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E.S. Kushnaryova

ENGLISH FOR SPECIFIC PURPOSES
(INTRODUCTION TO PROFESSIONAL COMMUNICATION)

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МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ
Государственное образовательное учреждение высшего профессионального образования
**«НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ
ТОМСКИЙ ПОЛИТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ»**

Е.С. Кушнарёва

ПРОФЕССИОНАЛЬНЫЙ ИНОСТРАННЫЙ ЯЗЫК
(ВВЕДЕНИЕ В ПРОФЕССИОНАЛЬНУЮ КОММУНИКАЦИЮ)

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Цель пособия – ознакомление студентов с терминологией и лексикой по профессиональному языку и их использование в профессионально-ориентированной речи. Пособие включает шесть тематических разделов, каждая часть содержит лексико-грамматический материал, материал для чтения, упражнения и задания для проверки усвоения материала, а также задания, направленные на развитие коммуникативных способностей и навыков письменной речи.

Предназначено для студентов третьего курса ТЭФ.

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Рецензенты

Кандидат педагогических наук, доцент ТУСУРа
Н.Д. Коваленко

Доцент ТУСУРа
Е.Р. Менгардт

MODULE 1
INTRODUCTION TO PROFESSIONAL ENVIRONMENT

UNIT 1
CAREER PLANNING

WARMING UP

1. List the professional/personal qualities which an engineer should possess.
2. Read the list of professional/personal qualities and put them into two columns.

positive qualities	negative qualities
<i>creative</i>	<i>lazy</i>

confident, ambitious, accountable, reliable, self-disciplined, safety-conscious, adaptable, practical, arrogant, independent, unreliable, imaginative, rude, polite, disorganized, active, stubborn, outgoing

READING

3. Read the abstract and answer the questions.
 - 1 What does each of these skills imply?
 - 2 Why do engineers need such skills?
 - 3 Who should become an engineer?
 - 4 What are your strengths?

Who Should Become An Engineer?

Like in all jobs, engineers come in all shapes and sizes. No one quality will make you a good engineer. Engineering is a field that requires many people with different skills to work together to solve complex problems. There's no precise formula that will tell you if you have what it takes, but here are some personal qualities that will help you become a successful engineer. Remember that not all these are necessary, but do keep these in mind when deciding if you see engineering in your future.

Power Engineering is a special career, which demands special qualities. You should have a keen interest in mathematics and science and you should have studied scientific subjects at high school or technical college.

Power Engineering consists out of the following:

- Fundamentals of Electrical Engineering.
- Generation of Power by means of conventional and alternative Energy.
- Transmission and Distribution of Electrical Power.
- Electrical Machines and Power Transformers.
- Electrical Protection and Power Electronics.
- High Voltage Engineering Principles
- Illumination, Networks, Systems, etc.

Analytical Skills

We make decisions everyday, but the decision engineers make may determine if a bridge can hold a car or if it will collapse under its own weight. That's why engineers have to be able to analyze a situation and see the factors involved that will help in making informed decisions.

Problem Solving Skills

Engineers make a living by applying knowledge in ways that can benefit people. In the real world, it's not always that easy. Anything that can go wrong will go wrong. When they run into dead ends, engineers have to find better ways of doing things or come up with a totally different approach. The ability to solve problems is key part of engineering.

You must have the ability to solve problems using a combination of logic and creativity. Fuel and energy engineers need excellent knowledge of energy and fuel engineering principles, as well as a strong awareness of environmental issues. You must be willing to keep up-to-date with changes in technology, the latest information on environmental issues, and new UK and European Union (EU) legislation governing emissions.

Communication Skills

Like in any other job, engineers have to be able to get along with others. Engineers must talk to other engineers to effectively solve problems. No one, no matter how smart, can do everything by themselves. Two heads are better than one. An engineer also has to talk to the public to make sure their needs are met. Excellent communication and interpersonal skills are needed to work in teams alongside other engineers, and to explain complex ideas clearly to people who do not have a technical background. Those fuel and energy engineers who work in manufacturing companies may need marketing and sales skills.

Proficiency in Math and Science

Math is the tool engineers use to develop solutions to problems while science is like a giant pool that engineers can pull ideas from. These ideas eventually become used to make people lives better. Don't worry; you don't have to be a genius. You just have to be comfortable with math and science.

Interest in Engineering

So far, we have covered several different skills used by an engineer. However, the most important thing required to be successful engineer is a genuine interest in engineering and the desire to excel. There's nothing worse than having to put up with years doing a job that you hate. Right now, you have the power to decide how much you will enjoy life in the future. Choose wisely.

Persistence

An interest in engineering is always not enough. You probably will face many obstacles on the path to a career in engineering and you probably won't always enjoy the challenges thrown at you, but you can't just give up. You have to be determined to do whatever it takes to succeed. As a female, you may have to go through more to get what you want as you encounter stereotypes and ignorance, but that does not mean that you are not capable of being a good engineer. It's all a matter of setting a goal and sticking with it through good and bad times.

Fuel and energy engineers must have leadership skills to supervise teams of engineering technicians. The ability to motivate and encourage others will be an advantage.

Whatever you decide to do, just remember it's **you** who should decide, not your parents, teachers, or friends. Don't let someone tell you can't be an engineer because of your race or gender. Engineering is a field wide enough for people of all types. In fact, despite what others may think, some of the most successful engineers in the past were women. Here's a few:

- **Ada Bryon Lovelace** helped invent a machine that would eventually lead to the modern computer. She also predicted the development of software and artificial intelligence years before they actually became reality. She even has a computer programming language named after her.
- **Grace Murray Hopper** created the first computer compiler that allows programmers today to write their programs using English rather than machine language, making their jobs much easier.
- **Elsa Garmire** advanced optical technology, making the commercial use of lasers possible. Thank her the next time you use a CD player or print something out on the computer using a laser printer.

- **Stephanie Kwolek** discovered a solvent that later became used in the production of kelvar, the key component of bullet-proof vests.
- **Mary Anderson** invented the windshield wiper that is widely used in cars today. (<http://www.engineergirl.org/sutee>)

LANGUAGE STUDY

- 4. Read the following statements and fill in the gaps using the words from the table.**

responsibility	analytical	willing	encourage	communication
technical	imagination	organizational	flexible	skills

- 1 To be an engineer, you need to have (1) _____ ability and an interest in mathematics, science and technology.
- 2 You must be able to combine an (2) _____, logical approach with creativity and (3) _____ to solve problems.
- 3 Engineers must be able to work as part of a team. The ability to (4) _____ other people's ideas is important, and you must also be (5) _____ and able to compromise. You will need strong (6) _____ skills to write reports and to explain complex engineering information to people from non-technical backgrounds.
- 4 You will need (7) _____ skills to plan your own time and to co-ordinate resources. Willingness to take on (8) _____ and to lead and motivate others is essential.
- 5 Engineers must have good information technology (9) _____.
- 6 You should be (10) _____ to keep up-to-date with advances in technology in this fast-changing area.

SPEAKING

- 5. Look through the list of a professional engineer qualities and knowledge. Which of them you think are more important and why?**

- knowledge of physics and maths
- problem-solving skills
- planning and organisational skills
- good communication skills
- writing skills for producing reports
- computer skills, including the ability to use computer-aided design (CAD) software

- creative and design skills for developing their designs
- skill in analyzing and interpreting information, such as the requirements of their clients
- able to make good judgments
- able to work well under pressure
- able to work independently and in a team

6. Read the following statement and comment it. Use the following phrases.

In my view/opinion
 It seems to me that ...
 As I see it ...
 From my point of view ...
 I think/don't think ...
 To my mind ...
 Personally I think ...
 In general ...
 I'm of the opinion that ...
 I can't say I share this point of view.
 As a matter of fact ...
 I completely agree that ...
 I'm not sure that ...
 There is no doubt that ...
 I really doubt that ...
 I also have the idea that ...
 On the one hand ..., on the other hand ...
 Nevertheless ...

An inquiring mind, perseverance, good communication skills and an ability to work with other people are personal attributes, which will help you succeed both in your studies and in achieving your career goals.

7. Explain why you decided to become an engineer.

READING

8. Read the text to find out the author's answer to the question: Why should I become an engineer?

Why Should I Become an Engineer?

It is true that years of hard work are required to become an engineer, but after of five years of university studying engineering, you can make good money. In fact, engineering is one of the few fields that let you earn good pay after only five years. Right now, five years might sound like a long time, but it's worth it. Consider it one of the best investment you can make. Besides, it's not all about the money. Here's a few other things you may want to consider:

Interesting Work

As it is mentioned before, engineering is a very broad field. There are so many types of engineering, that there is bound to be one you find interest in. Since science and technology are constantly expanding, there will always be new problems to solve-you'll rarely be bored. Unlike other jobs that require you to do the same thing over and over, the work of engineers greatly varies.

Challenges

In engineering, you will find yourself constantly finding new ways to solve problems. If you truly want to be an engineer, the challenges you will face will just make things more interesting. Overcoming obstacles will help sharpen your mind, helping you deal with problems not only in engineering but in life as well.

Creativity

In facing challenges, you will be encouraged to "**think out of the box**" and explore new possibilities. This need to creativity makes engineering even more exciting.

Sense of Accomplishment

There's no better feeling than the feeling that you accomplished something great. In engineering, you're doing just that. Imagine looking at a bridge that you helped design or picking up a new invention that you created.

Helping Others

Engineering is all about making things people can use and making life better for everybody. As an engineer, you will be able to see that you're actually making a difference in the world.

(<http://www.engineergirl.org/Sutee/why.html>)

9. Look through the text and say whether the following statements are true or false according to the information from the text.

- 1 Engineering is not about making things people can use.
- 2 Engineers make life better for everybody.
- 3 To become an engineer you are not required to work hard.

- 4 Overcoming obstacles will help you to deal with problems not only in engineering but in life as well.
- 5 Since science and technology are constantly expanding, there will always be new problems to solve.

LANGUAGE STUDY

10. Match the words with their synonyms.

- | | |
|-----------------|------------------|
| 1 constantly | a) to realize |
| 2 to consider | b) method |
| 3 rarely | c) gripping |
| 4 way | d) to think over |
| 5 to face | e) always |
| 6 obstacle | f) to encounter |
| 7 exciting | g) hardly ever |
| 8 to accomplish | h) problem |

11. Group any words which go together and make up sentences using some of these phrases.

- | | |
|----------------|---------------|
| 1 a new | a) problems |
| 2 broad | b) problems |
| 3 to solve | c) invention |
| 4 to face | d) challenges |
| 5 to overcome | e) field |
| 6 to deal with | f) obstacles |

SPEAKING

12. Explain the meaning of the phrase given in the text: “to think out of the box”.

13. Answer the questions.

- 1 Is a career of an engineer suitable for you?
- 2 What are the chief subjects at your department?
- 3 Which of the subjects you find difficult/easy/interesting/useless and why?

14. List the main activities of an engineer. Combine your list with others in your group. Then read this text to find out how many of the activities listed are mentioned here.

Power engineer work activities

Power Engineering forms an integral part of almost every industrial or household activity. There is a continuous demand for technicians, technologists and engineers in this field either from the electricity suppliers, mines, large industries, municipalities or small businesses.

Power engineers (also called fuel and energy engineers) research and develop ways to improve the efficient use of energy and to minimize environmental damage from its conversion into usable forms. Many industries employ them to assess environmental impact and to manage energy usage. They may also work in fuel production industries, manufacturing companies (boilers, furnaces, gas turbines and engines), or as consultants.

Fuel and energy engineers tackle the problem of providing us with safe and reliable sources of energy. Without energy, we would not have heating, lighting, or the power we need to run manufacturing industries and transport systems. Most energy is produced by the combustion of fossil fuels. However, atmospheric pollution from power stations, transport and industrial processes causes problems such as acid rain, global warming and the reduction of the ozone layer. For these reasons, many fuel and energy engineers are developing renewable energy technologies.

Many fuel and energy engineers work in the production of fossil fuels like coal, oil and natural gas. Their aim is to use these existing fuels as efficiently as possible, thereby conserving reserves for as long as possible. They also research, test and develop techniques to minimize atmospheric pollution, for example, reducing emissions of oxides from sulphur and nitrogen in the coal-fired power generation industry (strict emissions legislation is set by both the UK and the European Union).



In the oil industry, fuel and energy engineers may develop lubricants and detergents to make sure combustion engines are clean and working efficiently.

Other fuel and energy engineers are based in educational research departments, working on projects such as methods to improve diesel and gas turbine combustion, and investigations into the

formation of pollution. Fuel and energy engineers also research, develop and test alternative sources of energy such as tidal, wind, solar and geothermal power.

In manufacturing, fuel and energy engineers design, research, test, commission and install energy equipment like furnaces, boilers, gas turbines and engines. In research work, technologists may use computer-aided design (CAD) to create 3-D models, and other computer systems to analyze fluid dynamics. Fuel and energy engineers may also be involved in car manufacture, helping to meet strict exhaust emission legislation and working on catalytic converters.

Almost every area of industry uses a large amount of energy to power its production processes. Some power engineers work directly for industrial employers while others are consultants, advising employers on energy usage and pollution control.

(<http://www.careers-scotland.org.uk>)

15. Put questions into correct order and answer them.

- 1 What alternative sources do energy engineers research, develop and test?
- 2 What problems does atmospheric pollution cause?
- 3 What do power engineers do?
- 4 What is the aim of many fuel and energy engineers?
- 5 Why are energy engineers developing renewable energy technologies?
- 6 What problems do energy engineers solve?
- 7 What do technologists may use computer-aided design for?

16. Make up sentences by matching the information from A and B.

A	B
1 In educational research departments, fuel and energy engineers	a) may develop lubricants and detergents to make sure combustion engines are clean and working efficiently.
2 In the oil industry, power engineers	b) design, research, test, commission and install energy equipment like furnaces, boilers, gas turbines and engines.
3 In manufacturing, power engineers	c) help to meet strict exhaust emission legislation and working on <u>catalytic converters</u> .

4 In car manufacturing, fuel and energy engineers	d) work on projects such as methods to improve diesel and gas turbine combustion.
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17. Say whether the following statements are true or false according to the information from the text.

- 1 Most energy is produced by the combustion of fossil fuels.
- 2 A few of fuel and energy engineers develop renewable energy technologies.
- 3 There is a great demand for technologists and engineers only in large industries.
- 4 Almost every area of industry uses a lot of energy to power its production processes.
- 5 Many industries employ power engineers to assess environmental impact and to manage energy usage.
- 6 Fuel and energy engineers tackle the problem of providing us with safe and reliable sources of energy.
- 7 Power engineers may work only in heat and power engineering.

18. Match the words from column A with words from column B.

- | | |
|------------------------------|----------------------------------|
| 1 technician | a) как можно эффективнее |
| 2 demand for | b) динамика жидкости |
| 3 to tackle the problem | c) специалист |
| 4 manufacturing industry | d) по этим причинам |
| 5 for these reasons | e) контроль за загрязнением |
| 6 as efficiently as possible | f) биться над проблемой |
| 7 reliable source | g) обрабатывающая промышленность |
| 8 to make sure | h) спрос на |
| 9 fluid dynamics | i) надежный источник |
| 10 pollution control | j) быть уверенным |

19. Translate into Russian.

To minimize environmental damage, to manage energy usage, fuel production industries, fossil fuels, to cause acid rains, renewable energy technologies, to develop techniques, combustion engines, to install energy equipment, to be involved in, large amount of energy.

20. Translate into Russian paying attention to the word combinations in bold.

- 1 A continuous demand for **technicians, technologists** and engineers.
- 2 Power engineers research and develop ways to improve the **efficient use of energy**.
- 3 Fuel and energy engineers tackle the problem of providing us with **safe and reliable sources of energy**.
- 4 Most energy is produced by the **combustion of fossil fuels**.
- 5 Fuel and energy engineers design, research, test, commission and **install energy equipment** like **furnaces, boilers, gas turbines** and **engines**.
- 6 Many fuel and energy engineers are developing **renewable energy technologies**.
- 7 Some power engineers work directly for industrial employers while others are consultants, advising employers on **energy usage** and pollution control.
- 8 Fuel and energy engineers may also be **involved in car manufacture**.

LANGUAGE STUDY

21. Translate into Russian.

industry – industrial
engine – engineer – engineering
to achieve – achievement
to equip – equipment
technical – technician
to form – formation
to produce – product – production
to differ – difference – different
electric – electrical – electricity
science – scientific – scientist

22. Task

A Give as many nouns as possible with the following suffixes: -or, -er, -ist, -tion, -ment, -ness.

B Form verbs from the following nouns: increase, statement, movement, difference, application, requirement, knowledge, education.

C Form adjectives using the suffixes -able, -ful, -less, -ous: control, continue, danger, replace, need, power, use, change, vary.

D Form as many words as possible using suffixes and prefixes. Define what parts of speech the new words are and translate them: engine, apply, differ, value, oppose, transform.

23. Use the word given in the capitals at the end of each line to form a word that fits in the space in the same line.

<p>Most fuel and energy (1) _____ work 35-40 hours, Monday to Friday. However, late finishes and some week-end work may be required, especially as deadlines approach. (2) _____ are firms in the oil, gas and nuclear industries, which (3) _____ and distribute the various types of fuel.</p> <p>Power engineers also work in other industries that use fuel in their manufacturing and processing (4) _____ (such as steel, chemicals, ceramics and textiles). Other employers are manufacturers of (5) _____, (6) _____, generators, turbines, and engines that supply power plants.</p> <p>Some fuel and energy engineers work for consultancies that advise on energy (7) _____ and the efficient management of plant and buildings.</p>	<p>engineering</p> <p>employ production</p> <p>operate</p> <p>burn boil</p> <p>conserve</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------

LANGUAGE DEVELOPMENT

to deal with/to be concerned with/ to be the concern of

24. Work with a partner. Make up questions and answer them using the given information.

- 1 marine engineering/ships
- 2 aeronautical engineering/air-conditioning
- 3 heating and ventilating/power stations
- 4 electricity generating/roads and bridges
- 5 automobile engineering/cars and trucks
- 6 civil engineering/power stations
- 7 power thermal engineering/gas turbines
- 8 electronic engineering/steam generator

Example: Student A: Is marine engineering concerned with ships?
 Student B: Yes, marine engineering is concerned with ships.
 Student B: Does aeronautical engineering deal with air-conditioning?
 Student A: No, it doesn't. Aeronautical engineering deals with planes.

WRITING

25. Design a visit card.

- student's name
- name of the University
- name of the Department
- position; major
- address, telephone number, e-mail, fax

<p style="text-align: center;">Petrov Alexey Vasilievich Tomsk Polytechnic University Department of Heat and Power Engineering Major: Boiler and Reactor Building</p> <p style="text-align: center;">Tomsk Polytechnic University 30, Lenin Avenue, 634050, Russia Phone/fax: +7(3822) 43-43-45</p> <p style="text-align: center;">mobile: 8 913 813 15 15 e-mail: petrov_av@mail.ru</p>

GRAMMAR REVIEW

Modal verbs

Grammar Box

must/have to – obligation, necessity, advice

- *You **have to** get a higher education in engineering to be a qualified engineer.*
- *Engineers **must** have good information technology skills.*

can/could/be able to – ability

- *You **must** have some professional knowledge in heat and power engineering to **be able** to work at power plant.*
- *I **can** work in a team.*

can/could – permission, request, suggestion

- *You **can** work at power plant if you have a degree in engineering.*
- ***Can** I switch the air-conditioner on?*
- *We **could** become good engineers.*

may/might/could – possibility, asking for permission

- ***May** I use your instruction? (formal – we don't know the other person very well)*

- *Can I use your instruction?* (informal – we know the other person very well)
- *Could I use your instruction?* (more polite than “can”)
- *Where’s Tom? – He **may/might/could** be preparing for the presentation.*

should/ought to/shall/will – offer, suggestion, request, advice

- *You **should** be willing to keep up-to-date with advances in technology.*

need to – necessity

- *Engineers who work in manufacturing companies may **need** to have marketing and sales skills.*

26. Fill in the gaps with an appropriate modal verb. More than one variant is possible.

- 1 After five years of university studying engineering, you _____ make good money.
- 2 Right now, five years _____ sound like a long time, but it's worth it.
- 3 In engineering, you _____ to find new ways to solve problems.
- 4 You _____ overcome obstacles which will help you to deal with problems not only in engineering but in life as well.
- 5 After you graduate high school, you _____ to major in the field of engineering you are most interested in.
- 6 The skills required in engineering _____ take years to develop or even a lifetime.
- 7 What you learn now _____ seem to have no use to you now, but you will find yourself using a lot of it as an engineer, especially math and science.
- 8 Studying at Tomsk Polytechnic University will help you to get those skills you _____ to get a well-paid job.

27. Fill in the gaps with the appropriate modal verbs to express strong obligation (must/have to) or mild obligation and advice (should/ought to).

- 1 You _____ compile all available information before you start writing your term paper.
- 2 You _____ do this exercise again, there are many mistakes in your written work.
- 3 The experimental methods _____ be widely used nowadays.

- 4 The students _____ be very careful in handling computers at laboratory classes.
- 5 The manager _____ be consulted on this matter.
- 6 You _____ (not) work so hard, you know.
- 7 You _____ (not) take home company equipment.

PROJECT WORK

28. Make a presentation: «Me and my future profession».

Use the following questions to help you.

- 1 What is your special subject?
- 2 What is your future job?
- 3 What professional/personal qualities you should have to be a good engineer and why?
- 4 What spheres of engineering you may work at, what are your duties?
- 5 What are the advantages and disadvantages of your job?
- 6 What are the promotion prospects?
- 7 Explain your future job choice.

WRITING

29. Read the tips how to write Curriculum Vitae.

Your Name – Curriculum Vitae

(Insert your name. Use whatever heading(s) you prefer. The first section is about your personality – use statements that relate to the requirements of the job and the employer).

Personal Profile / Personal Attributes

- Create 5-7 descriptive bullet-point phrases that describe your strengths and attributes
- These statements should also reflect the personal qualities that the employer seeks
- Keep the statements simple and clear; one line for each statement
- Keep to a consistent format; use professional, concise, intelligent language
- Use good, appropriate punctuation; semi-colons are effective for joining word-strings
- Ensure you are able to back-up and provide an example for each statement you make

Experience / Specialisms (*This shows what you can do – it's about your capabilities. Relate them to the job requirements and the employer's needs*).

- Create 5-7 professional statements which explain your experience and/or specialisms
- Select the experience that best fits your capabilities and the needs of the new job
- Ensure each statement provides an example of a different capability
- For example, planning, communicating, problem-solving, analysing, etc.

Achievements (*This shows what you have done and indicates your credibility and potential.*

Relate this to the job requirements. Achievements need not all be work-based)

- Create 3-7 professional statements which describe your achievements
- Select the examples that best illustrate capabilities relevant to the needs of the new job
- Try to show a variety of types of achievements
- Achievements need not be work-related, especially for young people with little work history
- Ensure you attach context, scale, facts and figures to your achievements described

Career History (*Briefly list your past jobs, employers, industry, and dates (mth/yr). Most*

recent first. Try to keep the details in neat columns. Briefly state responsibilities if not

self-explanatory from the job titles. If appropriate state at the end: 'References are available upon request').

