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АНГЛИЙСКИЙ ЯЗЫК

Учебно-методический комплекс
для студентов радиотехнического факультета

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Комплекс построен по модульно-блочному принципу: весь курс разбит на модули, которые в свою очередь делятся на учебные элементы, материал которых объединен тематически.

Предлагаются тесты для входного и итогового контроля каждого модуля, ключи к тестам, лексический минимум.

Учебно-методический комплекс «Английский язык» для студентов радиотехнического факультета может быть использован не только во время аудиторных занятий, но и для самостоятельной подготовки студентов.

Предназначен для студентов радиотехнического факультета.

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ПРЕДИСЛОВИЕ

Возрастающая роль и значение самостоятельной работы студентов в вузе в системе высшего образования на данном этапе развития общества неоспорима и давно волнует преподавателей высшей школы, так как глубокие прочные знания и устойчивые умения могут быть приобретены студентами только в результате самостоятельной работы. Вопрос в том, как организовать самостоятельную работу студентов наиболее эффективно с тем, чтобы не только предоставить студентам определенную сумму знаний по различным учебным предметам, а стимулировать их взять из полученного ими материала все самое необходимое, уметь применять на практике знания, которые должны быть активными и развивающимися.

При таком подходе знания студентов не являются конечной целью, а служат лишь средством их дальнейшего развития.

Особое значение для формирования у студентов потребности в самостоятельном овладении знаниями, умениями и навыками самообразования имеет учебно-методический комплекс (УМК). В связи с этим и началась разработка УМК «Английский язык» для студентов радиотехнического факультета как необходимого компонента системно-методического обеспечения процесса обучения.

В настоящее время одной из основных отличительных особенностей изучения иностранного языка в вузе студентами неязыковых специальностей является его профессионально-ориентированный характер, отраженный в учебной цели и содержании обучения. Идет поиск наиболее эффективных методов и технологий организации учебного процесса. Особый акцент делается на организацию самостоятельной работы студента. Это вдвойне оправдано относительно изучения иностранного языка, так как специалисты говорят, что языку нельзя научить, а можно только научиться. Эффективным инструментом обеспечения самостоятельной работы предполагается использование в учебном процессе учебно-методических комплексов (УМК). Автор попыталась максимально наполнить УМК необходимым материалом, чтобы в конце курса и студент, и преподаватель могли сказать: «Наша цель – практическое владение английским языком как средством общения в сфере профессиональной деятельности – достигнута!»

ВВЕДЕНИЕ

В соответствии с рабочей программой курс «Английский язык» для студентов РТФ рассчитан на 120 часов практических занятий в течение двух семестров на первом курсе. На блок социально-культурного общения отводится 36 часов в первом семестре. Данный УМК не включает в себя вышеупомянутый блок и, таким образом, рассчитан на 84 часа.

Согласно Типовой программе главной целью обучения иностранным языкам является «формирование иноязычной коммуникативной компетенции будущего специалиста, позволяющей использовать иностранный язык как средство профессионального и межличностного общения».

Достижение главной цели предполагает комплексную реализацию таких целей, как познавательная, развивающая, воспитательная и практическая.

Эффективность работы студентов зависит от четко поставленных задач, правильной организации и продуманности работы, отбора учебно-методического материала и систематического, планомерного контроля со стороны преподавателя. Помочь преподавателю решить все эти задачи и должен УМК (учебно-методической комплекс).

Данный УМК построен на принципе блочно-модульного подхода, что предполагает тематическое членение материала, текущий контроль за качеством овладения материалом, акцентирование внимания на вопросах, вызывающих у студентов особые сложности, максимальную поддержку и помощь в процессе обучения.

Учебно-методический комплекс представляет следующие возможности и условия для обеспечения самостоятельной работы студентов:

– дается программа действий для самостоятельной работы студентов;

– осуществляется ориентация в материале курса в целом и в каждой его части;

– осуществляется завершенность и этапность обучения;

– обеспечивается возможность постоянного и систематического контроля за качеством знаний и умений, приобретаемых студентом;

– вырабатываются навыки рациональной организации учебного процесса;

– осуществляется индивидуализация обучения.

Основой учебно-методических комплекса выступает учебный модуль (УМ), т.е. пособие, содержащее необходимую и достаточную информацию для управления самостоятельной учебной деятельностью студента. Данный УМК состоит из 3 учебных модулей:

1. Учеба и работа (Studies and Jobs).
2. Электроника (Electronics).
3. Энергоресурсы (Energy).

В структуру УМК помимо трех модулей включены: учебный план, тесты и задания для контроля и самоконтроля, список рекомендованной литературы, аудио и видео материалы, а также полезные, как для учебного процесса, так и для практической работы, четыре приложения:

Appendix 1: Circuit Symbols.
Appendix 2: Speaking Practice.
Appendix 3: Audio Scripts.
Appendix 4: Keys.

Успехов в учебе! Good Luck!

ФОРМЫ КОНТРОЛЯ

Изучение всего курса «Английский язык» завершается ***экзаменом***, который состоит из следующих частей:

- Письменная часть:

– лексико-грамматический тест;

– чтение и письменный перевод оригинального профессионально ориентированного текста с иностранного языка на родной со словарем. Объем – 1300 – 1500 печатных знаков. Время – 45 мин.

- Устная часть:

– подготовленное высказывание по заданной ситуации и неподготовленная беседа с преподавателем в рамках данной ситуации (по предметно-тематическому содержанию дисциплины);

–реферирование аутентичного или частично адаптированного общественно-политического, культорологического, научно-популярного текста; беседа на иностранном языке по содержанию текста. Объем – 900 печатных знаков. Время – 5-7 мин.

Перечень тем, выносимых на экзамен для устного собеседования на основе данного УМК, следующий:

- **My Career Plans**.
- **Electronics.**
- **Component Values.**
- **Batteries**
- **Alternative Sources of Energy.**

Кроме того, программа предусматривает текущий и промежуточный контроль в устной форме и в виде тестирования в зависимости от требуемого уровня усвоения, а также семестровый зачет.

Содержание зачета.

Зачеты носят характер накопительного зачета, который предусматривает посещение 75 – 100 % практических занятий и усвоение 95 – 100 % программного материала.

НОРМЫ ОЦЕНКИ

1. Оценка перевода

Уровни	Баллы	Чтение
	0	Отсутствие перевода или отказ от него.
I. Низкий (рецептивный)	1	Перевод текста на уровне отдельных словосочетаний и предложений при проявлении усилий и мотивации.
	2	Неполный перевод текста (менее 90 %). Допускаются грубые искажения в передаче содержания. Отсутствует правильная передача характерных особенностей стиля переводимого текста.
II. Удовлетворительный (рецептивно-репродуктивный)	3	Неполный перевод (90 %). Допускаются грубые смысловые и терминологические искажения. Нарушается правильность передачи характерных особенностей стиля переводимого текста.
	4	Полный перевод. Допускаются грубые терминологические искажения. Нарушается правильность передачи характерных особенностей стиля переводимого текста.
III. Средний (репродуктивно-продуктивный)	5	Полный перевод. Допускаются незначительные искажения смысла и терминологии. Не нарушается правильность передачи стиля переводимого текста.
	6	Полный перевод. Отсутствуют смысловые искажения. Допускаются незначительные терминологические искажения. Нарушается правильность передачи характерных особенностей стиля переводимого текста.
IV. Достаточный (продуктивный)	7	Полный перевод. Соблюдается точность передачи содержания. Отсутствуют терминологические искажения. Допускаются незначительные нарушения характерных особенностей стиля переводимого текста.
	8	Полный перевод. Отсутствуют смысловые и терминологические искажения. В основном соблюдается правильная передача характерных особенностей стиля переводимого текста.
V. Высокий (продуктивный, творческий)	9	Полный перевод. Отсутствие смысловых и терминологических искажений. Правильная передача характерных особенностей стиля переводимого текста.
	10	Полный перевод. Отсутствие смысловых и терминологических искажений. Творческий подход к передаче характерных особенностей стиля переводимого текста.

2. Оценка понимания при чтении

Уровни	Баллы	Чтение
	0	Отсутствие ответа или отказ от ответа.
I. Низкий (рецептивный)	1	Понимание менее 30% основных фактов и смысловых связей между ними.
	2	Понимание 30 % основных фактов и смысловых связей между ними.
II. Удовлетворительный (рецептивно-репродуктивный)	3	Понимание менее 50 % основных фактов и смысловых связей между ними.
	4	Понимание 50 % основных фактов текста и смысловых связей между ними.
III. Средний (репродуктивно-продуктивный)	5	Понимание большинства основных фактов текста, смысловых связей между ними и отдельных деталей текста.
	6	Понимание всех основных фактов текста, смысловых связей между ними и 50 % деталей текста.
IV. Достаточный (продуктивный)	7	Понимание всех основных фактов текста, смысловых связей между ними и 70 % деталей текста.
	8	Понимание всех основных фактов текста, смысловых связей между ними и 80 % деталей текста.
V. Высокий (продуктивный, творческий)	9	Понимание всех основных фактов текста, смысловых связей между ними и 90 % деталей текста.
	10	100-процентное понимание основных фактов текста, смысловых связей между ними и деталей текста.

3. Оценка письменных тестов

Шкала перевода в десятибалльную систему в соответствии с Приложением к постановлению Министерства образования РБ от 1.04.2004 г. № 22

100 % – 95 % правильных ответов	10 баллов
94,8 % – 90 % правильных ответов	9 баллов
89,6 % – 83 % правильных ответов	8 баллов
82,6 % – 75 % правильных ответов	7 баллов
74,6 % – 65 % правильных ответов	6 баллов
64,7 % – 50 % правильных ответов	5 баллов
49,7 % – 35 % правильных ответов	4 баллов
34,7 % – 20 % правильных ответов	3 баллов
19,7 % – 10 % правильных ответов	2 баллов
9,7 % – 1,8 % правильных ответов	1 баллов
1,4 % – 0 % правильных ответов	0 баллов

Наименьшая положительная оценка – 4 балла – выставляется при правильном выполнении не менее 2/3 заданий. Отсутствие работы или отказ от выполнения соответствуют оценке 0 баллов.

УЧЕБНЫЙ ПЛАН

№ темы	Наименование темы	Кол-во часов
Модуль I “STUDIES AND JOB”		22
	Введение в модуль (Entry Test)	1
1	УЭ – 1 “Choosing a Course”	9
2	УЭ – 2 “Careers in Electronics”	10
	Обобщение и итоговый контроль	2
Модуль II «ELECTRONICS»		40
	Введение в модуль (Entry Test)	1
1	УЭ – 1 «Electronics»	9
2	УЭ – 2 «Understanding Electronic Diagrams»	9
3	УЭ – 3 «Component Values»	10
4	УЭ – 4 «Batteries»	9
	Обобщение и итоговый контроль	2
Модуль III «ENERGY»		22
	Введение в модуль (Entry Test)	1
1	УЭ – 1 «The UK’s Energy System»	9
2	УЭ – 2 « Alternative Sources of Energy»	10
	Обобщение и итоговый контроль	2
	Итого:	84

Модуль I. STUDIES AND JOBS

ЦЕЛИ:

Вы должны знать	*Вы должны уметь*
1. Грамматика: – степени сравнения прилагательных и наречий; – страдательный залог (Passive Voice). 2. Лексика: Ключевые слова и словосочетания по темам «Выбор образовательного курса» и «Карьера в сфере электроники»	– использовать знания грамматики и лексики при чтении и переводе текстов указанной тематики; – вести беседу и рассказать о карьерных возможностях в сфере электроники, а также уметь сравнить свой образовательный курс с обучением в Британии. – составить резюме и сопроводительное письмо для трудоустройства

Entry Test

Choose the correct variant.

Part I

1) My course of English is … than my friend's course.
a) as long as b) the longest c) longer
2) … courses are provided by Bell college.
a) Like b) Both c) Alike
3) My course lasts 4 years … Alan's course lasts only 2 years.
a) as soon as b) but c) like
4) Full-time course in electronics … by Bell college.
a) is provided b) provides c) provided
5) … course in electronics, Technology course lasts 4 years.
a) Like b) Both c) Alike
6) Our university … its students with thorough knowledge.
a) is provided b) provides c) is being provided
7) Alan's course is … of all the courses provided by our University.
a) as short as b) shorter c) the shortest
8) In Britain, Universities award degrees … colleges give diplomas or certificates.
a) like b) whereas c) both
9) New applications for electronics are … found nowadays.
a) being b) been c) having
10) Colleges and universities … graduates in electronics.
a) are employed b) are being employed c) employ

Part II

After finishing secondary school or college you can apply to a university, polytechnic, college of education or you can continue to study in a college of further education.

The academic year in Britain's universities, Polytechnics, Colleges of education 1) _____ into 3 terms, which usually run from the beginning of October to the middle of December, the middle of January to the end of March, from the middle of April to the end of June or the beginning of July.

There are 46 universities in Britain. 2) _____ and best-known universities 3) _____ in Oxford, Cambridge, London, Leeds, Manchester, Liverpool, Edinburgh, Southampton, Cardiff, Bristol and Birmingham.

Good A-level results in at least 2 subjects are necessary to get a place at a university. However, good exam passes alone are not enough. Universities 4) ____ their students after interviews. For all British citizens a place at a university 5) _____ with it a grant from their local education authority.

English universities greatly 6) _____ from each other. They differ in date of foundation, size, history, tradition, general organization, methods of instruction and way of student life.

After three years of study a university graduate 7) _____ with the Degree of Bachelor of Arts, Science, Engineering, Medicine, etc. Some courses, such as languages and medicine, may be one or two years longer. The degrees 8) _____ at public degree ceremonies. Later he/she may continue to take Master's Degree and 9) ____ a Doctor's Degree.

The 2 intellectual eyes of Britain – Oxford & Cambridge Universities – date from the 12^{th} and the 13^{th} centuries. They 10) _____ for all over the world and are the oldest and 11) _____ universities in Britain. They are often called collectively Oxbridge, but 12) _____ of them are completely independent. Only education elite go to Oxford and Cambridge.

In the nineteenth and the early part of the twentieth centuries the so-called Redbrick universities 13) _____. These 14) _____ London, Manchester, Leeds, Liverpool, Sheffield, and Birmingham. During the late sixties and early seventies some 20 "new" universities 15) _____. Sometimes they are called "concrete and glass" universities. Among them are the universities of Sussex, York, East Anglia and some others.

During these years the government 16) ____ 30 Polytechnics. The Polytechnics, like the universities, 17) _____ first and higher degrees. Some of them offer full-time and sandwich courses[1] (for working students).

Some of youngsters who 18) _____ to leave school at the age of 16 may go to a further education college where they can follow a course in typing, engineering, town planning, cooking, or hairdressing, full-time or part-time. Further education colleges have strong ties with commerce and industry.

Some 80,000 overseas students 19) _____ British universities or further education colleges or train in nursing, law, banking or in industry.

Note: [1] sandwich course is a course of study at a British college or university that includes periods of study with periods of work between them so that students get practical experience in industry or business

1) a) is divided	b) divides	c) divided
2) a) the old	b) older	c) the oldest
3) a) is located	b) are located	c) will be located
4) a) chooses	b) choose	c) chose
5) a) brings	b) bring	c) are brought
6) a) differs	b) are different	c) differ
7) a) will leave	b) will be left	c) will left
8) a) were awarded	b) are awarded	c) is awarded
9) a) than	b) then	c) when
10) a) are known	b) know	c) were known
11) a) prestigious	b) more prestigious	c) most prestigious
12) a) both	b) none	c) like
13) a) were found	b) were founded	c) founded
14) a) include	b) are included	c) includes
15) a) set up	b) are set up	c) were set up
16) a) set up	b) are set up	c) were set up
17) a) offers	b) offer	c) are offered
18) a) decides	b) decide	c) decided
19) a) study at	b) study in	c) studies at

Учебный элемент 1 (УЭ-1)

Choosing a Course

1. Study the following words and word combinations:

purpose – цель	to bridge – соединять
duration – длительность	to award – присуждать, награждать
mode – тип, режим	to meet the needs – отвечать требованиям
power plant – электростанция	to attain – достигать
joint course – совместный, объединенный курс	to solve a problem – решать проблему
	to deal with – иметь дело с
practical skills – практические навыки	to cover – охватывать, включать
graduate – выпускник	to enable – позволять, давать возможность
introductory subject – вводный предмет	
research – исследование	to suit – подходить
measurement – измерение	to assemble/disassemble (circuit) – собирать/ разбирать цепь
complicated – запутанный, трудный, тяжелой	
	to drop out – выбывать, быть отчисленным
a broad range of – широкий выбор	
tough – жесткий, трудный	to process – обрабатывать
to lead (led-led) (to) – приводить к	to become/be familiar with – знакомиться
to provide – обеспечивать	
to require – требовать	in addition to – в дополнение к, кроме того
to consist of – состоять из	

2. Match the words in A with their synonyms in B.

A	B
1. to suit	a. goal, aim
2. to attain	b. to let, to allow
3. to consist of	c. to get, to obtain
4. purpose	d. to fit
5. tough	e. to include
6. to bridge	f. wide
7. to enable	g. to connect, to link
8. to cover	h. to be composed of, to comprise
9. broad	i. difficult

3. Match the words in pairs of antonyms.

To graduate, complicated, narrow, to disassemble, familiar, broad, to assemble, easy, to enter, final, simple, unknown, introductory, tough.

4. Listening 1. Listen to these words. Try to mark the stressed syllable.

1. college
2. institute
3. university
4. diploma
5. information
6. electronics
7. management
8. engineering
9. technical
10. technician

5. Fill in the gaps in the text. Each gap represents one word. Compare your answers with your partner. More than one answer is possible for many of the gaps.

In the United Kingdom, you 1)_____ study electronics at a college of further education or a university.

A college of further education will 2)_____ students who have completed a minimum of four years 3)_____ secondary school. Most students study full-time 4)_____ colleges also offer day release classes 5)_____ people employed by local businesses who are given time 6)_____ work to attend courses. Colleges also provide evening 7)_____ for full-time workers and members of the local community 8)_____ want to study in their spare time.

Most university students will have completed six years of secondary 9)_____. Some will have completed four years and 10)_____ taken a course at a college of further education.

From a college you can 11)_____ a certificate or a diploma. A diploma usually requires a longer period of study 12)_____ a certificate.

Universities give degrees. A Bachelor's degree takes three to four years of 13)_____. A Master's degree usually requires a further 14)_____.

6. Listening 2. Listen to the text and note the words used in the recording for each gap. Compare your answers with the recording.

