamental research in natural sciences is being conducted intensively. In accordance to agreements with partner foundations in some of these countries joint competitions are held not every year and can be limited to one or two types of competitions. The closest and most fruitful ties are with colleagues from Germany, France, and China. Special attention is given to international projects leading to innovation breakthroughs in different fields.

The Foundation also supports: - joint scientific projects of the international DFG programme "International research groups with the participation of young scientists" within the framework of an RFBR-DFG agreement;

- projects within the framework of the competition "Joint research groups" Gemlinschaft – RFBR and other international programmes.

Continuing and improving the standard practice of holding bilateral international competitions, RFBR takes a wider and wider part in multilateral international competitions initiated by its foreign partners. RFBR participates in large international scientific research programmes:

- Interdisciplinary programme of developing software for calculations on the ekzaflop scale during solving global problems. Participants: the USA, Canada, Germany, France, Great Britain, Russia.
- Project of creation an X-ray laser on free electrons. Organisers: German foundation "Helmholz association, RFBR.
- Studies of ultra-strong electromagnetic fields. Organisers: CNRS (France), RFBR.
- Fundamental research in the field of molecular biology. Organisers: European Molecular Biology Laboratory (EMBL), RFBR.
- Coordination of national and joint programmes of studies in the field of physics of space particles (ASPERA) Organisers: EU countries, RFBR.
- Programme of support of fundamental research for fighting HIV.

Ex.6. Now read about RFBRinformational activity and say what information support does RFBR provide scientists with?

For many years RFBR has been working on providing scientists with access to the most current information and allowing them to publish the results of their research in authoritative publications.

The information activity of RFBR is conducted via:

- RFBR official website (www.rfbr.ru);
- the Foundation electronic scientific library with an access to electronic scientific information resources of leading foreign publishers;
- RFBR database of results of research and grant holders' publications over many years;

- electronic system of informational and organisational support “Grant-Express”;
- the Foundation's own publications: RFBR Journal, RBRF Information Bulletin, collections of popular science articles, bibliographic references and collections of annotated reports on RFBR projects;
- a system for monitoring the scientific community.

RFBR regularly organises workshops on the subject “Results of fundamental research for investment”.

The Foundation organises the following competitions:
- acompetition for publishing monographs, collections of articles, and also translations of foreign authors;
- competition for writing analytical reports on results of fundamental scientific research;
- competition for popular science articles.

Ex.7. Think carefully and try to prepare a draft of your proposal for a grant.

UNIT 4.PRESENTATIONS

As post-graduate students you are supposed to take part in conferences and present your findings there as well as report on your findings while defending your qualification paper or thesis. The following tips will help you to do this:

Preparation

Checklist – Organisation

Date and time___________

Length of the time for your talk_____

Questions at the end? If yes, length of time for questions_____

Place/Room_______

Equipment needed_____
Is it available? _____ Does it work? ________

Audience:

Number of people	1-5	6-15	16-30	Over 30
How much do they know about the	nothing	a bit	a lot	

topic?				
How well do I know them?	not at all	a little	quite well	
How formal?	very formal	formal	informal	
Nationality/Culture?	same as me	international		

Handouts no ____
yes / before talk _____ at end of talk _______ later (email)______

Checklist – Contents

Topic_______________________ **Three main points** 1. ________________________ 2. ________________________ 3. ________________________	**Purpose of your talk:** (What do I want to do?) ___ Inform the audience ___Train the audience ___Sell something to the audience ___Persuade the audience to do something

Importance to the audience: ____________

What do I want the audience to know by the end of my talk:

____

Preparing visuals

How many visuals will I have? _____________
Do they say (or show) what I want to say? ______
Are they clear and simple to understand? _________
Will the audience be able to read them (font size and colours)? _______
Do they have effective headlines? _________
Is there as little text as possible? _________
Have I remembered *the rule of six*? (max 6 lines and 6 words per slide) ______

The structure of your talk

> ***Tip*** *Remember how to make effective openings: start with a rhetorical question, a story or an amazing fact, or give the audience a problem to think about.*

