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АЭРОКОСМИЧЕСКОГО ПРИБОРОСТРОЕНИЯ

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# АНГЛИЙСКИЙ ЯЗЫК

Методические указания  
и контрольные задания



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в качестве учебного пособия

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В Английский язык: учеб.-метод. пособие / О. В. Власова,  
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Основной целью данного пособия является совершенствование навыков чтения, перевода и устной речи на английском языке.

Пособие состоит из следующих разделов: содержание курса английского языка для студентов заочного факультета, методические указания, систему упражнений для развития грамматических и лексических навыков, контрольные задания и тексты для профессионально-ориентированного чтения, тексты для дополнительного чтения.

Пособие предназначено для студентов I курса заочного отделения технических специальностей.

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# **ИНОСТРАННЫЙ ЯЗЫК. ДЛЯ СТУДЕНТОВ ТЕХНИЧЕСКИХ СПЕЦИАЛЬНОСТЕЙ**

## **ВВЕДЕНИЕ**

Иностранный язык – один из немногих предметов, изучение которых обязательно во всех вузах. Владение иностранным языком необходимо специалисту любого профиля, так как способствует поиску, извлечению и широкому практическому использованию информации из разных источников, обеспечивает возможность контактов с зарубежными коллегами. Процесс изучения иностранного языка чрезвычайно развивает мыслительные способности, тренирует память, расширяет кругозор.

Курс заочного обучения английскому языку предполагает выработку следующих навыков и умений:

- освоение лексического и грамматического материала с целью подготовки к практическому владению иностранным языком как в области чтения профессионально ориентированной литературы, так и в области устной речи;
- умение аудировать в непосредственном общении и в звукозаписи монологическую и диалогическую речь, опираясь на изученный языковой материал;
- владение письменной речью нейтрального характера в пределах изученного языкового материала;
- чтение и извлечение информации из специальных оригинальных текстов по профилю специальности, опираясь на изученный языковой материал и социокультурные знания и знание организации иноязычного дискурса.

# ПРОГРАММА КУРСА АНГЛИЙСКОГО ЯЗЫКА

## 1. Структура курса

В соответствии с действующими учебными планами на курс заочного обучения английскому языку отводится 16 часов аудиторных занятий (установочных, контрольно-закрепительных, итоговых) и 227 часов самостоятельной (внеаудиторной) работы. Количество учебных часов может быть несколько уменьшено или увеличено в зависимости от факультета и специальности.

Программа по английскому языку включает лексический и грамматический материал, необходимый для чтения и понимания литературы по специальности.

Программа предполагает преемственность вузовского курса обучения по отношению к школьному, поэтому нами учтена возможность возобновить изучение английского языка после значительного перерыва, вызвавшего утрату большинства навыков и умений.

## 2. Содержание курса

### 2.1. Фонетика

Фонетический строй английского языка. Система гласных. Система согласных. Основные правила чтения букв и буквосочетаний. Ударение. Членение речевого потока. Ритмическая группа. Синтагма. Основные интонационные типы.

### 2.2. Лексика

Морфологическая структура слова. Словообразовательные модели. Префиксальное и суффиксальное словообразование. Роль суффиксов в распознавании частей речи. Интернациональные префиксы и суффиксы. Переход слов из одной части речи в другую. «Ложные друзья» переводчика. Понятие фразеологического оборота. Идиома. Синонимы, антонимы, омонимы. Сокращения.

К концу обучения лексический минимум должен составить примерно 2000–2500 единиц. В этот минимум не входят слова и выражения, усвоенные в средней школе (не менее 350 единиц) и интернациональная лексика (т. е. слова, имеющие сходное звучание и одинаковое значение в русском и английском языках).

### 2.3. Грамматика

#### 2.3.1. Морфология

Артикль. Определённый, неопределённый артикль. Опущение артикля.

Имя существительное. Грамматические категории числа и падежа имен существительных. Род существительных.

Имя прилагательное. Степени сравнения прилагательных. Место прилагательного в предложении.

Имя числительное. Количественные и порядковые числительные. Хронологические даты. Дробные числительные.

Местоимение. Личные, указательные, притяжательные, относительные, вопросительные, неопределённые, возвратные местоимения. Местоимение *it*.

Глагол. Грамматические категории глагола. Вспомогательные глаголы. Действительный и страдательный залого.

Отрицательная и вопросительная формы. Система видо-временных форм глагола (*Indefinite, Continuous, Perfect, Perfect Continuous*). Сравнительная характеристика форм настоящего, прошедшего и 3 будущего времени. Модальные глаголы. Повелительное наклонение. Сослагательное наклонение. Неличные формы глагола: инфинитив, причастие, герундий.

Наречие. Образование наречий. Степени сравнения наречий.

Предлог. Функции и значения предлогов. Сложные предлоги. Многозначность предлогов.

Союз. Простые, производные и составные союзы.

### *2.3.2. Синтаксис*

Типы предложений. Простое предложение. Главные и второстепенные члены предложения. Прямой и обратный (инверсия) порядок слов. Виды вопросительных предложений. Сказуемое простое и составное. Место второстепенных членов предложения. Сложное предложение. Сложносочинённое и сложноподчинённое предложение. Виды придаточных предложений. Прямая речь, косвенная речь. Согласование времён. Инфинитивные конструкции. Причастные обороты. Абсолютная причастная конструкция. Конструкции с герундием. Эмфатические обороты.

## **3. Учебные тексты**

### **и тексты для дополнительного чтения**

При изучении английского языка студент использует следующие виды учебной литературы:

- тексты контрольных работ;
- учебные тексты;
- тексты для дополнительного чтения.

Цель контрольной работы – помочь студенту в самостоятельном изучении английского языка и проверить, насколько хорошо он усвоил пройденный учебный материал. Требования к выполнению и оформлению контрольных работ приведены ниже.

Чтение учебных текстов поможет студенту выработать навыки, необходимые для успешного овладения английским языком, закрепить

соответствующие грамматические правила, приобрести необходимый запас слов. Объём прочитанных текстов должен составлять 12 000 и 15 000 печатных знаков<sup>1</sup> на первом и втором курсе, соответственно, т. е. около 30 000 печатных знаков за полный курс обучения. Тексты для чтения включены в Методические указания и контрольные задания.

Дополнительное чтение имеет целью закрепление и углубление знаний по английскому языку. За полный курс обучения студент должен подготовить дополнительное чтение в объёме 20 000 печатных знаков, из них:

I семестр: адаптированные тексты по широкому профилю вуза или специальности в объёме 10 000 печатных знаков.

II семестр: неадаптированные или частично адаптированные тексты по специальности в объёме 10 000 печатных знаков.

Тексты для дополнительного (внеаудиторного) чтения также включены в Методические указания и контрольные задания.

#### **4. Итоговый контроль**

В соответствии с учебным планом в конце I семестра студент сдаёт зачёт, а в конце второго семестра – итоговый экзамен.