7. Study the list of courses. Do any match the courses offered by our University?

Course Gide

Information Technology

The following programmes are offered by Information Technology:

Code	*Course Title*
IT 1	Full-time National Certificate Course for Women in Electronics
IT 2	Full-time National Certificate Course in Information Technology
IT 3	Day release National Certificate in Information Technology
IT 4	Day release National Certificate in Electronics
IT 5	National Certificate evening classes in Electronics
IT 6	National Certificate evening classes in Electronics and Computers in Music
IT 7	Autocad for Industry
IT 8	Evening classes in Autocad

Further information may be obtained on course provision by contacting the College Information Centre.

Stevenson College Information Centre
Telephone 031-453-2761

8. Which course would best meet the needs of these people? Answer using the course code.

1) A school leaver who wants a qualification in information technology.

2) A worker in a company which makes electronic instruments and which is willing to give employees time off each week to attend a course which would help their career.

3) A worker in an engineering company who wants to find a new job in the electronics industry.

4) A manager who wants to train a small group of technicians in computer-aided design (CAD).

5) A housewife who wants to go back to work and would like a job in the electronics industry.

6) A rock musician who wants to create new sounds.

9. Study this information about two courses in electronics. Find three similarities and three differences between them.

	Course 1 **Introduction to Electronic Systems**	**Course 2** **National Certificate in Information Technology**
Description	This course provides a basic introduction to the world of electronic systems for the complete beginners. It illustrates how real-life problems can be solved by electronic means.	A two-year programme of electronics, control systems, and technical computing modules for technicians in employment.
Award	National Certificate	National Certificate
College	Bankhead	Bankhead
Mode	Evening	Day release
Duration	16 weeks*2 ½ hours	2 years of 39 weeks per year

Language Study

We can describe similarities like this:

1) **Both** courses are provided by Bankhead College.
2) **Like** Course 1, Course 2 deals with electronics.
3) Course 2 **is similar to** Course 1 in that it deals with electronics.

We can describe differences like this:

4) Course 2 is much **longer than** Course 1.
5) Course 2 is day release **but** Course 1 is an evening course.
6) Course 1 is for complete beginners **whereas** Course 2 is for technicians.

10. Study the course descriptions below of two higher level qualifications. Complete this table of differences between the courses.

	BTech	**HND**
Duration	3 years	
Award		Diploma
Institutes	Strathclyde and Bell	
Main subjects (unique)	electromagnetism, foreign language, engineering management, signals and systems, _____	quality management _____
Options (unique)	optoelectronics, signal processing	_____

Bachelor of Technology (BTech) in Electrical and Electronic Engineering

Duration: three years full-time

The Course

The degree resulting from this joint course between Strathclyde University and Bell College is awarded by Strathclyde University. Over the three years, students spend about half of the course in each institution. The BTech is a balance of theory and practical skills. It will enable graduates to attain the status of Incorporated Engineer after a period of industrial training and experience. It bridges the gap between HND and BEng Honours courses and there are transfer routes possible between all these courses.

Subjects

First year: Mathematics, Electrotechnology, Digital and Computer Systems, Analogue Electronics, Software Engineering, Engineering Applications.

Second year: Mathematics, Electromagnetism, Digital and Analogue Electronics, Power Engineering, Microprocessor Applications, System Principles, Circuit Analysis, Electronic Design and Production, Foreign Language.

Third year: Electrotechnology, Engineering Management, Signals and Systems, Software Development, Measurement and Control, Data Communications Project.

Students will also choose from a range of options including CAD, Optoelectronics, Materials, Power Plant, Signal Processing, and others.

Higher National Diploma in Electrical and Electronic Engineering

Duration: two years full-time.

The Course

This is a new HND course, planned after market research among employers and former students. This research identified the kinds of jobs, equipment, and management skills which holders of an HND must have in addition to their technological abilities. From this information we were able to plan the most appropriate course content. All students will study a broad range of subjects before choosing the options which will best suit their intended career. The Diploma is taught and awarded by Bell College.

Subjects

First year: there will be a range of introductory subjects to help everyone become familiar with new subject areas.

These will be followed by: Mathematics, Electronics, Electrotechnology, Computer Programming and Applications, Complementary Studies.

Second year: Electrotechnology, Computer Programming, Quality Management, Computer Aided Design, Complementary Studies, Project and a range of options covering electronics, power and machines, data communications, control systems, and electronic production.

11. Using the completed table and the course descriptions, describe the similarities and differences between the courses. Then compare one of these courses with your own course.

12. Role-play the following telephone conversations.

Dialogue

– Hello! Strathclyde College. This is Jennifer. How can I help you?
– Good morning! I'd like to talk to Jane Smith, please.
– Who is calling, may I ask?
– My name is Rose Dobson.
– Sorry, could you speak up, please?
– I'm Rose Dobson.
– Yes, Ms Dobson. Hold on. I'll put you through.

– Good morning! Jane Smith's speaking. Can I help you?
– Yes, please. I'd like to get some information about your courses.
– You are welcome. I'll try to do my best.
– Do you have any courses for school leavers like me who want a qualification in information technology?
– Yes, of course. We've got a Full-time National Certificate Course in Information Technology.
– Oh, I'd like to start working so do you provide the same day release course?
– Yes, we've got a day release course, if you wish.
– Well and how long does it last?
– It takes four years of studies. Anything else?
– Do you provide accommodation?
– Yes, we've got several hostels, but they are only for full-time students from other places.
– Oh, I see. Thanks for information.
– Not at all. It's my pleasure. We'll be happy to see you as our student.
– Thank you. Good buy.
– Good buy.

13. Ring the college mentioned in Task 7 and ask for the information about one of the courses which you would like to enter.

14. You are going to listen to an interview with Alan, a Scottish student of electronics at a college of further education. Before you listen, try to answer the questions about his timetable.

1) What time does Alan start in the morning?
2) What time does he finish for the day?
3) What do you think happens between 10.15 and 10.45?
4) What other time does this happen?
5) How often does he have maths?
6) When is the lunch break?

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
8.45 – 10.15	Electrical Principles	Analogue Electronics	Analogue Electronics	Electrical Principles	(5)
10.45 – 12.15	(1)	(2)	Communications	Computing	(6)
13.15 – 14.45	Maths	(3)	(4)	Maths	Maths
15.00 – 16.30	Programmable Systems			Programmable Systems	Digital Electronic

15. Listening 3. Now listen to the interview and complete the information missing from the timetable. Compare answers with your partner.

16. Listen to the recording again and answer the following questions:

1) Why did so many students drop out of Alan's course?
2) Why does he dislike Communications?
3) Why is it hard to use the indoor stadium?
4) Why is there a problem with his motorbike?

17. Write a short comparison and contrast of your timetable and Alan's using any of the ways in the Language study in Task 9 to describe similarities and differences.

Учебный элемент 2 (УЭ-2)

Careers in Electronics

1. Study the following words and word combinations.

domestic appliances – бытовые электроприборы to maintain – обслуживать, поддерживать to dispense – распределять, дозировать to design – проектировать to install – устанавливать to be in demand – пользоваться спросом to recruit – принимать на работу, набирать to require – требовать to commission – вводить в эксплуатацию on-board equipment – бортовое оборудование need for smb/smth – потребность в, спрос на LAN=local area network – локальная сеть transducer – преобразователь remote monitoring – дистанционный мониторинг (контроль) recycling – утилизация hi-fi=high fidelity – высокая точность воспроизведения звука satellite receiver – приёмник спутниковой связи to get in touch with – связаться с кем-либо expansion – расширение, распространение to manufacture – производить job satisfaction – чувство удовлетворения от работы to rival – соперничать, конкурировать oversea – за морем, за границей to assist – помогать, ассистировать assembly line – конвейер printed circuit board – печатная плата exchange – коммутатор каналов	trainee – стажер workshop – мастерская marital status – семейное положение CV=curriculum vitae – резюме, биография troubleshooter – аварийный монтёр; специалист, выявляющий и ликвидирующий неисправности wanted urgently – срочно требуется! fault finding – выявление повреждения, обнаружение неисправности referee – заверитель, поручитель advantage – преимущество disadvantage – недостаток to be (un)aware of – (не) знать, (не) быть осведомленным to man – обслуживать, укомплектовывать рабочей силой sophisticated – современный, сложный stressful – напряжённый, тяжелый, трудный tedious – утомительный negotiable – на договорной основе, возможно для обсуждения *Areas of employment* avionics – авиационная радиоэлектроника computing – вычислительная техника defence – оборона industrial electronics – промышленная электроника leisure products – продукция для отдыха telecommunications and broadcasting – телекоммуникационные средства и радиовещание medical equipment – медицинское оборудование

2. Study, translate and memorize the words with the same roots.

to employ (v.) – нанимать, взять на работу

employment (n.), unemployment (n.), employer (n.), employee (n.), unemployed (adj.)

to apply (for) (v.)– подавать заявление

application (n.), applicant (n.)

to interview (v.)– интервьюировать, проводить опрос

interview (n.), interviewee (n.), interviewer (n.)

3. Match the pairs of synonyms

1. to employ	a) to service
2. to rival	b) candidate
3. to maintain	c) minuses
4. to assist	d) to compete
5. applicant	e) abroad
6. to manufacture	f) to recruit
7. oversea	g) complex
8. advantages	h) to help
9. disadvantages	i) pluses
10. sophisticated	j) to produce

4. Complete the table with the omitted parts of speech.

Noun	Verb	Adjective
maintenance		
	to train	
	to satisfy	
recruitment		
installation		
		developed developing
		aware unaware
competition		
	to expand	

5. Fill in the gaps in this text using one word for each space. Compare your answers with your partner. More than one answer is possible for many of the gaps.

Careers in Electronics

We are now 1)____ the midst of the technological revolution which started 2)____ the introduction of the microchip in the 1970s. More and 3)____ electronic goods are being sold, especially computers, radio telephones, and leisure products. At the 4) ____ time, new applications for electronics are 5) ____ found. Most domestic appliances now 6) ____ some form of electronic control. Petrol 7) ____ the filling station and cash at the bank 8) ____ dispensed by electronic means. Electronically-controlled pumps measure out drugs 9) ____ the chronically ill. Electronic ignition and fuel management 10) ____ standard on cars.

All of these means 11) ____ career opportunities in electronics are growing. More engineers are 12) ____ to design, plan, manufacture and install. Service engineers are particularly 13) ____ demand although for the most part they now replace panels 14) ____ than individual components. For today's college and university graduates in electronics, 15) ____ future is bright.

6. Look through the text in Exercise 8 and find the examples of passive constructions. Define their tenses.

7. Change the sentences from Active into Passive.

1) They are selling more and more electronic goods.

2) Companies employ engineers to manufacture, plan, install, and maintain new equipment.

3) Automation has contributed to unemployment.

4) They have recently commissioned a new broadcasting station.

5) Electronic means dispense petrol at the filling stations and cash at the bank.

6) Many countries are still developing sophisticated defence systems.

7) Society expects a wide range of leisure electronic items.

8) They need a lot of engineers and technicians to design electronic equipment.

9) Recent years have seen a sharp increase in equipment for patient care.

10) Defence systems require engineers to design them.

8. The following text gives information on seven areas of employment. Read the section your teacher selects for you. Then explain to the others the career opportunities in those fields.

Areas of Employment

1. Avionics

Aircraft electronic equipment has to be maintained to a very high standard with rigorous checks at set intervals. Service engineers are required to maintain on-board equipment such as radio, radar, and automatic flight path plotting equipment. Air traffic control equipment is maintained on the ground.

2. Computing

This is an area where competition between companies is considerable and technology is moving very quickly. With the increasing numbers of computers used in the office, the home, and as part of industrial and communications equipment, there is growing need for engineers to design these as well as service them. On the software side, there is always a demand for programmers to design software for business use and for leisure.

Almost every large business organization, like banks and insurance companies, runs several local area networks (LANs). These require network managers and maintenance and software support.

3. Defence

The reduction in political tension in recent years has meant cuts in the defence industry. Nevertheless, many countries are still developing sophisticated defence systems both for home use and for export. These systems require not only engineers to design them, but highly-skilled operators to man them and maintain them. Thus the armed services recruit and train numbers of electronics technicians and engineers. The major fields of defence electronics are:

1) early warning systems, e.g. radar;
2) detection systems;
3) ranging, using radar and computers;
4) weapons guidance, using computers;
5) communications.

4. Industrial electronics

Industrial electronics started with transducers which allowed remote monitoring of processes, especially those which involved high temperatures or dangerous substances. Further development allowed processes in a whole range of industries – from food and drink production to garbage recycling – to be fully automated.

The development of robotics has led to widespread application in the car industry in particular. Everything from assembling to spraying the completed car can now be done without human assistance. Tedious and unpleasant jobs have disappeared. Automation has led to savings for the manufacturer but has also contributed to unemployment. Electronics engineers are required to design and service industrial circuits, including control panels.

5. Leisure products

Society expects a wide range of leisure electronic items. This can be gauged by sales of radio, hi-fi equipment, television sets, compact disc players, video recorders, satellite receivers, etc. Engineers and technicians are required not only to design and manufacture these, but also to maintain them.

6. Telecommunications and broadcasting

People today expect to be able to get in touch with each other at any time in any place. The communication of speech, text, and other data by cable and radio is a growing field of employment. Cellphones are an area of recent expansion.

Engineers are employed to manufacture, plan, install, commission, and maintain telecommunication equipment. National and local radio and television stations employ broadcasting and sound engineers.

7. Medical equipment

Recent years have seen a sharp increase in equipment for patient care. This ranges from body scanners to electronic stethoscopes. While the operation of this equipment is the responsibility of the medical team, engineers are required to work with medical experts in the design of such equipment, in the installation of larger equipment, and in maintenance. Job satisfaction in this area can be high.

9. Work in pairs A and B. Note any advantages and disadvantages for each type of employment using information from your partner and from your texts. You may add any opinions of your own.

Type of employment	**Advantages**	**Disadvantages**
Manufacturing Planning Installation Commissioning Maintenance Sales Teaching Research and Development (R&D)		

Student A: See Appendix 2

Texts for Student B

Maintenance

As electronic equipment has become more complex, so maintenance technicians have become more specialized. For instance, technicians who used to service both radio and television may now specialize in either radio and audio equipment or television sets and video recorders. Similarly, technicians now specialize in servicing computers, telecommunications equipment, medical equipment, industrial robots, and so on. Testing and fault-finding equipment has become more sophisticated. Oscilloscopes are commonplace on workbenches, and programmable analysers are available for carrying out a full range of diagnostic tests on particular types of equipment. Although these save a great deal of time, they can make the work of the service technician less challenging. Service men and women are always in demand.

Sales

Sales staff too require specialist knowledge – not so much of how the equipment works, but what it is capable of and the differences between similar types of equipment. They also have to know the advantages of their company's products over those of their rivals. Although selling ability is more important than technical expertise, it is not unusual for service technicians to transfer to sales.

Most salespeople work on a commission basis. In addition they usually have use of a company car. They can earn high salaries and are crucial to the success of a company. Selling usually involves a great deal of travel and can be stressful.

Teaching

Colleges and universities employ substantial number of graduates in electronics. Colleges prefer teaching staff who also have experience in industry or business. Universities look for teaching staff with research experience. Salaries in education tend to be lower than in industry. Technicians are also employed in educational institutes in laboratories and workshops to assist with research and to provide maintenance.

Research and Development

Large companies run their own R&D departments. Exciting opportunities exist for creative engineers in the design and testing of new products. Such opportunities are limited. Most R&D work is carried out at the company's headquarters. Many electronic companies are multinationals, so the R&D work may not be done in the country where the product is assembled.

10. Analyze all the texts in Exercises 8 and 9 and name all the mentioned jobs and duties.

11. Write a brief description of your career plans, using information of your own and from this unit.

12. Study this job advertisement and answer the questions.

WANTED ENGINEERING STAFF

Communicate-a go-ahead company involved in the design, development and production of VHF/UHF communications equipment and accessories, are looking for engineers for the following jobs:

Trainee Service Engineers (two posts)

Applicants should either have practical knowledge in RF communications or have qualifications in the field of electronics with/without practical knowledge.

Salary: negotiable, depending on experience.

Service Engineer

Applicant should have at least two years' experience in servicing VHF/UHF communications equipment down to component level. The successful applicant will be servicing land mobile, marine, and amateur radio products.

Salary: according to experience.

Analogue RF Design/Development Engineer

Applicants should have an HNC or BSc in Electronics or Telecommunications and should have experience in RF product design with an understanding of mechanical assembly.

Salary: according to qualifications and experience.

CVs for the attention of: Mr Clark
Head of Personnel
Communicate (UK) Limited
Tradescant House
Lewis Avenue
LONDON NW31BR

Questions:

1) What is the name of the company?
2) What are its activities?
3) Where is the company based?
4) How many posts are vacant?
5) Which posts are available to those without experience?

6) How do you apply for the post?
7) Who is Mr Clark?
8) What salaries are offered?
9) What do all the abbreviations mean?

13. Charles Dunkin decides to apply for one of the Trainee Service Engineer posts. Look at his CV below and his letter of application.

Imagine you are Mr Clark of Communicate (UK) Limited. List Charles' strong points and his weak points.

Applicant	*Charles Dunkin*
Strong points	
Weak points	

CURRICULUM VITAE

Personal details	Name: Charles Dunkin Date of birth: 30 May 1974 Address: 44 Maxton Street, Bath, BL14 6FH Marital status: Single
Education 2013-present	 Maxwell College of Further Education, Bath Ordinary National Certificate in Electronics. I will complete my ONC studies in June. I have already successfully completed modules in: Digital Electronics 1&2 Analogue Electronics 1&2 CAD Computing Mathematics Communication Skills
2007-2012	Bath Secondary School General Certificate of Education Physics A Mathematics B English B Geography C French C
Other qualifications	Clean driving license.

Work experience Summer 2014 2012 – 2013 Summer 2011	 Service technician, Baird Audio-Visual Products, Bath This vacation job gave me experience of servicing domestic television sets, VCRs, and radios Trainee Mechanic, Dunkin's Garage, Bath Waiter, Western Hotel, Bath	
Hobbies/interests	Motorcycle maintenance Football-College 2nd XI	
Referees	**Academic** Dr John Coulter Head of Department of Electronics Maxwell College of Further Education BATH BW4 6BN	**Work** Ms Jean Cadmus Head of Personnel Baird Audio-Visual Products Farrer Lane BATH BL41 3LH

44 Maxton Street Bath
BL14 6FH

Mr Clark
Head of Personnel
Communicate (UK) Limited
Tradescant House
Lewis Avenue
LONDON NW31BR

3 April 20__

Dear Mr Clark

Re: Trainee Service Engineers

I would like to apply for the post of Trainee Service Engineer, as advertised in the April issue of Electronics Today. I enclose my CV with the names of two referees.