- mth/year-mth/year – job title/function/responsibilities – employer/city – industry
- mth/year-mth/year – job title/function/responsibilities – employer/city – industry

Personal Details

- name
- address
- phone numbers
- email
- DOB (date of birth)
- marital status
- driving license
- dependents (children)

Education and qualifications

- school, college, dates, etc
- qualifications

Hobbies

- it is helpful to show hobbies that reflect qualities which relate to the job requirements

30. Fill in the table.

Your Name – Curriculum Vitae
Personal Profile / Personal Attributes
Experience / Specialisms
Achievements
Career History
Personal Details Education and qualifications Hobbies

Wordlist

ability to do smth	power engineer
accountable	power engineering
acid rain	power station
active	practical
adaptable	production process
alternative source of energy	reliable
ambitious	renewable energy
approach	rude
arrogant	safety-conscious
atmospheric pollution	self-disciplined
boiler	skill
combustion	solution
combustion engine	stubborn
confident	supplier
consultant	technician
demand for	technologist
disorganized	to accomplish
energy equipment	to apply knowledge in
energy usage	to assess
engine	to be able to do smth
environmental damage	to cause problem
fast-changing	to deal with
field	to develop
fossil fuel	to employ
furnace	to encourage
gas turbine	to explore
global warming	to face challenges
heat and power engineering	to face obstacles
imaginative	to install
impact	to invent
independent	to make decisions
invention	to make sure
investigation	to meet
machine	to minimize
manufacturing company	to motivate
manufacturing company	to overcome obstacles
on the path to a career	to provide smb with smth
outgoing	to reduce emissions
polite	to require
pollution control	to research

to sharpen one's mind
to solve problem
to supervise
to tackle the problem
to think out of the box
to work on project
turbine
unreliable
up-to-date

UNIT 2 APPLYING FOR A JOB

WARMING UP

- 1. List the main engineer requirements. Why do you think these requirements are important when employing an engineer?**

READING

- 2. Read the text and answer the questions.**

- 1 Who are professional engineers?
- 2 What are power engineer's requirements?

Professional Engineer Requirements

Licensed Professional Engineers are individuals that have qualified by education, experience and examination and have been issued a professional engineering license by the respective state board.

Each enterprise has minimum licensed professional engineer requirements including a successful Bachelor of Science engineering degree or an acceptable equivalent from an approved engineering school or college of not less than 4 years, together with an additional 4 years of satisfactory experience and finally pass rigorous exams administered by the state of licensing. Requirements vary by the company.

Licensed Professional Engineers are bound by a strict code of ethics established by each company. A licensee is always responsible for his or her work even if such work has been endorsed or accepted by another licensee. (<http://www.engineerseals.com/professional-engineer.php>)

A Power Engineer is a skilled worker who operates and maintains boilers and related mechanical equipment such as air compressors, generators, motors, turbines, air conditioning units, refrigeration equipment, and steam or hot water boilers to provide utilities such as light, heat, climate control or power for buildings and industrial processes.

A Power Engineer's duties and obligations will vary with the size, power rating of the plant and the function of the power plant in which he or she is working. Power Engineers operate mainly in heating and air conditioning equipment, and in some facilities, in refrigeration. The engineer's primary function is to operate equipment safely and efficiently. Normally, facilities employing these engineers require not only operators but maintenance

personnel, and in some instances personnel are required to perform other duties that may not be directly related to an engineer's normal function.

(<http://me.rrc.mb.ca/Catalogue/ProgramInfo.aspx?ProgCode=POW5FCT&RegionCode=WPG>)

3. Translate into Russian.

To be qualified by education, professional engineer requirements, bachelor of science engineering degree, skilled worker, to maintain mechanical equipment, generator, air conditioning unit, to provide utilities, primary function, to operate equipment safely and efficiently

SPEAKING

4. Read the following statement and comment it.

The engineer's primary function is to operate equipment safely and efficiently.

READING

5. Read the text and fill in the gaps using words from the table.

fossil	cooperate	contracts	supplier	inlet	innovative
maintenance	condensers	maintenance	utilize	equipment	

Skoda Power Company Profile

Skoda Power is a European leading (1) _____ of modern systems, components and services in the field of design and manufacturing of power generation (2) _____.

Our areas of service expertise include commissioning, retrofit of existing installed equipment and long-term service and (3) _____ for SKODA designed equipment, as well as that of other producers. We offer our customers a wide spectrum of technically and technologically progressive and economically effective project solutions derived from SKODA design components including steam turbines, (4) _____ and heat exchangers. Our company leverages a rich tradition, long experience and professional knowledge, with (5) _____ approaches to project management and quality, harnessed to leading edge technological know-how. Our research and development resources enable us to perfect our products and guarantee further innovations.

Philosophy:

- Quality services focused on the customers
- Quality-driven processes
- Technological and production core competencies
- Advanced design and solutions
- Optimal economical solutions
- Dynamic growth of the company

Skoda Power products and services for power engineering projects:

Machine halls, turbo generator sets and steam turbines based on own research & development, design and manufacturing of steam turbines and heat exchangers for:

- (6) _____ -fuelled power stations e.g. coal, oil and gas fuels
- cogeneration units using extraction and backpressure steam turbines
- nuclear power plants
- combined cycle power plant (steam&gas)
- incineration plants for waste and biomass

Basic features of equipment and services supplies:

- project optimization according to the customer's requirements
- application of standardized project solutions whenever possible
- solutions based on modular designs for steam turbines (SKODA MTD10 to MTD80)
- high operational reliability and flexibility of the equipment
- easy (7) _____
- after-sale services including long-term service (8) _____
- research and development focused on continuous improvement of products
- internal experimental base

Skoda Power Research & Development

Our R&D is primarily aimed at enhancing the cycle efficiency. The efficiency of energy conversion represents an important way towards reducing production emissions and greenhouse gases.

Skoda Power is developing such equipment which can (9) _____ waste heat, and co-developing new cycles for higher efficiency in biomass and municipal waste processing and also participate in the development of combined cycles, cogeneration units as well supply of heat and cool.

Our steam turbine development is focused on:

- raising the steam temperature and pressure at the (10) _____
- enhancing efficiency of the steam path
- improved sealing of rotating parts
- selection of new metallic and non-metallic materials and spray layers
- operating flexibility and reliability

International teams are involved in Skoda Power research and development programs – we (11) _____ intensively with universities in Germany and Austria, with research institutes in France, Great Britain, Spain and USA. We create teams in which are Czech universities involved. This approach creates conditions for career growth of the students and their interest in the branch.

LANGUAGE STUDY

6. Match the words from column A with the words from column B.

A	B
1 energy conversion	a) парогенераторная установка
2 leading supplier	b) паровой тракт
3 power generation equipment	c) гарантийное обслуживание
4 incineration plant	d) атомная электростанция
5 cogeneration unit	e) отработанное тепло
6 after-sales service	f) преобразование энергии
7 nuclear power plant	g) оборудование, вырабатывающее электроэнергию
8 continuous improvement	h) установка для сжигания мусора
9 waste heat	i) ведущий поставщик
10 steam path	j) постоянное (непрерывное) совершенствование

7. Answer the questions.

- 1 What products and services does Skoda Power Company offer?
- 2 What approach does Skoda Power Company apply and why?
- 3 Does the company provide after-sale services?
- 4 What are the basic features of equipment produced by the company?
- 5 Why is energy conversion important?
- 6 What are the benefits in cooperation with international teams?
- 7 What does “innovative approach” mean?
- 8 What is the aim of Skoda Power R&D?

GRAMMAR REVIEW

Questions

General Question:

1) auxiliary verb – 2) subject – 3) predicate – 4) object – 5) adverbial modifier

1) вспом. глагол – 2) подлежащее – 3) сказуемое – 4) дополнение – 5) обст-во

Do₁ engineers₂ design₃ new devices₄ now₅?

Special Question:

1) question word – 2) auxiliary verb – 3) subject – 4) predicate – 5) other parts of the sentence

1) вопросит.слово – 2) вспом.глагол – 3) подлежащее – 4) сказуемое – 5) др. члены предложения

What₁ do₂ engineers₃ operate₄ at power plants₅?

Question to the subject:

1) question word – 2) predicate – 3) object+ adverbial modifier

1) вопросит.слово – 2) сказуемое – 3) дополнение+обстоятельство

Who₁ designs₂ new devices now₃?

Question words:

what; who; when; where; what + noun – какой?; which; how; how many; whose; why; whom; how long

Tenses Revision/Active Voice

	Indefinite (Simple)	Continuous	Perfect	Perfect Continuous
Present	V / V_s (always, usually, often, sometimes, seldom, rarely, never, every day/week, etc.) <i>I work at power plant.</i>	am, is, are +V_{ing} (now, just now, at this moment) <i>Now I am working at power station.</i>	have/has+V_s (just, already, yet, ever, never) <i>I have applied for a job.</i>	have/has been+V_{ing} (since, for, all morning/week, etc.) <i>I have been working since 2 o'clock.</i>

Past	V_{ed} / V₃ (yesterday, last week/year, in 1994) <i>I applied for a job in 2005.</i>	was, were + V_{ing} (at 3 o'clock yesterday) <i>I was writing my resume when you came back.</i>	had + V_{ed} / V₃ (by Friday, before, till/until, by the time) <i>I had already written my resume when you came back.</i>	had been + V_{ing} (for, since, before, until) <i>I had been writing for 2 hours when you came back.</i>
Future	will + V (tomorrow, next week, in two days, one of these days) <i>I will graduate from TPU in 3 years.</i>	will be + V_{ing} (after..., at 5 o'clock tomorrow) <i>I will be writing my resume at 3 o'clock tomorrow.</i>	will have + V_{ed} / V₃ (by 5 o'clock, by that time, by then) <i>I will have written my resume by 5 o'clock tomorrow.</i>	will have been + V_{ing} (for, since, by the time) <i>I will have been writing my resume for 2 hours by the time you come back.</i>

8. Put the verbs in brackets into correct tense. Then form negative and interrogative sentences.

- 1 They (to get) all the necessary equipment yesterday.
- 2 He (to apply) already for a job.
- 3 The students (to get) practical knowledge at the laboratories.
- 4 My friend (to become) an engineer in 5 years.
- 5 The interviewer (to interview) me by that time.
- 6 Now an engineer (to design) new devices.
- 7 We just (to return) from our practice.
- 8 I (to do) research every day.
- 9 We (to finish) already our design.
- 10 Our design group (to work out) the project for an hour by the time I return.
- 11 At present time, the staff of the company (to consist) of 50 managers.

- 12 We (to specialize) in the heat-and-power industry since 1992.
- 13 They (to discuss) this project at midday tomorrow.
- 14 By 2030 Chinese (to become) the language of international scientific communication.
- 15 During the seminar you (to learn) about negotiation strategies.

9. Work in pairs. Imagine you would like to apply for a job for an engineering company “Metarossa”. Each of you has a part of the company profile. Student A reads part A, student B reads part B. Exchange the information by asking questions using the information given below.

A

Engineering company “METAROSSA” is located in the center of Moscow. In addition to office, we have a warehouse not far from Moscow.

METAROSSA was established in 1995 by highly skilled specialists. All specialists have high education; some of them have Doctor’s degree in the field of management and technical sciences.

At present time, the staff of the company consists of 50 managers and technical specialists. Most of our specialists have experience of work on the key enterprises of USSR. CEO of our company is a candidate of technical science in area of industrial automation.

The basic departments of our company are:

- sales department;
- procurement department;
- marketing department;
- project department;
- technical department

B

More than 10 years METAROSSA specialize in Hi-tech solutions in area of engineering, joining stages like designing and supply plant automation systems, equipment and piping. We realize work package of preparation and coordination project, propose technological solutions including equipment selection and developers, supply organization and realization for reconstructible objects and under construction plants.

We are working with following product lines:

1. Automation systems and monitors;
2. Pump equipment;
3. Stop pipeline valves;

4. Control pipeline valves;
5. Actuators for pipeline valves;
6. Pipes and pipeline details with alloy steel and stainless steel material performance;
7. Innovation technologies, constructions and materials.

We specialize in the most perspective and thriving industries in Russia.

- chemistry and petrochemistry;
- heat-and-power.

We have many years' experience of work with biggest enterprises of these fields.

Our permanent consumers are:

- OJSC "Kazanorgsintez" (Kazan);
- Joint-stock company "Voronezhskaya kauchuk" (Voronej);
- United Chemical Company «Shchekinoazot»;
- Joint-stock company "Mosenergo" (Moscow);
- Volga Territorial Generation Company (TGC-7) (Samara) and others.

On the Russian market we represent interests and provide not only Russian and Europe products. We have started cooperation with NEWAY Valve (Suzhou) Co Ltd (China) through their Russian representatives. Within the next 5 years, we will become import leader of Hi-tech automation system, equipment and pipelines for Russian chemistry, petrochemistry and heat-and-power enterprises. Nowadays we are looking for foreign producers, which are ready with our collaboration to compete with world leaders for taking leading position on the Russian market.

(<http://www.trubarm.ru/>)

A

- What/realize?
- What/product lines/work with?
- What/industry/specialize in?
- What/consumers?
- Plans for the next 5 years?

B

- Where/located?
- When/established?
- What /education/specialists?
- Number/staff?
- What/departments?

SPEAKING

10. **Imagine you are CEO of an engineering company; make up 5 sentences about your company using Present, Past and Future tenses.**

WRITING

11. Task

a. Read the tips how to write a Job Application.

1. Put your address, telephone number and date in the top right-hand corner and the name of the person you are applying to on the left, level with date. Write the company name and address below.
2. Leave a line between paragraphs.
3. First paragraph – a polite one-sentence opening explanation of why you are writing.
4. Describe yourself like a product on sale. List your skills and such personal qualities as high motivation, enthusiasm and adaptability.
5. If you have qualifications, list them briefly.
6. A positive attitude is important, so explain why it's the only firm you want to work for.
7. Ask for an interview. Say you are happy to come for a chat at any time, even if there are no jobs available now. Thank the readers for their time and remind them you are waiting for a reply. Use "Yours sincerely", if you are writing to a named person and "Faithfully" if you started "Dear Sir/Madam". Sign your letter at the bottom left and print your name clearly below.

JOB APPLICATION

212, Lenin Avenue, 15Tomsk
Russia
Tel. +7(3822) 43-43-45

Person _____

Company name _____

25th September 2004

Dear Sir/Madam

I am writing to enquire about the possibility of employment with your company. I can offer a variety of skills from practical to clerical, any role would suit at present time. I enclose my CV for your attention.

For the past two years I have been engaged in casual voluntary work at Queens Medical Center. This has kept me busy and has led to meeting new people. A position at your company, however, would allow me to resume a working role.

I am adaptable, reliable and willing to retrain. From packing to office work, my past experience may be useful to you, given the opportunity. If there is a position available at this time, I can be contacted on +7(3822) 43-43-45 in the afternoons and would be more than willing to come down for an interview. If not then would you please keep my details to hand for the near future?

Yours faithfully
Petrov Alexey Vasilievich

b. Read job advertisements and write a job application for one of these positions.

1

Reports to the Chief Engineer. Operates, maintains and repairs site power plant and related equipment throughout the facility by performing duties such as starting up and shutting down boilers and related heating, air conditioning, and ventilation machinery, medical gas systems, monitoring, recording and adjusting temperature and pressure levels, carrying out scheduled and unscheduled preventative maintenance on plant and facility equipment, and seals, fans and pumps. This position performs trade duties approaching the journeyman level and works without direct supervision.

Qualifications

Education, Training and Experience

- Graduation from a recognized program in power engineering plus two years recent related experience or an equivalent combination of education, training and experience.
- Certificate of competency as a 4th Class Power Engineer.
- Ability to read and interpret blueprints and drawings.

Demonstrated Skills and Abilities

- communicate effectively both verbally and in writing
- deal with others effectively
- organize work
- operate related equipment
- physically perform the duties of the position

We would like to thank all candidates in advance for their interest and only those candidates selected for interview will be contacted.

Due to the volume of applications we receive, we are unable to confirm the receipt of individual applications or resumes.

Please reply by e-mail to: jobopportunity@co.uk

(http://www.viha.ca/careers/job_postings/trades/engineer21010vi.htm)

2

Reports to the Assistant Chief Engineer. Operates, maintains and repairs site power plant and related equipment throughout the facility by performing duties such as operating boilers, generators and related heating, air conditioning, and ventilation machinery, monitoring, recording and adjusting temperature and pressure levels, carrying out scheduled and unscheduled preventative maintenance on plant equipment and repairing or replacing items such as valves, bearings, seals, fans and pumps.

Qualifications

Education, Training and Experience

- Graduation from a recognized program in power engineering plus four years recent related experience or an equivalent combination of education, training and experience.
- Certificate of competency as a 3rd Class Power Engineer.

Demonstrated Skills and Abilities

Ability to:

- communicate effectively both verbally and in writing,
- deal with others effectively,
- organize work,
- operate related equipment.
- physically perform the duties of the position.

Please reply by e-mail to: jobopportunity@co.uk

(http://www.viha.ca/careers/job_postings/trades/power_engineer_3rd_class_5557SI.htm)

LANGUAGE DEVELOPMENT

12. Read the abstract and fill in the gaps using words from the table.

applicant	curriculum vitae(CV (GB))/resume (US)	interview
application	job description	application form
employment agencies	references	candidate
		short-listed

Many people looking for work read the (1) _____ advertised in newspapers by companies and (2) _____. To reply to an advertisement is to (3) _____ for a job. (You become a (4) _____ or an (5) _____.) You write an (6) _____, or fill in the company's (7) _____, and send it, along with your (8) _____ and a covering letter. You often have to give the names of two people who are prepared to write (9) _____ for you. If your qualifications and abilities match the (10) _____, you might be (11) _____, i.e. selected to attend an (12) _____.

WRITING

13. Task

a. Read reference letters structure.

- Addressee name and address if known
- Date
- Salutation ('To whom it may concern', or 'Dear Sir or Madam', or 'Dear <title> <surname>')
- Confirm dates, job title(s) capacity, and salary and benefits details if required/appropriate.
- Confirm that the person's performance and attitude was (at all times) satisfactory/exceeded expectations or standards.
- Briefly explain the person's responsibilities (optional)
- Briefly describe their skills/qualifications/strengths/characteristics (optional)
- State that you would willingly re-employ the person if the opportunity arose (optional, and very re-assuring for the reader)
- Offer to provide more information if required (optional)
- Yours faithfully (or 'Yours sincerely' if writing to a named addressee)

b. Read the example of a reference letter and write your own letter using the information from the table.

20 October 2008

To whom it may concern,

I confirm that Tom Jonson was employed as a programmer with this organization from 20 September 2001 to 10 October 2008 and was paid 1500 \$ salary.

Their job of programmer carries the following responsibilities: support of the available software functioning at the enterprise, ordering computers and accessories, installing and setting of all the necessary computer software: Windows, Office, antiviruses, Delphi, FoxPro, AutoCAD, ICQ, MSN Messenger, Outlook etc., programming, preventive measures and repairing of electronic scales and scanning devices, providing their connection with the server, provision of proper functioning of the computer net at the enterprise. Tom Jonson is skilled in operating systems Windows 98, Word, Excel, Visual FoxPro, SQL, antivirus programs,

archivers, and is also self-disciplined, practical, flexible and adaptable, safety-conscious, able to work well under pressure, able to get on with a wide variety of people.

I would happily re-employ Tom Jonson as I consider him to be a valuable member of the team, who consistently achieved good results and delivers all expectations.

Yours faithfully,

Bob Walley

Date

To whom it may concern,

I confirm that (name) is/was employed as (position) with this organization from (date) to (date/the present day), and was/is paid (salary, plus bonus and benefits as applicable).

Their job of (position) carries the following responsibilities (describe briefly the job). (Name) is skilled in (details of skills) and is also (characteristics – e.g. reliable dependable, a good communicators, etc).

I would happily re-employ (name) as I consider him/her to be a valuable member of the team, who consistently achieved good results and delivers all expectations.

Yours faithfully,

(www.ico.gov.uk)

SPEAKING

14. Answer the questions.

- 1 What is job interview?
- 2 Is it necessary to be interviewed before getting a job? Why?/Why not?
- 3 How should you prepare for an interview?

LANGUAGE DEVELOPMENT

15. Use the word given in the capitals at the end of each line to form a word that fits in the space in the same line.

JOB INTERVIEWS

<p>Interviews are an (1) _____ method of choosing the best people for jobs, yet human (2) _____ like to examine each other in this way. One of the many problems of (3) _____ as it is commonly practiced is that the forms filled in by (4) _____ – often fail to show people as they really are. This means that you can follow all the best (5) _____ when completing your form and still find that you are (6) _____ at the next stage – the interview. Similarly, in the rare cases where interviews are automatic, a candidate with an (7) _____ form may do surprisingly well. Of course, your form needs to show that you have (8) _____ in your (9) _____ to do the job, but don't try to turn yourself into someone else – a person you have to pretend to be at the interview. Realism and (10) _____ are definitely the best approach.</p>	<p>perfect be select apply</p> <p>advise success adequate confident able</p> <p>honest</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

READING

16. Read the abstract. What other advices can you give for the interview preparation?

Telephone interview

There are three basic types of telephone interviews:

1. You initiate a call to the Hiring Manager and he or she is interested in your background. The call from that point forward is an interview.
2. A company calls you based upon a previous contact. You will likely be unprepared for the call, but it is still an interview.
3. You have a preset time with a company representative to speak further on the phone.

Telephone Interview Preparation

In preparing for your phone interview, there are several things you can do. To prepare for an unexpected contact:

- Research as much as you can about the company – products, services, markets, competitors, trends, current activities, priorities.
- Prepare your answers for the type of questions you'll be asked, especially, be able to say why you want the job, what your strengths are, how you'd do the job, what your best achievements are.
- Ensure you have two or three really good reputable and relevant references, and check they'd each be happy to be contacted.

- Tape your resume to a wall where you can view it while on the phone. It will be there for any call (planned or unplanned) and will be a constant reminder for your job search.
- Keep all of your employer research materials within easy reach of your phone.
- Have a notepad available to take notes.

If the phone interview is to occur at a set time, there are additional steps you can take:

- Place a “Do Not Disturb” note on your door.
- Turn off your stereo, TV, and any other potential distraction.
- Warm up your voice while waiting for the call. Sing an uplifting song to yourself.
- Have a glass of water handy, since you will not have a chance to take a break during the call.
- Turn off call waiting on your phone.

You have a major advantage in a phone interview that does not exist in a face-to-face interview. Namely, you cannot be seen. Use this to your advantage.

Have all of your materials on yourself and the employer open and available on your desk as you are speaking on the phone. This includes not only your resume, but also a “cheat sheet” of compelling story subjects you would like to introduce. It can also include a cheat sheet about the employer, including specific critical points describing the employer and their products.

As I am speaking with you on the other end of the phone, I have no idea that you are actually being prompted from a document as you are speaking. All I can hear is a well-informed, well-prepared interviewee. Keep in mind that this preparation is not “cheating” at all. It is interview preparation, pure and simple.

So have your materials open and available when you are preparing for your phone interview. They are there to support you and enhance your value to the employer, who will greatly respect your ability to answer questions with focus and meaningful content.

(<http://www.collegegrad.com/intv/>)

SPEAKING

17. Read the statement and comment it.

You have a major advantage in a phone interview that does not exist in a face-to-face interview.

18. Answer the question.

What way would you like to be interviewed (face-to-face or telephone)? Why?

LANGUAGE STUDY

19. Read the text and fill in the gaps using the words from the table.

charge reversed	connection	dial	direct	directory enquiries
engaged	international code-number	lift	long-distance	message
number	operator	person-to-person	receiver	telephone directory
		wrong number		

Making a Telephone-call

When you make a telephone-call you (1) _____ the receiver. Then you (2) _____ the number. If you don't know the (3) _____ you can look it up in the (4) _____. If you can't find it there you can call (5) _____.