Для получения зачёта или допуска к экзамену студент должен:

- а). В срок сдать контрольные работы (в первом семестре – № 1, во втором семестре – № 2), при необходимости исправить ошибки или выполнить всю работу заново, для получения оценки «зачтено»;
- б). Сдать норму чтения и перевода (учебные тексты, тексты контрольных работ, тексты для дополнительного чтения).

Содержание билета на экзамене по английскому языку:

1) Изучающее чтение и передача содержания в виде полного письменного перевода незнакомого текста объёмом 800–1000 печатных знаков за 1 академический час (со словарём).

2) Ознакомительное чтение незнакомого текста объёмом до 1200 печатных знаков и изложение его содержания на русском или английском языке. Время на подготовку 15 минут (без словаря).

3) Просмотровое чтение и перевод на русский язык одного из текстов для обязательного чтения (без словаря). Время на подготовку – 2–3 минуты.

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<sup>1</sup> Подсчёт количества печатных знаков: число печатных знаков (считая знаки препинания) в полной строке умножается на количество строк. Обычно на странице бывает 1800–2000 знаков.

## 5. Рекомендуемая литература

### 5.1. Учебники и учебные пособия

1. Английский язык. Грамматика: учеб. пособие: в 2 ч. Ч. I / О. В. Злобина, М. Н. Павлова, Д. Р. Пинтверите; ред. О. В. Злобина. СПб.: ГУАП, 2018. 87 р. – ISBN 978-5-8088-1417-2.

2. Английский язык. Грамматика: учеб. пособие: в 2 ч. Ч. II / О. В. Злобина, М. Н. Павлова, Д. Р. Пинтверите; ред. О. В. Злобина. СПб.: ГУАП, 2018. 76 р. – ISBN 978-5-8088-1419-6.

3. Английский язык: практикум по письменному переводу: в 2 ч. Ч. I / А. Ш. Габдуллина. СПб.: ГУАП, 2020. 64 р.

4. Английский язык: практикум по письменному переводу: в 2 ч. Ч. II / А. Ш. Габдуллина. СПб.: ГУАП, 2020. 71 р.

#### 5.2. Грамматические справочники.

5. Английский язык для специальных целей: сборник учебных материалов: учеб.-метод. пособие / Ю. М. Галковская, Е. Ю. Гордеева, О. П. Карпова. СПб.: ГУАП, 2020. 56 р.: табл., рис. – Библиогр.: с. 54 (14 назв.). – Б. ц. – Текст: непосредственный.

6. Английский язык. Грамматика: учеб. пособие: в 2 ч. Ч. II / О. В. Злобина, М. Н. Павлова, Д. Р. Пинтверите; ред. О. В. Злобина. СПб.: ГУАП, 2018. 76 р. ISBN 978-5-8088-1419-6: Б. ц. – Текст: непосредственный.

7. Английский язык для ИТ-направлений (B1–B2). IT-English : учеб. пособие для вузов / Е. Ю. Бутенко. – 2-е изд., испр. и доп. – М.: Юрайт, 2020. 119 с. – (Высшее образование). – ISBN 978-5-534-07038-5. – Текст: электронный // ЭБС Юрайт [сайт].

8. Профессионально ориентированный английский язык для специалистов в области информационных технологий: учеб. пособие / Е. А. Алешугина. Нижний Новгород: ННГАСУ, 2020. 104 с. – ISBN 978-5-528-00400-6. – Текст: электронный // Лань: электронно-библиотечная система.

9. Технический английский язык для студентов авиационных специальностей: English for Aircraft Engineering: учеб. пособие / Р. А. Чеснокова, М. Е. Друкаров, А. С. Золотилина. Новосибирск: НГТУ, 2020. 80 с. – ISBN 978-5-7782-4118-3. – Текст: электронный // Лань: электронно-библиотечная система.

10. Любой грамматический справочник.

#### 5.3. Словари

1. Англо-русский словарь на 70 тысяч слов и более. Любое издание.

2. Отраслевые словари.

3. Русско-английский словарь (любой).

## МЕТОДИЧЕСКИЕ УКАЗАНИЯ

### Произношение и чтение

Правильное произношение – гарантия понимания не только устной, но и письменной речи, так как чтение и письмо происходят под контролем слуха и сопровождаются проговариванием на уровне внутренней речи. Неправильное чтение слова приводит к его неправильному запоминанию и неузнаванию.

Основные сложности овладения английским произношением обусловлены следующими причинами:

1) Несовпадением звуковых систем русского и английского языков. Следует изучить фонетическую систему английского языка, научиться правильно и четко произносить звуки.

2) Отсутствием автоматизации фонетических навыков. Следует регулярно выполнять фонетические упражнения, прослушивать звукозаписи и передачи с английской речью, смотреть фильмы и телепередачи на английском языке.

3) Частым несовпадением звучания и написания. Следует изучить правила чтения букв и буквосочетаний, регулярно их повторять.

4) Несовпадение интонационных систем английского и русского языков.

Следует изучить правила слогоделения, членения речевого потока на ритмические группы и синтагмы, усвоить основные интонационные модели.

### Лексика

За полный курс обучения студент должен выучить и активно использовать около 2500 новых лексических единиц, т. е. по 1200 слов на каждом курсе. Потенциальный запас лексики может быть почти удвоен за счет:

1) усвоения системы английского словообразования;

2) запоминания значений словообразовательных элементов (префиксов, суффиксов), что позволит выводить значения производных слов;

3) изучения интернациональной лексики.

Работая над переводом текста или упражнения, следует выписывать в тетрадь-словарик встречающиеся незнакомые слова в их исходной (словарной) форме: глаголы – в неопределенной форме, существительные – в форме единственного числа, прилагательные – в форме положительной степени. Найдя слово в словаре, внимательно прочитайте всю словарную статью. Помните, что словарь чаще всего дает не однозначный перевод слова с одного языка на другой,

а предлагает несколько, иногда много, значений. Правильный перевод возможен только с учетом общего смысла, контекста.

Заучивать следует в первую очередь наиболее часто встречающиеся слова. Их надо сразу выделять в тетради-словарике и работать над ними: повторять, писать под диктовку, составлять с ними словосочетания и предложения, стараться в дальнейшем находить в тексте их однокоренные слова, определять их синонимы, антонимы и т. д. Нельзя забывать, что только постоянная работа над лексикой поможет выучить и активно использовать нужное количество слов.

### **Грамматика**

Грамматика обеспечивает связь слов в предложении и позволяет понять смысл текста. В каждой контрольной работе указаны грамматические темы, подлежащие изучению.

Пользуясь учебниками, пособиями, справочниками, таблицами, изучите данный раздел, выполните несколько упражнений, чтобы закрепить пройденное. В дальнейшем, читая тексты или слушая английскую речь, старайтесь опознавать выученную грамматическую форму. Особое и постоянное внимание следует уделять глагольным формам. Работайте над каждым глаголом: определите его видовременную форму, проспрягайте в уже изученных временах, образуйте вопросительную и отрицательную формы.