I consider I am well qualified for this post. I will shortly complete my ONC in Electronics and will be available for employment from the end of June. My college work has been good, and I have completed all my modules successfully to date.

On leaving school, I worked for one year in the family garage. Although I decided not to continue with this career, it gave me useful work experience. Last summer I spent two months of my vacation working for a small company which repairs electronic equipment. This provided valuable experience in servicing television sets, radios, and VCRs. I feel confident that my work experience, together with my college qualification, make me well suited for the post.

I have a clean driving license and enjoy good health.

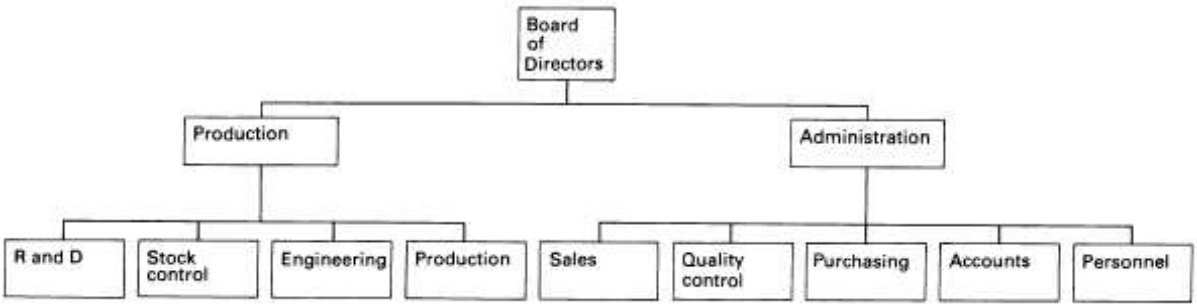
I look forward to hearing from you.

Yours sincerely

Charles Dunkin

Charles Dunkin

14. Study Fig 1. It shows the organizational structure of Communicate (UK) Ltd. Try to guess some of the functions of the different departments.



15. Listening 4. Mr Clark of Communicate (UK) Ltd. briefs a new trainee. Work in pairs A and B. Listen to the recording and find out the function of these departments:

Student A: Production, Stock control, Sales, Purchasing, Personnel.
Student B: Engineering, R&D, Quality control, Accounts.

Note your findings and share them with your partner.

16. a) Discuss in your group what you should and shouldn't do when invited for interview by a company. Write out your advice in note form like this:

You should	You shouldn't
1. 2. 3. etc.	1. 2. 3. etc.

b) Exchange your notes with another group. Compare their advice with yours.

17. This table lists the commonest cause of failure at interviews, as reported by four UK companies employing electronics graduates. How many of the problems listed did your group identify?

Company	**Commonest cause of failure at interview**
AB Electronic Products Group	Lack of awareness of how AB operates. Inability to communicate in straightforward non-jargon language.
Mars Group	Lack of preparation. Interviewees are often unaware of the range of qualities required and react badly to unexpected general questions which have not been properly considered beforehand.
NE Technology Ltd.	Inability of applicants to apply their academic knowledge to practical problems. Subjects studied are understood only in theoretical terms. Applicants are often unable to express themselves effectively to demonstrate their particular abilities, perhaps because of lack of preparation.
Rolls Royce plc	Candidates are inadequately prepared – not only in their knowledge of the work and products of Rolls Royce plc, but in their own attributes and experience.

18. a) Work in pairs A and B.

Student A: Play the part of Mr Clark. Write five questions to ask Charles Dunkin at his interview.

Student B: Play the part of Charles. Write five questions you think Mr Clark might ask you at your interview. Prepare suitable answers.

b) Conduct the interview.

19. Study the job advertisements and try to find suitable jobs for these candidates:

1) A technician with experience in servicing hospital equipment.
2) An engineer who would like to work in broadcasting.
3) Someone who wants a job which provides a car.
4) Someone who wants a job with a lot of travelling.
5) An engineer who wants to work in the USA.
6) Someone who wants to work in developing countries and who does not require a large salary.
7) A technician with experience in servicing all kinds of communications equipment.
8) An electronics engineer who wants to work in Europe and who speaks English, Italian, and German.

A

TRAINEE LOCATION ENGINEERS

This company has two vacancies for people to train as Location Engineers working on Broadcast and Corporate programmes. Successful applicants would be joining one of America's foremost suppliers of location video crews. Once trained, they can look forward to interesting work which includes travel both in the USA and abroad.

Applicants should have a suitable qualification in Electronics, Telecommunications, or similar. A clean driving license and preferably some practical experience of domestic VHS machines and televisions would be an advantage.

Please supply contact telephone number with application in writing to:

Joan Berridge
General Manager
Sunset Film & Video Limited
4900 University Avenue
SAN DIEGO
California
USA

B

ELECTRONIC ENGINEERS

Extremely competitive salaries.

If you would like to hear about outstanding opportunities in Europe to work in the expanding area of personal communication systems, write to:

Euroengineer Ltd
Austin Street
Norwich
NJ2 1BL

Enclose your CV and the names of two referees.

Applicants should have a degree or equivalent in electronics or a related discipline. *A good command of foreign languages* would be an advantage.

C

Wanted urgently

Practical people for the Third World

We seek practical people with skills to pass on to the developing world. You can help to link up the developed and the developing world.

If you can fill one of these vacancies, contact us at once.

Current requests include:

- ❖ Studio Electronics Engineer
- ❖ Refrigeration/Radio/TV Engineers
- ❖ Hospital Electronics Engineers
- ❖ Electrical Engineers for instruction/installation
- ❖ Electronics Instructors
- ❖ Lecturers in Power and Communications
- ❖ Maintenance and Repair Tecnician

For more details, please write to:
LINK, 10 Summer Gardens, London, SW14 2LH

Conditions of work:

- Pay based on local rates
- Posts are for a minimum of 2 years
- You should be without *dependants*
- Many employers will grant leave of absence

I'm interested. I have the following training/experience:_____

Name_____
Address_____

LINK

Linking the developed and developing worlds

D

ANGEL RECRUITMENT

Radiocomm Systems
Repair and service RF and VHF communications equipment.
Salary negotiable+car.
London

Medical Equipment
Maintain and fault-find x-ray and scanning equipment.
Salary negotiable+car.
South Coast

Data-Processing Support
Provide technical support on disc drives throughout Europe.
Salary negotiable.
Geneva

Microprocessor Systems
Complex fault-finding of digital and micro systems. Extensive travel in UK and overseas.
Salary negotiable.
Essex

Wrire to: Karen Crawley, BSc.
Angel Recruitment, Winchester
Hampshire SO19 1QB

20. Write a letter of application and a CV to apply for one of the jobs advertised in Exercise 19. Base your letter and CV on those shown in Exercise 13.

Progress Test

I. Match the English words to their Russian equivalents

1) trainee	a) требовать
2) purpose	b) совместный, объединенный курс
3) domestic appliances	c) проектировать
4) to maintain	d) распределять, дозировать
5) to recruit	e) подавать заявление
6) to dispense	f) жесткий, трудный
7) power plant	g) обслуживать, поддерживать
8) troubleshooter	h) на договорной основе
9) negotiable	i) стажер
10) to install	j) выявление повреждения, обнаружение неисправности
11) tough	k) тип, режим
12) referee	l) заверитель, поручитель
13) to require	m) цель
14) to meet the needs	n) практические навыки
15) to attain	o) аварийный монтер; специалист, выявляющий и ликвидирующий неисправности
16) duration	p) электростанция
17) fault finding	q) обеспечивать
18) to design	r) устанавливать
19) joint course	s) бытовые электроприборы
20) to apply	t) достигать
	u) принимать на работу, набирать
	v) отвечать требованиям
	w) длительность

II. Complete the sentences with the appropriate form of the word given in the right-hand column.

1. Our company makes a) … instruments and gives its b) … time off each week to attend courses.	a) an electron b) to employ
2. … technicians have become more specialized.	to maintain
3. … should have a suitable qualification in Electronics.	to apply
4. The a) … of speech, text, and other data by cable and radio is a growing field of b) … .	a) to communicate b) to employ
5. Candidates often fail at interviews because of lack of … of how a company operates.	aware
6. It's important to get job … .	to satisfy
7. First-year students study a lot of … subjects.	to introduce
8. Nowadays the work of a service technician may become less … .	to challenge

III. Fill in the gaps with the suitable prepositions.

1) Service engineers are … demand.

2) He applies … the job of an engineer.

3) Holders of an HND must have management skills … addition … their technological abilities.

4) I look forward … hearing … you.

5) Introductory subjects will help everyone to become familiar … new subject areas.

6) (On the telephone)

-I'd like to talk to Ms. Stain.

-Hold … . I'll put you … .

7) Some of my group mates dropped … because of Maths.

8) It gave me useful experience … servicing television sets, radios and VCRs.

9) I'd like to get a qualification … electronics.

10) Interviewees are often unaware … the range of required qualities.

IV. Write a short assay on your career plans. Describe what your duties will be. Use the information from this Module and Passive constructions where it's possible.

Модуль II. ELECTRONICS

ЦЕЛИ:

Вы должны знать	*Вы должны уметь*
1. Грамматика: – типы вопросов; – страдательный и действительный залоги в сравнении (Passive vs. Active); – составные прилагательные; – придаточные предложения (Relative Clauses). 2. Лексика: Ключевые слова и словосочетания по темам «Электроника», «Чтение электросхем», «Значение компонентов» и «Батарейки».	– использовать знания грамматики и лексики при чтении и переводе текстов указанной тематики; – вести беседу и рассказать о том, что такое электроника и как устроены батарейки, а также уметь описать электросхему и назвать значение компонентов.

Entry Test

Choose the correct variant.

1) Electronics is a branch of engineering and … .
a) chemistry b) physics c) quantum physics.
2) … are the key components in electronics.
a) Transistors b) Inductors c) Capacitors
3) The carbon rod in a zinc-carbon cell is a …
a) current collector b) oscillator c) electrolyte
4) A piece of equipment used to put electricity into a battery.
a) current collector b) heatsink c) charger
5) Balanced circuit made from four components.
a) oscillator b) bridge c) heatsink
6) Voltage produced by an electrical source (e.g. a battery).
a) EMF b) mains supply c) charger
7) It steps down the AC mains voltage.
a) transformer b) neon lamp c) fuse
8) It protects the transformer.
a) transformer b) neon lamp c) fuse
9) It shows when the charger is on.
a) transformer b) neon lamp c) fuse
10) It adds resistance to a circuit.
a) resistor b) capacitor c) transformer
11) It varies the current in a circuit
a) resistor b) potentiometer c) fuse
12) It breaks a circuit.
a) switch b) neon lamp c) transformer
13) It measures voltages.
a) ammeter b) fuse c) voltmeter
14) It measures very small currents.
a) capacitor b) aerial c) ammeter
15) It receives RF signals.
a) aerial b) capacitor c) ammeter

Учебный элемент 1 (УЭ-1)

Electronics

1. Study the following words and word combinations.

emission – эмиссия, выделение generation – образование, выработка transmission – передача, пересылка, трансмиссия reception – получение, прием a semiconductor – полупроводник a transistor – транзистор silicon – кремний germanium – германий computer-aided design – автоматизированное проектирование, компьютерное конструирование integrated circuit – интегральная схема, интегральная цепь, микросхема amplification – усиление demodulation – детектирование, выпрямление, уменьшение глубины модуляции recovery – извлечение, восстановление a capacitor – конденсатор	an inductor – индукционная катушка a transducer – преобразователь, приемник, датчик a vacuum tube (AmE) = valve (BrE) – электронно-лучевая трубка digitization – оцифровка, цифровое кодирование fidelity – точность reliability – надежность satellite communication – спутниковая связь to manufacture – производить to evaluate – оценивать to repair – чинить, ремонтировать to transmit – передавать intricate – сложный, замысловатый to facilitate – облегчать, способствовать to benefit from – получать выгоду high-performance – высокоточный

2. Match the words in A with their synonyms in B.

A	B
1. a vacuum tube	a) to produce, to generate
2. to manufacture	b) accuracy
3. to repair	c) valve
4. to evaluate	d) extraction
5. fidelity	e) enforcement
6. recovery	f) complex
7. amplification	g) to estimate, to value
8. intricate	h) to fix, to mend

3. One way of increasing vocabulary is to learn the associated words from a key word. Complete the table with the related words and memorize them.

Noun	Verb	Adjective
	activate	
amplification, amplifier		
emission		
	extract	
generation		
		integrated / integrative
		recovered
reception		
		reliable
		stored
		transmittable/ transmissible
entertainment		

4. Use the word in brackets to form a word which fits in the sentence.

1) The weak audio signal entering a radio is _____ by the _____ thus making it audible. (amplify)
2) Computer games are just one example of electronic systems being used for _____ (entertain)
3) Due to developments in mobile telecommunications systems, a new _____ of mobile phone is now available. (generate)
4) IC stands for _____ circuit. (integrate)
5) Computer software is _____ if it does what the manual says it should. (rely)
6) One area of electronics is concerned with the _____ of information. (store)
7) The _____ of signals to satellites is made by microwaves. (transmit)
8) A computer chip is capable of holding vast amounts of _____ information. (store)
9) _____ of speech was first carried out through _____ of the amplitude of a radio signal. (transmit, modulate)
10) In a laser, energy is released in the form of _____ light. (emit)

5. Read and translate the text.

Electronics

Electronics is a branch of engineering and physics. It deals with the emission, behaviour, and effects of electrons for the generation, transmission, reception, and storage of information. This information can be audio signals in a radio, images (video signals) on a television screen, or numbers and other data in a computer. Electronic systems are important in communication, entertainment, and control systems.

Electronic circuits consist of interconnections of electronic components, at the heart of which are semiconductors. Transistors, which are made of silicon or germanium, are made from semiconductors. Commercial products range from cellular radiotelephone systems and video cassette recorders to high-performance supercomputers and sophisticated weapons systems. In industry, electronic devices have led to dramatic improvements in productivity and quality. For example, computer-aided design tools facilitate the design of complex parts, such as aircraft wings, or intricate structures, such as integrated circuits.

The development of microelectronics has had a major impact on the electronics industry. Electronic components are expected to deliver ever higher performance, while electronic circuits continue to benefit from miniaturization.

The electronics industry creates, designs, produces, and sells devices such as radios, televisions, stereos, video games, and computers, and components such as semiconductors, transistors, and integrated circuits. In the second half of the 20th century, this industry had two major influences. Firstly it transformed our lives in factories, offices, and homes; secondly it emerged as a key economic sector. Specific advances include:

- the development of space technology and satellite communications
- the revolution in the computer industry that led to the personal computer
- the introduction of computer-guided robots in factories
- systems for storing and transmitting data electronically
- radio systems to automobiles, ships, and other vehicles
- navigation aids for aircraft, automatic pilots, altimeters, and radar for traffic control

The applications of electronic engineering cover almost every aspect of modern life such as aerospace, consumer goods, automotive, defense, energy/power, imaging equipment, industrial automation, medical instrumentation, oil and gas, semiconductor, telecommunication, transportation. The industry also involves a wide range of tasks e.g. design, development, evaluation, manufacture, etc.

6. Say whether the statement is true or false. If it is false, correct the mistake.

1) Electronics is a branch of engineering and chemistry.
2) Information can be audio signals, images, or numbers and other data.
3) Electronic circuits consist of interconnections of electronic components, at the heart of which are superconductors.
4) In industry, electronic devices have led to dramatic improvements in productivity and quantity.
5) Electricity deals with the emission, behaviour, and effects of electrons.
6) The development of microelectronics has had a major impact on the electronics industry.
7) In the first half of the 20th century, this industry had two major influences.
8) The applications of electronic engineering cover almost every aspect of modern life and involves a wide range of tasks.

7. Answer the questions to the text.

1) What is electronics?
2) What does it deal with?
3) Where are electronic systems important?
4) What do electronic circuits consist of?
5) What are transistors made of?
6) How do electronic devices help in industry?
7) What does the electronics industry do?
8) What were the two major influences of the electronics industry in the second part of the 20^{th} century?
9) What aspects of our life do the applications of electronic engineering cover?
10) Does the industry involve a wide range of tasks?

8. Choose the correct word in the following sentences.

1) *Transistors/inductors* are the key components in electronics.
2) They consist of three layers of silicon *semiconductor/superconductor*.
3) All *electronic/electrical* systems consist of input, a processor and output, and usually memory.
4) The input *receives/resists* and converts information while the output converts and supplies electronically processed information.

5) The memory may not be present in simple systems, but its function is the *storage/transmission* of information for the processor.

6) Continual developments in electronics give us increased *reliability /recovery* in electronic devices.

7) Electronic equipment controls *microprocessors/microwaves* in, for example, weapons systems, cellular radiotelephone systems and domestic appliances.

8) Electronic devices have improved our lives by providing high quality *communication/combination* and entertainment.

9. Complete the text about electronics by choosing a word from the list.

Diodes, semiconductor, electrons, devices, germanium, transistors, integrated circuits, capacitors, silicon, resistors

Electronic circuits are built from basic components. (1)_____ are the most important components. They can be used to amplify the strength of a signal by converting a weak signal into a stronger one or to switch other circuits on or off. (2)_____ reduce the flow of (3)_____ through the circuit, adding resistance to that circuit. (4) _____ function as electronic valves allowing current to flow in only one direction. (5) _____ store electricity in order to smooth the flow. They can be charged and discharged. The two most common capacitors are ceramic and electrolytic.

Most electronic devices use (6) _____ (IC) or microchips. Inside an IC is a very small piece of (7) _____ with circuits built in. Today, semiconductors are usually made of (8) _____ which is cheaper and easier to manufacture than (9) _____ .

Researchers are constantly trying to reduce the size of transistors in order to reduce the size of (10) _____.