Making a call to a place far away is called (6) _____ call. For most countries in Europe you can phone (7) _____; first dial the (8) _____.

If you don't have enough money you can ask for a (9) _____ call and have the (10) _____. This means that the (11) _____ of the call has to pay for it.

When there is a difficulty with the (12) _____ the (13) _____ may tell you to hold the line. If the person you want to call is already speaking to someone, the number is (14) _____.

When you call a friend and somebody else answers the phone, you can leave a (15) _____, or it may mean that you have dialed a (16) _____.

SPEAKING

20. Discuss what you know about telephone etiquette.

LANGUAGE DEVELOPMENT

21. Read the abstract and fill in the gaps using the words from the table.

answer	call	caller	come through	directory	hang up
identify	message	mouthpiece	number	operator	reach
receiver	replaced	ring	save	telephone	tone

Telephone Etiquette

1. Know the right number before making a (1) _____. When in doubt, consult a (2) _____, your personal number list, or the information (3) _____.
2. Allow time to (4) _____. Give the person you are calling enough time to (5) _____ their telephone. A little patience may (6) _____ you a second call.
3. Speak distinctly and in a normal (7) _____ of voice. Your lips should be about an inch away from the (8) _____.
4. Answer promptly. Try to answer your telephone on the first (9) _____. Otherwise the (10) _____ may hang up and you might miss an important message.
5. (11) _____ yourself when you answer the (12) _____. Do not merely say "Hello". Give your name, your telephone (13) _____, or the name of your firm.
6. Take messages for people who are not there. Write down the name and telephone number of the person calling. Place the (14) _____ where it can be seen.
7. (15) _____ gently. Slamming the (16) _____ down is discourteous. Be sure the receiver is always (17) _____ properly. Otherwise no calls can (18) _____ to you.

22. Match the words from column A with words from column B.

- | A | B |
|--------------------------------------|----------------------------------------------|
| 1 Can I take your name, please? | a) Говорит Джексон. |
| 2 Can I ask who is calling, please? | b) Это Джексон. |
| 3 Could I speak to Mr. Jackson? | c) Давайте я перезвоню вам через пять минут. |
| 4 Is Mr. Jackson in? | d) Могу я поговорить с мистером Джексоном? |
| 5 Can you hold on a moment? | e) Простите, вы могли бы говорить громче? |
| 6 Jackson speaking. | f) Мистер Джексон в офисе? |
| 7 This is Jackson. | g) Мистера Джексона сейчас нет на месте. |
| 8 Mr. Jackson is out at the moment. | h) Не могли бы вы немного подождать? |
| 9 Could I tell him who is calling? | i) Представьтесь, пожалуйста. |
| 10 Could I take a message? | j) Простите, могу я узнать, кто звонит? |
| 11 Would you like to live a message? | |
| 12 Sorry, can you speak up? | |

- 13 Let me call you back in five minutes.
- k) Я могу ему что-то передать?
l) Вы хотели бы оставить информацию?
m) Я могу ему передать, кто звонил?

ROLE PLAY

23. Work with a partner. Imagine you are at the job interview. One of you is an interviewee and the other is an interviewer. An interviewer makes up questions using the sentences below, an interviewee answers them.

Example: Tell me about the culture at your last company.

Interviewer: Could you tell me about the culture at your last company?

Interviewee: The culture encouraged people to develop, grow, and take responsibility. People were coached and mentored towards quality and productive effort. All of this helped me a great deal because I identify with these values, and respond to these opportunities.

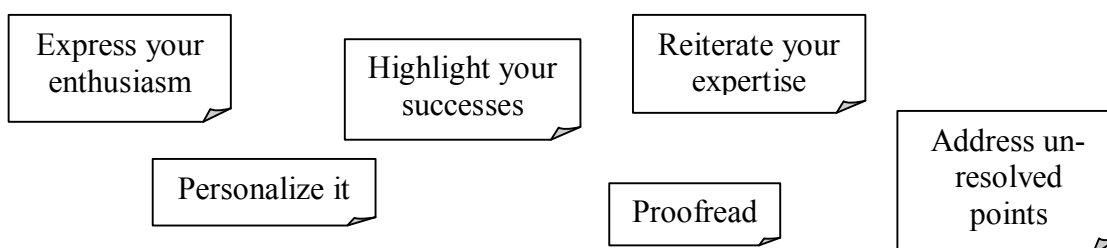
- 1 You are interested in our company.
- 2 Your objectives in this field.
- 3 Describe one or two of your most important accomplishments.
- 4 You left your previous job.
- 5 Important to you in a company.
- 6 Strong points for this position.
- 7 You prefer working alone or in groups.
- 8 You gave presentations during your university.
- 9 Use some computer programs frequently.
- 10 Courses in university helped the most in doing this job.
- 11 Describe yourself as a person.
- 12 Things which give you the most satisfaction at work.
- 13 Your professional goal.
- 14 You like to do best.
- 15 You like to do least.
- 16 Books or publications you read.

SPEAKING

24. Answer the questions.

- 1 What is a thank-you letter?
- 2 Who is it written to/by?

25. Read the following pieces of advices on how to write a thank-you letter.



- 1 What reason(s) can you think of for each piece of advice?
- 2 Which are the most important pieces of advice? Give reasons.
- 3 What other advice would you give to someone going to write a thank-you letter?

READING

26. Read the text and answer the question: What is a thank-you letter?

Thank-you letter

Since less than 10% of interviewees ever follow-up with a thank-you letter, doing so can help you stand out from the crowd. Here are some tips for writing your thank-you letters.

You should plan to send a thank you letter within 24 hours of your interview. While some professions would expect a mailed hard copy, in the technology industry, emailed thank-you letters are considered the norm.

A thank-you letter should be written after:

- An interview;
- A contact is helpful to you in a telephone conversation or e-mail;
- Someone provides / sends information to you at your request;
- You visit a contact at their work site; and
- Any other contact for which you want to express thanks and develop a good relationship.

When you write your thank-you letters, use these guidelines while writing:

- **Express your enthusiasm:** Convey your interest in and enthusiasm for the company and the position for which you interviewed. Try to be specific about why you are interested and how you are a good fit for the team.
- **Address unresolved points:** Address any issues or questions that came up during the interview that you feel you did not fully answer. This letter is your last chance to make a positive impression on the interviewer.
- **Personalize it:** You will likely be one of many interviewees, so you need to set yourself apart from the other candidates so they will remember you when you leave. In your letter, highlight a key point from your interview that you believe the interviewer will remember, and therefore remember you. Additionally, if you meet with more than one person, consider sending them all thank-you letters, each one a bit different; you may not know exactly who in the group will be making the decisions. Getting a business card from each interviewer will help you with names and titles when you sit down to write your thank-yours.
- **Reiterate your expertise:** If the company communicated its specific needs, issues or challenges, use your thank-you letter to demonstrate how you can meet those needs.
- **Highlight your successes:** Similarly, if the company communicated its ideal qualifications for a candidate, use your thank-you letter to outline how you meet or exceed those qualifications.
- **Proofread, and then proofread again:** Make sure your thank-you letter conveys a professional image by ensuring it is free of typos and grammatical errors.

Thank-you letters can be hard copy typed, handwritten or e-mailed. Hard copies are most formal and are always appropriate after an interview. Handwritten are more personal, and can be appropriate for brief notes to a variety of individuals you may have met during on-site interview or who may have helped you in other ways. E-mail is appropriate when that has been your means of contact with the person you want to thank, or if your contact has expressed a preference for e-mail, or if you want to send a quick thank-you to be followed up by hard copy.

(<http://jobsearchtech.about.com/od/resumesandletters/a/thankyous.htm>)

(<http://www.career.vt.edu/JOBSEARC/thankyou.htm>)

27. Answer the questions.

1. Why is it important to write a thank-you letter?

2. What are the types of a thank-you letter? What is the difference between them?
3. When should you write a thank-you letter?
4. What should you pay attention on while writing a thank-you letter?
5. How many people write a thank-you letter?

WRITING

28. Read the examples of thank-you letter and write your own letter.

Follow-up to telephone call.

30 Academy Road
Blacksburg, VA 24060
(540) 555-3333
mnop@vt.edu
February 1, 2005

Ms. Jane Roden
United Way
2300 E. Broad Street
Richmond, VA 23219

Dear Ms. Roden:

Thank you for talking with me on Wednesday in response to my inquiry about summer internship possibilities in social services in the Richmond area. After speaking with you and another Virginia Tech alumnus whose name I obtained through VT CareerLink at Career Services, I think I am much better prepared to pursue internship opportunities.

On your advice, I have updated my resume, emphasizing my recent hotline volunteer activities. A copy is enclosed for you. I also plan to contact Deborah Warren as you suggested, and appreciate your giving me her name.

Thank you for inviting me to visit your office. I will be in Richmond during spring break, so I will call your office two weeks prior to see if it would be convenient to schedule a visit.

Again, thank you so much for your help and advice. I look forward to meeting with you in March.

Sincerely,
(your handwritten signature)
Morgan Jeffers

Enclosure

Follow-up to personal contact.

909 Prices Fork Road
Blacksburg, VA 24060
(540) 555-1111
abcde@vt.edu

December 1, 2004

Ms. Marcia H. Meeks
30 Locke Lane
Richmond, VA 23219

Dear Ms. Meeks:

Thank you so much for your time and advice during my visit to your office last week. I very much appreciate your inviting me to visit since this was my first experience seeing the hands-on work which takes place in a design department. I learned a great deal, and hope to share what I learned with members of our student chapter of the American Society of Interior Designers.

After January, I will be in contact with you again to explore the possibility of arranging a summer internship with your firm. As I mentioned to you when we met, I had an opportunity to work on an intense, four-day interdisciplinary project judged by faculty in which my team received top honors. I gained valuable teamwork, problem-solving and presentation skills and learned to work effectively with students studying to enter different professions. I believe my skills would make me an asset to an organization like yours which often must produce excellent work under tight time constraints.

Thank you again for all your help, and I look forward to talking with you in the coming months.

Sincerely,
(handwritten signature)
Charlotte A. Leffen

(<http://www.career.vt.edu/JOBSEARC/thankyou.htm>)

Wordlist

accomplishment
additionally
advanced design
after-sales service
air compressor
air conditioning unit
applicant
application
application form
approach
automation system
Bachelor of Science
business card
chief engineer
cogeneration unit
combined cycle power plant
competency
condenser
connection
contract
Curriculum Vitae/CV
customer's requirements
directory enquiries
duty
employment
employment agency
enclosure
energy conversion
engineer requirements
enterprise
equipment
experimental base
flexibility
generator
greenhouse gas
hard copy
heat exchanger
highly skilled specialist
Hi-tech
in response to
incineration plant
industrial automation
inlet
innovative
inquiry
international code-number
interview
interviewee
interviewer
issue
job application
job vacancy
machine hall
maintenance
maintenance
maintenance
major advantage
market
marketing department
mechanical equipment
motor
nuclear power plant
obligation
on smb's advice
operator
permanent consumer
pipeline valve
piping
power generation equipment
pressure level
primary function
prior to
procurement department
production emissions
professional engineer
professional goal
project department
pump equipment
receiver
reference letter

refrigeration unit
reliability
representative
research and development
resume
sales department
sincerely
solution
steam path
steam temperature
supplier
supply of heat
technical department
technical science
technology industry
telephone directory
thank-you-letter
therefore
to address
to be convenient to do smth
to be engaged in smth
to be responsible for
to be specific about
to compete with
to confirm
to convey
to cooperate
to give presentations
to highlight a key point
to leave a message
to maintain
to make a call
to make an impression
to meet needs
to operate
to operate equipment
to outline
to pass exam
to pay attention on
to provide
to provide utilities
to pursue
to reduce
to retrain
to schedule
to specialize in
to utilize
to work alone
to work in group
unresolved
waste heat
work experience
to appreciate
to answer the phone

UNIT 3 COMMUNICATION AT WORKING PLACE

WARMING UP

1. Answer the questions.

- 1 What kind of organization do you want to work for?
- 2 In which department?
- 3 Do you think it will later be possible to change departments?
- 4 What do you think your first position will be?
- 5 Do you expect to have one immediate boss, to work for more than one superior, or to be part of a team?

Imagine you are already working

- 1 What is your function or job title?
- 2 What are you responsible for?
- 3 Who are you responsible to? (who do you report to?)
- 4 Does anybody report to you?
- 5 What other units, departments or divisions do you regularly have to work with?
- 6 What other departments do you occasionally have conflicts with?

SPEAKING

2. How important is each of the following for showing a person's status in an organization? Give each one a score from 1 (not important) to 5 (very important).

- | | |
|----------------------------|---------------------------------------------|
| 1 a reserved parking space | 9 taking holidays when you like |
| 2 an office with a window | 10 the size of your desk |
| 3 a uniform | 11 having more than one seat in your office |
| 4 a personal business card | 12 flying business class |
| 5 your own office | 13 a company credit card |
| 6 a company car | 14 having to clock in when you arrive |
| 7 your name on your door | |
| 8 having a secretary | |

3. Which of the words below can describe:

- a) good qualities of organization?
- b) bad qualities of organization?

professional democratic centralized impersonal decentralized
slow-to-respond cold paternal flat caring hierarchical
market-driven disciplined welcoming bureaucratic

4. Which words could you use to describe your own organization or an organization you know well?

5. Here are some ideas for creating a good working environment. Which do you consider a) crazy? b) good for motivating staff?

- singing at meetings
- dressing in strange clothes at meetings
- having no individual offices
- having no dress code
- unisex toilets
- organizing company holidays
- encouraging managers to invite staff home for dinner
- buying birthday presents for staff
- keeping small animals and birds at head office
- supplying flowers regularly for all offices

READING

6. Read the article. Which of the ideas above are used by the Finnish company, SOL?

Pioneer preaches flexibility while her firm cleans up

A Finnish innovator finds new ways to work that earn big returns in a tough sector. Alan Tillier reports.

Smart in yellow uniforms, staff hurry about in Finland's \$60 million-a-year SOL cleaning company carrying laptops and the latest Nokia mobile phones, as well as heavy-duty vacuum cleaners.

This is a company in which people work when they like, and flexibility is being strongly tested. It is one that Dr Joseph Juran, the management guru based in New York, considers to be the future.

SOL's owner, Liisa Joronen, a slim, charismatic brunette of 50, back from a 90-mile keep-fit cross-country ski run in Lapland, says that she has

thrown out traditional management styles and hierarchies in favour of people motivation and the strict auditing of targets.

She has brought fun to the workplace in a nation noted for its engineering innovation, but also for its people's shyness and introversion. This most extrovert of Scandinavian business leaders sometimes dresses as a sunflower and sings at sales meetings if it will help. The company's name is from the Spanish for sun, and its sun logo has a curved line turning it into a smile.

The key words around SOL are freedom, trust, goals, responsibility, creativity, joy of working and lifelong learning, Ms Joronen says. People's creativeness is restricted by routine and traditional office hours. As work becomes more competitive, so we need more flexible, creative and independent people.

To help staff towards independence of mind, Liisa has abolished territorial space, such as individual offices and desks, and organized a communal area similar to a social club. It has a colourful playground, with trees, caged birds and small animals, a nursery, a billiard table, sofas, modern art and kitchen corners.

Staff sit anywhere. There is not a secretary in sight. The boss makes the tea if everyone is on the phone to the field teams. Headquarters can be empty in the day and busy in the evenings and weekends. One headquarters worker, keen to go to midweek tango classes, was switching tasks with a colleague. The person supervising the cleaning of Helsinki's metro was working from home.

Flying the country Economy Class, Liisa tells 3,500 staff at 25 branches to kill routine before it kills you. At SOL Days, Japanese-style motivation sessions, she has the whole hall dancing, and urges staff: The better you think you are, the better you will become.

Half the country sees Lisa as a revolutionary boss, and several television programmes have been devoted to her. The other half thinks she is crazy.

From The Times

- 7. Work in two groups. Group A completes the information file on Liisa Joronen. Group B completes the information file on her company, SOL. When you have finished, check each other's files.**

SOL cleaning company	Liisa Joronen
Location: _____	Age: _____
Number of staff: _____	Position: _____
Number of branches: _____	Physical appearance: _____
Logo: _____	Personality: _____
Working conditions/practices: _____	Leadership ideas/style: _____
_____	Public image: _____
_____	_____

LANGUAGE STUDY

8. Which of these adjectives describe the type of worker SOL like to employ?

fun-loving competitive ambitious responsible animal-loving shy punctual independent flexible creative

9. Read these extracts from the article. Which word is similar in meaning to the underlined word in each extract?

1. Smart in yellow uniforms, staff rush about in Finland's \$60 million-a-year SOL cleaning company.
 a) intelligent b) colourful c) well-dressed
2. SOL's owner, Liisa Joronen, a slim, charismatic brunette of 50 ...
 a) powerful b) charming c) inspiring
3. This most extrovert of Scandinavian business leaders sometimes dresses as a sunflower ...
 a) lively b) quiet c) creative
4. People's creativeness is restricted by routine and traditional office hours.
 a) developed b) destroyed c) limited
5. Liisa has abolished territorial space such as individual offices and desks.
 a) increased b) stopped c) reduced
6. One headquarters worker, keen to go to midweek tango classes, was switching tasks with a colleague.
 a) changing b) planning c) sharing

SPEAKING

- 10. Would you like to work in a company SOL? Why?/Why not?**
- 11. Which of Liisa Joronen's ideas would you like to introduce into your own company or organization? Which would you not like to introduce? Why?**
- 12. Task**
Company Culture

Work with a partner. You and your business partner(s) are opening a power company. You want to create working conditions that will attract and keep staff and make them to work hard for you and encourage creative thinking.

Decide on 8-10 innovative features of your company culture that make your company stand out from others.

Think about things like:

facilities	hours	clothes	co-workers	management	job titles
leisure	stress	socializing	rewards	atmosphere	dress code
perks	workplace	hierarchy			

Make notes. Present them to other groups with reasons.

READING

- 13. Read the text to find out about different types of company in engineering industry.**

There are various ways of grouping the main elements of the engineering industry. Figure 1 shows one such grouping. This figure tends to oversimplify the structure of the industry. In reality the elements are by no means so clear cut and there is much overlapping of trades and services. Just consider a motor car. It combines mechanical engineering, electrical/electronic engineering, sheet metal fabrication, upholstery and trim, and painting. Across all the fields of engineering there is a need for servicing and maintenance engineering if complex plant and equipment is to be kept working efficiently so as to give an adequate return on the capital invested in them. Servicing and maintenance engineering is also important in ensuring that ma-

chinery, plant and equipment work safely and do not cause accidents or pollute the environment. Let's now look at the different types of company to be found within the engineering industry.

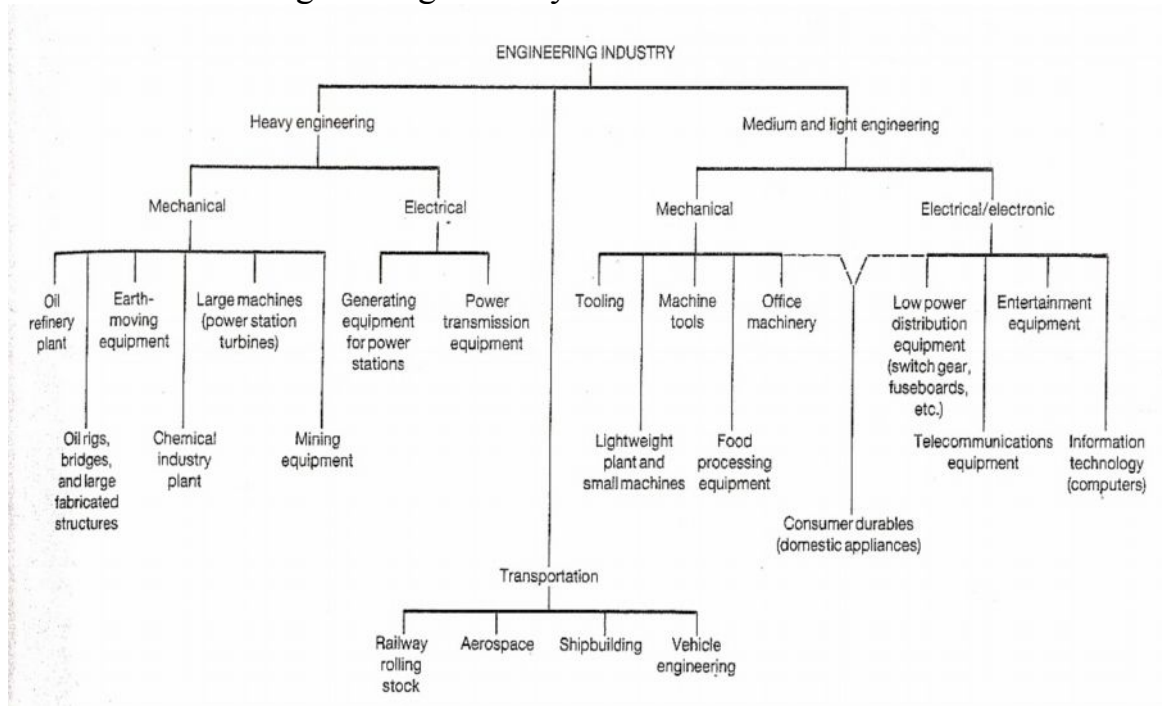


Figure 1. Engineering industry.

Companies

Private companies

These are companies which are wholly owned by a single person, a family or a small group of individuals. These persons own the company outright and none of the shares are available for sale to the general public. Such companies can be further subdivided into proprietorships, partnerships and private companies with limited liability.

Public limited companies

These are large companies whose scale of operation and financing is beyond the resources of even the wealthiest private individuals. Such companies are funded by the sale of stocks and shares to the general public, and the investment institutions such as the insurance companies. The stocks and shares in public limited companies (plc) are bought and sold through the stock broking companies who, in turn, operate through the stock markets. Public companies pay interest on the money borrowed in this way. In the case of stock, a fixed rate of interest is paid. This may be less than the interest paid on ordinary shares and there is no capital growth. However, stocks have pref-

erence over shares in the event of the company failing and can be considered a safer investment.

The interest paid on shares is called a dividend and it is paid out of the profits of the company. When the profits go up, the dividend is raised and the shareholders get a higher rate of return on their investment. If profits fall, the dividend may have to be reduced. If the company prospers its shares will be in demand and, following the law of supply and demand, the price of the shares will rise and the shareholders will make a capital gain if they sell their shares at a higher price than what they paid for them originally.

Nationalized industries

These are companies owned by the state because of strategic and social importance to the nation. Many of the public utilities (gas, water and electricity) were among the first companies to be nationalized in Britain after the Second World War. These were closely followed by such industries as the coal mines and the railways.

Monopolies

These are companies who are free from competition because they are the only companies operating in a particular market. This is most likely due to the specialized nature of the service they offer and the high level of capital investment involved. A group of companies acting together to reduce competition and to keep prices and profits artificially high is called a cartel. If monopolies and cartels raise their prices too high, then it eventually becomes worthwhile for other companies to be set up despite the high level of investment involved. This breaks the monopoly and brings prices to a more reasonable level. For example British Telecom now has to compete with Mercury Communications.