Ни один грамматический раздел не должен оставаться неувоенным. В случае необходимости следует обращаться за консультацией (письменной или устной) к преподавателю.

### **Работа над текстом**

В зависимости от цели, которую ставит перед собой читающий, и от скорости чтения выделяют:

- изучающее чтение;
- селективное (быстрое) чтение, включающее ознакомительное, просмотровое и поисковое.

Изучающее чтение предполагает полное и адекватное понимание всей информации текста.

Ознакомительное чтение предусматривает быстрое прочтение всего текста (скорость около 180–190 слов в минуту) с полным пониманием основной информации текста.

Просмотровое чтение позволяет выяснить, о чем идет речь в тексте. Этот вид чтения используется, когда необходимо определить, насколько важна или интересна для читающего информация, содержащаяся в тексте.

Поисковое чтение даёт возможность находить в тексте те элементы информации, о которых заранее известно, что они имеются в тексте.

Курс заочного обучения английскому языку предусматривает освоение всех видов чтения, при некотором доминировании изучающего.

Изучающее чтение предполагает полный письменный или устный перевод текста с использованием словаря.

При письменном переводе текста рекомендуется следующая последовательность действий:

1. Прочитать весь текст и постараться понять, о чем идет речь; это поможет выбрать нужный эквивалент незнакомого слова при пользовании словарем.

2. Прочитать первое предложение, обращая внимание на знаки препинания, знакомые слова, союзы, артикли, и постараться определить, простое это предложение или сложное. Каждое простое предложение в составе сложного следует переводить отдельно.

3. Найти сказуемое и подлежащее, ориентируясь на порядок слов и формальные признаки.

4. Перевести двучлен «подлежащее – сказуемое». Перевод этого двучлена и составит ядро перевода всей фразы.

5. Перевести слова, относящиеся к подлежащему (группу подлежащего).

6. Перевести группу сказуемого.

7. Перевести то, что осталось за рамками групп подлежащего и сказуемого.

8. Перевести все предложение целиком.

9. Отредактировать перевод, т. е. проверить, насколько четко и ясно передана мысль автора, соответствует ли ее изложение нормам русского языка.

Не следует выписывать незнакомые слова сразу из всего текста и переводить их изолированно. Этот способ не оправдывает себя: во-первых, о значении некоторых слов можно догадаться, переведя предыдущую часть текста. Во-вторых, придется выписывать либо все значения многозначного слова, либо первое попавшееся, которое может и не подойти для данного предложения, и тогда нужно будет снова обращаться к словарю, отыскивая другое, подходящее значение слова.

При устном переводе текста последовательность действий остается практически той же. Следует только более тщательно переводить новые слова, что поможет при сдаче текста преподавателю.

Все виды селективного (быстрого) чтения предполагают охват общего содержания текста без использования словаря. Следует

постараться уловить смысл прочитанного, опираясь на знакомые слова. Контроль понимания может осуществляться разными способами: студент должен изложить своими словами на русском или английском языке содержание всего текста или его части; составить план пересказа; озаглавить абзацы или другие структурные единицы текста; ответить на вопросы или выбрать правильный ответ из нескольких предложенных вариантов и т. д.

### **Дополнительное чтение**

Дополнительное чтение литературы на английском языке способствует расширению словарного запаса, повторению и закреплению пройденного грамматического материала, совершенствованию техники чтения, автоматизации навыка работы со словарем. При работе над дополнительными текстами следует все незнакомые слова и выражения выписывать в отдельную тетрадь словарь в исходной (словарной) форме.

Для удобства пользования рекомендуется указывать номер страницы, с которой выписаны слова. Можно даже пронумеровать абзацы и отмечать те слова, которые студент отбирает для выучивания.

При сдаче дополнительного чтения студент должен:

- 1) уметь правильно читать любой отрывок из текста;
- 2) предъявить преподавателю для контроля тетрадь-словарь с выписанными и переведенными незнакомыми словами из прочитанного текста;
- 3) адекватно перевести на русский язык любой отрывок из прочитанного текста, пользуясь тетрадь-словарем. Полный письменный перевод текста делать не рекомендуется. При ответе преподавателю пользоваться письменным переводом запрещается;
- 4) знать отобранные и выученные в процессе подготовки дополнительного чтения новые слова;
- 5) уметь объяснить любое фонетическое, лексическое, грамматическое явление текста в объеме, предусмотренном программой для данного курса.

### **Контрольные задания**

В первом семестре студенты выполняют контрольное задание № 1, во втором семестре – № 2. Выбор варианта контрольной работы осуществляется в соответствии с последней цифрой номера студенческого билета (шифра):

- 1-й вариант выполняют студентами с номерами шифра, оканчивающего на 1, 2 или 3;
- 2-й вариант – для студентов с последней цифрой шифра 4, 5 или 6;

наконец, 3-й вариант – для студентов с последней цифрой шифра 7, 8, 9 или 0.

Выполненные контрольные работы отправляются на электронную почту преподавателя или выкладываются в Личный кабинет. При этом помните, что высылать контрольную работу следует с учетом того, что Вам может потребоваться время на исправление работы.

Контрольную работу можно выполнить как в электронном виде, так и в рукописном.

При оформлении контрольных заданий придерживайтесь следующих указаний:

– Каждая контрольная работа должна иметь титульный лист (образец титульного листа можно найти на сайте [guar.ru](http://guar.ru)). На титульном листе необходимо указать: свою фамилию, имя, отчество, номер контрольной работы, а также выполняемый вариант.

– При выполнении в рукописном виде, контрольная работа должна быть написана аккуратно, четко, разборчиво, без сокращений. Для замечаний, объяснений, указаний рецензента оставляйте в тетради широкие поля или место после упражнения.

– Выполняйте работы в той последовательности, в которой они даны в настоящем пособии. Присылайте на проверку только одну работу. Во избежание возможного повторения ошибок следующую работу выполняйте и высылайте на проверку только после получения рецензии на предыдущую.

– Обязательно указывайте номер упражнения и переписывайте задание. Модель выполнения можно не переписывать.

– При выполнении работы лист следует разделить пополам и слева писать предложения по-английски, а справа – их перевод, либо оформлять в следующем виде: на первой строке – предложение на английском языке, на второй – его перевод, далее указываете необходимые комментарии в соответствии с заданием.

Если контрольная работа выполнена неясно, небрежно, не полностью или не в соответствии с указаниями, она возвращается студенту без проверки.

### **Исправления контрольной работы на основе рецензии**

Проверенная преподавателем контрольная работа возвращается студенту с рецензией и оценкой «зачтено» или «не зачтено» при отправке на электронную почту, либо, при отправке отчета в Личный кабинет с отметкой «Принят» или «Не принят». Студент должен ознакомиться с рецензией, с исправлениями, замечаниями, проанализировать их.