Introduction

Welcome the audience
Introduce yourself (name, position / function)
State your topic
Say why your topic is important for the audience
Describe the structure of your talk (the main points and when you will be dealing with them)
Say how long the talk will be
Say when you will answer questions
Say whether there are handouts

Main part

Briefly state your topic and objective(s) again
Then introduce your three (or two or?) main points and give details

Main point 1 **Tip** *Remember to:*

- *signal the beginning of each part*
- *talk about your topic signal the beginning of each part*
- *talk about your topic*
- *signal the end of each part*
- *highlight the main points*
- *summarise the main ideas*

Main point 2

> **Bullet charts?**
>
> - Refer to points in the same order
> - Use the same key words and phrases as on your bullet charts

Main point 3

Graphs, tables, pie charts, etc.?

- Start by telling your audience what the visual illustrates.
- Explain it if necessary.
- Highlight the key points.
- Say why these points are important (and explain the cause or effect).

Signal the end of the main part

Conclusion

Signal the end of your talk
Summarize the key points
Highlight one important point
Explain the significance
Make your final statement
Invite questions

Tip

Remember how to make effective conclusions: end with a question or a quote from a famous person, finish a story you started at the beginning of your talk and call the audience to action.

Dealing with questions

What questions can I expect? | How can I answer them?

Tip

Remember, when answering questions during or after your talk:

- *Listen carefully and make sure you have understood the question correctly*
- *Reformulate the question if necessary*
- *If you want to postpone the question, say why politely*
- *If you don't know the answer, say so and offer to find out*
- *Answer irrelevant questions politely but briefly*
- *Check that the questioner is satisfied with your answer.*

Checklist – Feedback

Organisation

Was my presentation the right length?
too long ____ too short ____ just right____
Was there time for questions at the end (if relevant)?
too long____ too short ____ just right ____

Communication

How was my body language?
good ____ bad ___ why? ______________________
How well did I deal with my nervousness?
well ____ not well ____ why?___________________
Did the audience understand me?
yes, all the time _____ yes, most of the time _____ yes, some of the time____ no __
Did I have trouble expressing myself in English?
yes, all the time ___ yes, most of the time _____ yes, some of the time____ no __
What were some words or phrases I needed but didn't know?

Look them up!

Parts of the presentation

Introduction

Did I tell the audience the purpose of my talk? yes ___ no ___
Did I explain the structure of my talk? yes ___ no ___
Did I tell the audience why the talk was relevant to them?yes __no ___ How can I improve the introduction? _
____
Main part Did I state my points clearly? yes ___ no ___
Did I use effective signposting? yes ___ no ___
Did I emphasise key points? yes ___ no __
Did I summarise key points after each section? yes ___ no ___
Did I present my visuals well? yes ___ no ___
How can I improve the main part? ____________________________
Conclusion Did I summarise the key points? yes ___ no ___
Did I tell the audience what to do (call to action)? yes ___ no ___
Did I leave a lasting impression? yes ___ no ___
How can I improve the conclusion?
____
QuestionsHow well did I deal with questions? very well _ well _ fairly well__ badly__
Why? _____________________

What questions were asked that I didn't appreciate? __________
How can I improve the way I deal with questions? ____________

Useful phrases and vocabulary

Starting/welcoming the audience

Good morning/afternoon, ladies and gentlemen/everyone.
Hello, everyone.
First of all, let me thank you all for coming here today.
It's a pleasure to welcome you today.
I'm happy/delighted that so many of you could make it today.
It's good to see you all here.

Introducing yourself

Let me introduce myself. I'm... from ...
For those of you who don't know me, my name is…
Let me just start by introducing myself. My name is…

Giving your position, function, department, company

As some of you know, I'm a postgraduate student at…
I'm a software developer and I'm responsible for…
I'm here in my function as the head of….
I'm the project manager in charge of….