Cooperatives

These are companies owned by the workforce, the management and, in some instances by the customers as well. For all practical purposes they operate as limited companies with the shares owned exclusively by the members. The idea is to eliminate the profit element demanded by the more usual sources of capital funding. Any profits which are made are retained and reinvested in the business after an agreed dividend has been paid to the members. Such companies are registered under the Industrial and Provident Societies Act.

14. Match the words from column A with words from column B.

A	B
1 private company	a) прибыль, доход
2 share	b) открытое акционерное общество
3 profit	c) общество, компания с ограниченной ответственностью
4 public limited company	d) закрытая акционерная компания, частная компания
5 competition	e) конкуренция
6 limited company	f) капиталовложение
7 interest	g) акция
8 investment	h) проценты, доход

15. Answer the questions.

- 1 Who are private companies owned by?
- 2 What are public limited companies funded by?
- 3 What is dividend?
- 4 When shareholders get a higher rate of return on their investment?
- 5 Who are nationalized industries owned by?
- 6 What are monopolies?
- 7 What companies may be owned by the customers?

16. Say whether the following statements are true or false according to the information from the text.

- 1 Private companies can be divided only into partnerships and private companies with limited liability.
- 2 Public limited companies are not large companies.
- 3 The stocks and shares in public limited companies are bought and sold through the stock broking companies.
- 4 If profits go up, the dividends raise.
- 5 Cooperatives were the first companies to be nationalized.
- 6 Monopolies are companies which are bound with competition.
- 7 Cooperatives operate as limited companies.

17. Group any words which go together and make up sentences using some of these phrases.

various	invested
engineering	accidents

adequate
capital
to work
to cause

safely
return
industry
ways

LANGUAGE STUDY

The most common verbs for describing structure are:

consists of
is composed of
contains

is made up of
includes
is divided into

- The company consists of five main departments.
- The marketing department is made up of three units.
- The sales department is divided into two sections.

Other verbs frequently used to describe company organization include:

to be in charge of
to support/to be supported by
to be accountable to

to be responsible for
to assist/to be assisted by

- The marketing department is in charge of the sales forces.
- The marketing department is responsible for advertising, sales promotions and market research.
- The five department heads are accountable to the Managing Director.

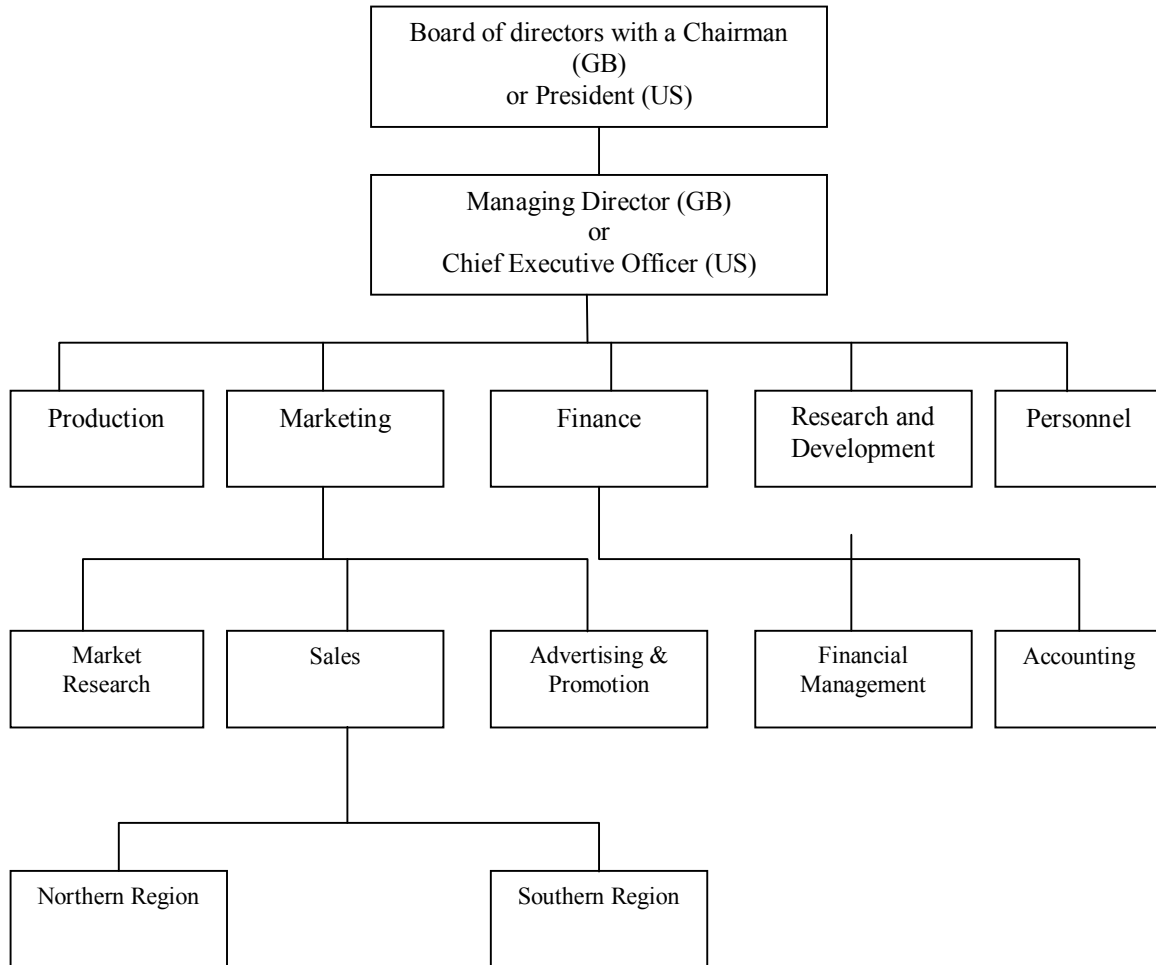


Figure 2. An example of part of a company organization chart.

WRITING

- 18. Write a description of either the organization charts (Fig1, Fig2) above, or a company you know, in about 100-150 words.**

SPEAKING

- 19. Work with a partner. Interview a partner about their company and be ready to answer these questions.**

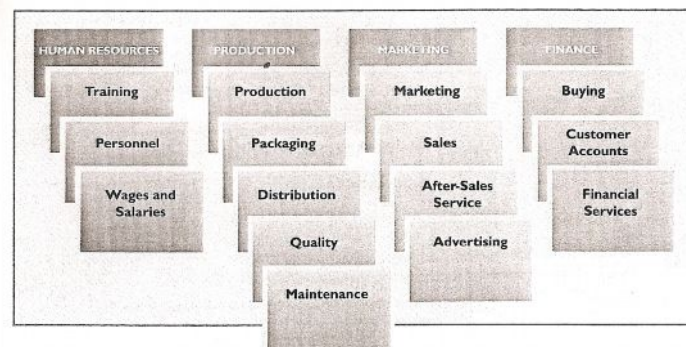
- 1 Are they entering any new markets? (Which ones?)
- 2 Are they developing any new products or services? (Why?)
- 3 Are they building any new facilities? (What? Where?)
- 4 Are they working in any joint ventures? (What?)
- 5 Are they taking on new staff? (Why?)

- 6 Are they reorganizing any work systems? (Which ones? Why?)
- 7 Are they introducing a quality programme? (What exactly?)
- 8 Are they introducing new technology? (What?)
- 9 Are your prices low or high compared with your competitors?
- 10 Is advertising important to you business?
- 11 What training does your staff receive?
- 12 Do you hold regular meetings with your colleagues and counterparts?
- 13 Do you have close relationship with your suppliers?
- 14 Are your managers locals or foreigners?
- 15 Why do your customers like your products/service?
- 16 Why is your company special?
- 17 What is your company's main strength?

Are these statements true for your company?

- 1 We produce high quality products.
- 2 We provide a high quality service.
- 3 We use the most advanced technology.
- 4 We are in close contact with the market.
- 5 We produce a wide range of products.
- 6 We invest a lot of money in research and development.
- 7 We have sales representatives all over the world.
- 8 We are market leaders.

20. Study this organization. Which department:

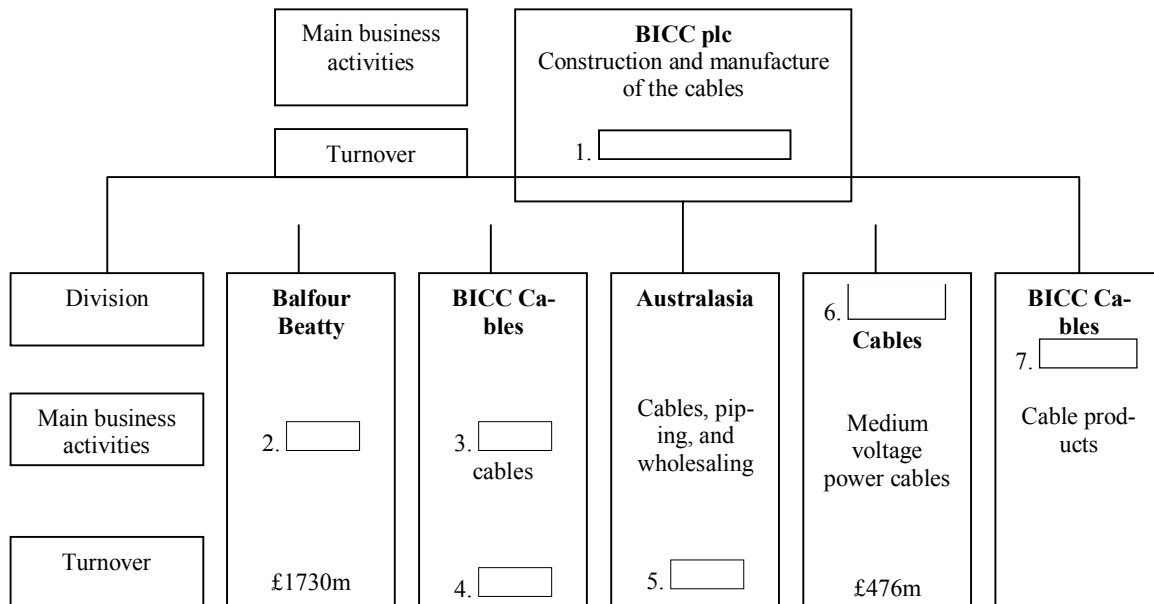


- a) puts the products in boxes?
- b) places ads in magazines?
- c) pays the staff?
- d) purchases supplies?
- e) sells the products to customers?
- f) plans how to sell new products?

- g) services the machines and equipment?
- h) arranges courses for the staff?
- i) recruits new employees?
- j) manufactures the products?
- k) invoices customers?
- l) looks after customer's problems and complaints?
- m) dispatches the products and sends them to customers?
- n) organizes control systems to prevent mistakes?
- o) deals with taxation, investment, and cash management?

READING

21. A manager from BICC describes her company. Read the abstract and complete the organization chart.



“BICC plc is a large multinational with about forty thousand employees worldwide and a turnover of approximately four billion pounds. The group’s main activities are construction and the maintenance of cables. I’d like to tell you about the five different divisions in the group and I’ll begin with Balfour Beatty. Balfour Beatty is Britain’s leading construction company with a turnover of around J1,700m. The company is famous for its work constructing motorways, buildings and of course, the channel tunnel.

The next division is BICC Cables. We are the largest manufacturer of fibre optic cables in Europe and we now own the Italian company, Ceat Cavi, CelCat in Portugal, part of CGC in Spain and KWO in the former East

Germany. BICC Cables is expanding fast in Asia too and it has a turnover of J1,183m.

Now I'll turn to BICC's overseas activities. There are three overseas divisions, Australasia, North America Cables and BICC Cables Asia Pacific. Australasia's principal activities are cables, piping and wholesaling and it has a turnover of J595m. North America Cables operates in the US and Canada and it's the market leader in medium voltage power cables. And finally, BICC Cables Asia Pacific. Based in Singapore, this division is growing fast. It is responsible for the manufacture and marketing of the groups' cable products in the important Asia-Pacific region. It's our newest division so we haven't got turnover figures yet".

PROJECT WORK

22. Prepare to make a short presentation about your company to your group mates.

a. Write notes first. Don't write sentences – just write key words and numbers.

	My company	The group
Products/Services		
Main customers		
Locations (factories, branches, etc.)		
Size (no. of employees/turnover)		
Main strength		
Current projects		
Other information?		

b. Now decide on the structure of your presentation. These phrases will help you to order the information.

THE INTRODUCTION:

I'd like to talk (to you) today about ...

I'd like to tell you about ...

I'm going to present my ...

ORDERING INFORMATION:

So, I'll start off by ... giving you an overview of ...

And then I'll go on to ...

Let me begin with/to start with ...

Firstly, I'd like to look at ... then/secondly/next... thirdly... finally/lastly

CHECKING UNDERSTANDING:

Is that clear?

Are you with me?

OK so far?

THANKING THE AUDIENCE:

Thank you for your attention.

Thank you for listening.

If you have any questions, I'd be pleased to answer them.

If there are any questions, I'll do my best to answer them.

- c. Use your notes to give the presentation and answer questions from your group mates.

GRAMMAR REVIEW**Type 1 Conditionals**

If-clause		Main clause	
If	+ Present Simple/ Present Continuous/ Present Perfect/ Present Perfect Continuous	Future/ Imperative/ infinitive Can/may/might/ must/should/could	+ Present bare

- *If I get paid today, I'll call you.*
- *If I finish the project on time, I may take a few days off.*

Type 2 Conditionals

If-clause		Main clause	
If	+ Past Simple/Past Continuous	would/could/might +	Present bare infinitive

- *If we were working more hard, we could get a better job.*
- *If I were you, I would hire more staff.*

Type 3 Conditionals

If-clause	Main clause
If + Past Perfect/Past perfect Continuous	would/could/might + Perfect bare Infinitive

- *If they had paid us more, we would not have applied for another job.*

23. Make up conditional sentences using the following ones.

Example: People require a higher salary. – If there was not rise in prices, people wouldn't require a higher salary.

- 1 People dislike work and avoid it.
- 2 Work is necessary to people's psychological well-being.
- 3 People avoid responsibility and would rather be told what to do.
- 4 People are motivated mainly by money.
- 5 Most people are far more creative and ingenious than their employers realize.
- 6 People are motivated by anxiety about their security.
- 7 People want to be interested in their work and, given the right conditions, they will enjoy it.
- 8 Under the right conditions, most people will accept responsibility and want to realize their own potential.

24. Define the type of Conditionals in the following sentences.

- 1 If the students had received and read books on their speciality they would not have broken the device.
- 2 If he had read yesterday's newspapers he could have told us the current event.
- 3 The work would have been done long ago if they had been prepared for it properly.
- 4 If he were here, he would help the trainees to do the last laboratory work.
- 5 If I were an electrician, I should know how to reduce the resistance of the conductor.
- 6 If he had used this formula he would not have made this mistake.
- 7 Provided the molecules of water had been divided into smaller parts, it wouldn't have been water any longer but some other substance.

- 8 If the sun got its energy from ordinary chemical processes, such as the burning coal and oil, it wouldn't exist for more than several thousand years.

25. Fill in the table.

adjectives	adverbs
	slowly
hard	
quick	
increasing	
rapid	
	probably
common	
	usually
comfortable	
	markedly
general	
good	
	easily
bad	
possible	

SPEAKING

26. Read the abstract and answer the questions.

Work equipment is almost any equipment used by a worker at work including:

- machines such as circular saws, drilling machines, photocopiers, mowing machines, tractors, dumper trucks and power presses;
- hand tools such as screwdrivers, knives, hand saws;
- lifting equipment such as lift trucks, elevating work platforms, vehicle hoists, lifting slings;
- other equipment such as ladders and water pressure cleaners.

- 1 What other work equipment do you know?
- 2 Look at all the equipment in use, decide what can cause risks, and why?
- 3 Consider what can be done to prevent or reduce these risks.



Many things can cause a risk, for example:

- using the wrong equipment for the job, e.g. ladders instead of access towers for an extended job at high level;
- not fitting adequate guards on machines, leading to accidents caused by entanglement, shearing, crushing, trapping or cutting;
- not fitting adequate controls, or the wrong type of controls, so that equipment cannot be turned off quickly and safely, or starts accidentally;

- not properly maintaining guards, safety devices, controls etc so that machines or equipment become unsafe;
- not providing the right information, instruction and training for those using the equipment;
- not fitting roll-over protective structures (ROPS) and seat belts on mobile work equipment where there is a risk of roll over;
- not maintaining work equipment or carrying out regular inspections and thorough examinations;
- not providing the personal protective equipment needed to use certain machines safely, e.g. chainsaws, angle grinders.

READING

27. Read the text and answer the questions.

Carry out maintenance work safely

Many accidents occur during maintenance work. Controlling the risk means following safe working practices, for example:

- where possible, carry out maintenance with the power to the equipment off and ideally disconnected or with the fuses or keys removed, particularly where access to dangerous parts will be needed;
- isolate equipment and pipelines containing pressurized fluid, gas, steam or hazardous material. Isolating valves should be locked off and the system depressurized where possible, particularly if access to dangerous parts will be needed;
- support parts of equipment which could fall;
- allow moving equipment to stop;
- allow components which operate at high temperatures time to cool;
- switch off the engine of mobile equipment, put the gearbox in neutral, apply the brake and, where necessary, chock the wheels;
- to prevent fire and explosions, thoroughly clean vessels that have contained flammable solids, liquids, gases or dusts and check them before hot work is carried out. Even small amounts of flammable material can give off enough vapor to create an explosive air mixture which could be ignited by a hand lamp or cutting/welding torch;
- where maintenance work has to be carried out at height, ensure that a safe and secure means of access is provided which is suitable for the nature, duration and frequency of the task.

- 1 Name all work equipment you know.
- 2 What work equipment will you need to use at your work?
- 3 What hand tools are used in our everyday life?
- 4 What lifting equipment do you know?
- 5 What do we use lifting equipment for?

28. Fill in the gaps with suitable words from the table. You do not need to use all of them.

metal head	plastics	heavy	eliminate	objects	non-flammable
helmet	flammable	adjustable	corrosion	light	helmet form
		construction	resistance		

a) Safety helmet

When working on site, or in a heavy engineering erection shop involving the use of overhead cranes, all persons should wear a safety (1)_____complying with BS 2826. Even small (2)_____ such as nuts and bolts can cause serious (3)_____ injuries when dropped from a height. Figure 1(a) shows such a (4)_____. Safety helmets are made from impact resistant (5)_____ or from fibre glass reinforced polyester mouldings. Such helmets can be color coded for personal identification and are (6)_____ and comfortable to wear. Despite their lightweight (7)_____, they have a high (8)_____ to impact and penetration. To (9)_____ the possibility of electric shock, safety helmets have no (10)_____ parts. The materials used in the manufacture of the outer shell must be (11)_____ and their insulation resistance must be able to withstand 35000volts. Figure 1(b) shows the harness inside a safety helmet. This provides ventilation and a fixed safety clearance between the outer shell of the helmet and the wearer's skull. This clearance must be maintained at 32 millimeters. The entire harness is removable for regular cleaning and sterilizing. It is fully (12)_____ for size, fit and angle to suit the individual wearer's head.

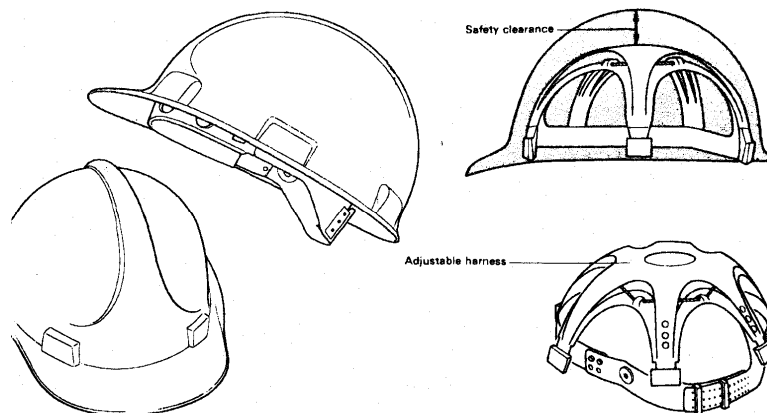


Fig. 1(a) a typical fibre-glass safety helmet 1(b) safety helmet harness

29. Read the abstract and answer the questions.

- 1 Why is it important to use safety goggles and visors?
- 2 What is the difference between goggles and visors?
- 3 What eye injuries can be

b) Eye protection

Whilst it is possible to walk about on an artificial leg, nobody has ever seen out of a glass eye. Therefore eye protection is possibly the most important precaution you can take in a workshop. Eye protection is provided by wearing suitable goggles or visors. When welding, special goggles (oxy-fuel gas welding) or visors (electric arc welding) have to be used. These have colored lenses to filter out harmful rays. Gas-welding goggles are not suitable for arc welding since they do not offer adequate protection. Eye injuries fall into three main categories:

1. pain and inflammation due to abrasive grit and dust getting between the lid and the eye;
2. damage due to exposure to ultraviolet (arc welding) and high intensity visible light. Particular care is required when using laser equipment;
3. loss of sight due to the eyeball being pierced or the optic nerve cut by flying splinters of metal (swarf), or by the blast of a compressed air jet.

30. Read the abstract and answer the questions.

- 1 Why should hands be protected?
- 2 When plastic gloves are used?
- 3 When leather gloves are should be used?
- 4 Think of other types of protection gloves.
- 5 What is barrier cream?
- 6 What is barrier cream used for?

c) Hand protection

Your hands are in constant use and, because of this, they are constantly at risk handling dirty, oily, greasy, rough, sharp, hot and possibly corrosive and toxic materials. Gloves and “palms” of a variety of styles and types of materials are available to protect your hands whatever the nature of the work. Some examples are shown in Fig. 3. In general terms, plastic gloves are impervious to liquids and should be worn when handling oils, greases and chemicals. However, they are unsuitable and even dangerous for handling hot

materials. Leather gloves should be used when handling sharp, rough and hot materials.

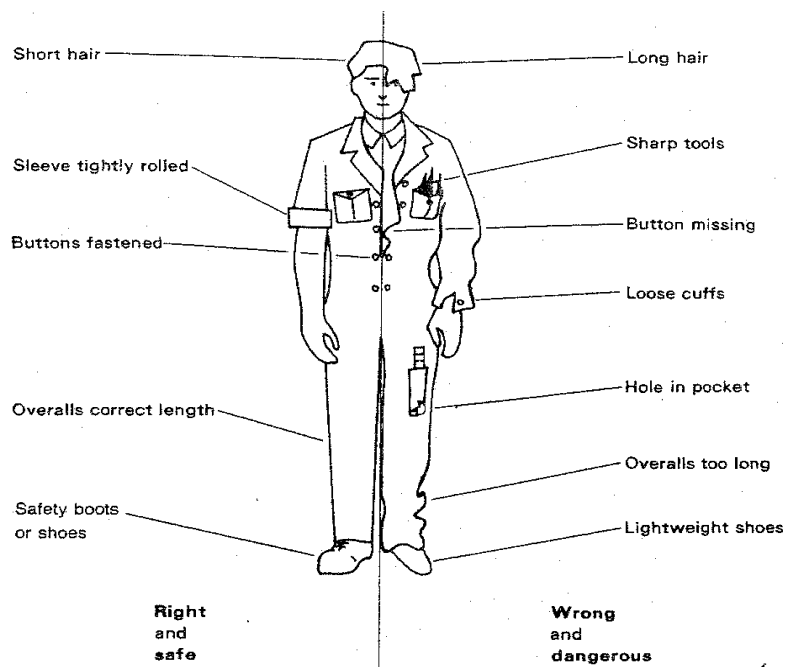
Where gloves are inappropriate, as when working precision machines, but your hands still need to be protected from oil and dirt rather than from cuts and abrasions, then you should use a barrier cream. This is a mildly anti-septic cream which you can rub well into your hands before work. It fills the pores of your skin and prevents the entry of oils and dirt which could cause infection. The cream is removed by washing your hands with ordinary soap and water at the end of the shift. Removal of the cream carries away the dirt and sources of infection.