Если работа зачтена, но в ней допущен ряд ошибок, то их надо исправить. Руководствуясь указаниями рецензента, повторите соответствующий грамматический материал, проверьте значения неверно переведенных слов по словарю и т. д. Обязательно уясните сущность каждой допущенной ошибки. Все предложения, в которых были ошибки, перепишите в конце контрольной работы в исправленном виде (при выполнении в рукописном виде). Контрольная работа с исправлением ошибок предъявляется преподавателю на зачетно-экзаменационной сессии.

Если работа не зачтена, ее следует переделать целиком или частично, в зависимости от указаний преподавателя, и вновь выслать на проверку вместе с незачтенной работой.

Контрольные работы являются учебными документами, которые необходимо сохранять и предъявлять на зачетах и экзаменах. При сдаче зачета или экзамена преподаватель может провести опрос и по контрольной работе.

### **Письменные консультации**

Сообщайте своему рецензенту обо всех возникающих у вас в процессе изучения английского языка затруднениях и обращайтесь к нему за консультацией по вопросам, которые вы не можете решить самостоятельно.

### **Занятия по английскому языку во время сессии**

На занятиях по английскому языку студент должен иметь:

- англо-русский словарь;
- русско-английский словарь;
- прорецензированные контрольные работы;
- переведенные учебные тексты, тексты по дополнительному чтению и тетрадь-словарь с выписанными и переведенными словами к ним;
- тетради с дополнительными упражнениями по грамматике;
- используемые учебники и пособия;
- данные методические указания.

### **График представления контрольных работ**

Контрольная работа № 1 выкладывается в Личный кабинет или отправляются на электронную почту преподавателя до 15 декабря.

Контрольная работа № 2 сдается до 15 мая.

**1 СЕМЕСТР ОБУЧЕНИЯ**  
**КОНТРОЛЬНОЕ ЗАДАНИЕ № 1**  
**FUNDAMENTALS OF ELECTRONICS**  
**AND RADIO ENGINEERING**

**Для правильного выполнения задания № 1 необходимо усвоить следующие разделы курса грамматики английского языка по любым учебникам:**

1. Артикли. Множественное число и притяжательный падеж имен существительных. Предлоги как показатели падежных отношений. Порядок слов в английском предложении. Использование существительных в функции определения.

2. Степени сравнения имен прилагательных и наречий. Сравнительные конструкции.

3. Имя числительное.

4. Местоимения: личные, притяжательные, вопросительные, указательные, неопределенные и другие.

5. Формы настоящего, прошедшего и будущего времени действительного залога изъявительного наклонения.

6. Видовременные формы глагола:

А) активный залог (The Active Voice) для форм Continuous (Present, Past, Future) и Perfect (Present, Past, Future)

Б) пассивный залог (the Passive Voice) для формы Indefinite (Present, Past, Future)

Особенности перевода на русский язык пассивного залога английских глаголов, имеющих предложное дополнение или дополнение без предлога.

7. Модальные глаголы и их эквиваленты:

А) модальные глаголы can (could), may (might), выражающие возможность, и эквивалент модального глагола can – to be able

Б) модальный глагол must, выражающий долженствование, и его эквиваленты to be to, to have to

В) модальные глаголы should, ought (следует), needn't (нет необходимости)

8. Простые неличные формы глагола Participle I (Present Participle) и Participle II (Past Participle) в функции определения и обстоятельства.

## **ТЕКСТЫ ДЛЯ ИЗУЧАЮЩЕГО ЧТЕНИЯ, ПЕРЕВОДА И ПОВТОРЕНИЯ ГРАММАТИЧЕСКОГО МАТЕРИАЛА**

### **Text 1 (A). History of Electronics**

Electronics is one of the main sciences and it surrounds us everywhere. Electronics was born in the 19th century and first established itself in wireless telegraphy. For a long time afterwards it was used only for the purpose of communication.

More intensive development of radiolocation began in the earliest forties. All these years the vacuum tube was the heart of electronics.

The first semiconductor device – a transistor – was invented in 1948. It meant another important advance in the development of electronics, because semiconductors possessed much more valuable advantages over electron vacuum tubes. Thus, electronics became the study of electron motion in vacuum, solid bodies and gasses.

This opened up new fields of application. Complex electronic systems control the work of the largest plants and power stations. Electronic computers capable of performing the most complex mathematical calculations are now widely used in scientific research. The latest models of electronic machines perform such operations as calculating the most accurate designs of jet-planes and the longest trajectories of artificial Earth satellites, telling the fishermen where the catch is the biggest, speed regulation, automatic control, etc.

Today electronics has started a new era. Different electronic devices and instruments have taken the place of man. Some industries such as the manufacture of goods are controlled by electronic robots. Planes and rockets are also electronically controlled. Electronic computers are becoming very good at routine clerical work in offices and factories. Progress in space research would be impossible without computers making thousands of operations per second.

### **Text 1 (B). Electronics as a Science**

Electronics as a science studies the properties of electrons, the laws of their motion, the laws of transformation of various kinds of energy.

Electronics is a science, which deals with devices and instruments that are operated by the control of the movement of electric charges in a vacuum, in gasses, or in semiconductors; or with the processing of information or the control of energy by such devices. This definition covers the whole complex family of vacuum and gaseous electron tubes and their application. It also includes semiconductor and transistor

technologies to process information or to convert energy. Without electronics we would not have cybernetics, cosmonautics and nuclear physics. It is no mistake to compare the birth of electronics to such great achievements of mankind as the discovery of fire, and penetration into the secrets of the atom. Shortly speaking, electronics is not so much a new subject; it is rather a new way of looking at electricity.

### **Text 1 (C). Development of Microelectronic Devices**

The development of the transistor initiated the development of microelectronic devices. Very small electronic circuits of great reliability were needed by those organizations, which were concerned with sending equipment into space since the weight of the missile was of primary importance.

Microelectronic devices (integrated circuits) are made from wafer-thin pieces (тонкие пластины) of semiconductor material, such as silicon. A small chip of silicon can contain a very large number of electronic components built into the circuit.

Integrated circuits (IC) have a wide variety of processing and storage functions. Today it is possible to have all circuits needed for a microcomputer, for example, on a single semiconductor chip, which is about the same size as the early ICs that contained only a few components. Large-Scale Integrated circuits (LSI), containing thousands of components, are now commonplace. Each IC (chip) is mounted in a package so that electrical connections can be made.

The availability of these small microelectronic devices allows the electromechanical devices in industrial and domestic equipment to be replaced by much more compact control systems, and has given rise to developments in automation which were not previously possible.

The use of microelectronic devices in computers has had a considerable effect in that computer power is now available in the office, on the shop floor, and at home.