10. Put 5 questions of different types to the text in Task 9 and ask your partner. Then answer his/her questions.

11. Make up the plan of the text “Electronics” and present a report on this topic.

Учебный элемент 2 (УЭ-2)

Understanding Electronic Diagrams

1. Study the following words and word combinations.

AF = audio frequency – звуковая частота, низкая частота silicon chip – кремниевый чип value – значение aerial – антенна tuner – тюнер, приемник speaker – динамик supply rail – шина питания, питающая шина approach – подход, принцип wiper – ползунок, скользящий контакт block/circuit diagram – блок-схема / электроцепь complicated – сложный, трудный, запутанный	variable – переменный variable resistor – переменный резистор to feed-fed-fed – питать, подавать энергию to consist of – состоять из to comprise – включать to bridge – соединять to earth – заземлять to deal with – иметь дело с in series – последовательно in parallel – параллельно modulator – регулятор, модулятор синхронизатора, преобразователь

2. Match the pairs of synonyms.

1) value	a) complex, composite
2) complicated	b) to include
3) variable	c) to compose
4) to bridge	d) meaning, magnitude
5) to consist of	e) to link, to connect
6) to comprise	f) alternative, alternating

3. Complete the table with the related words and memorize them.

Noun	Verb	Adjective
value		
		variable
	to tune	
speaker		
wiper		
		complicated
	to frequent	
modulator		

4. Use the word in brackets to form a word which fits in the sentence.

1) Using this approach we'll get … results. (to value)
2) The a) … b)… a carrier wave. (to modulate)
3) A … capacitor can vary between 5 and 65 picofarads. (to vary)
4) AF stands for audio … . (to frequent).
5) The … selects the required signal. (to tune)

5. Read the text and find the answers to the following questions:

1) What do we call the two types of diagrams shown in the text?
2) What do we call the approach to electronics which focuses on the function of units?

Although electronic devices may look complicated, they are made up of common basic units ("building blocks") connected together. The function of each of these units and the path of the signals between them can be shown in a block diagram. For example, the block diagram of a simple radio is shown in Figure 1.

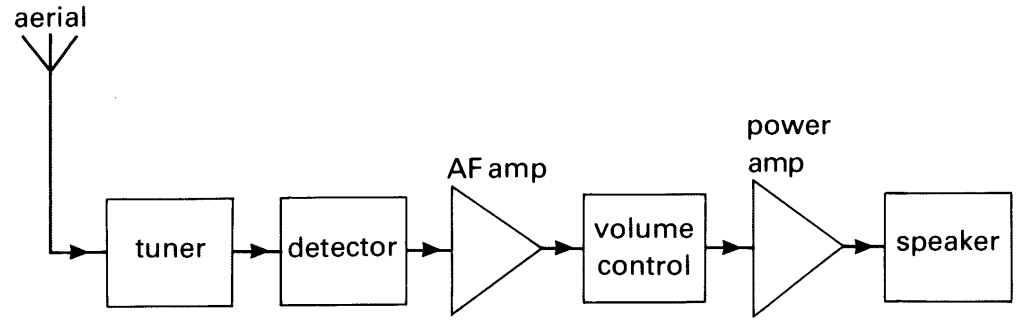


Fig. 1

To understand how the radio works, it is important to understand the function of each unit than to know what components are used. This is known as a systems approach to electronics. For example, in Fig. 1 the tuner selects the required signal, the detector then separates off the audio part of the signal, and the AF amplifier (amp) amplifies it.

The connections and values of the components inside these basic units can be shown in a circuit diagram using standard electronic symbols. Fig. 2 shows the circuit diagram for the simple radio.

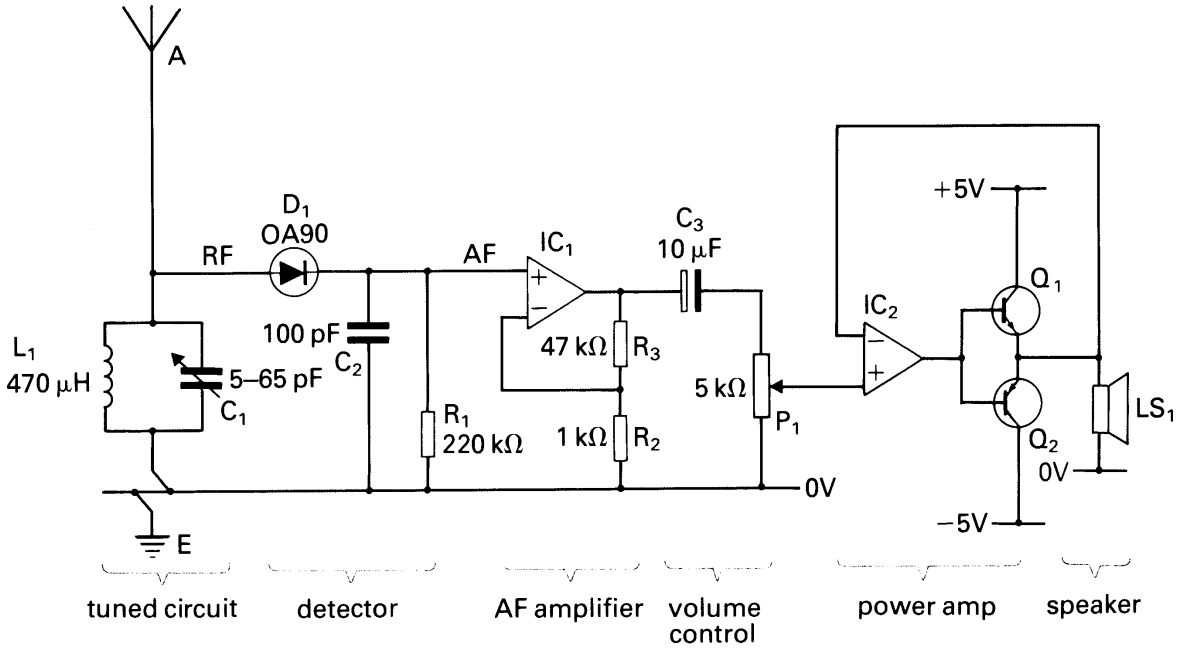


Fig. 2

6. How many of the circuit symbols in Fig. 2 can you identify? Use Appendix 1 to help you.

Language Study

Describing block diagrams and circuits

Look again at Fig. 1 above. We can describe it like this:

The radio ***consists of*** *a tuner, a detector, and an AF amplifier.*
is composed of

Using *comprise,* we can start our description with the blocks:

A tuner, a detector, and an AF amplifier ***comprise*** *the radio.*

We can describe the links between each building block using these expressions:

The tuner ***is connected to*** *the detector.*
is linked to

Now look again at Fig.2. We can describe the values of the components like this:

R1 *a-two-hundred-and-twenty-kilohm resistor*

C2 *a hundred-picofarad (puff) capacitor*

7. Describe the value of these components:

1) R2; 2) C1; 3) R3; 4) C3; 5) P1; 6) L1.

This table provides the terms you need.

Prefix	Symbol	Multiple	Example
giga	G	10^9	GHz gigahertz
mega	M	10^6	MΩ megohms
kilo	k	10^3	kV kilovolts
deci	d	10^{-1}	dB decibels
milli	m	10^{-3}	mW milliwatts
micro	µ	10^{-6}	µH microhenries
nano	n	10^{-9}	nF nanofarads
pico	p	10^{-12}	pF picofarads

Looking now at the basic units of the circuit, we can describe the volume control like this:

The volume control consists of a ten-microfarad electrolytic capacitor connected in series with a five-kilohm potentiometer (pot). The positive terminal of the capacitor is connected to the output of the AF amplifier and the wiper of the pot is connected to the power amp. The third terminal of the pot is connected to the zero voltage supply rail, which is earthed.

8. Fill in the gaps in this description of the tuned circuit shown in Fig.2. Each gap represents one word.

The circuit 1)____ of a four hundred and seventy 2) ____ inductor which is connected in parallel with 3) ____ capacitor. The 4) ____ can be varied between five and sixty-five 5) ____ . The aerial is 6) ____ to the top end of the tuner. It is also connected to the positive terminal of the 7) ____ in the detector. The bottom end of the tuner is connected to earth via the zero voltage 8) ____ rail.

9. Work in pairs A and B. Complete you circuit diagram with help from your partner.

Ask questions like these:

What kind of component is P1?

What's the value of C1?

What is connected between the collector of Q2 and the positive side of the battery?

If you don't understand your partner, say:

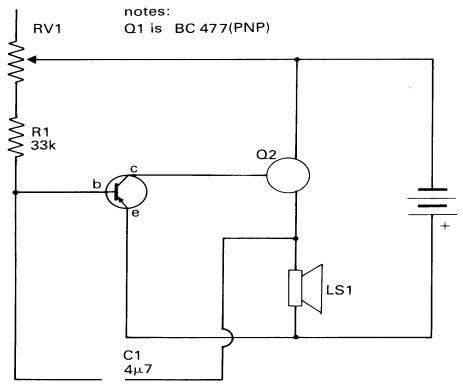
I'm sorry. I don't understand. Could you say that again, please?

Could you speak more slowly?

If your partner doesn't understand you at first, try phrasing your answer in a different way. For example:

It's a variable resistor. It's a resistor which you can vary or change by turning the control. It's called a variable resistor.

Student A



Student B: Your circuit diagram is in Appendix 2.

10. With the help of the diagram, fill in the gaps in the text. Each gap represents one word. The description should answer the questions:

1) What is the diagram of?
2) What does it consist of in terms of blocks?
3) How are the blocks connected?
4) What is the function of each block?

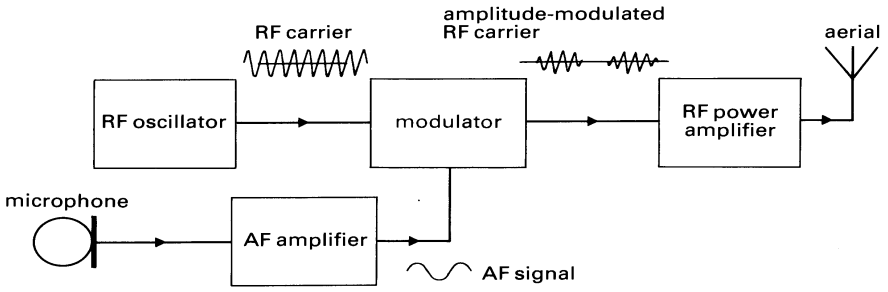


Fig. 3

Fig. 3 shows the block diagram of an amplitude-modulated (AM) radio transmitter. It 1) ____ of a radio frequency (RF) oscillator, a 2) ____, an audio frequency (AF) amplifier, and an RF power amplifier. The RF 3) ____ generates an RF 4) ____ wave which is fed into the modulator.

The microphone converts sounds into audio frequency signals which are amplified by the AF 5) ____. The modulator then uses the amplified AF 6) ____ to modulate the RF carrier wave.

The power of the modulated carrier wave is increased by the RF 7) ____ amplifier. The strong modulated output signals are fed to the 8) ____ which enables them to be transmitted over long distances.

Учебный элемент 3 (УЭ-3)

Component Values

1. Study the following words and word combinations.

band – лента tolerance – погрешность resistance – сопротивление preferred values – рекомендуемые номиналы manufacture / manufacturer – производить/ производитель extreme – предел, крайний член capacitor – конденсатор multiplier – множитель, коэффициент voltage – напряжение significance – значение, важность purpose – цель figure – число, цифра, рисунок end cap – заглушка, торцевая пробка (крышка) coating – покрытие, слой carbon rod – угольный электрод, угольный стержень to insulate – изолировать to spray – распылять, напылять to ease – облегчать to increase – увеличивать, возрасти to indicate – показывать, указывать to vary – меняться, колебаться, варьироваться	housing – корпус to reflect – отражать to enable – позволять, давать возможность to overlap – перекрывать, накладываться to equal – уравнивать, ровняться to involve – включать to denote – означать, значить to stem from – происходить, возникать to be coded with – быть закодированным с помощью ч-л to correspond to – соответствовать ч-л to be limited to – ограничиваться ч-л to be listed in – быть перечисленным в poor – некачественный internal – внутренний satisfactory – достаточный, удовлетворительный adjacent – прилегающий, смежный available – доступный accurate – точный equally – равно with respect to – относительно at first sight – на первый взгляд in the case of – в случае

2. Match the words in A with their synonyms in B.

A	B
1. manufacture	a) producer, maker
2. housing	b) aim, objective, goal
3. to vary	c) jacket
4. purpose	d) production
5. to enable	e) to differ
6. manufacturer	f) number, digit, character
7. figure	g) to let, to allow
8. to involve	h) bad
9. to stem from	i) to include
10. poor	j) to originate from

3. Match the words in A with their antonyms in B.

A	B
1. internal	a) to decrease
2. satisfactory	b) excellent
3. to increase	c) to make sth difficult
4. to ease	d) to absorb
5. to reflect	e) external
6. poor	f) unsatisfactory

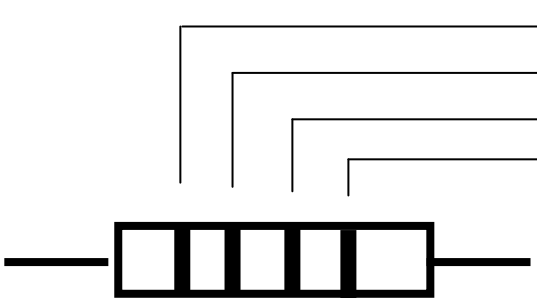
4. Complete the table with the related words and memorize them.

Noun	Verb	Adjective
	increase	
	vary	
multiplier		
		satisfactory
resistance		
		easy
manufacturer		
significance		

5. Fill in the missing colours in the table with the help of the text. Translate the text.

Reading the Resistor Code

0-black
1-
2-red
3-orange
4-
5-green
6-blue
7-violet
8-
9-white



Resistors are coded with coloured bands to ease the problem of marking such small components.

The numbers corresponding to the ten colours used and the values per position are shown above.

For example, 180 000 ohms is coloured with the first digit brown, then grey and finally yellow. The fourth band indicates the tolerance that the value has with respect to the stated value. For example, silver indicates 10% tolerance, meaning that the 180 000 ohms could vary between 180 000±18 000, i.e. 162 000 to 198 000.

These tolerances may seem to reflect poor manufacture but in most circuits they are, in fact, quite satisfactory. Relaxing the tolerance enables the maker to sell them more cheaply.

6. Find the values and tolerances of resistors banded as follows. How can the values vary? Then compare your answers with your partner.

1st band	2nd band	3rd band	4th band
1. red	violet	orange	silver
2. blue	grey	brown	gold
3. green	blue	red	silver
4. red	red	green	–
5. brown	black	orange	–
6. orange	orange	brown	gold
7. yellow	orange	red	gold
8. brown	green	green	–
9. violet	green	brown	red
10. white	brown	red	red

7. Read and translate this additional text.

Preferred Values

If the maker tried to produce and sell every value of resistance that exists, there would be chaos and the costs would be greatly increased. The actual values made, therefore, are limited to a range called the preferred values. These are listed in the table.

The values may seem illogical at first sight, but this is not so. They stem from the fact that the tolerance extremes of a value reach the extremes of adjacent values, thereby covering the whole range without overlap. Values normally available stop in the megohm decade.

Tolerance

±5%	±10%	20%±
1.0	1.0	1.0
1.1		
1.2	1.2	
1.5	1.5	1.5
1.6		
1.8	1.8	
2.0		
2.2	2.2	2.2
2.4		
2.7	2.7	
3.0		
3.3	3.3	3.3
3.6		
3.9	3.9	
4.3		
4.7	4.7	4.7
5.1		
5.6	5.6	
6.2		
6.8	6.8	6.8
7.5		
8.2		
9.1		

8. Answer the questions, which refer to both texts.

1) Why are resistors coded with coloured bands rather than some other form of marking?

2) What would be the effect of making resistors with a much higher tolerance?

3) Between which values might a resistor marked green, blue, orange, and silver vary?

4) Why do manufacturers make resistors in the preferred values shown rather than in equally stepped values?

9. Learn how to find capacitor values. Name the colour bandings of the capacitors below. (Note: 1nF = 1000pF)

C280 capacitor colour coding. The first three bands give the value (in pF) using the same system as for the four band resistor coding. The first and the second bands correspond to the first and the second digits respectively. The third band denotes multiplier. The fourth band means tolerance and the fifth one indicates voltage. The meanings for the fourth and the fifth bands are listed in the table below.

		band	
		4	**5**
colour	black	20%	--
	white	10%	--
	green	5%	--
	orange	2,5%	--
	red	2%	250V
	brown	1%	--
	yellow	--	400V

Now let's study the example:
220 pF, 2,5 %
Band 1 *red*=2 Band 3 *brown = one zero*
Band 2 *red*=2 Band 4 *orange = 2,5 % tolerance*
Now try to name the colour bandings of the following capacitors:
1) 100 pF 20 % 3) 22nF, 5 % 250V
2) 180 pF, 10 % 4) 47 nF, 20 %

10. Identify these diodes with the help of the text below.

1. BAX16 **2.** BY126 **3.** BZX55C2V4 **4.** AA119 **5.** BPX65

Diode Coding

The European system for classifying semiconductor diodes involves an alphanumerical code which employs either two letters and three figures (general purpose diodes) or three letters and two figures (special purpose diodes). The first two letters have the following significance:

First letter – semiconductor material:
A germanium
B silicon
C gallium arsenide etc
D photodiodes etc

Second letter – application
A general purpose diode
B tuning (varicap) diode
E tunnel diode
P photovoltaic diode
Q light-emitting diode
T controlled rectifier
X varactor diode
Y power rectifier
Z zener diode

In the case of diodes for specialized applications, the third letter does not generally have any particular significance. Zener diodes have an additional letter (which appears *after* the numbers) which denotes the tolerance of the zener voltage. The following letters are used:

A ± 1 %

B ± 2 %

C ± 5 %

D ± 10 %

Zener diodes also have additional characters which indicate the zener voltage (e.g. 9 V1 denotes 9.1 V).

Example

Identify each of the following diodes:

1) AA113

2) BB105

3) BZY88C4V7

Diode 1 is a general-purpose germanium diode.

Diode 2 is a silicon diode for tuning applications (sometimes referred to as a varicap).

Diode 3 is a silicon zener diode having 5 % tolerance and 4.7 V zener voltage.

Language Study
Linking facts and ideas

Study these statements about resistors:

1) *Resistors are electronic components.*

2) *Resisters are used to add resistance to a circuit.*

We can link the statements like this:

Resistors are electronic components ***which*** *add resistance to a circuit.*

which *add resistance to a circuit* is a relative clause. This clause helps to define resistors. It is an essential part of the sentence.

Study these statements:

3) *Very accurate resistors are used in instruments.*

4) *These resistors are expensive.*

We can link these statements like this:

Very accurate resistors, ***which*** *are expensive, are used in instruments.*

which *are expensive* is also a relative clause, it contains information that is not essential to the sentence. Relative clauses that carry inessential information are separated from the rest of the sentence by commas.