31. Look through the abstracts a), b), c) again and choose the correct answer. Explain your choice.

1. The best clothing to wear for fitting and machining in an engineering workshop is a
 - a) tracksuit and trainers
 - b) T-shirt, jeans and trainers
 - c) boiler suit and industrial safety shoes
 - d) Leather apron and industrial safety shoes
2. Appropriate safety glasses should be worn
 - a) only when welding
 - b) only when machining
 - c) only when grinding
 - d) whenever there is danger to the eyes
3. For sit work a safety helmet should be worn to
 - a) protect you from falling objects
 - b) keep you hair clean
 - c) prevent your hair becoming entangled in a machine
 - d) keep you warm
4. In a workshop long hair is a hazard because
 - a) it is difficult to keep clean and can result in a scalp infection
 - b) it can become entangled in a machine
 - c) it can be distracting
 - d) of all the above
5. A barrier cream is used to
 - a) keep your skin soft
 - b) prevent dirt from entering the pores of your skin
 - c) save having to use soap when you are washing
 - d) act as antiseptic when you cut yourself

READING

32. Look at the picture and say what problems wrong dress can cause. Then read abstracts and compare your ideas.



Long hair

Long hair is liable to be caught in moving machinery such as drilling machines and lathes. This can result in the hair and scalp being torn away which is extremely dangerous and painful. Permanent disfigurement will result and brain damage can also occur.

Sharp tools

Sharp tools protruding from the breast pocket can cause severe wounds to the wrist. Such wounds can result in paralysis of the hand and fingers.

Buttons missing

Since the overalls cannot be fastened properly, it becomes as dangerous as any other loose clothing and liable to be caught in moving machinery.

Loose cuffs

Not only are loose cuffs liable to be caught up like any other loose clothing, they may also prevent you from snatching your hand away from a dangerous situation.

Hole in pocket

Tools placed in a torn pocket can fall through onto the feet of the wearer. Although this may not seem potentially dangerous, nevertheless it could cause an accident by distracting your attention at a crucial moment.

Overalls too long

These can cause you to trip and fall, particularly when negotiating stairways.

Lightweight shoes

The possible injuries associated with lightweight and unsuitable shoes are:

- puncture wounds caused by treading on sharp objects
- crushed toes caused by falling objects
- damage to your Achilles tendon due to insufficient protection around the heel and ankle

Wordlist

abrasion	employee
adjustable	erection shop
advertising	explosion
ambitious	explosive
arc welding	flammable
auditing of a target	flat
bureaucratic	for instance
business leader	function
by no means	fuse
capital gain	gas
caring	gas welding
cartel	gearbox
centralized	hand saw
chainsaw	hazardous
circular saws	helmet
coal mine	hierarchical
cold	high quality
communication	impersonal
compared with	impervious
competition	in some instances
competitive	independence
construction	independent
corrosion	inflammation
creativeness	innovation
creativity	innovator
crucial moment	insufficient protection
cutting torch	insulation resistance
decentralized	insurance company
demand	intensity
democratic	interest
department	job title
despite	joint venture
disciplined	knife
dress code	ladder
drilling machine	lathe
drilling machine	lifelong learning
due to	lift truck
dumper truck	liquid
dust	location
electric shock	logo

market leader	swarf
market-driven	to abolish
motivation	to act together
non-flammable	to allow
organization	to be divided into
overall	to be free from competition
overhead crane	to be in demand
owner	to be owned by
parking space	to be part of a team
partnerships	to be responsible to smb
paternal	to be restricted by
perks	to carry out inspection
position	to carry out maintenance
precaution	to cause a risk
pressurized fluid	to cause accidents
private company	to clock in
private company with limited liability	to compare with
professional	to compete with
profit	to comply with smth
proprietorships	to distract smb's attention
public limited company	to eliminate
public utilities	to encourage
punctual	to filter out
reserved	to fund
resistance	to give off
responsibility	to handle
return	to ignite
reward	to invest in smth
safety device	to isolate
safety goggles	to lock off
sales representative	to occur
share	to occur
shareholder	to offer service
slow-to-respond	to operate in a market
solid	to own
splinter	to pollute the environment
staff	to preach
stock market	to prevent
stocks	to prevent from smth
superior	to prosper
supply	to protrude

to raise one's price
to reduce competition
to report to
to subdivide
to support
to switch off
to switch tasks with smb
to weld
to work for
to work from home
to work on site
to work with
tool
training
ultraviolet
uniform
vapour
vessel
visors
welcoming
welding torch
workforce
working environment
working place
workshop
worthwhile ; wound

MODULE 2
INTRODUCTION TO PROFESSIONAL ACTIVITY

UNIT 4
INTRODUCTION TO PROFESSIONAL ACTIVITY

WARMING UP

- 1. What is a thermal power station equipped with?**

READING

- 2. Read the text and answer the question: What equipment is used at a thermal power station?**

Thermal power station

A modern thermal power-station is known to consist of four principal components, namely, coal handling and storage, boiler house, turbine house, switchgear.

If you have not seen a power-station boiler it will be difficult for you to imagine its enormous size.

Besides the principal components mentioned above there are many additional parts of the plant. The most important of them is the turbo generator in which the current is actually generated.

A steam turbine requires boilers to provide steam. Boilers need a coal-handling plant on the one hand and an ash-disposal plant on the other. Large fans are quite necessary to provide air for the furnaces. Water for the boilers requires feed pumps. Steam must be condensed after it has passed through the turbines, and this requires large quantities of cooling water. The flue gases carry dust which must be removed by cleaning the gases before they go into the open air.

A modern thermal power-station is equipped with one or more turbine generator units which convert heat energy into electric energy. The steam to drive the turbine which, in its turn, turns the rotor or revolving part of the generator is generated in boilers heated by furnaces in which one of three fuels may be used – coal, oil and natural gas. Coal continues to be the most important and the most economical of these fuels.

At present great attention is paid to combined generation of heat and electricity at heat-and-power plants and to centralized heat supply. One of the world's largest heat-and-power installations is operating at the Moskowskaya thermal power-station-25.

It is necessary to say that separate power-stations in our country are integrated into power systems. Integration of power systems is a higher stage in scientific and technical development of power engineering.

3. Answer the questions.

- 1 What are the components of a power station?
- 2 Where current is generated?
- 3 Why boilers are necessary in a steam turbine?
- 4 What provides air for the furnaces?
- 5 Why is it necessary to have large quantities of cooling water in the boiler?
- 6 What converts heat energy into electric energy?
- 7 What fuels may be used in furnaces?

4. Look through the text and say whether the following statements are true or false according to the information from the text.

- 1 A modern thermal power-station is known to consist of three main parts.
- 2 A power station boiler is rather small in size.
- 3 There are many additional parts of the plant, besides the principal components.
- 4 Boilers need only a coal-handing plant.
- 5 Steam must be condensed after it has passed through the turbines and this does not require large quantities of cooling water.
- 6 A modern thermal power-station is equipped with one or more turbine generator units.
- 7 The turbo generator is one of the important principal components of the plants.
- 8 Coal is not the most important and economical fuel.
- 9 Integration of power-systems does not mean a higher stage in scientific and technical development of power engineering.
- 10 A steam turbine requires a fan to provide steam.
- 11 Water for the boilers requires feed pumps.

5. Complete the following sentences.

- 1 A modern thermal power station consists of...
- 2 It will be difficult for you to imagine...
- 3 The most important of additional parts is...
- 4 Large fans are necessary to ...

- 5 A modern thermal power-station is equipped ...
- 6 At present great attention is paid to ...
- 7 A steam turbine requires ...
- 8 The steam is generated in boilers heated by ...

LANGUAGE STUDY

6. Match the word combinations from column A with the word combinations from column B.

A	B
1 steam turbine	a) теплоснабжение
2 ash-disposal	b) охлаждающая вода
3 cooling water	c) тепловая энергия
4 heat energy	d) распределительное устройство
5 natural gas	e) турбинный зал
6 heat-and-power installation	f) котельное помещение
7 heat supply	g) паровая турбина
8 switchgear	h) теплоэнергетическая установка
9 boiler house	i) вентилятор
10 turbine house	j) природный газ
11 fan	k) установка по удалению золы

7. Match the words with their synonyms.

to provide	up-to-date
quantity	essential
necessary	to work
modern	to demand
to operate	to supply
to use	amount
to require	to employ

8. Find opposites from the text for the following words.

old, easy, small, to stop the turbine, to cool, artificial, below.

9. Group any words which go together and make up sentences using some of these phrases.

1 thermal	a) part
2 enormous	b) component

- | | | | |
|----|------------|----|---------------|
| 3 | principal | c) | size |
| 4 | additional | d) | steam |
| 5 | to provide | e) | power station |
| 6 | feed | f) | gas |
| 7 | cooling | g) | generator |
| 8 | turbine | h) | system |
| 9 | electric | i) | pump |
| 10 | natural | j) | energy |
| 11 | power | k) | water |

10. Translate into Russian the following words and analyze them as parts of speech. Define suffixes of: nouns, verbs, adjectives, adverbs.

thermal, station, storage, boiler, principal, additional, important, slowly, generate, disposal, remove, gaseous, generator, convert, electric, electricity, revolve, natural, economical, installation, basis, basic, separate, technical, rapidly.

11. In which part of the text you can find information about:

- 1 four principles components of a modern thermal power-station.
- 2 the most important additional part of the station.
- 3 the purpose of additional parts of a plant.

12. Write questions to which the following are answer.

- 1 A modern thermal power-station consists of four principal components, namely, coal handling and storage, boiler house, turbine house, switchgear.
- 2 The turbo generator is the most important additional part of the station.
- 3 A steam turbine requires boilers to provide steam.
- 4 Large fans are quite necessary to provide air for the furnace.
- 5 Water for the boilers requires feed pumps.
- 6 Steam must be condensed after it has passed through the turbine, and this requires large quantities of cooling water.
- 7 The turbine generator unit converts heat energy into electric energy.
- 8 Steam drives the turbine which, in its turn, turns the rotor or revolving part of the generator.
- 9 The steam is generated in boilers heated by furnaces in which one of the three fuels may be used – coal, oil and natural gas.

- 10 Coal continues to be the most important and economical of these fuels.

GRAMMAR REVIEW

Passive Voice/Tenses Revision

Tenses	Indefinite (simple)	Continuous	Perfect	Perfect Continuous
Infinitive	to be + V_{ed} / V₃ <i>to be maintained</i>	—	to have been + V_{ed} / V₃ <i>to have been maintained</i>	—
Present	am, is, are + V_{ed} / V₃ <i>Turbines are maintained by technicians.</i>	am, is, are being + V_{ed} / V₃ <i>The turbine is being serviced now by a technician.</i>	has/have been + V_{ed} / V₃ <i>The turbine has just been serviced.</i>	—
Past	was, were + V_{ed} / V₃ <i>The turbine was serviced yesterday.</i>	was, were being + V_{ed} / V₃ <i>The turbine was being serviced when the manager came in.</i>	had been + V_{ed} / V₃ <i>The turbine had been serviced before the manager came in.</i>	—
Future	will be + V_{ed} / V₃ <i>The turbine will be serviced tomorrow.</i>	—	will have been + V_{ed} / V₃ <i>The turbine will have been serviced by 3 o'clock tomorrow.</i>	—

13. Put the verbs in brackets into correct tense and voice.

- 1 The separate elements of the building (to manufacture) at different factories.
- 2 Modern architecture (to characterize) by simplicity.
- 3 Several descriptions of these reactions (to refer) to in detailed reports.
- 4 This newly developed method (to follow) by a number of others.
- 5 Scientists (to offer) to determine the composition of the new substance obtained.
- 6 The engineer (to show) a new device which (to construct) by the scientists and engineers of their laboratory.
- 7 The molecules of even a good insulator (to act) upon by an electric field.
- 8 Friction (to effect) by the degree of smoothness or roughness of the bearing surfaces.
- 9 The positive particle in the nucleus (to give) the name “proton”.
- 10 Special attention (to pay) to the problem of direct conversion of energy into electricity.

14. Translate and put the verbs in Passive Voice.

- 1 The conference (проводить) in Moscow last month.
- 2 The student (говорить) in a minute.
- 3 The atmospheric pressure (показывать) by a barometer.
- 4 Atomic energy must (использовать) for peaceful purposes.
- 5 Radium (открывать) by Marie and Pier Curie.
- 6 K.Tsiolkovsky’s work “The study of cosmic space by rocket engines” (ссылаться) often by many scientists everywhere in the world.
- 7 The number of electrons an atom loses or receives (называть) its valence.

15. Match the verbs below with the correct prepositions. Prepositions may be used more than once. Make up sentences including these combinations using Passive Voice.

- | | | | |
|---|----------|----|------|
| 1 | to speak | a) | for |
| 2 | to look | b) | of |
| 3 | to send | c) | at |
| 4 | to base | d) | upon |
| 5 | to rely | e) | to |

- | | | | |
|----|------------------|----|-------|
| 6 | to think | f) | with |
| 7 | to act | g) | on |
| 8 | to deal | h) | about |
| 9 | to pay attention | | |
| 10 | to dream | | |
| 11 | to refer | | |
| 12 | to laugh | | |

16. Translate into Russian paying attention to the words in bold.

- 1 This method has been **referred to** in the earlier paper.
- 2 The modern scientific forecasts of weather can be fully **relied upon**.
- 3 Light may be **thought of** as some factor that is capable of affecting the eye.
- 4 A gas may be **looked upon** as the vapour of a liquid with a very low boiling point or very great vapour pressure.
- 5 Lead is very slightly **acted upon** by the oxygen of the air.
- 6 Atoms of zinc may be **looked upon** as composed of electrons and zinc ions.
- 7 I do not think this instrument can be **relied upon**.

READING

17. Read the text to find out about the turbines and generators.

Turbines, Generators and Power Plants

Electricity flows through wires to light our lamps, run TVs, computers and all other electrical appliances. But where does the electricity come from?

Thermal power plants have big boilers that burn a fuel to make heat. A boiler is like a teapot on a stove. When the water boils, the steam comes through a tiny hole on the top of the spout. The moving steam makes a whistle that tells you the water has boiled. In a power plant, the water is brought to a boil inside the boiler, and the steam is then piped to the turbine through very thick pipes.

In most boilers, wood, coal, oil or natural gas is burned in a firebox to make heat. Running through the fire box and above that hot fire are a series of pipes with water running through them. The heat energy is conducted into the metal pipes, heating the water in the pipes until it boils into steam. Water boils into steam at 212 degrees Fahrenheit or 100 degrees Celsius.



Photo credit: Prof. Carl Lira, Mich. State Univ.

Picture 1.

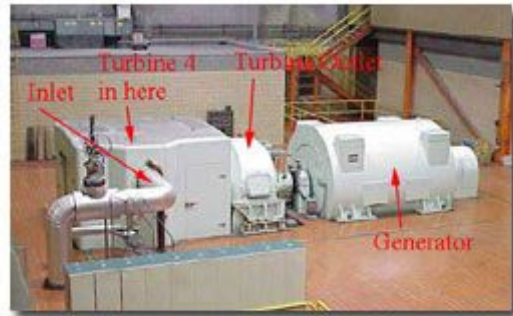


Photo credit: Prof. Carl Lira, Mich. State Univ.

Picture 2.

The first picture is of a small power plant located at Michigan State University. The black area to the left of the power plant is coal, the energy source that is burned to heat the water in the boilers of this plant.

In the second picture to the right, you'll see the turbine and generator at MSU's power plant. The big pipe on the left side is the steam inlet. On the right side of the turbine is where the steam comes out. The steam is fed under high pressure to the turbine. The turbine spins and its shaft is connected to a turbo generator that changes the mechanical spinning energy into electricity.



Photo credit: Prof. Carl Lira, Mich. State Univ.

Picture 3.



Photo credit: Prof. Carl Lira, Mich State Univ.

Picture 4.

The third picture is of the turbine fan before it is placed inside the turbine housing. You can see a close-up of the turbine blades on the fourth picture. The turbine has many hundreds of blades that are turned at an angle like the blades of a fan. When the steam hits the blades they spin the turbine's shaft that is attached to the bottom of the blades.

After the steam goes through the turbine, it usually goes to a cooling tower outside where the steam cools off. It cools off and becomes water again. When the hot pipes come into contact with cool air, some water vapor in the air is heated and steam is given off above the cooling towers. That's why you see huge white clouds sometimes being given off by the cooling towers. It's not smoke, but is water vapor or steam. This is not the same steam

that is used inside the turbine. The cooled water then goes back into the boiler where it is heated again and the process repeats over and over.

Most power plants in California use cleaner-burning natural gas to produce electricity. Others use oil or coal to heat the water. Nuclear power plants use nuclear energy to heat water to make electricity. Still others, called geothermal power plants, use steam or hot water found naturally below the earth's surface without burning a fuel.

The turbine is attached by a shaft to the turbo generator. The generator has a long, coiled wire on its shaft surrounded by a giant magnet. You can see the inside of the generator coil with all its wires in the picture on the right.



Photo credit:
Prof. Carl Lira, Mich. State Univ.

The shaft that comes out of the turbine is connected to the generator. When the turbine turns, the shaft and rotor is turned. As the shaft inside the generator turns, an electric current is produced in the wire. The electric generator is converting mechanical, moving energy into electrical energy.

The generator is based on the principle of "electromagnetic induction" discovered in 1831 by Michael Faraday, a British scientist. Faraday discovered that if an electric conductor, like a copper wire, is moved through a magnetic field, electric current will flow (or "be induced") in the conductor. So the mechanical energy of the moving wire is converted into the electric energy of the current that flows in the wire.

The electricity produced by the generator then flows through huge transmission wires that link the power plants to our homes, schools and businesses.

All power plants have turbines and generators. Some turbines are turned by wind, some by water, and some by steam.

(<http://www.energyquest.ca.gov/story/chapter06.html>)

LANGUAGE STUDY

18. Match the words from column A with the words from column B.

- A**
- 1 electrical appliance
 - 2 electric generator
 - 3 turbine blade
 - 4 electric conductor
 - 5 cooling tower
 - 6 turbo generator

- B**
- a) лопатка турбины
 - b) электроприбор
 - c) градирня
 - d) турбогенератор
 - e) электрогенератор
 - f) электрический проводник

19. Say whether the following statements are true or false according to the information from the text.

- 1 Thermal power plants have big boilers that burn a fuel to make heat.
- 2 When the generator turns, the shaft and rotor is turned.
- 3 After the steam goes through the boiler, it usually goes to a cooling tower outside the where the steam cools off.
- 4 The turbine has many hundreds of blades that are turned at an angle like the blades of a fan.
- 5 All power plants have turbines and generators.
- 6 The shaft that comes out of the generator is connected to the turbine.
- 7 Nuclear power plants use nuclear energy to heat water to make electricity.
- 8 The boiler is attached by a shaft to the turbo generator.
- 9 When the steam hits the blades they spin the turbine's shaft.

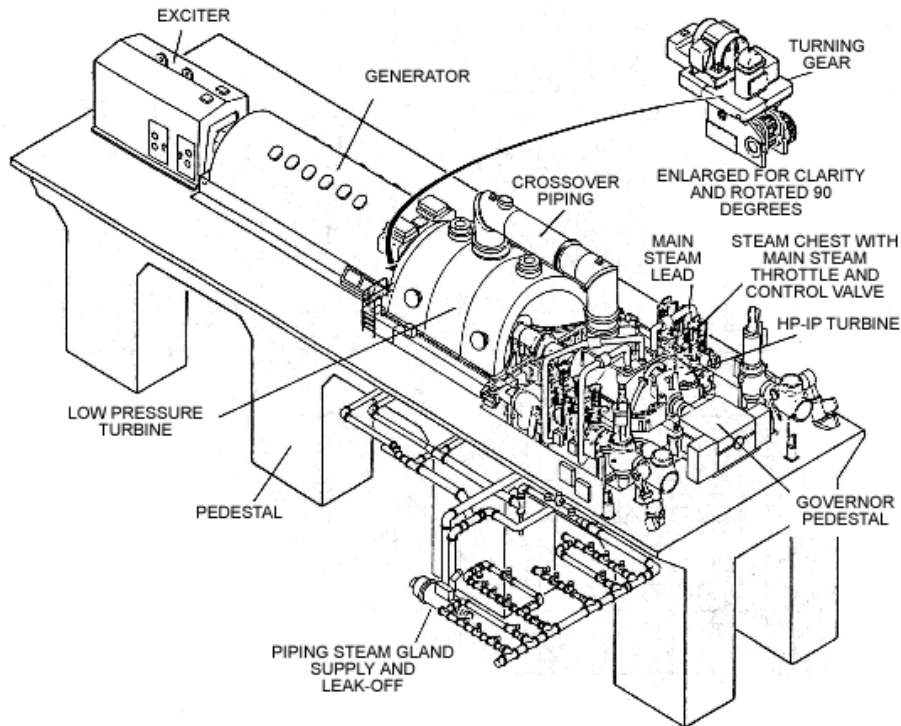
20. Translate into Russian paying attention to the word combinations in bold.

- 1 Thermal power plants have big **boilers that burn a fuel** to make heat.
- 2 The steam **is fed under high pressure** to the turbine.
- 3 The turbine **is attached by a shaft to** the turbo generator.
- 4 When the **turbine turns**, the shaft and rotor is turned.
- 5 Some turbines **are turned by** wind, some by water, and some by steam.
- 6 The **electricity produced by the generator** then flows through huge transmission wires.

21. Read the text. Underline all the Passive Voice constructions and translate them.

De Laval, Parsons and Curtis developed the concept for the steam turbine in the 1880s. Modern steam turbines use essentially the same concept but many detailed improvements have been made in the intervening years mainly to improve turbine efficiency.

Steam turbines are used in all of our major coal fired power stations to drive the generators or alternators, which produce electricity. The turbines themselves are driven by steam generated in 'Boilers' or 'Steam Generators' as they are sometimes called.



A TYPICAL POWER STATION STEAM TURBINE AND ITS EXTERNAL EQUIPMENT

Energy in the steam after it leaves the boiler is converted into rotational energy as it passes through the turbine. The turbine normally consists of several stages with each stage consisting of a stationary blade (or nozzle) and a rotating blade. Stationary blades convert the potential energy of the steam (temperature and pressure) into kinetic energy (velocity) and direct the flow onto the rotating blades. The rotating blades convert the kinetic energy into forces, caused by pressure drop, which results in the rotation of the turbine shaft. The turbine shaft is connected to a generator, which produces the electrical energy. The rotational speed is 3000 rpm for Australian (50 Hz) systems and 3600 for American (60 Hz) systems.

(<http://www.energy.qld.gov.au/electricity/infosite/index.htm>)

22. Look through the text and complete the following sentences.

- 1 Steam turbines are used _____
- 2 _____ are driven by steam generated in boilers.
- 3 Energy in the steam is converted into _____
- 4 _____ convert the potential energy of the steam into kinetic energy.
- 5 The turbine shaft is connected to a generator, which _____

23. Answer the questions.

- 1 What turbines consist of?
- 2 What are steam turbines used for?
- 3 What is the function of a generator?