Introducing your topic*I'd like to talk to you today about...*
What I'd like to present to you today is….
I'm here today to present…
Today's topic is…
The subject/topic of my presentation is…
In my presentation I would like to report on…
In my talk I'll tell you about…
Today I'm going to talk about…
I'll be talking about…

Say why your topic is relevant for your audience

Today's topic is of particular interest to those of you/us who…
My talk is particularly relevant to those of us who…
My topic is/will be very important for you because…
By the end of this task you will be familiar with…

Stating your purpose

The purpose/objective/aim of this presentation is to…
Our goal is to determine how/the best way to…
What I want to show you is…
My objective is to…
Today I'd like to give you an overview of…
Today I'll be showing you/reporting on…
I'd like to update you on/inform you about…
During the next few hours we'll be …

Signalling the structure

The presentation is organised/divided into ... sections/parts.
I've divided my presentation into … (main) parts.
In my presentation I'll focus on three major issues.

Sequencing

I'll begin with...
I'll start off by…
Point one deals with..., point two…., and point three…
First, I'll be looking at..., second…., and third…
Then/Next/After that ... and lastly/finally...
I'll end with…

Timing

My presentation will take about 30 minutes.
It will take about 20 minutes to cover these issues.
This won't take more than…

Handouts

Does everybody have a handout/brochure/copy of the report? Please take one and pass them on.
Don't worry about taking notes. I've put all the important findings on a handout for you.
I'll be handing out copies of the slides at the end of my talk.
I can email the PowerPoint presentation to anybody who wants it.

Questions

There will be time for questions after my presentation.
We will have about 10 minutes for questions in the question and answer period.
If you have any questions, feel free to interrupt me at any time.
Feel free to ask questions at any time during my talk.

Rhetorical questions

Is online fraud an important security issue for every company?
Do we really need confidentiality on the Internet?

Interesting facts

According to an article I read recently, ...
Did you know that…?
I'd like to share an amazing fact/figure with you.

Stories and anecdotes

I remember when I attended a meeting in Paris, ...
At a conference in Moscow, I was once asked the following question: ...
Let me tell you what happened to me…

Problems to think about

Suppose you wanted to…. How would you go about it?
Imagine you had to… What would your first step be?

Saying what is coming

In this part of my presentation, I'd like to talk about…
So, let me first give you a brief overview.

Indicating the end of a section

This brings me to the end of my first point.
So much for point two.
So, that's the background on…
That's all I wanted to say about…

Summarising a point

Before I move on, I'd like to recap the main points.
Let me briefly summarise the main issues.
I'd like to summarise what I've said so far…

Moving on

Turning to the next part, ...
Let's now look at/move on to/turn to/take a look at...
This leads directly to my next point.
This brings us to the next question.

After examining this point, let's turn to…

Going back

As I said/mentioned earlier, …
Let me come back to what I said before…
Let's go back to what we were discussing earlier.
As I've already explained, …
As I pointed out in the first section, …

Referring to other points

I have a question in connection with/concerning …
There are a few problems regarding….
With respect/regard to …, we need more background information.
According to the survey, …

Adding ideas

In addition to this, I'd like to say that …
Moreover/Furthermore, there are other interesting facts we should look at.
Apart from being too expensive, this model is too big.

Talking about (difficult) issues

I think we first need to identify the problem.
Of course we'll have to clarify a few points before we start.
We will have to deal with the problem of increasing pressures.
How shall we cope with…?
The question is: why don't we tackle the problem of …?
If we don't solve the problem now, we'll get/run into serious trouble soon.
We will have to take care of this problem now.
We are currently having difficulties with…

Rhetorical questions

What conclusion can we draw from this?
So, what does this mean?
So, just how good are the results?
So, how are we going to deal with this increase?
So, where do we go from here?
Why do I say that? Because…
Do we really want to miss this opportunity to…?