### **Text 1 (D) Fundamentals of Radio**

Radio transmission and reception was perhaps one of the earliest applications of electronics, the application that made the greatest impact on society. Surprisingly enough, we can use radio, predict its properties and design circuits that work very efficiently, but we know little about the real nature of radio. Ask an electronic engineer what radio is, and the answer will be a confident “electromagnetic waves” Ask a physicist what electromagnetic waves are, and he will tell you that really we do not know.

We do know that electromagnetic radiation is a form of energy, and that it is propagated as waves. The model became more of a model and less like reality when we discover that radio travels through vacuum. One has to understand how can there be waves in a vacuum. Perhaps in the future, theoretical physics will give us an answer.

Possibly the hardest concept to understand radio is the way in which circuits can broadcast or communicate radio waves.

As to communication it is a process of conveying intelligence from one point to another by radio.

At the start, and also at the end of the communication process radio technique is identical with that of wire telephony and telegraphy. Radio differs from other methods of communication in the means used to connect the transmitting and receiving points.

As we have already mentioned that the science of radio is centered round electromagnetic fields or waves. In fact, the term “radio” has been driven from “radiation” – the process of propagating or sending the waves into space.

The basic elements of any system of radio communication are: a transmitter and a receiver, a transmitting and a receiving antenna, a modulator, a cathode-ray tube, a relay, headphones, a loudspeaker, etc.

### **Text 1 (E) Radio Waves**

Radio waves are electromagnetic waves used for radio-communication. According to their frequencies electromagnetic waves produce different effects and are generated and detected by different methods. The waves of highest frequency so far discovered are cosmic rays, which appear in interstellar space and reach the earth from all directions. Next in order down the frequency spectrum come X-rays, ultra-violet rays and ordinary light space, to be followed by infrared rays and radio waves. The frequencies of radio waves are too low to be perceived<sup>1</sup> by the eye, although they are of exactly the same type as light waves, which operate on higher frequencies. Because of their low frequency, radio waves have to be collected on an aerial system and made perceptible by converting them to sound or vision. They have a great advantage over other forms of communication in that they follow the curvatures<sup>2</sup> of the earth and so are suitable<sup>3</sup> for communication over great distances.

NOTES: <sup>1</sup> to perceive – воспринимать; <sup>2</sup> curvature – искривление; <sup>3</sup> suitable – подходящий, соответствующий.

## КОНТРОЛЬНАЯ РАБОТА №1

### Вариант 1

**1. В приведенных ниже предложениях найдите местоимения и укажите их разряд (личные, указательные, притяжательные, возвратные, вопросительные, неопределенные, отрицательные, относительные, определительные). Предложения переведите.**

1. The first great progress in electronics came with the invention of the vacuum tube or valve in 1904. It made broadcasting possible.

2. They led to the international standardization of the units volt, ampere, coulomb, ohm, farad, and henry.

3. In his classic physics experiments of 1888, Heinrich Hertz proved Maxwell's theory.

4. Electrical engineering must respond to numerous demands, including those for more efficient and effective lights and motors...

5. These devices are made from semiconductors using a process known as photolithography

6. What does solid-state mean in relation to electronics?

7. It will be the scientific discovery that everyone will remember.

8. Neither of the statements is true.

9. These are called parasitic effects, and the goal of the microelectronics design engineer is to find ways to compensate for or to minimize these effects.

10. These were also the first areas in which electrical engineering was developed.

**2. Поставьте выделенные существительные во множественное число, если это возможно. Произведите все необходимые изменения.**

1. Not a day passes without the appearance of a new electronic *device*.

2. A *computer* is always susceptible to large voltage fluctuations.

3. According to its material, *wire* can be aluminium, copper, steel, etc.

4. *Electricity* has been the subject of scientific interest since the early 17-th century.

5. The *ohmmeter* consists of a milliammeter calibrated to read in ohms, a battery and resistors.

6. Complex electronic *system* controls the work of the largest plants and power stations.

**3. Раскройте скобки и поставьте прилагательные в нужную степень.**

1. Compared to vacuum tubes, transistors were (small), (reliable), had indefinite lifespans, and required (little) power than vacuum tubes

2. Information storage can be (easy) in digital systems than in analog ones.

3. The MOSFET has thus been credited as the birth of modern electronics, and possibly (important) invention in electronics

4. On the one hand a lot of outstanding discoveries in electronics made the life of the people (comfortable) and (pleasant).

5. Electrical engineering must respond to numerous demands, including those for (efficient) and (effective) lights and motors.

**4. Раскройте скобки, употребив нужную форму глагола (Present Simple, Past Simple, Future Simple, Present Continuous). Предложения переведите.**

1. The field of electronics (to be) a branch of physics and electrical engineering that (deal) with the emission, behaviour and effects of electrons using electronic devices.

2. The term “analogue” (to describe) the proportional relationship between a signal and a voltage or current that represents the signal.

3. They (to play) a leading role in the field of microwave and high power transmission as well as television receivers until the middle of the 1980s.

4. The first known study of bioelectronics (to take place) in the 18th century, when scientist Luigi Galvani (to apply) a voltage to a pair of detached frog legs.

5. The junction transistor (to be) one of the first types of transistor to come into commercial use, and many thousands are now used in electronic circuits.

6. Satellite communications (play) a vital role in the global telecommunications system.

7. The number of computers that are networked (grow) phenomenally.

8. Classical mechanics analytically (describe) motion of all objects on the macroscopic scales.

9. Their invention and development (to result) in the expanded use of semiconductor devices of all kinds.

10. Nanoelectronics (to refer) to the use of nanotechnology in electronic components.

11. So the question of technical progress is very wide but one thing is quite obvious – it (not, to stop) ever and machines will continue substituting everything except the human being.

**5. Из ряда слов постройте предложения, соблюдая правила порядка слов в английском предложении.**

1. theory – Accepted – states that – all matter – structure – in – electrical – is – atomic

2. Heat – are – energy – of – light – and – examples

3. electronics – Today – difficult – it – imagine – life – our – is – to – without

4. technology – The – development – circuit – integrated – semiconductor – progress – led to – in – the – of

5. microelectronics – One – that – is – devices – power – more – consume – less – of – advantage – smaller

**6. Поставьте нужный артикль вместо пропуска.**

1. \_\_ battery is the simplest source of power for the direct current.

2. This is \_\_ circuit. \_\_ circuit consists of a voltage source, a resistor and a conductor.

3. \_\_ electric cell is used to produce and supply electric energy.

4. \_\_ conductors are materials having a low resistance so that current easily passes through them.

5. The MOSFET was \_\_ first truly compact transistor.

**7. Переведите предложения на английский язык, используя времена Simple.**

1. Микроэлектроника – это подраздел электроники, который занимается изучением и производством очень маленьких электронных компонентов.

2. Ученые Bell Labs изобрели транзистор в 1947 году.

3. Устройство необходимо упаковать в коробку. Это предотвратит попадание пыли и грязи внутрь механизма.