24. Group any words which go together and make up sentences using some of these phrases. Some words may be used more than once.

- | | |
|--------------|------------|
| 1 potential | a) turbine |
| 2 rotational | b) energy |
| 3 steam | c) blade |
| 4 rotating | d) speed |
| 5 electrical | |

25. Translate into Russian paying attention to the multifunctional words in bold.

- 1 The engineer **is** at the power plant.
- 2 The engineer **is** to work at the power plant.
- 3 They **have** to speak to the inventor.
- 4 They **have** an inventor at the shop.
- 5 The engineer **was** to invite us to visit the power plant.
- 6 They **had** to speak to the inventor.
- 7 It **is necessary that** the workers **should oil** the bearings.
- 8 I find **it** necessary to look through these articles.
- 9 **It** is necessary to have a higher education to get a well-paid job.
- 10 **It** is not an easy task to overcome the power of the planet.
- 11 **It** is said that he knows English.
- 12 It is the magazine **that** I need badly.
- 13 The machines **that** you see are produced by our machine-building plant.
- 14 Studying regularly is **the only** way to master a foreign language.
- 15 The young man could read and translate **only** very easy texts.
- 16 Our plants **provided** with the most modern equipment have raised their output.

PROJECT WORK

26. Imagine you are going to give an excursion to the thermal power station for the first year students of Heat and Power Engineering Department.

Use the following questions to help you.

- 1 What is a thermal power station used for?
- 2 What are the components of the power station?
- 3 What are the functions of these components?
- 4 Tell about the structure of the power plant equipment.

WRITING

27. Read the examples and write your own letters.

a. Making an enquiry.

Visteria Ltd.
142 South Road
London R15 5 AP
England

28th February, 1997

Dear Sirs,

I am writing with reference to your range of power plant products which I recently saw on display at the Newfoundland Trade Fair. We would be very interested in receiving further information about your products.

We would therefore be grateful if you could send us a copy of your current price list together with any available samples.

We look forward to doing business with you in the near future.

Yours faithfully,
Vladimir Smurov
Export-Import Manager

b. Letter of Complaint.

Energy Production Ltd.
P.O. Box 82
Sheffield S20 4 HL
England

18th April, 1997

Dear Sirs,

We have just taken delivery of the goods ordered from you on 1st

February 1997, and I am afraid to say that we are extremely dissatisfied with both the merchandise and the service we have received.

Firstly, we specified when placing the order that the goods should reach us no later than March 30th. However, the order did not arrive until yesterday, and this delay has caused us serious inconvenience. Furthermore, we ordered 5 generators and only 3 were included in the delivery, and due to insufficient packaging, there were damaged. Under the circumstances, we are requesting a price reduction on this order, and replacement goods for those which are unsatisfactory.

We would appreciate a prompt reply.

Yours faithfully,
Vladimir Smurov
Export-Import Manager

c. Answering a Complaint.

Visteria Ltd.
142 South Road
London R15 5 AP
England

21st April, 1997

Dear Mr. Smurov,

We acknowledge receipt of your letter dated 18th April in which you complain about late delivery and damaged items in order №AB/394.

First of all, please accept our sincere apologies for the inconvenience you have been caused which due to a three-week strike in the dispatch department.

In order to compensate, we are prepared to replace the damaged goods free of charge, and shall be pleased to grant you a discount of 10% on your present order, and 5% on any orders you may care to place with us in the near future.

We apologize once again for the inconvenience caused, and we hope that such an unfortunate incident will not compromise our future business relations.

Yours sincerely,
Jack Brown
Claims Department

LANGUAGE STUDY

28. Make up sentences by matching the information from A and B.

- | A | B |
|----------------------------------------------------|-----------------------------------------------------|
| 1. Following your advertisement in the "Daily" ... | a) your order will be one week later. |
| 2. Please find enclosed ... | b) your letter dated 12 th January 2003. |
| 3. We regret to inform you that ... | c) please do not hesitate to contact us. |
| 4. We look forward to ... | d) a visit from your salesman. |
| 5. We acknowledge receipt of ... | e) to enquire about your range of software. |
| 6. Please accept our sincere apologies ... | f) send us a quotation for 20 items. |
| 7. I am writing ... | g) in taking the matter further ... |
| 8. Should you require any further information ... | h) I am writing to apply for the position of ... |
| 9. We would be grateful if you could ... | i) doing business with you in the near future. |
| 10. We would be very interested in receiving ... | j) for the inconvenience you have been caused. |
| 11. Should you be interested ... | k) a copy of our brochure and price list. |

29. Make up sentences by matching formal sentences from column A with informal ones from B.

- | A | B |
|--------------------------------------|----------------------------------------------|
| 1. Sorry about the late delivery. | a) please do not hesitate to contact us. |
| 2. If you need more information ... | b) We received delivery this morning. |
| 3. Best regards. | c) I would be grateful if you could ... |
| 4. In a different envelope. | d) Please find enclosed a copy of ... |
| 5. Sorry about the mistake. | e) Dear Sir/Dear Mr. Haus. |
| 6. I'm sorry, but it's not possible. | f) Please acknowledge receipt of the parcel. |
| 7. Soon | g) I look forward to seeing you. |
| 8. Could you ...? | |
| 9. Just call the office. | |
| 10. Thanks for your letter of ... | |

11. We got it this morning.
 12. Can't wait to see you.
 13. Dear Friedrich
 14. Let me know if you get the parcel.
 15. Could you find out what is going on?
 16. Please send us your samples.
 17. I hope to hear from you.
 18. We will give you a 5% discount.
 19. Here is a copy of ...
- h) We would be pleased to offer you a 5% discount.
 - i) We would like to apologize for the delay.
 - j) Under separate cover.
 - k) In the near future.
 - l) We regret to inform you that we are unable to ...
 - m) Could you please give this matter your immediate attention?
 - n) I look forward to hearing from you.
 - o) We are writing to thank you for your letter dated ...
 - p) Yours faithfully/Your sincerely.
 - q) I would be grateful if you could send us some samples.
 - r) Should you require further information ...
 - s) Please accept our apologies for any inconvenience this may have caused.

additional part
ash-disposal
blade
boiler house
coal fired power station
combined generation
cooling tower
cooling water
current
degrees Celsius
degrees Fahrenheit
electric generator
electrical appliance
enormous
fan
feed pump
firebox
flue gas
force
fuel
furnace
heat supply
heat-and-power installation
improvement
induction
installation
integration
nozzle
power system
pressure drop
professional activity
revolving part
rotating blade
rotation
stationary blade
steam inlet
storage
switchgear
thermal power station

Wordlist

to consist of
to consist of
to convert
to drive the generator
to generate
to pass through
to provide
to require
to rotate
to spin
transmission wires
turbine house
turbine's shaft
turbo generator
velocity
wire

UNIT 5
PROJECT AS A PROFESSIONAL ACTIVITY

WARMING UP

1 What sources of power production do you know?

READING

2 Read the text to find out about different energy resources and power production methods.

Fossil Fuels

Coal, oil and gas are called "fossil fuels" because they have been formed from the organic remains of prehistoric plants and animals.

Coal provides around 28% of our energy, and oil provides 40%.

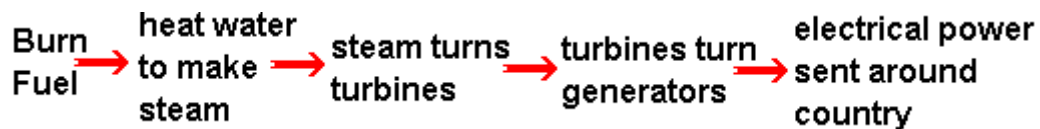
Burning coal produces sulphur dioxide, an acidic gas that contributes to the formation of acid rain. This can be largely avoided using "flue gas desulphurization" to clean up the gases before they are released into the atmosphere. This method uses limestone, and produces gypsum for the building industry as a by-product. However, it uses a lot of limestone.

Crude oil (called "petroleum") is easier to get out of the ground than coal, as it can flow along pipes. This also makes it cheaper to transport.

Natural gas provides around 20% of the world's consumption of energy, and as well as being burnt in power stations, is used by many people to heat their homes. It is easy to transport along pipes, and gas power stations produce comparatively little pollution.

How it works

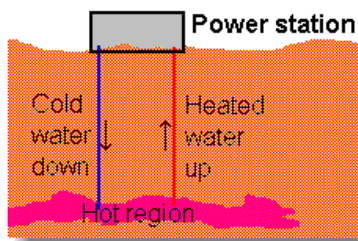
Coal is crushed to a fine dust and burnt. Oil and gas can be burnt directly.



Geothermal energy

The Earth generates a lot of heat while going about its normal business, in the form of subterranean steam and magma among others. The energy generated within the Earth's crust can be harnessed and transformed into other forms of energy, such as electricity.

How it works



Deep under the surface, water sometimes makes its way close to the hot rock and turns into boiling hot water or into steam. The hot water can reach temperatures of more than 300 degrees Fahrenheit (148 degrees Celsius).

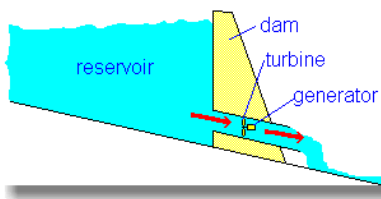
We drill holes down to the hot region, steam comes up, is purified and used to drive turbines, which drive electric generators.

There may be natural "groundwater" in the hot rocks anyway, or we may need to drill more holes and pump water down to them.

Hydropower energy

The use of hydropower involves using the kinetic motion in water as it flows downstream, part of the normal water cycle of the Earth, to generate other forms of energy, most notably electricity. Dams use this property as a means of generating electricity. This form of hydropower is called hydroelectricity. Water wheels were an ancient technology which also made use of this concept to generate kinetic energy to run equipment, such as a grain mill.

How it works



The water behind the dam flows through the intake and into a pipe called a penstock. The water pushes against blades in a turbine, causing them to turn. The turbine is similar to the kind used in a power plant. But instead of using steam to turn the turbine, water is used.

The turbine spins a generator to produce electricity. The electricity can then travel over long distance electric lines to your home, to factories and businesses.

Notice that the dam is much thicker at the bottom than at the top, because the pressure of the water increases with depth.

Hydro power today can be found in the mountainous areas of states where there are lakes and reservoirs and along rivers.

Hydro-electric power stations can produce a great deal of power very cheaply.

Although there are many suitable sites around the world, hydro-electric dams are very expensive to build. However, once the station is built, the water comes free of charge, and there is no waste or pollution.

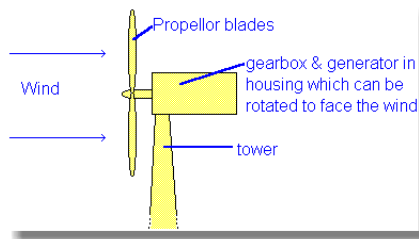
Wind energy

Modern windmills can transfer the kinetic energy of the air flowing through them into other forms of energy, such as electricity. There are some

environmental concerns with using wind energy, because the windmills often injure birds that may be passing through the region.

How it works

The wind blows the propeller round, which turns a generator to produce electricity.



We tend to build many of these towers together, to make a "wind farm" and produce more electricity.

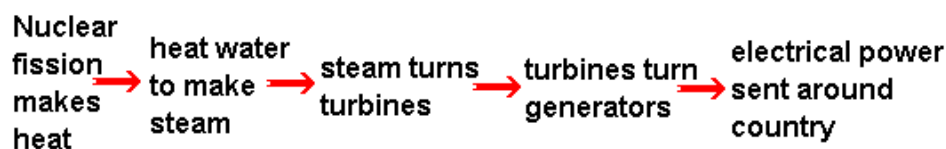
The more towers, the more wind, and the larger the propellers, the more electricity we can make.

It's only worth building wind farms in places that have strong, steady winds, although boats and caravans increasingly have small wind generators to help keep their batteries charged.

Nuclear energy

Certain elements are able to undergo powerful nuclear reactions, releasing energy which can be harnessed and transformed into electricity. Nuclear power is controversial because the material used can be dangerous and resultant waste products are toxic. Accidents that take place at nuclear power plants, such as Chernobyl, are devastating to local populations and environments. Still, many nations have adopted nuclear power as a significant energy alternative.

How it works



Nuclear power stations work in pretty much the same way as fossil fuel-burning stations, except that a "chain reaction" inside a nuclear reactor makes the heat instead.

The reactor uses Uranium rods as fuel, and the heat is generated by nuclear fission. Neutrons smash into the nucleus of the uranium atoms, which split roughly in half and release energy in the form of heat.

Carbon dioxide gas is pumped through the reactor to take the heat away, and the hot gas then heats water to make steam.

The steam drives turbines which drive generators. Modern nuclear power stations use the same type of turbines and generators as conventional power stations.

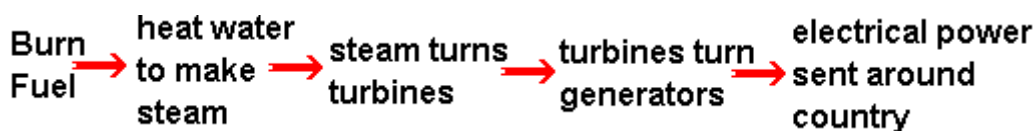
In Britain, nuclear power stations are built on the coast, and use sea water for cooling the steam ready to be pumped round again. This means that they don't have the huge "cooling towers" seen at other power stations.

The reactor is controlled with "control rods", made of boron, which absorb neutrons. When the rods are lowered into the reactor, they absorb more neutrons and the fission process slows down. To generate more power, the rods are raised and more neutrons can crash into uranium atoms.

Biomass energy

Biomass is not really a separate type of energy, so much as a specific type of fuel. It is generated from organic waste products, such as cornhusks, sewage, and grass clippings. This material contains residual energy, which can be released by burning it in biomass power plants. Since these waste products always exist, it is considered a renewable resource.

How it works



The fuel is burned, which heats water into steam, which turns turbines, which in turn drive generators, just like in a fossil-fuel power station. (<http://physics.about.com/od/energyresources/p/powersources.htm>) (<http://home.clara.net/darvill/alterneg>)

3 Answer the questions.

- 1 What are the main forms of fossil fuels?
- 2 Which of the sources mentioned above create waste byproducts which can be harmful pollutants?
- 3 Which of the resources are used in Tomsk region for energy production?
- 4 Which of them are the most ecologically friendly?
- 5 Is producing nuclear energy harmful for the environment? Why?/Why not?
- 6 Why the dam is much thicker at the bottom than at the top?

4 Look through the text and say whether the following statements are true or false according to the information from the text.

- 1 Coal, oil, natural gas, wood fires are examples of fuels.
- 2 Fuels are nonrenewable.

- 3 Dams are necessary for generating hydroelectricity.
- 4 The wind is the single most significant source of energy to the planet Earth.
- 5 Nuclear power is controversial because the material used is not dangerous but resultant waste products are toxic.
- 6 Biomass is considered to be nonrenewable resource.
- 7 Coal is more difficult to get out of the ground than crude oil.
- 8 Burning coal produces no sulphur dioxide.
- 9 Kinetic energy of running water is used to produce hydropower energy.
- 10 Modern nuclear power stations use different type of turbines and generators as conventional power stations.

LANGUAGE STUDY

5 Match the word combinations from column A with the word combinations from column B.

A	B
1 fossil fuel	a) закачивать
2 to provide	b) способствовать
3 to contribute	c) электроэнергия, выработанная ГЭС
4 groundwater	d) ископаемое топливо
5 to pump	e) впускное отверстие
6 hydroelectricity	f) обеспечивать
7 intake	g) подземная вода
8 penstock	h) шлюзный затвор
9 to spin	i) бесплатно
10 electric line	j) обычный, традиционный
11 free of charge	k) вращать
12 conventional	l) линия электропередачи

6 Group any words which go together.

1 acid	a) gas
2 fossil	b) generator
3 crude	c) farm
4 natural	d) cycle
5 energy	e) process
6 electric	f) fuel
7 water	g) oil

- | | |
|------------|----------------|
| 8 kinetic | h) product |
| 9 wind | i) energy |
| 10 nuclear | j) rain |
| 11 waste | k) consumption |
| 12 fission | l) reaction |

7 Read the following statements and fill in the gaps using the words from the table.

methods	drill	air	biomass	reduce	renewable	fuel
earth	entire	uranium	speeds	electricity	geothermal	

- 1 Coal is mined out of the ground using various _____.
- 2 To find oil and natural gas, companies _____ through the earth to the deposits deep below the surface.
- 3 Natural gas is lighter than _____.
- 4 Your trash contains some types of _____ that can be reused.
- 5 Using biomass can help _____ global warming compared to a fossil fuel-powered plant.
- 6 Biomass is a _____ resource because plants to make biomass can be grown over and over.
- 7 Hot water or steam from below ground can also be used to make electricity in a _____ power plant.
- 8 A geothermal power plant is like in a regular power plant except that no _____ is burned to heat water into steam.
- 9 The steam or hot water in a geothermal power plant is heated by the _____.
- 10 Water power supplies about 10 percent of the _____ electricity that we use.
- 11 A nuclear power plant uses _____ as a "fuel."
- 12 In order for a wind turbine to work efficiently, wind _____ usually must be above 12 to 14 miles per hour.
- 13 About 11 percent of the entire world's wind-generated _____ is found in California.

READING

8 Read the text below and answer the question: What does the programme deal with?

Union's European Programme

EUP supports the progression of improved non-nuclear energy technologies through demonstration and market penetration. The focus of the programme component is on the demonstration and promotion of clean and efficient energy technologies in three broad areas:

- renewable energy sources;
- rational use of energy in buildings, industry and transport;
- cleaner and more efficient use of fossil fuels and more effective exploration, distribution and transportation of hydrocarbons.

At the core of the aims of the European Union as a whole, are three central objectives. First, to help promote economic growth and create employment. Second, to improve the competitiveness of our industries. Third, to protect our environment and contribute towards sustainable development. New energy technologies can make an important contribution towards achievement of these objectives. A more efficient use of resources, such as fuels and electricity, helps to improve the relative cost-effectiveness of our industries and hence the goods and services they make and sell. As the recent economic crises in the Far East has shown, the world is truly a global village. Likewise, our industries across the EU are intrinsically connected to the ebbs and flows of international markets. The technologies supported under programme like THERMIE have contributed to a more efficient use of resources, thus reducing costs and making the companies more competitive. The indicator commonly used to measure the "efficiency of energy use" sector is that of energy consumption per unit of output, known as "energy intensity".

Investment in new technologies can also have an impact in another area, namely that of employment creation. Many of the technologies supported by initiatives such as THERMIE are more labor intensive than their conventional competitors, either in manufacturing and installation, or in operation and maintenance. Thus, investing in these applications, and the firms that produce them, allows for a contribution towards employment creation. Moreover, many of the jobs created are highly skilled, or are located in priority areas.

Investing in technology to stimulate economic growth is not sufficient, in itself, to meet our objectives. We must also work towards promoting sustainable development and protection of our environments. The emphasis on clean and efficient technologies can make a substantial contribution towards achievement of these aims. All of the technologies and applications supported under THERMIE offer access to zero or low emissions of gases such as CO₂, the main greenhouse gas. In the Solid Fuel sector, for example, the advanced coal technologies supported within THERMIE offer access to

substantial reductions in emissions of greenhouse gases and those responsible for acid deposition. A recent analysis by the European Commission sought to quantify these savings.

As a consequence of the investments made in new technologies, and changing patterns of energy supply, the Member States of the EU, and the EU itself, are contributing to lowering the emissions of greenhouse gases. The investments made from EU funds can help a project partner in many different ways. Firstly, the mechanism allows for the creation of a vehicle to support the exchange of information and experience between companies and organizations across the EU and beyond. Second, the impact of the European funding is to stimulate projects, which would not otherwise have gone ahead, or to the same extent.

Technical performance is another key area where the Programme's initiatives have been focused. In this case, the impact of THERMIE has been to improve the reliability and efficiency of the technologies and applications, so as to encourage their market deployment.

9 Answer the questions.

- 1 What is the focus of the programme?
- 2 What are three central objectives at the core of the aims of the European Union as a whole?
- 3 Why is the world truly a global village?
- 4 What impact can investment in new technologies also have?
- 5 What can the emphasis on clean and efficient technologies make?
- 6 How can the investments made from EU funds help a project partner?

10 Look through the text and say whether the following statements are true or false according to the information from the text.

- 1 EUP supports the progression of improved nuclear energy technologies through demonstration and market penetration.
- 2 As the recent economic crises in the Middle East has shown, the world is truly a global village.
- 3 Likewise, our industries across the EU are intrinsically connected to the ebbs and flows of international markets.
- 4 Investment in new technologies can also have an impact in another area, namely that of employment creation.
- 5 Research and development is another key area where the Programme's initiatives have been focused.

LANGUAGE STUDY

11 Group any words which go together.

- | | | |
|----|-------------|---------------|
| 1 | penetration | a) economic |
| 2 | component | b) efficient |
| 3 | source | c) fossil |
| 4 | fuels | d) low |
| 5 | objective | e) energy |
| 6 | crises | f) greenhouse |
| 7 | use | g) market |
| 8 | emissions | h) project |
| 9 | gas | i) central |
| 10 | partner | j) programme |

12 Find synonyms from the text for the following words and make up one sentence containing as many of these words as possible.

Application, in the center, aims, essential, influence, as a result

13 Translate into Russian.

Improved non-nuclear energy technologies, clean and efficient energy technologies, renewable energy sources, energy intensity, employment creation, acid disposition, market deployment

READING

14 Read the text and answer the questions.

- 1 What kind of energy is called waste free?
- 2 What kind of energy pollutes the habitat?
- 3 What does global warming influence on?

Development of power engineering in its connection with the environment

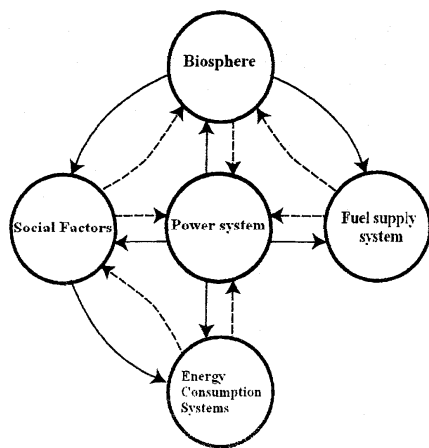
The so-called Kyōto (a Japanese city) Protocol signed by the majority of industrially developed countries in 1997 testifies that this problem has become of public concern. According to this Protocol, countries have committed themselves to control polluting emissions into the atmosphere.

Periodic meetings of state leaders in which problems of sustainable development of the human civilization primarily in connection with ecological problems are discussed become a tradition.

Obviously, planning and designing power systems as well as their subsequent development and maintenance must consider all their effects on the environment. In this connection, experts in power engineering must have extensive knowledge of the nature and natural phenomena.

A power system in which electrical and thermal energies are produced is directly connected with a system providing primary power resources (Fig. 1.). Building of a power system and conditions of its operation in many respects are determined by natural factors, for example, by the availability of water reservoirs and geographical location of power resources and customers. A state of the biosphere and a degree of its pollution connected with the operation of power systems impose definite limitations on their characteristics and working conditions. Direct relationships and feedbacks between the biosphere and a power system are traced here.

Efficient management of a power system must consider its influence on the biosphere, social functions of a system of fuel supply, demands for energy of industry and transport, and other factors. Not only energy production in the power system but also its consumption by various branches of economy must be managed.