Study these statements:

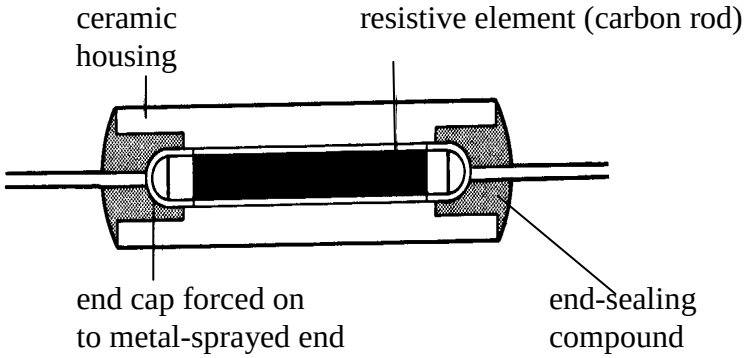
5) *Each resistor is marked with colours.*

6) *The colours indicate the value of the resistor.*

Statement 6 explains the purpose of the colours. We can link these statements with the help of the infinitive:

7) *Each resistor is marked with colours* ***to indicate*** *its value.*

11. Study this diagram of a carbon resistor and consider how it is made.



Now join the following groups of statements to make longer sentences. Use the words printed in *italics* above each group. You may omit words and make whatever changes you think are necessary in the word order and punctuation of the sentences.

1 *which*

A resistor is a component. A resistor is used to add resistance to a circuit.

2 *which*

Carbon resistors are made of compressed graphite. The graphite is formed into small tubes.

3 *to*

A ceramic coating is applied over the graphite. The ceramic coating insulates the graphite.

4 *to*

The ends of the graphite are sprayed with metal. This forms contacts.

5 *which*

End caps are forced on the metal-sprayed ends. The caps have connecting wires attached.

6 *to*

The ceramic is marked with colour bands. The bands indicate the value and tolerance.

7 *which*

Resistors are made in a range of preferred values. These values meet all the needs of circuit designers.

Учебный элемент 4 (УЭ-4)

Batteries

1. Study the following words and word combinations.

EMF = electromotive force – электродвижущая сила (ЭДС)	overheating – перегрев
AC = alternative current – переменный ток	smoothing/stabilizing circuit – сглаживающая/стабилизирующая цепь
DC = direct current – постоянный ток	fluctuation – колебание
Walkman – плеер	portable – переносной, портативный
cell – батарея, ячейка	constant – постоянный
manganese dioxide – двуокись марганца	cordless – беспроводной, с батарейным питанием
torch – фонарик	to (re)charge – (пере)заряжать
charger – зарядное устройство	to supply – поставлять, снабжать, питать
solution – раствор	to rectify – выпрямлять
current collector – токосниматель	to step up\down – повышать/ понижать
low-current – слабый/низкий ток	to break (a circuit) – разрывать, разъединять цепь
high current – сильный ток	to oscillate – генерировать, колебаться
switch – ключ, включатель, переключатель	to process – обрабатывать
fuse – предохранитель	to tune – настраивать (на частоту)
detector – приемник	to remove – удалять
rectifier – выпрямитель	to switch on\off – включать/выключать
mains power supply – источник питания от сети	to convert – превращать, переводить
live (side) – подключенный к источнику питания, «+»	to prevent – предотвращать, препятствовать
bridge – мост	to protect – защищать
heatsink – радиатор, теплоотвод	in contact with – соприкасающийся с

2. Read and try to translate the following words. Use a dictionary if necessary.

Electrolyte, electrode, ammeter, transformer, voltmeter, nickel, zinc, cadmium, aluminium, potentiometer.

3. Match the words in A with their synonyms in B.

A	B
1) to process	a) to turn on
2) live	b) to feed
3) to switch on	c) to protect
4) to prevent	d) to elaborate
5) to supply	e) positive
6) battery	f) housing
7) jacket	g) cell

4. Match the words in A with their antonyms in B.

A	B
1) live	a) to discharge
2) constant	b) negative
3) to switch on	c) to close
4) to charge	d) to turn off
5) to break	e) variable

5. Each of the following verbs has a related noun ending in *–er* or *–or* which refers to an instrument or component. Derive nouns and memorize the words.

Example: to record - recorder

To oscillate, to transmit, to transform, to charge, to rectify, to process, to amplify, to collect, to detect, to tune.

6. Match the words with their definitions.

Electrolyte, EMF, current collector, rectifier, solution, heatsink, charger, bridge, mains supply, smoothing circuit, oscillator, primary.

1) Transformer input coil.
2) The carbon rod in a zinc-carbon cell.
3) A piece of equipment used to put electricity into a battery.
4) Balanced circuit made from four components.
5) A liquid mixed with a solid or gas, usually without a chemical change.
6) Common source of high voltage AC electricity provided throughout most buildings.
7) Voltage produced by an electrical source (e.g. a battery).
8) Chemical which aids the flow of current between electrodes.
9) Electronic circuit for changing AC into DC.
10) Electronic circuit that produces a repeating signal.
11) Piece of metal used to allow the heat to escape from a component such as a transistor.
12) Electronic circuit for removing fluctuations in DC.

7. Try to complete the table of the differences between two kinds of cells with the help of the following words:

Secondary, manganese dioxide, cadmium, primary, nickel, zinc, portable phones, torches.

	Zinc-carbon cell	**NiCad cell**
Type of cell		
Positive electrode		
Negative electrode		
Example of use		

8. Listening 5. Listen to the recording to check your answers.

9. Now read this text. Note any further information about these cells.

	Zinc-carbon cell	**NiCad cell**
Electrolyte		
EMF		

Zinc-carbon cell

It has a zinc negative electrode, a manganese dioxide positive electrode, and the electrolyte is a solution of ammonium chloride. The carbon rod is in contact with the positive (but is not involved in the chemical reaction) and is called the current collector. The EMF is 1.5V and the internal resistance about 0.5Ω. This is the most popular cell for low-current or occasional use, e.g. in torches.

NiCad cell

The electrodes are of nickel (+) and cadmium (-) and the electrolyte is potassium hydroxide. It has an EMF of 1.2V and is made in the same sizes as primary cells, e.g. HP2, PP3; button types are also available. High currents can be supplied. Recharging must be by a constant current power supply because of the very low internal resistance

10. Answer the questions on types of cells. Listen to Recording 5 once again if necessary.

1) What is a battery?
2) Why should we call batteries cells?
3) What sizes and shapes of batteries are available?

4) What are the two types of cells? What is the difference between them? What is similar?

5) What are negative and positive electrodes in zinc-carbon/NiCad cells?

6) What are the electrolytes and EMF in zinc-carbon/NiCad cells?

7) What is the internal resistance of these cells?

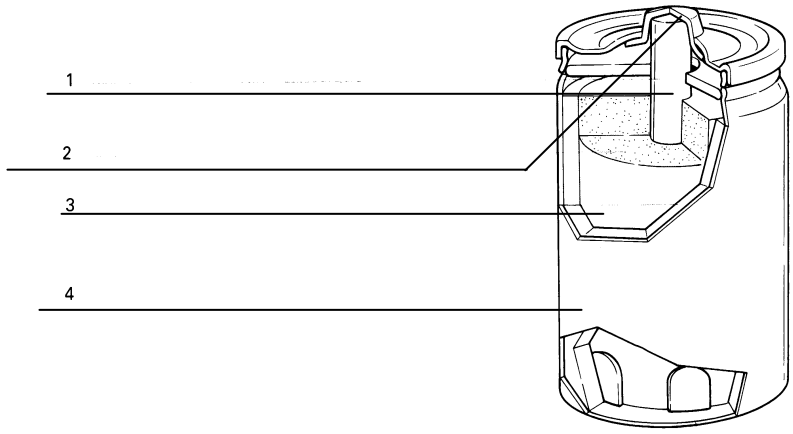
8) Why NiCad cells must be recharged by a constant current power supply?

9) Where can these batteries be used?

10) Do you use batteries? What for? What type of batteries do you use?

11. Label this diagram of a Zinc-carbon cell with these terms. More than one term can refer to the same part of the diagram.

a) zinc can; b) current collector; c) jacket; d) carbon rod; e) positive electrode; f) electrolyte



Language Study

Describing components

Two questions we may need to answer when we describe components are:

1) What is it called?

2) What does it do?

In other words, we need to be able to:

1) label components.

2) describe their function.

We can use these ways of labeling components:

It ***is called*** a Zinc-carbon cell.

It ***is known as*** a NiCad cell.

We can describe the function of components like this:

A cell ***provides*** electricity.

Cells ***change*** chemical energy into electricity.

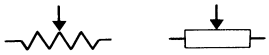
12. Here are some circuit symbols. Label them and describe their function. For example:

3h *It's called a transformer. It steps AC voltages up or down.*

This list of functions may help you.

a) varies capacitance in a circuit
b) rectifies alternating current
c) adds resistance to a circuit
d) measures very small currents
e) breaks a circuit
f) protects a circuit
g) varies the current in a circuit
h) steps AC voltages up or down.
i) receives RF signals
j) measures voltages

1 

2 

3 

4 

5 

6 

7 

8

9 

10

13. Work in pairs , A and B. You have some details, but not all, about two kinds of cells. Find out the missing details from your neighbour so that you can complete your table. Student B can find the information in Appendix 2. Be ready to tell about one of these batteries.

Student A

Cell	**Mercury**	**Lithium**
Type	?	primary
Output voltage	1.35 V	?
Applications	? hearing aids, watches, calculators	backup for computer RAM memories, ?
Usual size	?	button and small cylindrical cells
Advantages	small size but high energy	? high voltages, last for long periods at low currents
Disadvantages	?	lithium is poisonous, used cells should be disposed of carefully

14. Match the following words with their definitions.

Cathode, anode, catholytes, to interact, pallet, to seal, pressure build-up, glue

a) to have an effect on each other and work together;

b) the negative electrode from which electric current leaves a piece of equipment like a battery;

c) to close an entrance or a container with smth. that stops air, water etc from coming in or out of it;

d) a sticky substance used for joining things together;

e) the part of a battery that collects electrons, often a wire or piece of metal with the sign (+);

f) the part of the electrolyte that surrounds the cathode in an electrolytic cell;

g) a large metal plate;

h) action of rising pressure.

15. A) Try to match the materials to their functions.

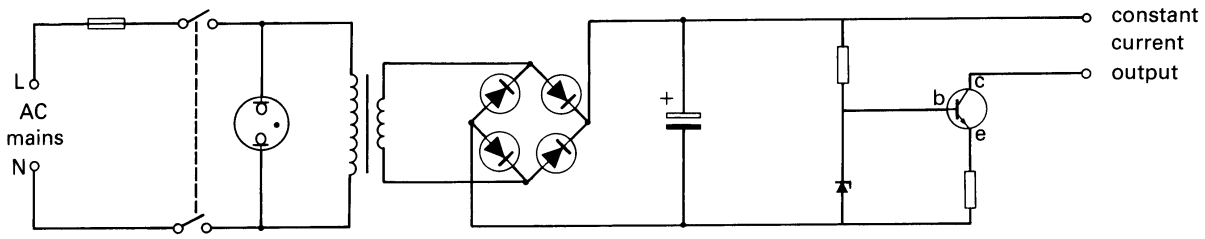
1) graphite	a) the main ingredient in the cathode
2) silver catholytes	b) binds the cathode ingredients
3) manganese dioxide	c) interacts with electrodes to produce electricity
4) barium sulphate	d) conducts electricity
5) zinc	e) keeps zinc particles suspended
6) jell agent	f) produces chemical pressure build-up
7) potassium hydroxide	g) the main ingredient in the anode

B) Watch video 1 on "How batteries are made" and check your matchings.

16. Now watch the video once again and try to answer the questions.

1) When does a battery produce electricity?
2) How many pallets an hour does the press produce?
3) What is paper used for? How is it called?
4) How long does it take for glue to harden?
5) How much zinc does a battery contain?
6) What makes batteries rechargeable?
7) What's the power of each battery?
8) Do you need to charge batteries before using them?
9) What is the function of a label?
10) What's the temperature in an oven?

17. Study the circuit diagram of a battery charger and try to name all the components.



Now read this text to check your answers:

The power to drive an electronic circuit is normally provided by an AC mains power supply but batteries are often used for portable equipment Secondary cells can be recharged to their original voltage and can therefore be used many times over.

Recharging is done using a battery charger which consists of a mains power supply with a DC output slightly larger than the required battery EMF. A current is driven through the battery in the opposite direction to its normal output current. The block diagram of a battery charger is shown in Fig.1.

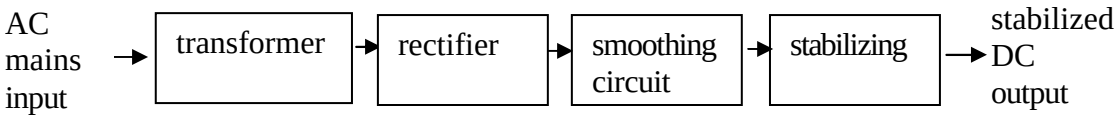


Fig. 1

The first stage consists of a transformer which steps down the voltage of the AC mains (see Fig. 2).

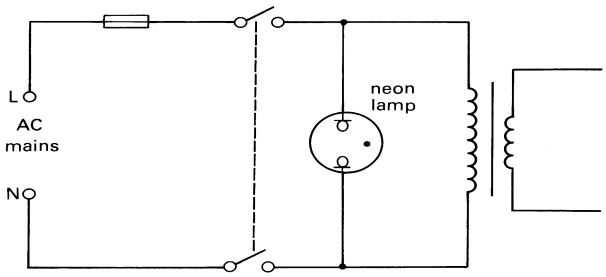


Fig. 2

The charger is switched on and off by a double-pole switch connected in series with the mains output. A neon lamp, connected across the primary of the transformer, shows when the charger is on. A fuse is connected in the live side of the supply to protect the transformer.

The second stage is a bridge rectifier which converts the AC voltage to a DC voltage (see Fig. 3).

This can be made from discrete components but more usually consists of four diodes contained in one package. It is mounted on an aluminium heatsink to keep the diodes from overheating.

The third stage is a smoothing circuit. It removes the fluctuations in the DC output of the rectifier. It consists of a large electrolytic capacitor connected in parallel with the rectifier as shown in Fig. 4.

The final stage is a stabilizing circuit consisting of a transistor biased by two resistors and a zener diode. This prevents the output from changing when the load varies. NiCad batteries have such a small internal resistance that the charger must produce a constant current output (see Fig. 5).

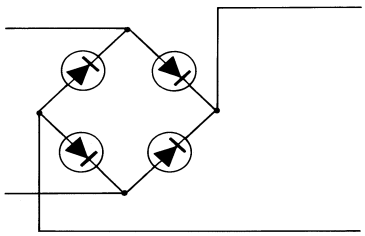


Fig. 3

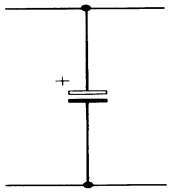


Fig. 4

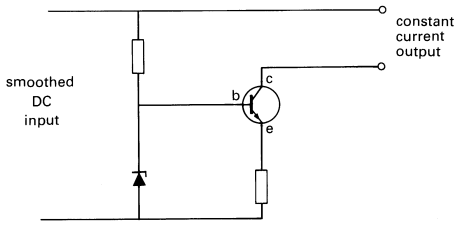


Fig. 5

18. Match each component or unit with its function in a battery charger.

Example: The transformer steps down the AC mains voltage.

Component/Unit	**Functions**
1. transformer	a) steps down the AC mains voltage
2. double-pole switch	b) prevents the output from changing when the load varies
3. neon lamp	c) keeps the diodes from overheating
4. fuse	d) shows when the charger is on
5. rectifier	e) removes the fluctuations in the DC output of the rectifier
6. aluminium heatsink	f) protects the transformer
7. smoothing circuit	g) converts the AC voltage to a DC voltage
8. stabilizing circuit	h) switches the charger on and off

19. Write the description of the block diagram of the battery charger and the function of each building block.

One way of planning your writing is to think of questions which your readers will want to know the answers to. In this task base your description on the following questions:

1) What is the function of a battery charger?
2) What does it consist of in terms of blocks?
3) How are the blocks connected?
4) What is the function of each block?

Progress Test

I. Match the English words to their Russian equivalents

1) silicon	a) преобразователь, приемник
2) aerial	b) переменный
3) poor	c) отражать
4) to supply	d) выпрямитель
5) speaker	e) ползунок
6) transducer	f) восстановление, извлечение
7) accurate	g) эмиссия, выделение
8) to denote	h) заземлять
9) wiper	i) питать, запитывать
10) demodulation	j) кремний
11) variable	k) точность
12) to insulate	l) поставлять
13) adjacent	m) некачественный
14) to earth	n) изолировать
15) recovery	o) динамик
16) fidelity	p) предохранитель
17) current collector	q) значить, означать
18) fuse	r) антенна
19) rectifier	s) прилегающий, смежный
20) to feed	t) детектирование, выпрямление
	u) достаточный, удовлетворительный
	v) токосниматель
	w) точный

II. Complete the sentences with the appropriate form of the word given in the right-hand column.

1. The fourth band of a resistor indicates the …	to tolerate
2. Resistors add … to a circuit.	to resist
3. A … capacitor can vary between 5 and 65 picofarads.	to vary
4. The weak audio signal entering a radio is amplified by the … .	to amplify
5. Computer games are just one example of electronic systems being used for … .	to entertain
6. The third band denotes … .	to multiply
7. IC stands for … circuit.	to integrate
8. Computer software is … if it does what the manual says it should.	to rely
9. Smoothing circuit removes the … in the DC output of the rectifier.	to fluctuate
10. Secondary cells can be … to their original voltage	to charge

III. Fill in the gaps with the suitable prepositions.

1) The neon lamp shows when the device is switched … or ….
2) … first sight it seems to be difficult.
3) This word stems … Greek.
4) … the case … overheating the device will be turned ….
5) The number of zeros is limited … three.
6) Diodes are coded … color bands.
7) Preferred values are listed … the table.
8) This resistor is … contact … an inductor.
9) The transformer steps the voltage … or ….
10) Nowadays electronics benefits … miniaturization.

IV. Join the sentences into one compound.

1) NiCad cell is a secondary cell. Secondary cell can be recharged.

2) The electrolyte surrounds the carbon rod. It helps the flow of current between electrodes.

3) The diodes are marked with colour bands. The bands indicate the tolerance and value.

4) The bridge converts the AC voltage to a DC voltage. The bridge is the second stage.