Introducing a visual

Let's now look at the next slide which shows…
To illustrate this, let's have a closer look at…
The chart on the following slide shows…
I have a slide here that shows…
The problem is illustrated in the next bar chart…
According to this graph, the results have doubled.
You can see the test results in this table.
As you can see here, …

Explaining a visual

First, let me quickly explain the graph.
You can see that different colours have been used to indicate…
The new models are listed across the bottom.
The biggest segment indicates…
The key in the bottom left-hand corner…

Highlighting information

I'd like to stress/highlight/emphasise the following point(s).
I'd like to start by drawing your attention to…
Let me point out that…
I think you'll be surprised to see that…
I'd like you to focus your attention on…
What's really important here is…
What I'd like to point out here is…
Let's look more closely at…

Explaining purpose

We introduced this method to increase….
The purpose of this step is to ...
Our aim was to…

Explaining cause and effect

What's the reason for this drastic decrease?
The unexpected drop was caused by…
This was because of…
As a consequence/consequently, the figures went up significantly.
As a result, …

Indicating the end of your talk

I'm now approaching/nearing the end of my presentation.
Well, this brings me to the end of my presentation.

That covers just about everything I wanted to say about…
As a final point, I'd like to…
Finally, I'd like to highlight one issue.

Summarising points

In conclusion/To conclude, I would just like to say...
To summarise/sum up, we…
Before I stop, let me go over the key issues again.
Just to summarise the main points of my talk, …
I'd like to run through my main points again.

Making recommendations

We'd suggest…
We therefore (strongly) recommend that…
In my opinion, we should…
Based on the figures we have, I'm quite certain that…

Inviting questions

Now if there are any questions, I'll be happy to try and answer them.
And now I'll be happy to answer any questions you may have.
Please feel free to ask any questions and I'll do my best to answer them.
Are there any questions?
We just have time for a few questions.

Quoting a well-known person

As… once said, …
To quote a well-known scientist, …
To put it in the words of…

Referring back to the beginning

Remember what I said at the beginning of my talk today?
Let me just go back to the story I told you earlier. Remember, …

Clarifying questions

I'm afraid I didn't (quite) catch that.
I'm sorry, could you repeat your question, please?
So, if I understood you correctly, you would like to know whether …
So, in other words you would like to know whether…
If I could just rephrase your question, you'd like to know…

Does that answer your question?

Avoiding giving an answer

If you don't mind, could we discuss that on another occasion?
I'm afraid that's not really what we're discussing today.
Well, actually I'd prefer not to discuss that today.

Admitting you don't know*Sorry, I don't know that off the top of my head.*
I'm afraid I'm not in a position to answer that question at the moment.
I'm afraid I don't know the answer to your question, but I'll try to find out for you.
Sorry, that's not my field. But I'm sure John White from R&D could answer your question.

Postponing questions

If you don't mind, I'll deal with/come back to this point later in my presentation.
Can we get back to this point a bit later?
I'd prefer to answer your questions in the course of my presentation.
Would you mind waiting until the question and answer session at the end?
Perhaps we could go over this after the presentation.

Summarising after interruptions

Before we go on, let me briefly summarise the points we've discussed.
So, now I'd like to return to what we were discussing earlier.

Ex.8. Task: try to make a presentation to report some of the findings from your thesis or to report some of the results at a scientific conference.

UNIT 5. REVISING GRAMMAR MATERIAL

Ex.1. Find the predicates and define their tense. Translate the sentences.

1. In the early days of telephony each pair of wires was used for a single conversation. 2. Radar systems are based on the use of electrical echoes. 3. The present telecommunications networks have been constructed in response to various service objectives. 4. Unlike human workers, robots are unaffected by poisonous fumes. 5. Flowcharting should be done for each major problem before writing a program. 6. When data or programs need to be saved for long periods of time, they are stored on various secondary memory devices. 7. Writing a program is followed by its testing. 8. The processor is usually referred to as the CPU. 9. This type of navigators has been already written about. 10. As you can see, the operation of the motor is affected by a number of factors. 11. The field computer was designed to be used in harsh environments. 12. A mainframe can be thought of as a

large powerful computer. 13. These data can be relied on. 14. Analogue recording devices were followed by digital ones. 15. A versatile GPS- based radio data system will be dealt with later. 16. The quality of television signal is influenced by various kinds of atmospheric interference. 17. The system was referred to in the previous chapter. 18. Various positioning systems are being developed nowadays.