Interactions of power systems with the related economic system and the biosphere must be considered in the process of managing the power system, predicting and designing its future development, and carrying out scientific research. Fig. 1. Different factors influencing the operation of a power system

The development of power engineering influences directly the general state of technology. In turn, achievements in different branches of technology are reflected in the state of power engineering. Power engineering, the biosphere, and social and economic human activities are interrelated.

Power engineering based on non-renewable sources results in additional heating of the habitat, that is, the energy of these sources is added to the energy of heating of our planet by the Sun.

Renewable power sources do not heat our planet; therefore, this type of energy is called non-adding. Indeed, in this case, using, for example, solar rays in power systems located on the Earth, we eliminate their energy from the heating cycle of the planet. After usage, we return this energy to the

planet as the same amount of heat. The same is true for the wind or oceanic energy, namely, as much energy is returned to the habitat in the form of heat as there is taken from the power background. The non-adding energy can be called waste free, whereas the adding energy should be considered as the energy polluting the habitat.

Calculations demonstrate that the production of only 1 % of the adding energy (for example, chemical, nuclear, or thermonuclear energy) of the total solar energy will cause the average temperature of the biosphere to increase by $\sim 1^\circ$.

It is generally recognized that such an increase in the average temperature of the biosphere will cause disastrous global consequences not only on the Earth's geography and climate but also on animal and vegetable kingdoms. Global warming will unpredictably change the rate and character of all processes proceeding on the Earth and will considerably change the atmospheric circulation and soil moistening. As a result, zones optimal for agriculture and other types of economic activities will be strongly displaced.

15 Say whether the following statements are true or false according to the information from the text.

- 1 The Kyōto Protocol was signed by every industrially developed country.
- 2 There are no direct relationships and feedbacks between the biosphere and a power system.
- 3 Experts in power engineering must have extensive knowledge of the nature and natural phenomena.
- 4 Building of a power system and conditions of its operation are determined by economic forces.
- 5 The development of power engineering influences directly the general state of technology.
- 6 Power engineering, the biosphere, and social and economic human activities are interdependent.
- 7 Renewable power sources heat our planet; therefore, this type of energy is called adding energy.

16 Group any words which go together.

- | | |
|--------------|----------------|
| 1 heating | a) engineering |
| 2 average | b) cycle |
| 3 human | c) phenomena |
| 4 disastrous | d) rays |

- | | |
|---------------|-----------------|
| 5 power | e) activity |
| 6 solar | f) emissions |
| 7 polluting | g) consequences |
| 8 atmospheric | h) circulation |
| 9 natural | i) recognized |
| 10 generally | j) temperature |

17 Translate into Russian.

- 1 **Global warming** will unpredictably change the rate and character of all processes proceeding on the Earth.
- 2 The non-adding energy can be called waste free, whereas the adding energy should be considered as **the energy polluting the habitat**.
- 3 **A power system in which electrical and thermal energies are produced** is directly connected with a system providing primary power resources.
- 4 Planning and designing power systems as well as their subsequent development and maintenance must consider all their **effects on the environment**.
- 5 It is generally recognized that such an increase in the average temperature of the biosphere will **cause disastrous global consequences**.

SPEAKING

18 Make up the plan of the text and retell it.

READING

19 Read the following abstract and fill in the gaps using the words from the table.

grow	determine	concentration	difficult	population
global	convert	increase	consumption	natural

Greenhouse effect

Over the past few years, the problem of (1)_____ greenhouse effect has attracted a close attention of the scientists. Unfortunately, it turns out that it is very (2)_____ to predict the future correctly because of a high degree of uncertainty of this problem due to our poor knowledge of many processes proceeding in the atmosphere, soil, and ocean. It is not surprising that predictions of different scientific groups differ radically from each

other. An optimistic prediction implies that the temperature will (3)_____ by 1° as the amount of carbon dioxide is doubled, whereas a pessimistic prediction implies that the temperature will grow by 5° . An average value of $2.5-3^{\circ}$ is taken as the most probable value of temperature rise.

How fast will carbon dioxide be accumulated actually? If the rate of carbon dioxide (4)_____ is retained, in 50 years the carbon dioxide concentration will increase by 15-20% compared to its value at present.

However, since the (5)_____ of fossil fuel grows, it seems more probable that the carbon dioxide (6)_____ will have increased by 25% and more by the early 40s. In the context of the most probable prediction, this would correspond to a temperature rise of $\sim 1^{\circ}$, which would be very dangerous.

Life in developed countries differs by an extraordinary high rate of consumption of (7)_____ resources. In particular, these countries burn more than halve the fossil fuel whereas their population is only 20% of the Earth's (8)_____. Such rate of consumption of resources is determined by the life standards that have already been reached by the majority of population of these countries and for which the remaining countries strive: a separate rather large house and one or better two cars per family, an opportunity to travel, etc. These standards finally (9)_____ the vital needs of the society for black and nonferrous metals, cement, plastic, wood, etc. and through the necessity to extract, to treat, and to transport all this demands for energy.

A question arises: can the population of developed countries anyhow change their life standards? Do the old life standards (large house, two cars etc.) remain so much attractive if we take into account that following this lifestyle we will soon (10)_____ our Earth into a desert?

20 Group any words which go together.

- | | |
|------------------|------------------|
| 1 poor | a) metals |
| 2 temperature | b) concentration |
| 3 carbon dioxide | c) standards |
| 4 natural | d) knowledge |
| 5 life | e) needs |
| 6 vital | f) resources |
| 7 nonferrous | g) rise |

21 Find synonyms from the text for the following words.

completely, quantity, possible, extremely, specifically, transform

22 Read the text again and make up 5 questions.

SPEAKING

23 Read the following statements and comment them. Use the following phrases.

I don't think ...
 I don't suppose ...
 I'm sure (certain) that ...
 It's .../likely, not very likely, unlikely, possible ...
 I totally disagree ...
 I have a firm belief ...
 There is no reason to deny ...

- 1 A more efficient use of resources, such as fuels and electricity, helps to improve the relative cost-effectiveness of our industries and hence the goods and services they make and sell.
- 2 Investment in new technologies can also have an impact on employment creation.
- 3 The emphasis on clean and efficient technologies can make a substantial contribution towards achievement and protection of our environment.

GRAMMAR REVIEW

The Gerund

	Indefinite	Perfect
	simultaneous	priority
Active	<i>using</i>	<i>having used</i>
Passive	<i>being used</i>	<i>having been used</i>

Grammar Box

The Gerund is used:

As a noun

- *Swimming keeps you fit.*

After prepositions

- *He left without saying goodbye.*

After: love, like, enjoy, dislike, hate, prefer to

- *She likes doing presentations.*

After: it's no use, it's (not) worth, it's no good, be busy, what's the use of ...?, there's no point in, can't help, can't stand, be/get used to, have difficulty (in)

- *It's worth **using** efficient technologies.*

Functions:

Subject (подлежащее)

- *Solving financial problems is a difficult job. – Решение (решать)...*
- *His having solved the problem surprised me. – То, что он решил...*

Predicate (сказуемое)

- *Our aim is solving the problem. – ... решить (решение)...*

Prepositional indirect object (предложное дополнение)

- *I know of the problem having been solved... – что задача решена (была решена)...*

Direct object (прямое дополнение)

- *He likes solving difficult financial problems. – ... решать (решение)*

Attribute (определение)

- *The way of solving the problem is not clear. – ...решения (решить)...*

Adverbial modifier (обстоятельство):

1 Of time

- *On solving the payment problem he proceeded to drawing the contract. Решив (после решения)...*

2 Of manner

- *By solving the payment problem he got good returns Решая (решив)...*
- *In solving the problem he made some mistakes. Решая (при решении...)*

3 Of condition

- *You can't do without solving the problem. Не решив (без решения)...*

4 Of purpose

- *It is well known that the generator being used for production of energy.*

(http://reuters.forekc.ru/index_157.htm)

24 Translate the following sentences paying attention to the Gerund.

- 1 Learning English is not an easy thing.
- 2 His friend began learning the English language.

- 3 Studying natural phenomena without making observations is useless.
- 4 There are many methods of solving this problem.
- 5 On coming home my father began watching television.
- 6 Russian scientists played an important part in solving the problem of atmospheric electricity.
- 7 On splitting atoms in the reactor heat is developed.
- 8 Seeing is believing.

25 Complete the following sentences using the Gerund.

Example: *When will you finish (to read) ...? – When will you finish reading this scientific magazine?*

- 1 Do you like (to go) ...?
- 2 My friend never thought of (to become)
- 3 This is a device for (to turn)
- 4 Excuse me for (to be late)
- 5 Why are you translating a scientific article without (to read) ...?
- 6 We went to the cinema instead of (to watch)
- 7 An electric lamp is used for (to light)
- 8 We began (to translate) the article after (to read)

26 Translate into English.

- 1 Использование новых материалов способствует техническому прогрессу.
- 2 При объяснении физического явления преподаватель сделал несколько опытов.
- 3 Увеличение производства энергии необходимо.
- 4 Изобретатель был против изменения конструкции этого устройства.
- 5 Увидев прибор в действии, студенты решили, что он надежен.
- 6 Мы закончили обсуждать эту проблему к концу недели.

27 Read the sentences and define the functions of the Gerund. Translate sentences into Russian.

- 1 Working with him was difficult.
- 2 Her only fun was reading books.
- 3 Nothing could stop Tim from being an engineer.
- 4 They give the impression of not working.

- 5 They have not spoken a word since leaving the party.
- 6 The whole evening was spent in deciding whether to go or not.
- 7 You can't make a good presentation without preparing for it.
- 8 We know of his house being destroyed by a stroke of lightning.
- 9 Franklin's having worked in the field of electricity is known the world over.
- 10 Everybody insisted on this experiment being made once more.
- 11 Carrying this test successfully was helped by the careful investigations of outstanding scientists.
- 12 You don't mind my mentioning it, do you?
- 13 Mastering this speciality is an indispensable thing.
- 14 I like studying English.
- 15 They spoke of organizing a meeting.
- 16 He tells me of his going on a mission tomorrow.
- 17 He insists on his being sent on a mission.

28 Choose the correct answer.

- 1 I don't like him taking so much of my time.
 - a) Мне не нравится, что он отнимает у меня столько времени.
 - b) Мне он не нравится, потому что отнимает у меня слишком много времени.
 - c) Я не хочу брать его с собой на столь длительное время.
- 2 We are tired of listening to her complaints.
 - a) Мы устали, слушая ее жалобы.
 - b) Нам надоело слушать ее жалобы.
 - c) Так как нам надоело слушать, мы пожаловались ей.
- 3 This accident was due to the driver's having been careless.
 - a) Авария должна была произойти из-за небрежного вождения.
 - b) Авария происходит, когда водители едут неосторожно.
 - c) Авария произошла из-за того, что водитель допустил небрежность.
- 4 They insist on the sample being tested repeatedly.
 - a) Они настаивают на том, чтобы повторить испытания образца.
 - b) Они настаивают на том, чтобы образец был многократно проверен.
 - c) Они настаивают на том, что проверили образец много раз.
- 5 His having conducted the experiment is a known fact.
 - a) То, что он должен провести этот эксперимент, фактически известно.
 - b) То, что он провел этот эксперимент, является известным фактом.

- c) Факт проведения им этого эксперимента известен.
- 6 Дети любят, когда им читают.
- Children like their reading.
 - Children like when them being read.
 - Children like being read to.
- 7 Партнеры не одобряют того, что он пренебрегает своими обязанностями.
- The partners don't approve of his duties neglecting.
 - The partners don't approve of him neglecting his duties.
 - The partners don't approve of his having neglected his duties.
- 8 Почему вы избегаете говорить об этом?
- Why do you avoid speaking about it?
 - Why do you avoid your speaking about it?
 - Why do you avoid being spoken about it?
- 9 Тренер гордится тем, что его команда заняла первое место.
- The coach is proud of his team's taking first place.
 - The coach is proud of his team's having been taken first place.
 - The coach is proud of his team having taken first place.
- 10 Англичане были против введения евро в их стране.
- The English were against the euro's introducing in that country.
 - The English were against the euro having been introduced in that country.
 - The English were against the euro being introduced in that country.

PROJECT WORK

- 29 Look through the table. Using the information make up a summary about different sources of energy, their benefits and environment influence.**

Comparisons of various energy sources

Source	Advantages	Disadvantages
Coal	Inexpensive Easy to recover (in U.S. and Russia)	Requires expensive air pollution controls (e.g. mercury, sulfur dioxide) Significant contributor to acid rain and global warming Requires extensive transportation system

Nuclear	<p>Fuel is inexpensive Energy generation is the most concentrated source Waste is more compact than any source Extensive scientific basis for the cycle Easy to transport as new fuel No greenhouse or acid rain effects</p>	<p>Requires larger capital cost because of emergency, containment, radioactive waste and storage systems Requires resolution of the long-term high level waste storage issue in most countries Potential nuclear proliferation issue</p>
Gas / Oil	<p>Good distribution system for current use levels Easy to obtain Better as space heating energy source</p>	<p>Very limited availability as shown by shortages during winters several years ago Could be major contributor to global warming Expensive for energy generation Large price swings with supply and demand</p>
Hydroelectric	<p>Very inexpensive once dam is built Government has invested heavily in building dams, particularly in the Western U.S.</p>	<p>Very limited source since depends on water elevation Many dams available are currently exist (not much of a future source[depends on country]) Dam collapse usually leads to loss of life Dams have affected fish (e.g. salmon runs) Environmental damage for areas flooded (backed up) and downstream</p>
Wind	<p>Wind is free if available Good source for periodic water pumping demands of farms as used earlier in 1900's Generation and maintenance costs</p>	<p>Need 3x the amount of installed generation to meet demand Limited to windy areas. Limited to small generator size; need many towers. Need expensive energy storage (e.g. batteries) Highly climate dependent – wind can damage equipment during windstorms</p>

	<p>have decreased. Wind is proving to be a reasonable cost renewable source. Well suited to rural areas.</p>	<p>or not turn during still summer days. Can affect endangered birds, however tower design can reduce impact..</p>
Biomass	<p>Industry in its infancy Could create jobs because smaller plants would be used</p>	<p>Inefficient if small plants are used Could be significant contributor to global warming because fuel has low heat content</p>

a great deal of smth
achievement
acidic gas
alternative
atmospheric circulation
average temperature
biosphere
boron
by-product
carbon dioxide
comparatively
competitiveness
concentration
consumption
control rod
controversial
conventional
cooling tower
cost-effectiveness
crude oil
dam
deployment
devastating
distance
distribution system
economic growth
electric line
energy resource
fission process
geothermal energy
grain mill
greenhouse effect
groundwater
heating cycle
hydroelectricity
hydropower
impact
inexpensive
influence on smth
instead of

Wordlist

intake
limestone
market penetration
neutron
non-nuclear
nuclear fission
nuclear reaction
objective
organic remain
penstock
petroleum
pollution
power production
prehistoric
pressure
propeller
rational use
reactor
reduction
renewable resource
resultant
scientific research
source
subterranean
sulphur dioxide
sustainable
to absorb
to adopt
to clean up
to contribute
to correspond to smth
to crush
to differ
to drill
to eliminate
to exist
to flow through smth
to get out of
to have an impact
to increase

to predict the future
to promote
to pump
to purify
to push against smth
to release
to release into atmosphere
to run equipment
to support
to take place
to transfer
to transport
to undergo
tower
toxic
turbine spin
uranium
waste free
waste product
water cycle

UNIT 6

PROJECT AS A PRODUCT OF PROFESSIONAL ACTIVITY

WARMING UP

1. Answer the questions.

- 1 What is innovation?
- 2 What are the purposes of innovations?

READING

2. Read the text and answer the question: What is the purpose of the innovation described below?

New system uses mine waste to generate clean power



New technology for generating power from coal mining waste was launched by the Federal Minister for Industry, Tourism and Resources, the Hon. Ian Macfarlane, at CSIRO in Brisbane. The revolutionary technology has the potential to significantly reduce greenhouse gases and bring big savings to mining companies operating coal mines. The CSIRO-Liquatech hybrid coal and gas turbine system unveiled at the Queensland Centre for Advanced Technologies will generate electricity from waste coal and gas that would otherwise have polluted the atmosphere.

The method harnesses existing technologies in a 1.2 megawatt hybrid coal and gas turbine system that burns waste coal and methane to generate electricity which can either be used to power the mine's operations or be returned to the grid for general consumption.

CSIRO and its partners have developed the system over three years as part of a CSIRO research project targeting a 75 per cent reduction in greenhouse gas emissions from coal mines over the next 20 years. Funded by CSIRO, the Australian Coal Association Research Program (ACARP), the

NSW Sustainable Energy Development Authority (SEDA) and the Brisbane-based Liqueatech Turbine Company, the turbine-furnace technology will be commercially demonstrated in NSW next year. CSIRO project leader Patrick Glynn says the technology works by burning methane and coal in a kiln to produce hot air which is then passed through a specially adapted heat exchange unit to drive a gas turbine which generates the electricity.

"Using a kiln coupled with an externally-fired gas turbine allows for a simple but highly efficient system," Mr. Glynn says. "It is significantly cheaper and more efficient than steam-powered systems because it does not require water treatment systems, condensers, cooling towers or high-pressure fluid handling systems."

It is estimated that emissions from underground coal mines contribute around 5.7 per cent of the total 6.7 per cent of Australia's total annual greenhouse emissions attributed to coal mining operations.

"The scale of the problem can be gauged by the fact that each of Australia's underground coal mines produces around 800,000 tonnes of waste coal every year," Mr. Glynn says. "As waste coal is a significant cost for coal mines – accounting for up to eight per cent of their budgets – by recycling the waste and returning it to the generating system as power the new technology will potentially save the Australian industry alone millions of dollars annually. "The new turbine has the potential not only to reduce fugitive emissions from coal mines but also to significantly reduce existing greenhouse effects by displacing hundreds of megawatts of electricity already in the power grid with electricity fuelled by burnt methane which has seven times less greenhouse potential," he says. (<http://www.innovations-report.com>)

LANGUAGE STUDY

3. Match the words from column A with words from column B.

- | A | B |
|-----------------|---------------------|
| 1 research | a) unit |
| 2 heat exchange | b) system |
| 3 highly | c) company |
| 4 underground | d) project |
| 5 coal mining | e) efficient system |
| 6 greenhouse | f) coal mine |
| 7 mining | g) waste |
| 8 fugitive | h) treatment system |
| 9 generating | i) gas |
| 10 coal | j) emissions |
| 11 water | k) mine |

4. Translate into Russian.

new technology, to be launched by, revolutionary technology, reduce greenhouse gases, existing technologies, research project, specially adapted, annual greenhouse emissions, to reduce emissions.

5. Make up your own sentences using words and word combinations from task 3 and task 4.

READING

6. Read the text and answer the question: What is the text about?

Power Plant Waste Heat Could Produce Fresh Water

University of Florida Department of Mechanical and Aerospace Engineering professors James Klausner and Renwei Mei have developed a method to use power plant waste heat to lower the cost of water desalination.

Since power plants need water for cooling purposes and desalination plants need heat, why not combine the needs of both? The professors – James Klausner and Renwei Mei – calculate that their process would shave a sixth of the cost from today's most efficient technology.

If we either develop cheaper energy sources or more of the world becomes industrialized then there will be no world scale shortage of drinkable water. If people can afford to pay for water it can always be produced by desalination. Alarmist talk in some circles about future water shortages assumes a high rate of poverty. Water shortages will become a bigger problem in the future only where severe poverty will continue to be a problem.

Employing a major modification to distillation, Klausner's technology relies on a physical process known as mass diffusion, rather than heat, to evaporate salt water.

In a nutshell, pumps move salt water through a heater and spray it into the top of a diffusion tower – a column packed with a polyethylene matrix that creates a large surface area for the water to flow across as it falls. Other pumps at the bottom of the tower blow warm, dry air up the column in the opposite direction of the flowing water. As the trickling salt water meets the warm dry air, evaporation occurs. Blowers push the now-saturated air into a condenser, the first stage in a process that forces the moisture to condense as fresh water.

Klausner said the key feature of his system is that it can tap warmed water plants have used to cool their machines to heat the salt water intended for desalination, turning a waste product into a useful one.

He has successfully tested a small experimental prototype in his lab, producing about 500 gallons of fresh water daily. His calculations show that a larger version, tapping the waste coolant water from a typically sized 100-megawatt power plant, has the potential to produce 1.5 million gallons daily. The cost is projected at \$2.50 per 1,000 gallons, compared with \$10 per thousand gallons for conventional distillation and \$3 per thousand gallons for reverse osmosis.

Because the equipment would have to extract as much heat as possible from the coolant water, it would need to be installed when a plant is built, he said. Another potential caveat is that a full-scale version of the mechanism would require a football field-sized plot on land, likely to be expensive in coastal areas where power plants are located, Klausner said. Presumably a utility would sell the fresh water it produces, recouping and then profiting from its investment, he said.

Limited quantities of energy and intelligence are the two biggest factors holding down the rate of economic development. Every technology that increases the efficiency of utilization of energy or lowers the cost of energy spurs economic growth. Anything that raises human intelligence levels will do the same. Also, computer technologies effectively increase the efficiency of the use of human intelligence by unburdening many tasks from human minds. So computers are brain utilization efficiency increasers.

(<http://www.futurepundit.com/archives/002609.html>)

7. Match the word combinations from column A with the word combinations from column B.

A	B
1 desalination	a) сокращать
2 waste heat	b) предполагать
3 to combine	c) парообразование
4 drinkable	d) отработанное тепло
5 to shave	e) недостаток
6 shortage	f) объединять
7 to assume	g) опреснение
8 high rate	h) годный для питья
9 distillation	i) высокий процент
10 to rely on	j) основывать на чём-либо
11 evaporation	k) выпаривание
12 to hold down	l) удерживать, поддерживать

8. Look through the text and say whether the following statements are true or false according to the information from the text.

- 1 Limited quantities of energy and intelligence are the two biggest factors holding down the rate of economic development.
- 2 Any technology that increases the efficiency of utilization of energy or lowers the cost of energy doesn't spur economic growth.
- 3 Power plants need water for cooling purposes.
- 4 Klausner's technology relies on a physical process known as mass distillation, rather than heat, to evaporate salt water.
- 5 The professors calculate that their process would reduce a sixth of the cost from today's most efficient technology.
- 6 Computer technologies effectively increase the efficiency of the use of human intelligence by unburdening many tasks from human minds.

SPEAKING

9. Speak about advantages and disadvantages of the invention described above.

READING

10. Read the text to find out about Combined Heat and Power.

**Combined Heat and Power:
Saving Energy and the Environment**

What if a technology could cut energy costs by 40 percent, reduce pollution and greenhouse gas emissions by 50 percent, increase energy efficiency by 20 percent, and pay for itself in less than five years? Wouldn't manufacturers, universities, and other institutions rush to buy it? Wouldn't local, state, and federal governments support its increased use? Such a technology exists – we call it Combined Heat and Power or "CHP" – but it has received little recognition. In fact, CHP sales declined in 1997, largely because of uncertainties associated with electric utility restructuring, increased problems obtaining environmental permits, and rising costs and difficulties in dealing with local utilities.

Recent advances in efficient, cost-effective, electricity generation technologies – in particular, advanced combustion turbines and engines – have allowed for new configurations that reduce size yet increase output. Turbines are now cost-effective for systems down to 500 kilowatts (KW), the size needed for a small manufacturing plant or moderate-sized building. Recipro-

cating engines are cost-effective for systems down to 50 KW, the size of a small office or restaurant. Even smaller equipment is on the horizon.