5) A smoothing circuit removes the fluctuations. A smoothing circuit is the third stage.

6) The first stage consists of a transformer. The transformer steps down the voltage of the AC mains.

Модуль III «Energy»

ЦЕЛИ:

Вы должны знать	*Вы должны уметь*
1. Грамматика: – образование прилагательных с помощью отрицательных приставок un-, in-; 2. Лексика: Ключевые слова и словосочетания по темам «Энергетика Британии» и «Альтернативные источники энергии».	– использовать знания грамматики и лексики при чтении и переводе текстов указанной тематики; – вести беседу и рассказать о развитии энергетики в Британии, а также представить презентацию по теме «Альтернативные источники энергии». – рассказать, какие физические силы действуют на высокие конструкции.

Entry Test

Choose the correct variant.

1. Today domestic … is the UK's largest source of energy.
a) oil b) natural gas c) coal
2. Renewable sources of energy are
a) tidal energy, biofuel, sun; b) coal, wind, oil; c) natural gas, coal, sun;
3. Non-renewable sources of energy are
a) oil, natural gas, coal; b) wood, coal, wind; c) biofuel, uranium, oil;
4. Wind turbines are used to
a) measure the speed of wind;
b) protect the territory from hurricanes;
c) produce energy
5. Wind turbines consist of
a) a tower, a transformer and blades;
b) a tower, a generator and blades;
c) a barrage, a transformer and a generator;
6. All the objects on Earth are influenced by
a) twisting force b) compression c) gravity
7. The first nuclear power plants appeared in Britain in
a) early 1940s b) 1960s c) the mid-1950s
8. In the first half of the twentieth century … was the dominant fuel.
a) coal b) natural gas c) petroleum
9. "Offshore" stands for …
a) far from the shore b) in the sea/ocean c) on the shore
10. Solar towers are used to
a) produce energy
b) reflect sunrays
c) warm water with the help of sunrays.

Учебный элемент 1 (УЭ-1)

The UK's Energy System

1. Study the following words and word combinations.

renewable – возобновляемый non-renewable – невозобновляемый biofuel – биотопливо coal – уголь oil = petroleum - нефть to commission – вводить в строй / в эксплуатацию electrical/ geothermal/ hydroelectric/ kinetic/ magnetic/ nuclear/ solar energy – электро-/ геотермальная/ гидроэлектро-/ кинетическая/ магнитная/ атомная/ солнечная энергия gas/ hydraulic/ steam/ tidal/ water/ wave/ wind power – газовая/ гидравлическая/ паровая/ приливная/ водная/ волновая/ ветровая энергия	gasworks – газовая станция fossil/ transport fuel – ископаемое/ транспортное топливо greenhouse effect – парниковый эффект town-gas network – коммунальная система газоснабжения distribution network – распределительная сеть transmission network – сеть линий передачи, магистральная сеть electrical appliance – электроприбор open coal fire – печь с угольным отоплением solar cell – солнечная батарея hydroelectric scheme – гидроэлектростанция tidal barrage – приливная плотина

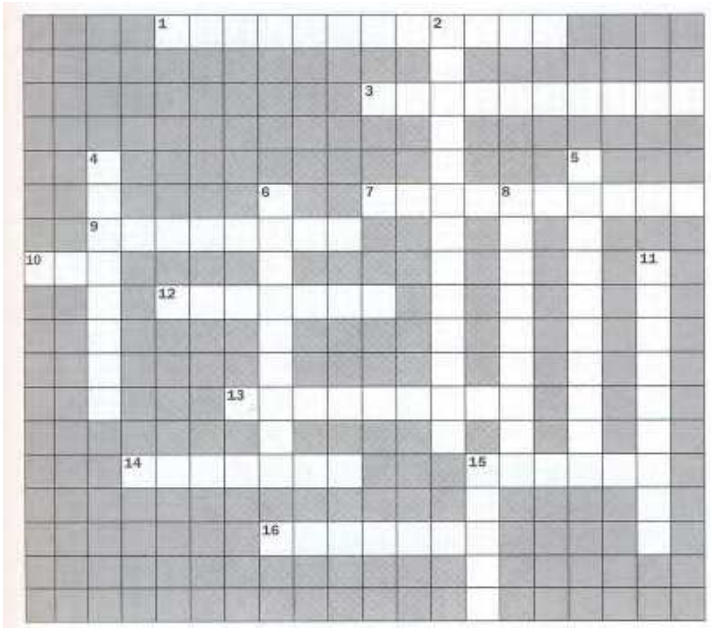
2. Divide these sources of energy into two groups: renewable and non-renewable. Name those which refer to fossil fuels.

sun, petroleum, uranium, wind, biofuel, wave, plutonium, natural gas, water, coal, oil.

3. Rearrange the letters to name six sources of energy.

1) uns; 2) fbielou; 3) dwni; 4) plumutoin; 5) weva; 6) peumroetl.

4. Complete the crossword with the words from the previous exercises.



Across

1) When a nuclear plant is put into action it is _____ .
3) The flow of electrons produces this type of energy.
7) This heat comes from the earth itself.
9) This is where gas was made from coal in the past.
10) Almost all the energy we use comes from this.
12) The reactor in nuclear power stations contains a nuclear fuel such as ___ .
13) This turns the energy in sunlight into electricity.
14) This kind of energy is in things that are moving, e.g. a moving turbine.
15) This is a hydroelectric power station together with its dam and reservoir.
16) This is made from plant or animal matter.

Down

2) The main way of heating homes before central heating.
4) This energy is associated with electric current.
5) Exhaust gases from vehicles and power stations, methane from oil and gas rigs and CFCs in refrigerators all contribute to this effect.
6) This type of fuel is used to power all sorts of vehicles.
8) This power comes from the pressure or movement of a liquid.
11) Another word for oil.
15) This type of energy comes from the sun.

5. Read and translate the text.

The UK's Energy System

The UK's energy system has changed dramatically over the last century.

In the first half of the twentieth century coal was the dominant fuel in industry and electricity power plants, and in houses and businesses. Town-gas networks existed only in larger towns, with the gas derived from coal.

In the second half of the 20^{th} century there were the following changes:

– coal continued to be of central importance for electricity generation, although its importance elsewhere fell substantially;

– nuclear power plants began to be commissioned from the mid-1950s;

– the electricity industry was combined into state-owned monopolies, during the 1950s;

– the high voltage electricity transmission network was created in order to transport electricity over long distances from big power plants;

– electricity distribution networks shrank in importance and activity;

– during the 1960s and 1970s there was a move to an extensive natural gas network for heating (industry, commerce, and domestic);

– demand for transport fuel increased dramatically;

– gas-fired central heating largely replaced open coal fires in homes;

– the use of electrical appliances in commerce and the domestic sector increased hugely.

In 1950, the energy system for both industry and domestic demand was fuelled by coal. Today domestic natural gas is the UK's largest source of energy.

Developments in technology are gradually lowering the costs of generating electricity from alternative and renewable sources. The increasing and fluctuating prices of natural gas are contributing to making biomass and wind energy competitive.

Nowadays we are seeing increasing interest in those renewable sources of energy which can deliver clean and cheap types of energy, using environmentally-friendly processes and equipment.

6. Answer the following questions:

1) How much has the UK's energy system changed over the last century?

2) What was industry and domestic demand fuelled by in 1950?

3) Which changes of the second half of the 20th century are the most important and dramatic in your opinion?

4) When was the first nuclear power plant commissioned?

5) What tendency are we seeing nowadays?

6) What sources of energy are the most environmentally-friendly to your mind?

7) Have you ever seen open coal fires? Are they used in our country?

8) What does the UK's energy system have in common with our energy system?

7. Complete the text with the given words.

Barrage, gas, non-renewable, produce, water, wave, fossil fuels, power stations, generators, renewable, tidal, coal, turbines.

Most large power stations burn (a)_____ which were formed from the remains of plants and animals that lived on the earth millions of years ago. The first type of fossil fuel to be used in large quantities was (b) _____. Today, it is increasingly expensive to mine, however, many (c) _____ still burn it to (d) _____ electricity. Oil and natural (e) _____ have now largely replaced coal. These fuels are all (f) _____ and will eventually run out. Wood is used by 2 billion people in the developing world and unlike fossil fuels it is a (g) _____ energy source. Alternative energy sources include (h) _____ power technology. In hydro schemes, water from a reservoir or from a river powers (i) _____ which drive (j) _____. (k) _____ power systems use the energy from wind and sea or take mechanical energy from wave movement. The UK offers a good position to exploit wave energy. The movement of the sun, moon and earth combine to produce (l) _____ power. Electricity can be generated when tidal water passes through turbines positioned in a (m) _____.

8. Make a plan and get ready to speak about British energy system.

Учебный элемент 2 (УЭ-2)

Alternative Sources of Energy

1. Study the following words and word combinations.

wind turbine – ветряная турбина blade – лопасть tower – башня, вышка offshore – в открытом море lifespan – срок эксплуатации strength – прочность, сопротивление constituent – составная часть, компонент steel – сталь concrete – бетон reinforced concrete – железобетон tubular – трубчатый, полый installation – конструкция, установка corrosion – коррозия, ржавчина maintenance – техническое обслуживание load – нагрузка	opposing / twisting force – противодейст-вующая/ скручивающая сил substructure – фундамент, основание stack effect – эффект тяги huge – огромный to act on – действовать на to erode – корродировать, изнашиваться to assess – оценивать to look into – исследовать, рассматривать to expose – подвергать, подвергать действию to embed – вставлять, армировать to exert – действовать (о силе) to absorb – поглощать to cause – причинять, быть причиной

2. Match the words in A with their synonyms in B.

A	B
1) huge	a) handling, servicing
2) constituent	b) to corrode
3) maintenance	c) to subject
4) to erode	d) colossal, enormous
5) to cause	e) basement, foundation
6) to expose	f) component
7) substructure	g) to explore; to study
8) to look into	h) to effect

3. Complete the table with the related words and memorize them.

Noun	Verb	Adjective
corrosion		
	to absorb	
maintenance		
		opposing
installation		
	to expose	

4. Match the words to their definitions. Memorize these adjectives.

1) appropriate/ suitable	a) the right solution for a particular situation
2) consistent/ reliable	b) good enough for the intended function
3) cost-effective/ economical	c) performs a function well
4) effective	d) works quickly and well
5) efficient	e) makes the most of resources, isn't wasteful
6) sufficient/ adequate	f) doesn't break down, always performs in the same way

5. Make the following words negative by adding the prefixes in- or un-.

Example: adequate – inadequate

1) appropriate; 2) consistent; 3) economical; 4) effective; 5) efficient; 6) reliable; 7) sufficient; 8) suitable.

6. a) In pairs, answer the following questions about wind turbines:

1) What function do wind turbines perform?
2) What are the main advantages and disadvantages of wind turbines?
3) What types of location are most suitable for wind farms?

b) In pairs, discuss the functions of the following wind turbine components.

A) BLADE B) TOWER C) GENERATOR

7. a) Listening 6. Mike, Loretta and Hanif, engineers at a wind turbine constructor, are discussing performance and suitability issues relating to offshore wind turbines. Listen to the conversation and answer the following questions.

1) Which wind turbine component do the engineers discuss?
2) What is the big problem with offshore installations?
3) Which two types of construction material are being compared?
4) Why are costal defences mentioned?
5) What point does Hanif make about regular maintenance?
6) What comparison needs to be made with regard to lifespan?

b) Listen again. What issues do Mike, Loretta and Hanif agree and disagree on?

8. a) The following information is from the web site of Sigma Power, a firm that advises corporate and government clients on wind energy projects. Complete the text using the words in Exercises 4, 5.

WIND TURBINES – FACT FILE

The fact that wind turbines consume no fuel and waste very little energy is clearly a fundamental advantage. But just how 1) *efficient* they are? **Key figures**

Clearly, wind turbines need to be located on relatively windy sites in order to function. From a meteorological standpoint, what kinds of geographical location are the most 2) _____?

Turbines are generally placed at the tops of tall towers, where wind speeds are higher, thus making them more 3) _____. What other positioning factors influence performance?

Wind turbines rarely function continuously, due to the fact that wind speeds are 4)_____. How significant is the impact of variable weather conditions on power generating capacity?

Transmitting electricity over long distances is inherently 5)_____, due to power losses from overhead or underground power lines. Find out more about the advantages of generating power locally.

The generating capacity of wind turbines is generally 6) _____ for it to be relied upon 100%. What percentage of total generating capacity can wind turbines realistically provide?

Some early wind turbines were 7)_____, suffering breakdowns caused by inaxial stresses stemming from higher wind loads on the upper blade. However, this problem has been overcome on modern units. Learn more about the technical evolution of wind turbines.

b) You are engineers at Sigma Power. The marketing manager has asked you to provide some technical answers for the frequently asked questions section of the company's website. The FAQ section is aimed primarily at potential clients who are thinking of installing wind turbines at their sites – factories, office complexes, hospitals, and university campuses. In pairs, discuss the following questions and write the answers for the website using the information in the fact file and your own knowledge.

Frequently Asked Questions

A common-sense introduction to wind turbines

1) What's the big advantage of having a wind turbine at my site?

2) How dependable wind turbines as a source of power, given that weather conditions are changeable?

3) What kinds of site are most suitable for wind turbines, relative to natural factors such as hills, the coast, and height above sea level?

4) What's the most appropriate location for my wind turbine, relative to features on the site, such as trees and buildings?

Describing Physical Forces

9 a) Read the following article. What is a solar tower and how does it use the forces of expansion and pressure?

Solar Towers

The dawn of a new era in renewable energy?

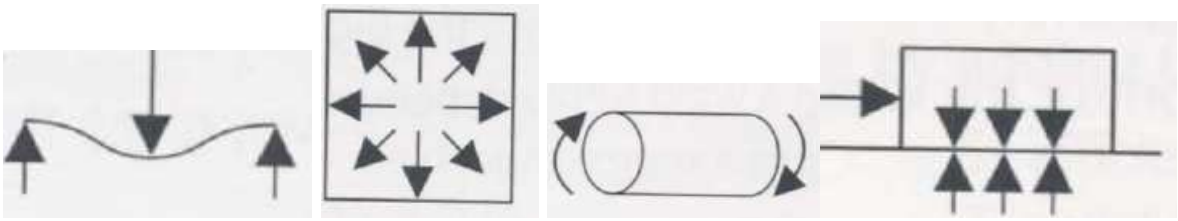
The need to develop renewable energy is widely seen as a futuristic technological challenge. In reality, some of the most effective ways of harnessing horsepower from nature are based on concepts that have existed for donkey's years. The wind turbine is an obvious example. Another – less well known, but conceived almost a century ago – is the solar tower or solar chimney. And if the Australian company EnviroMission completes an ambitious solar tower project in the New South Wales desert, the technology could capture not just the sun's rays but the public's imagination worldwide. The firm is planning to construct a tower a colossal one kilometer high. If built, it will be the world's tallest structure by a huge margin.

How it works

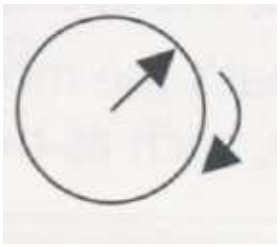
A large glass enclosure is built, with a chimney at its centre. The sun heats the enclosure, causing expansion of the air inside. At the top of the chimney, the lower temperature and lower pressure due to the higher altitude create a pressure differential known as stack effect. This causes air to flow up the chimney. Electricity is generated by turbines at the bottom of the chimney, which are driven by the flow of air. The bigger the area of glass and the taller the chimney, the greater the airflow and the higher the generating capacity.

b) Label the diagrams using the forces in a box.

bending, centrifugal force, compression, contraction, expansion, friction, pressure, shear, tension, torsion/torque



1. 2. 3. 4.



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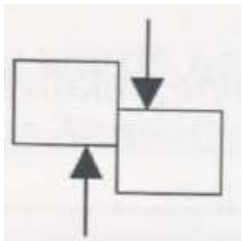

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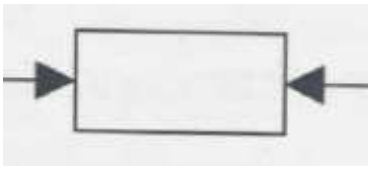

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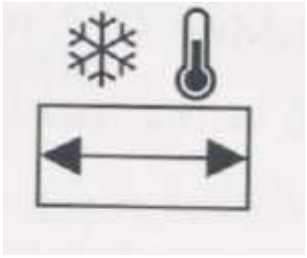

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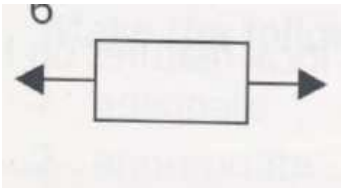

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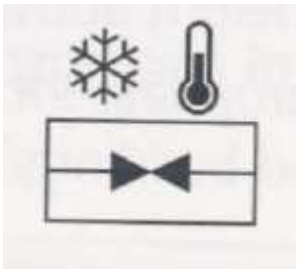


10.

c) What physical forces would act on a solar tower 1 km high?

d) Listening 7. Su, a structural engineer specializing in the design of very tall structures, is giving a talk to a group of engineering students. Listen to the talk. Which of the forces in Exercise 9b doesn't she mention?

e) Complete the following sentences from the talk using the forces in Exercise 9b. Listen again and check your answers.

1) So that downward force means the structure is in _____, especially near the bottom.

2) … a horizontal load, exerted by air _____ against one side of the structure.

3) Because the structure is fixed at the ground level, and free at the top, that generates _____ forces.

4) …when elements bend, you have opposing forces: _____ at one side, _____ at the other.