4. Помимо приборов для измерения тока и напряжения, существуют устройства для измерения электрической мощности.

5. Электронные лампы были одними из первых электронных компонентов.

**8. Прочтите и письменно переведите текст.**

### **Basic Solid-State Principles**

In a conductor, electric current flow is a movement of free electrons. The outer or valence electrons of a good conductor are loosely bound to the atom. At room temperature the thermal energy causes approximately one electron to detach from each atom and become free to move and result in a current flow when an electric potential is applied.

Insulators are materials in which outer electrons are tightly bound to the atom and no electrons are free to move. Thus, no current can flow when voltage is applied.

Between these two major categories is a class of materials called semiconductors. As the name implies, a semiconductor is a material with conductivity roughly midway between conductors and insulators.

It is not just a poor conductor; it has two important properties. First, its resistance normally decreases with increase of temperature, while in conductors resistance slightly increases with temperature. Second, the flow of current in a semiconductor may be caused either by a flow of negative electrons or by a movement of missing sites in the opposite direction. If an atom has one outer electron missing, a loosely bound electron from a neighbouring atom can jump into it, leaving behind a new vacant site; this, in turn, can be filled by an electron from the third atom and so on. The impression is as if the vacant site has moved. Such vacant sites are called “holes” and since a negative electron is missing, the hole can be said to have a positive charge.

Semiconductor materials in which conduction is due to a flow of electrons are called n-type materials and those in which conduction is due to the movement of positive holes are called p-type.

### **9. Измените предложения, употребив глаголы в форме Past Continuous и Future Continuous.**

1. They use a variety of equipment and transport media to design the telecom network infrastructure.

2. Audio engineers develop audio signal processing algorithms to allow the electronic manipulation of audio signals.

3. Radio stations broadcast with several different types of modulation.

4. Basically every machine translation system requires programs for translation and automated dictionaries and grammars to support translation.

5. Scientific research requires substantial funding, especially when it involves the use of expensive equipment.

### **10. Раскройте скобки и поставьте глагол в форму Present Perfect, Past Perfect или Past Indefinite.**

1. The emergence of cable television (make) available in major media markets, programs.

2. Several concepts that Michael Faraday derived directly from experiments (become) common ideas in modern physics.

3. The cell tower (sophisticate) multichannel receivers that receive the signals from many cell phones simultaneously.

4. Most research into possible health hazards of exposure to radio waves (focus) on “nonthermal” effects.

5. The coil (lengthen) the antenna to achieve an electrical length of 2.5 meters.

6. Computers (be) around for many years, but it is the development of large-scale integrated circuits which (boost) their spread.

7. There are a lot of facts telling about a great amount of well-known scientists who (burn) their works when they have understood the consequences of their inventions.

8. Bill Gates again (adapt) to re-define the computer market, and just in time.

9. Karl Gauss (come) to similar conclusions earlier but he (not publish) his results. 10. This (be) only a small part of the policies that Hewlett and Packard (set up) to offer their employees.

### **11. Раскройте скобки, употребив глагол в форме Passive Voice.**

1. Radio waves first (predict) by mathematical work done in 1867 by Scottish mathematical physicist James Clerk Maxwell.

2. The IF signal also has the modulation sidebands that carry the information that (present) in the original RF signal.

3. Older designs used an oscillator at a lower frequency, which (multiply) by frequency multipliers to get a signal at the desired frequency.

4. It is generally recognized that the first radio transmission (make) from a temporary station set up by Guglielmo Marconi in 1895 on the Isle of Wight.

5. The sound (reproduce) either by a loudspeaker in the radio or an earphone which plugs into a jack on the radio.

6. Satellites these days (use) for many applications such as uses in GPS, television, internet and telephone uses.

### **12. Трансформируйте предложения из Active Voice в Passive Voice.**

1. Telecommunication engineers generally design telecommunication systems in the late 19th century and the radio and the telephone industries in the early 20th century.

2. We do not usually call transmitters generators of radio waves for heating or industrial purposes, such as microwave ovens or diathermy equipment, even though they often have similar circuits.

3. The antenna intercepts radio waves and converts them to tiny alternating currents which one apply to the receiver, and the receiver extracts the desired information.

4. Charged particles generate radio waves undergoing acceleration, such as time-varying electric currents.

5. Some celestial bodies and interstellar gases emit relatively strong radio waves that we observe with radio telescopes.

6. Equipment receive the television audio signals similar to that used in other forms of radio.

**13. Заполните пропуски модальными глаголами или их эквивалентами.**

1. There are also important duties regarding radio towers, which ..... be maintained with proper lighting and painting.

2. In 1904, Sir John A. Fleming developed the first vacuum electron tube, which ..... detect radio waves electronically.

3. According to current estimates, the duration of the pulse ..... be approximately a thousand-millionth of a second.

4. The other types of electromagnetic waves besides radio waves; infrared, visible light, ultraviolet, X-rays and gamma rays, also ..... carry information and be used for communication.

5. Radio stations ..... be linked in radio networks to broadcast common radio programs, either in broadcast syndication, simulcast or subchannels.

6. Any condition which could interfere with other radio services would require immediate manual intervention; facilities also ..... be monitored for any fault conditions which could impair the transmitted signal.

**14. Переведите предложения на русский язык, обращая внимание на модальный глагол would.**

1. Antennas are characterized by a number of performance measures which a user would be concerned with in selecting or designing an antenna for a particular application.

2. When applied to an earphone this would reproduce the transmitted sound.

3. The resistance is somewhat lower than would be desired to match commercial coax.

4. The heated filament, or cathode, was capable of thermionic emission of electrons that would flow to the plate (or anode) when it was at a higher voltage.

5. Engineers would set up a transmitting aerial and the station would then begin broadcasting.

**15. Переведите предложения, определите функцию причастий.**

1. Later known as the Fleming valve, it could be used as a rectifier of alternating current and as a radio wave detector.

2. Within the industry, a tiering is sometimes created among groups of networks based on whether their programming is simultaneously originated from a central point.

3. Some systems have remote monitoring points which report back to the main unit though telemetry links, particularly for lower radio frequencies like AM radio where propagation changes from day to night.

4. The antenna intercepts radio waves and converts them to tiny alternating currents which are applied to the receiver, and the receiver extracts the desired information.

5. The prime purpose of radio is to convey information from one place to another through the intervening media without wires.

6. Radio technology provides a means of instant communication with moving vehicles such as taxicabs, service trucks, squad cars and motorcycles.

## Вариант 2

**1. В приведенных ниже предложениях найдите местоимения и укажите их разряд (личные, указательные, притяжательные, возвратные, вопросительные, неопределенные, отрицательные, относительные, определительные). Предложения переведите.**

1. Thomas J. Watson Jr. ordered all future IBM products to use transistors in their design.

2. Although the efficiency of these cells is no more than 10 %, they provide a reliable electric power source that lasts for years on a satellite.