Ex.2. Find the modal verbs or their equivalents. Translate the sentences.

1. The encoder represents a processor, which transforms the source output into a form that can be transmitted through the channel. 2. It should be noted that a flowchart is not a program, but only a step in the preparation of a program. 3. In real-time processing the user doesn't have to wait long to receive answers to his questions. 4. The source generates information that must be sent to the user. 5. The individual units are to be thoroughly tested. 6. The objective of information systems is to provide information levels of management at the most relevant time, at an acceptable level of accuracy and at an economical cost. 7. Subscribers to electronic mail services may send and receive mail to and from other mailboxes on the same system. 8. They will be able to compute their profit for next year with the new program. 9. This device should have been repaired. 10. A programmer decides what the program is to be. 11. An operating system had to be booted into the internal memory. 12. The computed results were to be printed. 13.The students have been allowed to watch the reaction proceeding. 14. A more effective technique was to employ the cross-correlation function described above. 15. The telephone system security problems have to be solved. 16. This article should be translated as soon as possible.

Ex.3. Define the type of Conditionals. Translate.

1.If the aerial is pointing at a target, a reflected wave will be received after a time delay, which equals twice the range of the target divided by the velocity of light. 2. If the data bank of an airline were not updated, reservations would become messy and complicated. 3. If the flowchart is correct, the program will certainly work. 4. If the data had been added to the program, the computer could have performed calculations. 5. Were the whole file transmitted, the PC would then have to perform the query itself. 6. Computers do not usually make mistakes unless they break down. 7. Had he known about this technique, he would have used it in his work. 8. If we had had a GPS navigator, we should have precisely determined our location. 9. Provided the temperature is low, the reaction will proceed slowly. 10. Should this device have a trouble, it would stop operating. 11. If these substances were cooled to a few degrees above absolute zero, they would lose their resistance.

Ex.4. Translate the sentences with the construction «There is (are)...»

1. There are a lot of channels, because the frequency band per channel is small. 2. There is a rapidly growing market for personal computers. 3. There will be no problems in updating this system. 4. There are a lot of computer manufacturers today. 5. There isn't a very big difference in flowcharting for a program to be written in Cobol or Fortran. 6. There were some errors in his program. 7. There should be no problems now. 8. There

can be some questions after our demonstrating this device. 9. There exist several forms of Geiger counters.

Ex.5. Define the functions of the verb «to do» in these sentences. Translate the sentences.

1.Metals conduct electric current better than semiconductors do. 2. They didn't have to repeat the experiment. 3. The experiments indicated that isomerization did take place. 4. The growth of population and the industrial development do make the energy problem more acute. 5. Robots do a wide range of repetitive actions. 6. This new device operates more quietly than the old one did. 7. Don't use pirated software.

Ex.6.Translate the sentences, taking into account various functions of the Gerund.

1. Using transistors instead of vacuum tubes increased the speed at which calculations were done. 2. It is a good idea to test the program before adding the data. 3. Simple reliable solutions to the problems of splicing and connecting fibres and assembling fibres into cables have not been found. 4. The bandwidth of an optical fibre is limited, because signals are distorted and broadened after passing through a fibre. 5. Plotting the transfer function has produced the result shown in Fig. 6. The Earth's atmosphere filters sunlight by absorbing most of the ultra-violet and some of the infra-red light. 7. The students' taking part in the research was of great help to the whole laboratory. 8. We know of copper being an excellent conductor of electricity. 9. Voice input means controlling a computer directly by speech instead of a keyboard. 10. On reading the report, we can see that considerable progress in this field has been made. 11. Radioactive isotopes are sometimes used in tracing water movement. 12. Due to overheating, the device stopped operating. 12. A person may suddenly find the answer to a problem without working out too many of the details. 13. Real-time processing takes a very short time compared with batch processing.

Ex.7. Translate the sentences with different forms of Participles.