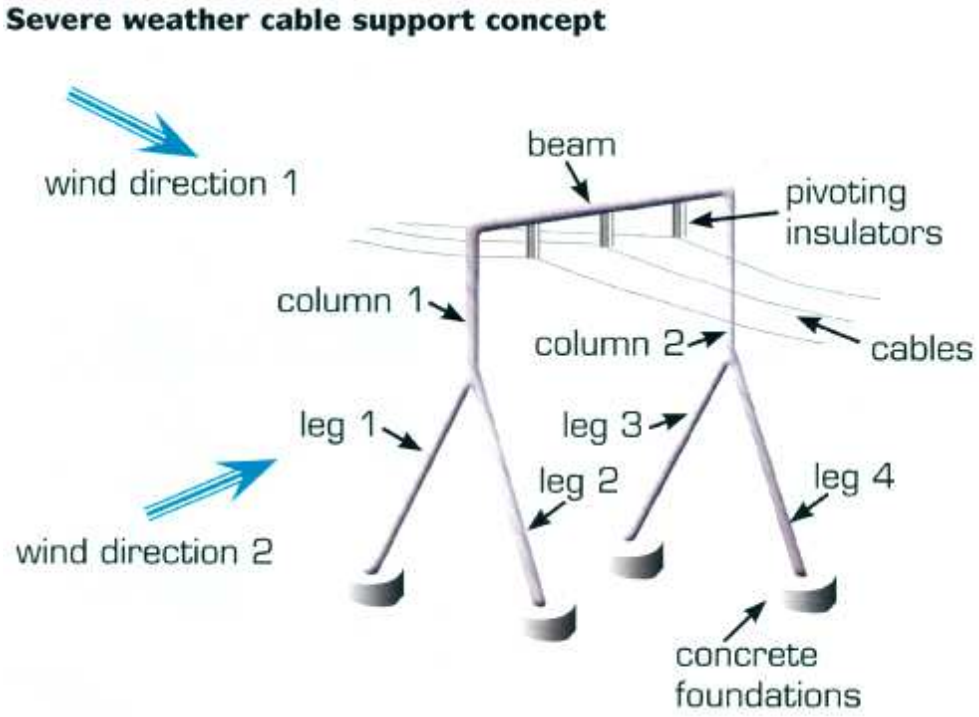
5) … the wind effectively tries to slide the structure along the ground, and the foundations below the ground resist that. The result of that is _____ force…

6) … the foundations need to rely on _____ with the ground to resist the pull-out force, …

7) The action of the wind can also generate _____. You get a twisting force…

8) When concrete absorbs heat from the sun, you get _____; as soon as the sun goes in, there's _____ .

10. You and your partner specialize in designing structures for electrical transmission grids. You are currently working on a cable support concept for power lines near wind farms exposed to severe weather. You have come up with the following design. In pairs, hold a short meeting to evaluate your design concept. Explain the forces acting on the structure.



11. Nowadays we often have to make presentations. Study the tips on making presentations and arrange them in order of importance (your opinion).

TIPS ON MAKING PRESENTATIONS

Dress smartly: don't let your appearance distract from what you are saying.

Smile. Have an upright posture. Try to appear confident and enthusiastic.

Say hello and smile when you greet the audience: your audience will probably look at you and smile back: an instinctive reaction.

Speak clearly, firmly and confidently as this makes you sound in control. Don't speak too quickly: you are likely to speed up and raise the pitch of your voice when nervous. Give the audience time to absorb each point. Don't talk in a monotone the whole time. Lift your head up and address your words to someone near the back of audience. If you think people at the back can't hear, ask them.

Use silence to emphasise points. Before you make a key point pause: this tells the audience that something important is coming. It's also the hallmark of a confident speaker as only these are happy with silences. Nervous speakers tend to gabble on trying to fill every little gap.

Keep within the allotted time for your talk.

Eye contact is crucial to holding the attention of your audience. Look at everyone in the audience from time to time, not just at your notes or at the PowerPoint slides. Try to involve everyone, not just those directly in front of you.

Walk around a little and gesture with your hands. Bad presenters keep their hands on the podium or in their pockets! Good presenters will walk from side to side and look at different parts of the audience.

You could try to involve your audience by asking them a question.

Don't read out your talk, as this sounds boring, but refer to brief notes jotted down on small (postcard sized) pieces of card. Don't look at your notes too much as this suggests insecurity and will prevent you making eye contact with the audience.

It's OK to **use humour**, in moderation, but better to use anecdotes than to rattle off a string of jokes.

It can be very helpful to practice at home in front of a mirror. You can also record your presentation and play it back to yourself: don't judge yourself harshly when you replay this - we always notice our bad points and not the good when hearing or seeing a recording or ourselves! Time how long your talk takes. Run through the talk a few times with a friend.

It's normal to be a little nervous. This is a good thing as it will make you more energized. Many people have a fear of speaking in public. Practicing will make sure that you are not too anxious.

Build variety into the talk and break it up into sections: apparently, the average person has a three minute attention span!

12. Think about the things you should and shouldn't do making presentations. Share your opinion with your partner. How many of your ideas coincide?

13. Listening 8. Listen to the tips on making presentation. Compare the information with your own ideas. What are similarities and differences?

14. Every presentation should have a definite structure. Read the text and make up a plan that would suit any presentation.

HAVE A STRUCTURE

Have a beginning, middle and an end. Use short sentences.

Consider:

Who are the audience?

What points do I want to get across?

How much time have I got?

What visual aids are available? Powerpoint projector? flip chart? Don't necessarily use these. Sometimes the best presentations are the most informal.

Firstly, welcome the audience.

Say what your presentation will be about: the aims and objectives.

The introduction should catch the attention. Perhaps a provocative statement or a humorous anecdote:

“Genetically-modified crops could save millions of people from starvation”

“The first day of my vacation job went with a bang, but it wasn't my fault that the microwave exploded.

The Middle should outline your argument or develop your story

In five minutes you will only have time for two or three main points and allow everything else to support these. List your main headings and any key phrases you will use.

Use graphics or anecdotes to add variety.

In conclusion briefly summarise your main points.

Answer any questions.

Thank the audience for listening. Look at the audience again, smile and slow down.

The end should be on a strong or positive note – not tailing away to “..well that's all I've got to say so thank you very much for listening ladies and gentlemen”. You could try something along these lines:

“Hang-gliding is brilliant, so try it – you'll believe a man can fly!”

“The danger is increasing – if we don't all act soon it could be too late!

In preparing your talk, first jot down any interesting points you want to include in your talk, put these in a logical sequence, then try to find an interesting title, and a good introduction and ending.

13. Make a presentation on Alternative Sources of Energy. Use the information below. (Before making a presentation it’s advisable to watch the film “Inconvenient truth” paying attention to the way Al Gore (the main character) makes his presentation).

A Plan

1 Welcome the uadience
2 Introduce yourself
3 Introduce the topic
4 Tell the audience why they should be interested in the topic

5 Tell a short personal anecdote
6 Give an overview of the talk
7 Main point 1
8 Main point 2
9 Main point 3
10 Main point 4
11 Summary
12 final “bang” – leave the audience with a strong final impression

Language function	**Phrase**
Welcoming the uadience	**1** Hello, everyone, and thanks for coming along.
Introducing yourself	**2** Let me just introduce myself….
Introducing the topic	**3** Today I’m going to tell you about…
Telling the audience why they should be interested in the topic	**4** The topic I’m sure will be of particular interest to you as …
Telling a short personal anecdote	**5** I remember when I … **6** I know from my own experience that…
Giving an overview of the talk	**7** There are (three) main points that I’d like to cover today. **8** First, I’ll start by giving you a little information about… **9** I’ll then go on to outline… **10** Finally, I’ll …
Introducing the next point	**11** So, to start with, what is…? **12** This brings me to the next point: … **13** This leads directly to … **14** Let’s now move on to…
Concluding the presentation	**15** To summarize, … **16** Finally, I’d like to remind you about what I said at the beginning of my talk today. …

Progress Test

I. Match the English words to their Russian equivalents

1) renewable	a) действовать (о силе)
2) solar cell	b) приливная плотина
3) fossil fuel	c) сжатие
4) to expose	d) газовая станция
5) torsion	e) действовать на
6) friction	f) возобновляемый
7) tidal barrage	g) срок эксплуатации
8) to commission	h) техническое обслуживание
9) to embed	i) трубчатый, полый
10) hydroelectric scheme	j) кручение
11) stack effect	k) оценивать
12) lifespan	l) транспортное топливо
13) tension	m) вставлять, армировать
14) tubular	n) фундамент, основание
15) to exert	o) ископаемое топливо
16) to act on	p) гидроэлектростанция
17) constituent	q) эффект тяги
18) to assess	r) вводить в эксплуатацию
19) maintenance	s) подвергать воздействию
20) substructure	t) натяжение
	u) солнечная батарея
	v) составная часть, компонент
	w) трение

II. Complete the sentences with the appropriate form of the word given in the right-hand column.

1) Steel structures need protection from … .	to corrode
2) Coal, gas and petroleum are … sources of energy	new
3) The alternative to steel structures is … concrete.	force
4) Steel is completely … if it's corroded.	to effect
5) Paint can be a good … of steel structures.	to protect
6) The high voltage electricity … network was created in order to transport electricity over long distances.	to transmit
7) Electricity … networks shrank in importance and activity.	to distribute
8) Why do … defences crumble?	coast

III. Fill in the gaps with the suitable prepositions.

1) Magnetic energy is associated … electric current.
2) The topic I'm sure will be … particular interest … you.
3) I'll then go … to outline the advantages of using alternative sources of energy.
4) The big problem … offshore installations is corrosion.
5) We have to bear … mind regular maintenance.
6) You need to take …consideration the main load.
7) Reinforced concrete is inefficient unless we look …it … details.
8) Some of the most effective ways of harnessing horsepower from nature are based … concepts that have existed … donkey's years.

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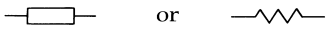
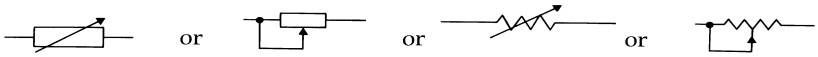
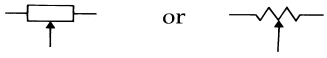
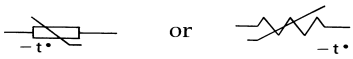
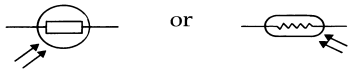
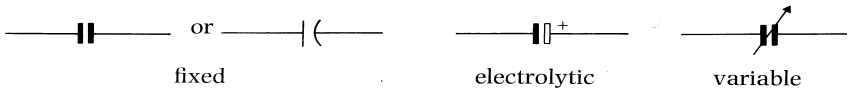
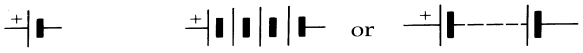
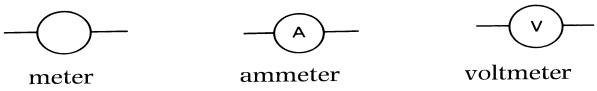
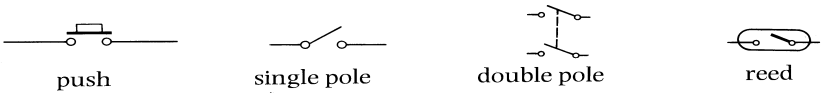
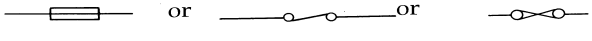
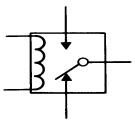
Appendix 1

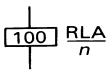
Circuit Symbols

Component	Common symbols
1 fixed resistor	
2 variable resistor	
3 potentiometer	
4 thermistor	
5 LDR	
6 capacitor	
7 inductor	
8 transformer	
9 aerial	
10 earth	
11 cell/battery	
12 meter	
13 switch	
14 fuse	
15 microphone	
16 loudspeaker	
17 bell	

18 relay

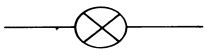


or



relay with coil resistance of 100 ohms with *n* contacts

19 lamp



signal

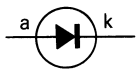
illuminating

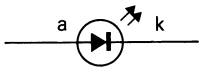
neon

20 electric motor

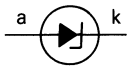
21 crystal

22 diode



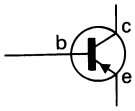


LED

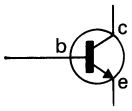


zener

23 bipolar transistor

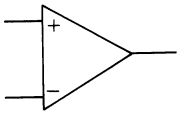


PNP

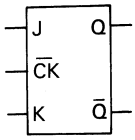


NPN

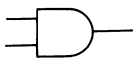
24 op amp



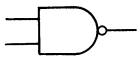
25 J-K flip-flop



26 logic gate

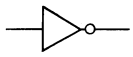


AND



NAND

OR



NOT

Appendix 2

Speaking Practice

Модуль I
(УЭ-2)

Student A

Manufacturing

Manufacturing includes making anything from individual components or printed circuit boards to complete pieces of equipment such as televisions. In the case of the latter, it is usual to break down the equipment into modules and manufacture these separately. For instance, television sets are manufactured in this way with each set consisting of up to seven individual modules. When the modules come off the assembly line, they are passed to groups of testers and troubleshooters to check for faults. The various modules are then assembled to produce the complete unit. The disadvantage of this kind of work is the monotony and the time pressure of assembly line work.

Planning

Firms with large communications networks require planners. For instance, telecommunications networks providers need to know where to place exchanges for maximum switching capability, and microwave towers for minimum interference. They also need to know the sizes of cables to handle traffic growth.

Rapidly springing up everywhere from a number of different suppliers are the radio mobile and cellular networks. All these require careful planning and field surveys to prevent mutual interference. Job opportunities have grown in this sector.

Installation

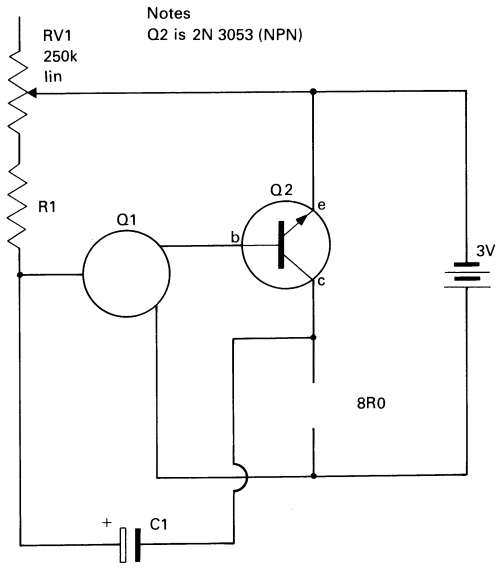
There is a wide range of installation work required, for example, installing exchanges, LANs, and medical equipment. Such work involves cabling and may require some knowledge of mechanical engineering if special racks and even entire rooms have to be constructed to accommodate equipment. Installation work usually involves travel which can be overseas depending on the product involved.

Commissioning

Once equipment is installed, it needs to be commissioned, i.e. put into operation. Problems often emerge at this stage which have to be ironed out. This work is usually done by engineers with long experience in the type of equipment being commissioned.

Модуль II
(УЭ-2)

Student B



УЭ-5

Student B

Cell	**Mercury**	**Lithium**
Type	primary	?
Output voltage	?	3V
Applications	cameras, hearing aids, watches, ?	? photographic equipment
Usual size	button	button and ?
Advantages	? but high energy	long storage life, high voltages, last for long periods at low currents
Disadvantages	expensive	? used cells should be disposed of carefully

Appendix 3

Audio Scripts
Модуль I

УЭ-1

Listening 3

A = Alan I = Interviewer

I: Can I ask how old you are?

A: Nineteen.

I: And what's the name of the course you are taking?

A: It's a National Certificate in Information Technology.

I: Is that a full-time or a day-release course?

A: Full-time.

I: And how long does it last?

A: A year. It finishes in the end of June.

I: Ahm… How many students are there in your class?

A: Twelve.

I: Oh, so it's quite a small group.

A: Yes. But we started of we twenty but some *dropped out*.

I: Why was that?

A: Well, some found a bit *tough* at the beginning especially the Maths. Others found jobs.

I: What subjects are you studying this block?

A: Electrical Principles, Digital and Analog Electronics. These are the first thing in the morning. Then we've got Communications.

I: I guess that's language. Is it English?

A: Yes. We get it on Monday and Wednesday after the coffee break.

I: What's PSD on Tuesday at 10.45?

A: *Job seeking skills*. Techniques for interviews. For the last four weeks we've been having mock interviews getting videoed.

I: You've got Computing on Thursdays and Fridays before lunch. Is that Programming?

A: Yes. We're learning Pascal. We're doing machine code too.

I: Does it look like English?

A: No. It's all numbers. It's *binary*.

I: And you've got Mathematics also of course.

A: Yes, *calculus* just now.

I: What's CAD on Tuesday afternoon?

A: *Computer-Aided Design*.

I: What sort of things do you do?

A: Design circuits on it.

I: What subjects do you enjoy most?

A: Probably Principles, Maths, most of the electronic ones. *I'm not keen on* Communications. All these words…I must say…

I: I see Practical here on Wednesday afternoon. Is that when you *assemble circuits*, for example?

A: Yes.

I: What sort of things have you made?

A: A function generator, an oscillator.

I: And is your course *assessed partially on the practical side*?

A: Yes. We get marks for that.

I: Well, you've got a very full week! That's from 8.45 through to 4.30 and it's a five-day week. Do they give you any time for sports?

A: No. But we can use the indoors stadium. There's basketball, football, everything. It's quite hard to get in though. It's very strict. You've got to wear the right shoes and you've got to have enough people to make two teams.

I: What about hobbies?

A: The hobby of mine is bikes?

I: Oh, what have you got?

A: GS5-50 the Magnum but I haven't got a license.

I: (laughing) Slight inconvenience.

УЭ-2

Listening 4

We are a medium-sized company, we employ around 250 people. We're doing a very hi-tech business: the production and development of communications equipment. We equip police and fire services throughout the country. You'll also find our equipment in new set airports and on light aircrafts. There's a great deal of competition in this field and we have *to stay on our toes* at all times, that's why so much of our budget goes onto Research and Development.

How is the company organized? Hmm… The diagram should help. I'll concentrate on the production side. We'll leave administration for later.

The Production department *is responsible for* all aspects of the assembly of our products. The production manager is *in charge*. He has to make sure that the right part is in the right place at the right time. Below him there're production *supervisor*s. They make sure the assembly line *runs smoothly*. Without good production control our whole line *grinds to a halt*.

The Engineering department has a number of key roles. There's work study to ensure that we use the most *efficient assembly methods*. It's an old cliché that time is money, but it's true. If the work study engineer can save us a few minutes on the production line, we can keep our costs down. Engineering also *handle* maintenance in the company. This department also employs field service technicians and this is where you come in. In our business we have to respond quickly if anything goes wrong with our equipment in the field. Our clients can't wait until tomorrow. They need immediate help.

Stock Control check and store the components we *buy in* and they assure *everything* production needs to meet an order.

I've already mentioned the importance of R&D. They are the ideas people. They have *to make sure* our equipment is better than the competition's.

On the admin side let me start with Sales. They deal with our *customers, negotiate contracts* and prices. Some of them have been technicians so they can provide technical advice also. They are also a useful source of market intelligence.

Quality Control comes next. They take a *random sample* from the assembly line and *run a series of tests* to make sure there are no problems. If there are problems, they get on to production. They also check in coming components to assure they *meet our specifications*.