3. What should one take into consideration using the ohmmeter?

4. Let us consider some cases of electron tube application.

5. Conducting materials are by no means the only materials to play an important part in electrical engineering.

6. Sometimes it may be difficult to differentiate between analog and digital circuits

7. That part of the energy stored within an atom or molecule.

8. A generator whose field-magnet winding is connected in series with or in succession to its armature.

9. Any conductor has some definite value of inductance.

10. When does a direct current flow?

**2. Поставьте выделенные существительные во множественное число, если это возможно. Произведите все необходимые изменения.**

1. Besides, electric *circuit* uses different types of switches, protection devices, and meters.

2. An important electronic *technique* in both analog and digital electronics involves the use of feedback.

3. The *water* flows into the hydroturbine runner, acts upon the runner blades and rotates the runner and the turbine shaft.

4. This *effect* represents a continual transformation of electric energy into heat.

5. The *atom* consists of a nucleus and a cloud of electrons.

6. The *heat* developed in the electric circuit is of great practical importance

**3. Раскройте скобки и поставьте прилагательные в нужную степень.**

1. (Small) particle of matter is called the atom.

2. Moving-coil instruments are (accurate) and (sensitive), but (expensive) than those of moving-iron types.

3. (Good) insulators are oil, rubber and glass.

4. (Small) the transistor, (fast) it works.

5. Environmentally and economically, the Sun is (great) energy source.

**4. Раскройте скобки, употребив нужную форму глагола (Present Simple, Past Simple, Future Simple, Present Continuous). Предложения переведите.**

1. A capacitor (to store) electric energy provided that a voltage source is applied to it.

2. One more advantage of microelectronics (to be) that smaller devices (to consume) less power.

3. This sub-field of ICs (to win) the Nobel Prize in 2009.

4. Amplitude modulation (to involve) altering the amplitude of a sinusoidal voltage waveform by the source information, frequency modulation (to change) the frequency.

5. However, if a digital electronic device is to interact with the real world, it (to need) always an analogue interface.

6. P. Chebyshev (to invent) the arithmometer performing multiplication and division in 1882.

7. It is well known that in the end of the 19-th century a professor of physics in Cambridge Joseph Thompson (to discover) the electron.

8. The progress in semiconductor technology (to lead) to the development of integrated circuit.

9. In the new age of exploration the computer (solve) in milliseconds the problems a generations of mathematicians would need years to solve without its help.

10. The concept of automation (evolve) rapidly, partly because the applications of automation techniques vary both within a plant or industry and also between industries.

11. Automation generally (imply) the integration of machines into a self-governing system.

**5. Из ряда слов постройте предложения, соблюдая правила порядка слов в английском предложении.**

1. microelectronic – Many – normal – design – available – equivalent – components – of – electronic – are – in – a

2. electrons – This – is – current – flow – of – the – electric
3. of – Quick – electronics – with – development – began – the – transistors – invention – of
4. industry – of – Electromagnetic – called – are – devices – relays – used – in – widely – branches – various
5. In – current – 1820 – Oerstad – magnetic – the – electric – of – discovered – effect

**6. Поставьте нужный артикль вместо пропуска.**

1. \_\_ conductor connects the elements of any circuit.
2. This circuit consists of \_\_ voltage source and two resistors. \_\_ voltage source is broken.
3. \_\_ open and \_\_ short are troubles in a circuit.
4. \_\_ cells can be connected in series, in parallel and in series-parallel.
5. \_\_ first multi-chip microprocessors were developed with multiple MOS LSI chips.

**7. Переведите предложения на английский язык, используя времена Simple.**

1. Энергия не имеет массы, поэтому не занимает пространство.
2. Конденсатор сохранит больше энергии при высоком напряжении.
3. Существует несколько видов интегральных схем в зависимости от их степени интеграции, технологии изготовления и вида сигнала.
4. Электроника – это раздел физики и электротехники, который изучает взаимодействие электронов с электромагнитными полями и методы создания электронных приборов.
5. Джек Килби изобрел интегральную схему в 1958 году.

**8. Прочтите и письменно переведите текст.**

### **Junction Transistors**

The junction transistor was one of the first types of transistor to come into commercial use, and many thousands are now used in electronic circuits. The junction transistor is a bipolar transistor, that is it employs both p-types and n-types semiconductor regions. The junction transistor makes possible the amplification of electric power in a small solid-state device, previously possible only with vacuum tube circuits and related techniques.

The bipolar point-contact transistor was invented in December 1947 at the Bell Telephone Laboratories by John Bardeen and Walter Brattain under the direction of William Shockley. The junction version also known as the bipolar junction transistor (BJT), invented by Shockley in 1948, was for three decades the device of choice in the design of discrete and integrated circuits.

Early transistors were made from germanium, and were mainly of the pn-p type. That is, they comprise a single crystal, which contains two p-regions and one n-region. One of the p-regions, known as an emitter, is of low resistivity material with a heavy impurity doping. The emitter is the source of charge carriers in the transistor. The central n-region is known as the base region of the transistor, and is a relatively pure semiconductor of high resistivity. The base region is the control electrode or control region of the transistor. The second p-region, known as the collector region, has a lower conductivity than the emitter region, and is the region in which the mobile charge carriers are finally collected.

With the development of silicon devices, p-n-p transistors have come into more common usage. In the n-p-n transistor, the two extreme n-regions are the emitter and collector, respectively, while the central p-region is the base region.

### **9. Измените предложения, употребив глаголы в форме Past Continuous и Future Continuous.**

1. The software simultaneously repositions the transported pixels and the polygons they form to warp the emerging image.

2. Physicists sometimes explain the flow of current through a material, such as a resistor, by comparing it to water flowing through a pipe.

3. And so another computer criminal departs with just the recommendations he needs to continue his exploits elsewhere.

4. The molten steel flows through a short trough to a large ladle set below the furnace at ground level.

5. Engineers in this field design, test, build, and operate machinery of all types.

### **10. Раскройте скобки и поставьте глагол в форму Present Perfect, Past Perfect или Past Indefinite.**

1. Television (emerge) as the major source from which most Americans get the news.

2. Marconi himself publicly (state) that the signals were heard with certainty and distinctness.

3. Many of over one thousand inventions of Thomas Edison profoundly (change) the lives of nearly everyone in the world.

4. The National Ocean Service in recent years (hope) to increase the density of horizontal control to the extent that no location in the United States will be farther than 50 miles (80 kilometres) from a primary point.

5. Research in these fields (lead) to the development of such key devices as transistors, integrated circuits, lasers, and optical fibres.

6. There are many variations of the “iron claw” which Archimedes (design) and consequently (construct) in order to ward off attacking ships.

7. New maths theories (be) outline in talks by the camp fires.

8. Company executives are afraid of the bad publicity that would result if the public (find out) that their computer (be) misused.

9. If we think how everything (develop), how many new things (appear) and how the minds of people (become) so wide we ever won't be able to understand it.