This next generation of turbines, fuel cells, and reciprocating engines is the result of intensive, collaborative research, development, and demonstration by government and industry. Advanced materials and computer-aided design techniques have increased equipment efficiency and reliability dramatically, while reducing costs and emissions of pollutants. Now the range of CHP system configurations includes:

- **Boiler Systems with Steam Turbines.** In the traditional cogeneration configuration, a boiler generates steam from burning fuel or utilizing waste heat from an industrial process, such as a furnace. Some or all of the steam turns a steam turbine that generates electricity. The steam then satisfies thermal requirements like space heating or industrial processes. This CHP configuration still dominates industrial electricity cogeneration.

- **Combustion Turbine or Reciprocating Engine with Heat Recovery.** In this configuration, a combustion turbine or engine generates electricity or mechanical energy. The heat in the exhaust and in the cooling water and oil generates steam in a boiler. Such systems will capture a greater share of the CHP market in the future. Reciprocating engines are the dominant technology for smaller systems with an average installed size of less than one MW.

- **Combined Cycle Systems.** In a combined cycle system, a steam turbine is used as part of a combustion turbine system in order to increase the electricity produced. The electricity fraction of usable energy in these systems frequently exceeds the thermal output. While these systems account for only a small number of industrial CHP systems, they are significant in terms of capacity and are the dominant configuration for new merchant power plants. These independently-owned power generation facilities produce both electrical and thermal energies that are sold to third parties.

(<http://www.nemw.org/ERheatpower.htm>)

11. Translate into Russian. Make up your own sentences using the given word expressions.

to cut energy costs by 40 percent, reduce pollution and greenhouse gas emissions, increase energy efficiency, rising costs, recent advances, electricity generation technologies, next generation, collaborative research.

12. In pairs discuss advantages and disadvantages of CHP.

READING

13. Read the following statements and comment on them.

1 The Fundamental Canons

- Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
- Engineers shall perform services only in the areas of their competence.
- Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
- Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.
- Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

(<http://ethics.iit.edu/codes/engineer.html>)

14. Use the word given in the capitals at the end of each line to form a word that fits in the space in the same line.

2 Code of Ethics for Engineers

<p>(1) _____ is an important and learned profession. As members of this profession, engineers are (2) _____ to exhibit the (3) _____ standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require (4) _____, impartiality, fairness, and equity, and must be dedicated to the (5) _____ of the public health, safety, and welfare. Engineers must (6) _____ under a standard of professional behavior that (7) _____ adherence to the highest principles of ethical conduct.</p> <p>Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:</p> <ul style="list-style-type: none">• (8) _____ their knowledge and skill for the enhancement of (9) _____ welfare;• being honest and impartial, and serving with fidelity the public, their (10) _____ and clients;	<p>engineer expect high</p> <p>honest</p> <p>protect</p> <p>performance requirement</p> <p>use humanity</p> <p>employ</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<ul style="list-style-type: none"> • striving to increase the competence and prestige of the engineering profession; and supporting the (11) _____ and technical societies of their disciplines. 	profession
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------

15. Read the text and fill in the gaps using words from the table.

environmental participate resources generations promote protect community acknowledge serve management achievements

3 Professional Obligations

Engineers shall be guided in all their relations by the highest standards of honesty and integrity.

- a) Engineers shall (1) _____ their errors and shall not distort or alter the facts.
- b) Engineers shall advise their clients or employers when they believe a project will not be successful.
- c) Engineers shall not (2) _____ their own interest at the expense of the dignity and integrity of the profession.

Engineers shall at all times strive to (3) _____ the public interest.

- a) Engineers are encouraged to (4) _____ in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their (5) _____.
- b) Engineers are encouraged to extend public knowledge and appreciation of engineering and its (6) _____.
- c) Engineers are encouraged to adhere to the principles of sustainable development in order to (7) _____ the environment for future (8) _____.

"Sustainable development" is the challenge of meeting human needs for natural (9) _____, industrial products, energy, food, transportation, shelter, and effective waste (10) _____ while conserving and protecting (11) _____ quality and the natural resource base essential for future development.

(<http://www.nspe.org/Ethics/CodeofEthics/index.html>)

SPEAKING

16. Look through the abstracts 1-3 and make up a summary “Code of Ethics”.

PROJECT WORK

17. Make a presentation: «The product as a project of professional activity»

Use the following plan to help you:

- 1 name of the product
- 2 functions
- 3 principle of work
- 4 spheres of application
- 5 advantages/disadvantages
- 6 influence on environment
- 7 safety
- 8 innovations

GRAMMAR REVIEW

The Infinitive

	Active	Passive
Indefinite	<i>to write</i>	<i>to be written</i>
Continuous	<i>to be writing</i>	-
Perfect	<i>to have written</i>	<i>to have been written</i>
Perfect Continuous	<i>to have been writing</i>	-

Grammar Box

The to-Infinitive is used:

To express purpose

- *She entered the University **to get** a high education.*

After certain verbs (*advise, agree, appear, decide, expect, hope, manage, offer, promise, refuse, seem, want, afford, pretend, etc.*)

- *He advised me **to apply** for the job.*

After: *know, decide, ask, learn, remember, want to know, etc.* when they are followed by question words (*who, what, where, how, etc.*). “Why” is followed by a subject + verb, not by an infinitive.

- *I can't **decide where to go.***
- *I want to know **why you've decided to leave.***

After adjectives: *nice, sorry, glad, happy, willing, afraid, ashamed, etc.*

- *He is glad to get this job.*

After: *too* and *enough*

- *She's too shy to talk to the manager.*
- *We've got enough money to buy a new car.*

After: *it+be+adjective (+of+noun/pronoun)*

- *It was nice of him to help.*

After: *would like/would love/would prefer* (to express specific preference)

- *I would like to learn a foreign language.*

After: *only* to express an unsatisfactory result.

- *He rushed to the back door only to discover that it was locked.*

The bare infinitive is used:

After modal verbs: *may, should, can,* etc.

- *You must study hard.*

After: *let, make, see, hear, feel*

- *They made him pay for the damage.*

BUT: *be made/be heard/be seen + to-infinitive* (passive)

- *He was made to pay for the damage.*

After: *had better/would rather*

- *You had better sign the contract.*
- *I would rather go home now.*

NOTE: 1. *Help* is followed by either the *to-infinitive* or the bare infinitive.

- *She helped me (to) fix the tap.*

2. If two infinitives are joined by *and*, the *to* of the second infinitive can be omitted.

- *He decided to go to university and study biology.*

3. We form the negative infinitive with *not*.

- *He decided not to accept the job.*

The subject of the infinitive

The subject of the infinitive is omitted when it is the same as the subject of the main verb.

- ***She wants to leave now.*** (The subject of the main verb and the infinitive is “she”).

The subject of the infinitive is not omitted when it is different from the subject of the main verb. The subject of the infinitive comes before the infinitive and can be an object pronoun (me, you, them etc.), a name (Kate) or a noun (the woman).

- ***She wants them to leave now.*** (The subject of the main verb is “she”, whereas the subject of the infinitive is “them”).

Functions:

Subject (подлежащее) (often with the introductory *it*)

- *It would be a pity to miss such an opportunity.*
- *It was stupid of you not to have accepted the offer.*
- *It will take years to repair it.*

Predicative (именная часть составного сказуемого)

- *His only dream was to buy a car.*
- *That was for him to find out.* – *Выяснить это должен был он.*

Complex Object (сложное дополнение)

- *He waited for her to speak.*
- *He asked for the papers to be brought.*

Attribute (определение)

- *The best thing for you to do is to enter the University.*
- *There was really nothing for him to do but what he had done.* – *ему действительно ничего не оставалось делать, кроме того, что он сделал.*

Adverbial modifier (обстоятельство):

5 Of purpose

- *We are getting up at 7 o'clock tomorrow to (in order to/so as to) catch the 8 o'clock train.*
- *Fold the paper so as to have an envelope.*

6 Of result

- *She is too happy to say a word.*
- *He is too sensible a driver to take risks.*
- *He spoke loud enough for you to hear.*

18. Make up sentences using the *it+be+adjective (+of+noun/pronoun)* construction and the following verbs.

to answer	to repeat	to mention	to observe
to change	to think	to remember	to repair

Example: **It was good of him to answer** the phone.

19. Use either the full or the bare infinitive.

- 1 She made me (to wait) for half an hour.
- 2 The student was made (to revise) the new grammar rules.
- 3 I'd like you (to join) us.
- 4 Her parents wanted her (to learn) two foreign languages.
- 5 You had better (to put) the money in a bank than (to keep) it in a tea-pot.
- 6 The only thing I could do was (to check) myself.
- 7 She asked why it was necessary (to take) the tablets.

20. Put the infinitives in brackets into correct tense and voice.

- 1 We were (to translate) that article yesterday.
- 2 The article was (to translate) yesterday.
- 3 We are happy (to take part) in this exhibition.
- 4 He may (to do) it today.
- 5 (To work) is everybody's duty.
- 6 It is necessary (to master) this speciality.
- 7 (To master) this speciality is not an easy thing.
- 8 We shall (to go) there at once.
- 9 He hopes (to give) a pay rise soon.
- 10 He is said (to injure) in an accident.
- 11 This music is too slow for me (to dance) to.
- 12 Look at him. He seems (to sleep).
- 13 Has he passed the exam? – Yes, he seems (to pass) the exam.
- 14 Tom expects (to meet) at the railway station by his wife.

21. Read the sentences and define the functions of the Infinitive. Translate sentences into Russian.

- 1 It seemed necessary to speak.
- 2 Her attitude to this was hard to explain.

- 3 If you think I am happy to sit in a hotel room waiting for a telephone call you are wrong.
- 4 It might be difficult to work tomorrow.
- 5 I didn't like to call Doctor Rush, though.
- 6 To master his speciality is not an easy thing.
- 7 The aim of our research work is to find the necessary data to proceed with our experiments.
- 8 I have come here to help you.
- 9 He was so weak as to be unable to work.
- 10 I have not had time to examine this room yet.
- 11 It is useless to discuss the question.
- 12 To know English well you have to work hard.

22. Choose the correct answer (Gerund or Infinitive).

- 1 Valves are used *to regulate/regulating* the flow of fluids.
- 2 A steam turbine is used *to increase/increasing* the electricity produced.
- 3 Safety valves prevent pressure from *to exceed/exceeding* safe limits.
- 4 Workers should avoid *to wear/wearing* loose clothing near machines.
- 5 A micrometer enables engineers *to measure/measuring* diameters with great accuracy.
- 6 The engine stopped *to work/working* because of a blocked fuel line.
- 7 Students are prohibited *to smoke/smoking* in the classroom.
- 8 Students are permitted *to bring/bringing* calculators into the examination room.
- 9 This experiment is intended *to show/showing* the effect of heat on metal.

Wordlist

advancement	performance
average	pollutant
capacity	power grid
caveat	professional duty
cogeneration	prototype
collaborative research	reciprocating
combined cycle	recognition
combustion	reduction
competence	revolutionary technology
competence	shortage
condenser	supervision
consumption	sustainable
conventional	sustainable
coolant water	to adhere
cooling tower	to condense
desalination	to contribute
diffusion	to cut
diffusion tower	to distort
dignity	to dominate
distillation	to enhance
dominant	to evaporate
drinkable	to exceed
economic growth	to exist
evaporation	to extract
existing technology	to generate power
fraction	to hold down
fuel cell	to launch
generation	to protect
heat exchange unit	to reduce
high rate	to rely on
hybrid	to shave
innovation	to strive
integrity	to uphold
intensive	utility
manufacturer	utilization
modification	waste
moisture	waste product
nutshell	water treatment system
output	welfar
paramount	

Grammar Reference*Modal verbs*

must/have to – obligation, necessity, advice

- *You **have to** get a higher education in engineering to be a qualified engineer.*
- *Engineers **must** have good information technology skills.*

can/could/be able to – ability

- *You **must** have some professional knowledge in heat and power engineering to **be able** to work at power plant.*
- *I **can** work in a team.*

can/could – permission, request, suggestion

- *You **can** work at power plant if you have a degree in engineering.*
- ***Can** I switch the air-conditioner on?*
- *We **could** become good engineers.*

may/might/could – possibility, asking for permission

- ***May** I use your instruction? (formal – we don't know the other person very well)*
- ***Can** I use your instruction? (informal – we know the other person very well)*
- ***Could** I use your instruction? (more polite than “can”)*
- *Where's Tom? – He **may/might/could** be preparing for the presentation.*

should/ought to/shall/will – offer, suggestion, request, advice

- *You **should** be willing to keep up-to-date with advances in technology.*

need to – necessity

- *Engineers who work in manufacturing companies may **need** to have marketing and sales skills.*

Questions

General Question:

1) auxiliary verb – 2) subject – 3) predicate – 4) object – 5) adverbial modifier

1) вспом. глагол – 2) подлежащее – 3) сказуемое – 4) дополнение – 5) обстоятельство

1. *Do₁ engineers₂ design₃ new devices₄ now₅?*

Special Question:

1) question word – 2) auxiliary verb – 3) subject – 4) predicate – 5) other parts of the sentence

1) вопросит.слово – 2) вспом.глагол – 3) подлежащее – 4) сказуемое – 5) др. члены предложения

2. *What₁ do₂ engineers₃ operate₄ at power plants₅?*

Question to the subject:

1) question word – 2) predicate – 3) object+ adverbial modifier

1) вопросит.слово – 2) сказуемое – 3) дополнение+обстоятельство

3. *Who₁ designs₂ new devices now₃?*

Question words:

what; who; when; where; what + noun – какой?; which; how; how many; whose; why; whom; how long

Tenses Revision/Active Voice

	Indefinite (Simple)	Continuous	Perfect	Perfect Continuous
Present	<p>V / V_s (always, usually, often, sometimes, seldom, rarely, never, every day/week, etc.)</p> <p><i>I work at power plant.</i></p>	<p>am, is, are +V_{ing} (now, just now, at this moment)</p> <p><i>Now I am working at power station.</i></p>	<p>have/has +V_s (just, already, yet, ever, never)</p> <p><i>I have applied for a job.</i></p>	<p>have/has been+V_{ing} (since, for, all morning/week, etc.)</p> <p><i>I have been working since 2o'clock.</i></p>

Past	<p>V_{ed} / V₃ (yesterday, last week/year, in 1994)</p> <p><i>I applied for a job in 2005.</i></p>	<p>was, were + V_{ing} (at 3 o'clock yesterday)</p> <p><i>I was writing my resume when you came back.</i></p>	<p>had + V_{ed} / V₃ (by Friday, before, till/until, by the time)</p> <p><i>I had already written my resume when you came back.</i></p>	<p>had been + V_{ing} (for, since, before, until)</p> <p><i>I had been writing for 2 hours when you came back.</i></p>
Future	<p>will+V (tomorrow, next week, in two days, one of these days)</p> <p><i>I will graduate from TPU in 3 years.</i></p>	<p>will be + V_{ing} (after..., at 5 o'clock tomorrow)</p> <p><i>I will be writing my resume at 3 o'clock tomorrow.</i></p>	<p>will have + V_{ed} / V₃ (by 5 o'clock, by that time, by then)</p> <p><i>I will have written my resume by 5 o'clock tomorrow.</i></p>	<p>will have been+ V_{ing} (for, since, by the time)</p> <p><i>I will have been writing my resume for 2 hours by the time you come back.</i></p>

Type 1 Conditionals

If-clause		Main clause	
If	+ Present Simple/ Present Continuous/ Present Perfect/ Present Perfect Continuous	Future/ Imperative/ Can/may/might/ must/should/could	+ Present bare infinitive

- *If I get paid today, I'll call you.*
- *If I finish the project on time, I may take a few days off.*

Type 2 Conditionals

If-clause	Main clause
If + Past Simple/Past Continuous	would/could/might + Present bare infinitive

- If we were working more hard, we could get a better job.
- If I were you, I would hire more staff.

Type 3 Conditionals

If-clause	Main clause
If + Past Perfect/Past perfect Continuous	would/could/might + Perfect bare infinitive

- If they had paid us more, we would not have applied for another job.

Passive Voice/Tenses Revision

	Indefinite (simple)	Continuous	Perfect	Perfect Continuous
Infinitive	to be + V _{ed} / V ₃ <i>to be maintained</i>	—	to have been + V _{ed} / V ₃ <i>to have been maintained</i>	—
Present	am, is, are + V _{ed} / V ₃ <i>Turbines are maintained by technicians.</i>	am, is, are being + V _{ed} / V ₃ <i>The turbine is being serviced now by a technician.</i>	has/have been + V _{ed} / V ₃ <i>The turbine has just been serviced.</i>	—

Past	be + V_{ed} / V₃ <i>The turbine was serviced yesterday.</i>	was, were being + V_{ed} / V₃ <i>The turbine was being serviced when the manager came in.</i>	ad been + V_{ed} / V₃ <i>The turbine had been serviced before the manager came in.</i>	—
Future	will be + V_{ed} / V₃ <i>The turbine will be serviced tomorrow.</i>	—	will have been + V_{ed} / V₃ <i>The turbine will have been serviced by 3 o'clock tomorrow.</i>	—

The Gerund

	Indefinite	Perfect
	simultaneous	priority
Active	<i>using</i>	<i>having used</i>
Passive	<i>being used</i>	<i>having been used</i>

The Gerund is used:

As a noun

- *Swimming keeps you fit.*

After prepositions

- *He left without saying goodbye.*

After: love, like, enjoy, dislike, hate, prefer to

- *She likes doing presentations.*

After: it's no use, it's (not) worth, it's no good, be busy, what's the use of ...?, there's no point in, can't help, can't stand, be/get used to, have difficulty (in)

- *It's worth using efficient technologies.*

Functions:

Subject (подлежащее)

- *Solving financial problems is a difficult job.* – Решение (решать)...
- *His having solved the problem surprised me.* – То, что он решил...

Predicate (сказуемое)

- *Our aim is solving the problem.* – ... решить (решение)...

Prepositional indirect object (предложное дополнение)

- *I know of the problem having been solved...* – что задача решена (была решена)...

Direct object (прямое дополнение)

- *He likes solving difficult financial problems.* – ... решать (решение)

Attribute (определение)

- *The way of solving the problem is not clear.* – ...решения (решить)...

Adverbial modifier (обстоятельство):

1 Of time

- *On solving the payment problem he proceeded to drawing the contract.* Решив (после решения)...

2 Of manner

- *By solving the payment problem he got good returns* Решая (решил)...
- *In solving the problem he made some mistakes.* Решая (при решении...)

3 Of condition

- *You can't do without solving the problem.* Не решив (без решения)...

4 Of purpose

- *It is well known that the generator being used for production of energy.*

(http://reuters.forekc.ru/index_157.htm)

The Infinitive

Grammar Box

The to-Infinitive is used:

To express purpose

- *She entered the University to get a high education.*

After certain verbs (*advise, agree, appear, decide, expect, hope, manage, offer, promise, refuse, seem, want, afford, pretend, etc.*)

- *He advised me to apply for the job.*

After: *know, decide, ask, learn, remember, want to know, etc.* when they are followed by question words (*who, what, where, how, etc.*). “Why” is followed by a subject + verb, not by an infinitive.

- *I can't decide where to go.*
- *I want to know why you've decided to leave.*

After adjectives: *nice, sorry, glad, happy, willing, afraid, ashamed, etc.*

- *He is glad to get this job.*

After: *too* and *enough*

- *She's too shy to talk to the manager.*
- *We've got enough money to buy a new car.*

After: *it+be+adjective (+of+noun/pronoun)*

- *It was nice of him to help.*

After: *would like/would love/would prefer* (to express specific preference)

- *I would like to learn a foreign language.*

After: *only* to express an unsatisfactory result.

- *He rushed to the back door only to discover that it was locked.*

The bare infinitive is used:

After modal verbs: *may, should, can, etc.*

- *You must study hard.*

After: *let, make, see, hear, feel*

- *They made him pay for the damage.*

BUT: *be made/be heard/be seen + to-infinitive (passive)*

- *He was made to pay for the damage.*

After: had better/would rather

- *You had better sign the contract.*
- *I would rather go home now.*

NOTE: 1. Help is followed by either the to-infinitive or the bare infinitive.

- *She helped me (to) fix the tap.*

2. If two infinitives are joined by *and*, the *to* of the second infinitive can be omitted.

- *He decided to go to university and study biology.*

3. We form the negative infinitive with *not*.

- *He decided not to accept the job.*

The subject of the infinitive

The subject of the infinitive is omitted when it is the same as the subject of the main verb.

- *She wants to leave now. (The subject of the main verb and the infinitive is “she”).*

The subject of the infinitive is not omitted when it is different from the subject of the main verb. The subject of the infinitive comes before the infinitive and can be an object pronoun (me, you, them etc.), a name (Kate) or a noun (the woman).

- *She wants them to leave now. (The subject of the main verb is “she”, whereas the subject of the infinitive is “them”).*

Functions:

Subject (подлежащее) (often with the introductory *it*)

- *It would be a pity to miss such an opportunity.*
- *It was stupid of you not to have accepted the offer.*
- *It will take years to repair it.*

Predicative (именная часть составного сказуемого)

- *His only dream was to buy a car.*
- *That was for him to find out. – Выяснить это должен был он.*

(Complex) Object ((сложное) дополнение)

- *He waited for her to speak.*
- *He asked for the papers to be brought.*

Attribute (определение)

- *The best thing **for you to do** is to enter the University.*
- *There was really nothing **for him to do** but what he had done. – ему действительно ничего не оставалось делать, кроме того, что он сделал.*

Adverbial modifier (обстоятельство):

1 Of purpose

- *We are getting up at 7 o'clock tomorrow **to** (in order to/so as to) **catch the 8 o'clock train.***
- *Fold the paper **so as to** **have an envelope.***

2 Of result

- *She is too happy **to say** a word.*
- *He is too sensible a driver **to take** risks.*
- *He spoke loud enough **for you to** hear.*

Language Reference

In my view/opinion
 It seems to me that ...
 As I see it ...
 From my point of view ...
 I think/don't think ...
 To my mind ...
 Personally I think ...
 In general ...
 I'm of the opinion that ...
 I can't say I share this point of view.
 As a matter of fact ...
 I completely agree that ...
 I'm not sure that ...
 There is no doubt that ...
 I really doubt that ...
 I also have the idea that ...
 On the one hand ..., on the other hand ...
 Nevertheless ...

I don't think ...
 I don't suppose ...
 I'm sure (certain) that ...
 It's .../likely, not very likely, unlikely, possible ...
 I totally disagree ...
 I have a firm belief ...
 There is no reason to deny ...

THE INTRODUCTION:

I'd like to talk (to you) today about ...
 I'd like to tell you about ...
 I'm going to present my ...

ORDERING INFORMATION:

So, I'll start off by ... giving you an overview of ...

And then I'll go on to ...

Let me begin with/to start with ...

Firstly, I'd like to look at ... then/secondly/next... thirdly... finally/lastly

CHECKING UNDERSTANDING:

Is that clear?

Are you with me?

OK so far?

THANKING THE AUDIENCE:

Thank you for your attention.

Thank you for listening.

If you have any questions, I'd be pleased to answer them.

If there are any questions, I'll do my best to answer them.

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КУШНАРЁВА Елена Сергеевна

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ИЗДАТЕЛЬСТВО  ТПУ. 634050, г. Томск, пр. Ленина, 30
Тел./факс: 8(3822)56-35-35, www.tpu.ru