1. A more complicated system of reception, called the super-heterodyne system, has been used. 2.The bandwidth of a modulator of the order of 6 GHz may be obtained using a travelling-wave modulator. 3. Having been cooled, gases first condense to liquids. 4. The fibres being so small, thousands of them could be put in one tiny cable. 5. The channel is a physical line connecting the source to the user through which information is transmitted. 6. The solution of the problem mentioned required efforts of many specialists. 7. Having put a wedge of glass in front of a narrow beam of light, Sir Isaac Newton noticed the spectrum. 8.Unless filtered, the mixture should not be used. 9. Some new devices having been obtained, the researchers could make more complex experiments; 10. When required, these data will be applied in our practical work. 11. Being informed about the dangerous properties of the substance, they continued working with it more carefully. 12.While determining the quality of the alloy, the engineer took into account all the factors influencing its qualities. 13. In pulse amplitude modulation the modulating wave is used to control the amplitude alone of the carrier pulses, the pulse duration and the interval between pulses remaining constant. 14. A positron colliding with an electron, the two particles destroy one another producing gamma rays. 15. When combining chemically, hydro-

gen and oxygen form water. 16. If alloyed with aluminium, magnesium will make a useful, light alloy. 17. The method referred to gave good results. 18. Constructing an algorithm followed by its translating into a computer program is the most important part of solving a problem. 19. The method of flowcharting depends on the programming language being used. 20. The substances investigated showed quite interesting properties. 21.The work finished, they left the laboratory. 22. Sound is known to travel in water at the speed of about a mile per a second, the exact speed depending upon the temperature of water. 23. With the experiments having been carried out, we started new investigations. 24. Being a good conductor, copper is widely used in electric engineering. 25. Lasers being employed in industry, medicine and space exploration are of various sizes.

Ex.8. Translate the sentences with the Infinitive.

1.To be able to request information from the computer and get it quickly is called real-time processing. 2. “To parse” means to analyse the syntax of a string of input symbols. 3. Multi-meters have traditionally been used to measure voltage, current and resistance. 4. Some molecules are large enough to be seen in the electron microscope. 5. To complete the experiment on time is of great importance. 6. This system can be used to monitor and log the precise location of a wide variety of mobile units. 7. We hope to get new data in a few days. 8. The problem to be solved at this stage is an entirely geometric one. 9. Boyle was the first to have a clear concept of “element”, “compound” and “mixture”. 10. Using a mouse, the user clicks on icons, which represent the function to be performed. 11. The German physicist Heinrich Hertz was the first to demonstrate the existence of radio waves. 12. The process to be analysed in this article is known as ionization. 13. The work to be finished next week is of great interest.

Ex.9 Translate the sentences with the Complex Subject.

1. A semiconductor laser operating at room temperature seems to be particularly suitable. 2. If the signal shape is not preserved during amplification, the signal is said to have been distorted. 3. The speed at which different computer components function is considered to be one of the limitations of the computer. 4. In multi-user environments an operating system is required to control terminal operations on a shared access basis as only one user can access the system at any moment of time. 5. The history of International Telecommunication Union can be said to be a mirror of the history of the whole of telecommunications. 6. Conductors are known to be of two main types : electronic or metallic conductors and electrolytic or ionic conductors. 7. The application of this device is certain to give good results. 8. This substance was found to be radioactive. 9. This laboratory appears to be working out a new model of alarm systems. 10. The new electronic sensor is likely to have been put into mass production. 11. The results obtained proved to be different from the expected ones.

Ex.10. Translate the sentences with the Complex Object.

1. The channel is usually subject to various noise disturbances,,which cause the channel output to be distorted. 2. We can make a computer do what we want by inputting instructions. 3. Computers permit people to use their time more effectively. 4. We know the

television system to be more complex than the sound broadcasting system. 5. The experiments showed a radioactive body to give out alpha, beta and gamma radiations. 6. Observations from space have enabled scientists to locate ancient volcanoes hidden by sedimentary layers.7. Most minicomputers have an interrupt feature, which allows a program to be interrupted when they receive a special signal. 8. Einstein found the speed of light to be constant. 9. One may assume the information to be correct. 10. One cannot expect a complicated problem like that of using solar energy to be solved in a year or so.