Purchasing buy in components and equipment. They try to get the best deal possible for us *in terms of* prices and delivery dates.

Accounts *look after* the financial side. They *bill our customers*, draw up the balance sheets and provide management with all the financial information they need for decision taking. Important to you and me they also look after *wages* and *salaries*.

Finally, Personnel. My own department. We have to make sure we recruit the best *workforce*. We are responsible for staff training and we have to work with the unions to make sure there's a good understanding between management and the workforce.

Модуль II

УЭ-5

Listening 5

Everyone knows what a battery is. It's one of those little *tubes* that you put in your Walkman or your torch so that you can have music or light wherever you go. It's *portable electricity*. In fact, batteries come in many shapes and sizes, not simply tubes. And we should really call them cells because a battery is

a number of cells linked together. They range from the *button-size cells* which keep your watch going for more than a year to the heavy batteries which can *power submarines*.

There are two different types of cells. One is called a *primary cell* and the other is known as a *secondary cell*. Both kinds change chemical energy into electricity. Primary cells are thrown away when the chemicals they contain are used up. Secondary cells can be *recharged* and used again and again.

The commonest and cheapest kind of primary cell is the zinc-carbon cell. It consists of a zinc can which contains two chemicals. The zinc is the negative electrode. One of the chemicals, manganese dioxide, forms the positive electrode. Millions of cells like this are used every year in radios, torches and tape-recorders.

More and more people want a cell which can be used again and again. The NiCad cell fits this description. It's a secondary cell with a nickel positive electrode and a cadmium negative electrode (Ni for nickel, Cad for cadmium. Ni-Cad). NiCad cells are more expensive but they can be recharged hundreds of times. They are used in many *cordless appliances* such as portable phones.

Video 1

A battery produces an electric current when its positive end called the cathode and its negative end called the anode connect the air-conductive pathway in a battery-operated device. This pathway conducts electricity when three components two electrodes and an electrolyte interact.

These alkaline batteries are the rechargeable type. They last for years depending on how you use them. The factory begins production by cutting nickel-plated steel into oval pieces, then gradually shaping each piece into a tube called a console. The console houses some important chemical ingredients: graphite which conducts electricity; silver catalyst which reduces chemical pressure build-up; manganese dioxide – the main ingredient in the cathode; barium sulfate which binds the cathode ingredients; zinc – the main ingredient in the anode; a gelling agent to keep the zinc particles suspended; and finally potassium hydroxide which interacts with electrodes to produce electricity. This 25 head press shapes the cathodes powdered chemicals into hollow pellets. The press turns out twenty five thousand pellets an hour. p machine called the console Press then inserts three pallets in each console. Three because these pellets are so fragile that three smaller ones are easier to manipulate than one big palette would be. Here's the insertion in slow motion. The next machine makes a ridge on one end of the console to help seal it. Plastic holders called parks hold the consoles still as nozzles apply seal onto the top which is the negative end of the

console. Next they cut a roll of paper into small strips. These strips are called separators. They have microscopic holes that permit the flow of ions, electrically charged molecules, between the cathode and the anode. A hot-melt glue machine deposits a small amount of glue into the separator now rolled and seals the positive end of the paper tube. The glue cools and hardens over the next minute-and-a-half as the consoles move along a conveyor. The next machine injects an electrolyte – a potassium hydroxide solution. It takes nine minutes to soak through the separator liner into the cathode pallets. Nozzles then inject about four grams of zinc gel into the anode cavity. Only about two-thirds of the gel weight is actually zinc. The other third is this company's closely-guarded trade secret. It's what makes these batteries rechargeable. The zinc gives the gel its silver-gray colour. A welding machine fuses four-centimeter nails onto the cap of the battery. This is where current collects before it's discharged. The machine ejects the cap when finished and another machine inserts it into the negative end of the battery. This cap includes a safety feature crucial to rechargeable batteries. It can resist high-pressure, but if heater power surges cause excessive pressure, a tiny vent prevents the battery from exploding. The machine folds over the console lip to enclose the content. A rotating three-headed crimping machine then makes a ridge in the finished battery to reduce the chance of leakage. An electrical testing machine contacts each battery for two hundred milliseconds to ensure it has at least 1.5 volts. These batteries will be ready to use right away. No need to charge them first. The labeling machine uses light sensors to time the labeling of each battery casing. The plastic label lists technical information and adds additional insulation. Then three seconds in an oven at 198 degrees Celsius shrinks the labels to a tight fit.

Модуль III

УЭ-2

Listening 6

Mike: Obviously, a *tubular steel tower* only gives you sufficient structural strength if you give it adequate protection from corrosion – the big problem with *offshore installations*. So, technically, you could say steel is inappropriate in that environment.

Loreta: They make ships out of it.

Mike: I know, Loreta, but only because there's no cost-effective alternative. But we're not talking about ships, we're talking about fixed structures. The point is, I think we should look more seriously at alternatives to all-steel supports. And the obvious alternative is reinforced concrete.

Loreta: We've already looked into it, though, and it wasn't cost-effective.

Mike: Not *in the short term*. But we didn't really look into it properly over the long term.

Loreta: But you made the point yourself, Mike, that steel's completely ineffective if it's corroded. And one of the main constituents of reinforced concrete is steel.

Mike: It's protected, though, isn't it? It's embedded inside concrete. That's a much more effective protection than paint.

Loreta: Not necessarily. If we're talking about the long term, as you say, what happens to concrete when *it's exposed* to the sea for a few years? It erodes. Which means the steel eventually gets exposed. You look at concrete coastal defences. How often do you see the concrete all crumbling away, and all the steel exposed?

Mike: That's due to inconsistent quality, though. You only get that problem if there's insufficient cover. As long as there's appropriate cover at design level, and the construction quality's consistent, then there shouldn't be a problem.

Loreta: Isn't inadequate cover more of a problem in a slender structure, though? You'd probably have less cover, compared with the big lumps of concrete they use for coastal defences.

Mike: Not if...

Hanif: Just a second.

Mike: Yes, Hanif?

Hanif: Let's just think about what we're trying to resolve, here. The key issue is, what's the most suitable long-term solution? And in both cases, we're saying steel is necessary, either in an all-steel tubular structure or in the form of reinforcement inside concrete. But obviously exposed steel is unsuitable because of the problem of corrosion. So the question is, what's the most reliable way of protecting steel, over the long term? And we have *to bear in mind* that, just because something requires *regular maintenance*, such as painting, that doesn't necessarily mean it's unreliable. As long as the maintenance is consistent. The key question is, what's the most *economical approach*? So painting a steel structure every couple of years is uneconomical only if the cost of painting is more expensive than the additional cost of using concrete at the time of construction.

Mike: So, to determine the most efficient solution, we need to assess the lifespan of a reinforced concrete structure. If we know that, we can determine how many times the equivalent steel structure would need to be repainted over that same period, and what the cost of that would be.

Hanif: Yeah.

Mike: But this is really the point I'm making, Hanif. We can't categorically say that reinforced concrete is inefficient unless we look into it in detail.

Hanif: Of course not. Look, let me make a suggestion ...

Listening 7

Su: With very tall structures, one of the main *loads* you need *to take into consideration*, clearly, is the mass of the structure, its weight. *Due to* gravity, that mass exerts a *downward load*, which has to be transmitted to the ground. So that downward force means the structure is in compression, especially near the bottom. Obviously, the closer you are to the bottom, the more compressive force the structure is subjected to. But with tall structures, downward load compressing the structural elements is only part of the problem. Another major force *acting on* the structure is wind load, which is a *horizontal load*, exerted by air pressure against one side of the structure. Because the structure is fixed at ground level, and free at the top, that generates *bending forces*. And when elements bend, you have *opposing forces*: compression at one side, tension at the other. And at ground level, the wind effectively tries to slide the structure along the ground, and the foundations below the ground resist that. The result of that is shear force between the substructure and the superstructure. The wind generates *tensile loads* on the foundations of tall structures as well, as the bending action tries *to pull them out* of the ground on one side, a bit like a tree being uprooted by the wind. So the foundations need to rely on friction with the ground to resist the *pull-out force*, just as tree roots do. The action of the wind can also generate torsion. You get a *twisting force* sometimes, when the air pressure is *comparatively* higher against one corner of a building, although that's less of a problem with chimneys because of their *circular profile*. With very large masses of concrete, you also have to think about the forces generated by thermal movement. When concrete absorbs heat from the sun, you get expansion; as soon as the sun goes in, there's contraction. That movement can be significant over a large area, especially as the sun generally heats one side of a structure much more than the other. So there are all kinds of different forces acting on a tall structure.

Appendix 4

Keys

Модуль I

Entry Test

Part I

1) c; 2) b; 3) b; 4) a; 5) a; 6) b; 7) c; 8) b; 9) a; 10) c.

Part II

1) a; 2) c; 3) b; 4) b; 5) a; 6) c; 7) a; 8) b; 9) b; 10) a; 11) c; 12) a; 13) b; 14) a; 15) c; 16) a; 17) b; 18) b; 19) a.

УЭ-1

Ex 2. 1-d, 2-c, 3-h, 4-a, 5-I, 6-j, 7-b, 8-e, 9-f.

Ex 3. To graduate – to enter, to assemble – to disassemble, complicated – simple, broad – narrow, familiar – unknown, tough – easy, introductory – final.

УЭ-2

Ex 3. 1-f; 2-d; 3-a; 4-h; 5-b; 6-j; 7-e; 8-i; 9-c, 10-g.

Ex 4

Noun	Verb	Adjective
maintenance	to maintain	maintained maintaining
trainee trainer	to train	training trained
satisfaction	to satisfy	satisfied; satisfactory
recruitment recruiter	to recruit	-
installation	to install	installed
development	to develop	developed developing
awareness	-	aware unaware
competition	to compete	competitive competing
expansion	to expand	expanded

Ex. 5 1) in; 2) with; 3) more; 4) same; 5) being; 6) have; 7) at; 8) are; 9) for; 10) are; 11) of; 12) needed; 13) in; 14) rather; 15) the/their.

Progress Test

I. 1-i; 2-m; 3-s; 4-g; 5-u; 6-d; 7-p; 8-o; 9-h; 10-r; 11-f; 12-l; 13-a; 14-v; 15-t; 16-w; 17-j; 18-c; 19-b; 20-e.

II. 1. a) electronic; b) employees; 2. maintenance; 3. applicants; 4. a) communication; b) employment; 5. awareness; 6. satisfaction; 7. introductory; 8. challenging.

III. 1) in; 2) for; 3) in; to; 4) to; from; 5) with; 6) on; through; 7) out; 8) of; 9) in; 10) of.

Модуль II

Entry Test

1) b; 2) a; 3) a; 4) c; 5) b; 6) a; 7) a; 8) c; 9) b; 10) a, 11) b, 12) a, 13) c, 14) c, 15) a.

УЭ-1

Ex. 2. 1-c, 2-a, 3-h, 4-g, 5-b, 6-d, 7-e, 8-f

Ex 3.

Noun	Verb	Adjective
activation	activate	active
amplification, amplifier	amplify	amplified
emission	emit	emitted
extraction	extract	extracted
generation	generate	generative
integration	integrate	integrated / integrative
recovery	recover	recovered
reception	receive	receptive
reliability	rely	reliable
storage	store	stored
transmission	transmit	transmittable/ transmissible
entertainment	entertain	entertaining

Ex 4 1) amplified, amplifier 2) entertainment 3) generation 4) integrated 5) reliable 6) storage 7) transmission 8) stored 9) transmission, modulator 10) emitted

Ex 8 1) transistors 2) semiconductor 3) electronic 4) receives 5) storage 6) reliability 7) microprocessors 8) communication

Ex 9 1) Transistors 2) Resistors 3) electrons 4) Diodes 5) Capacitors 6) integrated circuits 7) semiconductor 8) silicon 9) germanium 10) devices

УЭ-2

Ex 2 1-d; 2-a; 3-f; 4-e; 5-c; 6-b.

Ex 3

Noun	Verb	Adjective
value	value	valuable
variety	vary	variable
tuner	tune	tuning
speaker	speak	speaking
wiper	wipe	wiping
complication	complicate	complicated
frequency	to frequent	frequent
modulator	modulate	modulating

Ex 4 1) valuable; 2) a) modulator; b) modulates; 3) variable 4) frequency, 5) tuner

Ex 8 1) consists; 2) microhenry; 3) variable; 4) capacitor; 5) picofarads; 6) linked/connected; 7) diode; 8) supply.

Ex 10 1) consists; 2) modulator; 3) oscillator; 4) carrier; 5) amplifier; 6) signal; 7) power; 8) aerial.

УЭ-3

Ex 2 1-d, 2-c, 3-e, 4-b, 5-g, 6-a, 7-f, 8-i, 9-j, 10-h

Ex 3 1-e, 2-f, 3-a, 4-c, 5-d, 6-b

Ex 4

Noun	Verb	Adjective
increase	increase	increasing
variety	vary	various
multiplier	multiply	multipliable
satisfaction	satisfy	satisfactory
resistance	resist	resistive
easiness	ease	easy
manufacturer	manufacture	manufacturing / manufactured
significance	signify	significant

Ex 6

1) 27 000 10 % between 24300 and 29700
2) 680 5% between 646 and 714
3) 5600 10% between 5040 and 6160
4) 2200000 20% between 1760000 and 2640000
5) 10000 20% between 8000 and 12000
6) 330 5% between 313,5 and 346,5
7) 4300 5% between 4085 and 4515

8) 1500000 20% between 1200000 and 1800000
9) 750 2% between 735 and 765
10) 9100 2% between 8918 and 9282

Ex 9 1) brown, black, brown, black; 2) brown, grey, brown, white; 3) red, red, orange, green, red; 4) yellow, violet, orange, black.

Ex 10. 1) Diode 1 is a general-purpose silicon diode.
2) Diode 2 is a power rectifier silicon diode.
3) Diode 3 is a silicon zener diode having 5% tolerance and 2.4V zener voltage.
4) Diode 4 is a general-purpose germanium diode.
5) Diode 5 is a photovoltaic silicon diode.

УЭ-4

Ex3 1-d, 2-e, 3-a, 4-c, 5-b, 6-g, 7-f
Ex4 1- b, 2- e, 3-d, 4-a, 5-c
Ex 6 1-primary, 2-current collector, 3-charger, 4-bridge, 5-solution, 6-mains supply, 7-EMF, 8-electrolyte, 9-rectifier, 10- oscillator, 11-heatsink, 12-smoothing circuit
Ex11 1) b, d; 2) e; 3) f; 4) a, c
Ex 12 1-c; 2-g; 3-h; 4-e; 5-d; 6-j; 7-a; 8-f; 9-d; 10-i.
Ex 14 a) to interact; b) cathode; c) to seal; d) glue; e) anode; f) catholytes; g) pallet; h) pressure build-up
Ex 15 A) 1-d; 2-f; 3-a; 4-b; 5-g; 6-e; 7-c.
Ex 18 1-a; 2-h; 3-d; 4-f; 5-g; 6-c; 7-e; 8-b.

Progress Test

I. 1-j; 2-r; 3-m; 4-l; 5-o; 6-a; 7-w; 8-q; 9-e; 10-t; 11-b; 12-n; 13-s; 14-h; 15-f; 16-k; 17-v; 18-p; 19-d; 20-i;
II. 1) tolerance; 2) resistance; 3) variable; 4) amplifier; 5) entertainment; 6) multiplier; 7) intergrated; 8) reliable; 9) fluctuatein(s); 10) recharged.
III. 1) on/off; off/on; 2) at; 3) from; 4) in; of; off; 5) to; 6) with; 7) in; 8) in; with; 9) up/down; down/up; 10) from.
IV. 1) NiCad cell, *which* can be recharged, is a secondary cell.
2) The electrolyte surrounds the carbon rod *to* help the flow of current between electrodes.
3) The diodes are marked with colour bands *to* indicate the tolerance and value.
4) The bridge, *which* is the second stage, converts the AC voltage to a DC voltage.
5) A smoothing circuit, *which* is the third stage, removes the fluctuations.
6) The first stage consists of a transformer *which* steps down the voltage of the AC mains.

Модуль III

Entry Test

1-b; 2-a; 3-a; 4-c; 5-b; 6-c; 7-c; 8-a; 9-b; 10-a.

УЭ-1

Ex 4 Across: 1) commissioned; 3) electrical; 7) geothermal; 9) gasworks; 10) sun; 12) uranium; 13) solar cell; 14) kinetic; 15) scheme; 16) biofuel.

Down: 2) open coal fires; 4) magnetic; 5) greenhouse; 6) transport; 8) hydraulic; 11) petroleum; 15) solar.

Ex 7 a) fossil fuel; b) coal; c) power stations; d) produce; e) gas; f) non-renewable; g) renewable; h) water; i) turbines; j) generators; k) wave; l) tidal; m) barrage.

УЭ-2

Ex 2 1-d; 2-f; 3-a; 4-b; 5-h; 6-c; 7-e; 8-g.

Ex 3

Noun	Verb	Adjective
corrosion	to corrode	corrosive/corrodent
absorption	to absorb	absorbent/ absorptive
maintenance	to maintain	maintaining
opposition	to oppose	opposing
installation	to install	installed
exposition, exposure	to expose	exposed

Ex 4 1-b; 2-f; 3-e; 4-a; 5-c; 6-d.

Ex 5 1) inappropriate; 2) inconsistant; 3) uneconomical; 4) ineffective; 5) inefficient; 6) unreliable; 7) insufficient; 8) unsuitable.

Ex 8a 2) suitable; 3) effective; 4) inconsistent; 5) inefficient; 6) insufficient/inadequate; 7) unreliable.

Ex 9b 1) bending; 2) pressure; 3) torsion/torque; 4) friction; 5) centrifugal force; 6) shear; 7) compression; 8) expansion; 9) tension; 10) contraction.

Ex 9e 1) compression; 2) pressure; 3) bending; 4) compression; tension; 5) shear; 6) friction; 7) torsion; 8) expension; contraction.

Progress Test

I. 1-f; 2-u; 3-o; 4-s; 5-j; 6-w; 7-b; 8-r; 9-m; 10-p; 11-q; 12-g; 13-t; 14-i; 15-a; 16-e; 17-v; 18-k; 19-h; 20-n.

II. 1-corrosion; 2-non-renewable; 3-reinforced; 4-ineffective; 5-protection; 6-transmission; 7-distribution; 8-coastal.

III. 1) with; 2) of, to; 3) on; 4) with; 5) in; 6) into; 7) into, in; 8) on.

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