Ex.11.Translate the sentences, taking into account different functions of «one».

1. One can always rely on a computer to obtain accurate answers. 2. One should be careful when working with toxic substances. 3. This experiment is much more complicated than the previous one. 4. One cannot live without three key chemical elements, namely carbon, oxygen and hydrogen. 5. One of the most significant achievements is the development of improved automatic exchanges with electronic switching. 6. One finds it difficult to increase the efficiency of the unit. 7. There are a lot of diagrams in this book, the most interesting ones being in the last chapter. 8. One could think that the appropriate way to begin the development of the theory would be with a discussion of how to construct appropriate mathematical models for physical sources and channels.

Ex.12. Translate the sentences with the emphatic construction «It is (was)... that (who, which)»

1. It is in telephone and data service and their extensions that large-scale integration and new, cheaper methods of transition can have their greatest impact. 2. It was in early 1960s that people started to think about the potential role of telecommunications. 3. It is during bad weather that the need for efficient communication is most apparent and use of a wide range of navigation aids becomes essential for safety. 4. It is through the "on" and "off' states that information is transmitted by the computer. 5. It was Hendrick A. Lorentz who predicted the electron nature of electrical charge. 6. It is these ions, which actually transport the current.7. While our views of the world may come from TV, it is the telephone that we use in the conduct of our lives, at home or at work.

Ex.13. Translate the sentences with empty subject «It».

1. Some problems arise when it is desirable to use a radar system to track an aircraft or a ship and then to use the information received to predict the future position of the target. 2. It is mathematically convenient to represent a band pass channel by an equivalent low pass or baseband channel. 3. It should be noted that the nonlinear filter differs from the linear filter by feedback. 4. It was found that the human ear is capable of receiving sounds from about 30 cycles per second to about 18,000 cycles per second. 5. To meet these requirements it was necessary to construct an Information Network System. 6. It has been known that a very long- range communication at frequencies in the UHF and microwave frequency bands can be obtained by using the phenomenon of tropospheric scattering. 7. It took me two or three weeks to train myself to use the word processor. 8. As for a computer, it doesn't take it much time to solve a difficult problem. 9. It is to be emphasized that these correlations are purely empirical in nature.

Ex.14. Translate the sentences with substitutes.

1. Gases are fluids, which have their atoms and molecules much farther apart than those are in liquids and solids. 2. The equatorial radius of Mars is about half of that of the Earth. 3. A hologram may be regarded as a four-dimensional image, a photograph being a two-dimensional one. 4. The apparatus is identical with that described above. 5. A series of experiments were obtained. These proved to be rather pure. 6. Cellular telephone systems are now providing subscribers with reliable mobile phone services of a quality equal to that of wired telephone systems. 7. The useful properties of certain pure metals are worse than those of their alloys.

Ex.15. Translate the Complex sentences .

1. The apparatus must decide whether a signal is present or absent. 2.1 think they will complete their research in time. 3. The first generation of computers, which used vacuum tubes came out in 1950. 4. All the data the scientists referred to were obtained experimentally.5. This procedure is the part of what is referred to as program documentation. 6. Scientists are not sure whether the Earth is growing bigger and stretching crustal rocks, or shrinking to wrinkle them like dried apple skins. 7. The most fundamental wave shapes Fourier analysis is based on are the simple “sine” and “cosine” waves. 8. We know there are “primary” and “mixed” colours. 9. A Geiger counter shows if a body is radioactive or not. 10. A computer is a machine that processes and stores information. 11. The new microcomputer we purchased does not have a Fortran compiler. 12. In 1897 J.J. Thomson showed that the “Edison effect” current was indeed caused by negatively charged particles, electrons. 13. A printout shows if the program works. 14.The kind of program a programmer writes depends on who he is working for. 15.Since ceramic materials are easy to mass-produce, they result in a plentiful supply of low-cost products. 16. That it is possible to convert heat to energy and vice versa can be demonstrated in a number of ways.

Список использованной литературы

1.