10. The Institute of Quantum Optics and Quantum Information at the University of Innsbruck (announce) that scientists (create) the first qubit, or series of 8 qubits, using ion traps.

### **11. Раскройте скобки, употребив глагол в форме Passive Voice.**

1. Transmission medium over which the signal (transmit).

2. Practical frequency modulation (FM) transmission (invent) by Edwin Armstrong in 1933, who showed that it was less vulnerable to noise and static than AM.

3. Much shorter wavelengths bend or diffract very little and travel on a line of sight, so their propagation distances (limit) to the visual horizon.

4. Occasionally the equivalent term “aerial” (use) to specifically mean an elevated horizontal wire antenna.

5. TV (develop) at a time when Americans were becoming more affluent and more mobile.

6. They (transmit) from Poldhu in Cornwall, and were received 3,520 kilometers away in St John's, Newfoundland, using an aerial flown in the air by a kite.

### **12. Трансформируйте предложения из Active Voice в Passive Voice.**

1. H. Hertz tested Maxwell's theory in 1888.

2. We know the distance from one wave crest to the next as the wavelength.

3. We required about four minutes to transmit the entire message.

4. Besides being used for transmitting sound and television signals, one use radio for the transmission of data in coded form.

5. Radio signals activate various remote-control devices, including rocket and artificial satellite operations systems and automatic valves in pipelines.

6. Radio telescopes composed of very sensitive receivers and large directional antennas observe some celestial bodies and interstellar gases emit relatively strong radio waves.

**13. Заполните пропуски модальными глаголами или их эквивалентами.**

1. Advanced systems ..... monitor and often correct other problems which are considered mission-critical.

2. The conversion to digital broadcasting means broadcast engineers ..... now be well-versed in digital television and digital radio, in addition to analogue principles.

3. In 1900 Reginald Fessenden ..... wirelessly transmit a human voice.

4. Optical fiber ..... be used as a medium for telecommunication and computer networking.

5. Power requirements ..... be calculated and provided to power any electronic equipment being placed in the wire center.

6. Shoring also ..... be taken into consideration for larger trenches or pits.

**14. Переведите предложения на русский язык, обращая внимание на модальный глагол would.**

1. It was expected that the circuit elements would become too small and contain too few individual atoms to be manufactured reliably.

2. Such a substance is referred to as a semiconductor, and at the absolute zero it would be the insulator.

3. Use of FM would result in stronger stations blocking out reception of weaker stations due to FM's capture effect.

4. A hypothetical antenna that radiates equally in all vertical as well as all horizontal angles is called an isotropic radiator however these cannot exist in practice nor would they be particularly desired.

5. Monopoles, which are one-half the size of a dipole, are common for long-wavelength radio signals where a dipole would be impractically large.

**15. Переведите предложения, определите функцию причастий.**

1. Facilities had to be monitored for any fault conditions which could impair the transmitted signal or cause damage to the transmitting equipment.

2. FM stereo radio stations broadcast in stereophonic sound (stereo), transmitting two sound channels representing left and right microphones.

3. Radio waves are generated by charged particles undergoing acceleration, such as time-varying electric currents.

4. Until then wireless radiating transmitting and receiving elements were known simply as "terminals".

5. A radio wave acts as a carrier of information-bearing signals; the information may be encoded directly on the wave by periodically interrupting its transmission.

6. Both AM and FM are analog transmission systems, that is, they process sounds into continuously varying patterns of electrical signals which resemble sound waves.

### Вариант 3

**1. В приведенных ниже предложениях найдите местоимения и укажите их разряд (личные, указательные, притяжательные, возвратные, вопросительные, неопределенные, отрицательные, относительные, определительные). Предложения переведите.**

1. These troubles result from constant use or from some other reason.
2. What is the value of current in the circuit?
3. They may include some large thermal and hydroelectric power plants.
4. A rheostat is a resistor whose resistance value may be varied.
5. His dynamo machine became the forerunner of modern generators.
6. Copper is also widely used in electrical engineering but its cost is much higher.
7. Why is aluminium widely used nowadays?
8. There is no difference in the conducting ability of various substances.
9. They deliver electric current to the consumers.
10. It provided the same functions as the vacuum tube but at reduced weight, cost, power consumption, and with high reliability.

**2. Поставьте выделенные существительные во множественное число, если это возможно. Произведите все необходимые изменения.**

1. *Oxygen* is required for nitric acid regeneration.
2. *Conductor* is the substance through which electricity is easily transmitted.
3. When an *insulator* is connected to a voltage source, it stores electric charge and a potential is produced on the insulator.
4. Digital signal *processor* is another example of digital circuits.
5. Practical *electricity* is produced by small atomic particles known as electrons.
6. A *transformer* of this type increases or steps up the voltage and is called a step-up transformer.

**3. Раскройте скобки и поставьте прилагательные в нужную степень.**

1. MOS chips had reached (high) transistor density and (low) manufacturing costs than bipolar chips.

2. Silver and copper are (good) of conductors.

3. (Simple) source of power for the direct current is a battery.

4. (Great) the number of free electrons in any metal, (high) is its conductivity.

5. (Good) conductors are silver, copper, gold and aluminum.

**4. Раскройте скобки, употребив нужную форму глагола (Present Simple, Past Simple, Future Simple, Present Continuous). Предложения переведите.**

1. Development of nuclear power plants for civil use (to begin) in the mid-1950s

2. Today it (to be) difficult to imagine our life without electronics.

3. A capacitor (to stop) operating and (not, to store) energy in case it has a trouble.

4. Early transistor (to be) fast enough to serve in radio circuits.

5. In the late 1990s, plastic quad flat pack and thin small-outline package packages (to become) the most common for high pin count devices.

6. Microelectronics (to embrace) electronics connected with the realization of electronic systems and subsystems from very small electronic devices.

7. A two-winding transformer (to consist) of a closed core and two coils

8. An analogue signal (to use) some attribute of the medium to convey the signal's information.

9. The armature closes the contacts of the secondary circuit, and the motor starts operating; it (to stop) when the relay opens.

10. The only thing we know that we never (to return) to the life which people lived a lot of centuries ago because there is no way back.

11. Wireless networking (become) increasingly ubiquitous even in mobile computing environments.

**5. Из ряда слов постройте предложения, соблюдая правила порядка слов в английском предложении.**

1. form – Electronic – computer – basis – the – devices – any – automatic – of

2. Andre Ampere – connection – magnetism – between – and – investigated – the – electricity

3. include – of – Good – examples – circuits – amplifiers – tube – and – analog – vacuum

4. for – the – electrical – The – automobiles – systems – require – current – their – in – airplanes – and – operation – direct

5. consist – active – They – of – elements – passive – and

**6. Поставьте нужный артикль вместо пропуска.**

1. \_\_\_ resistor is one of the most common elements of any circuit.

2. This circuit includes \_\_\_ battery of four cells. But \_\_\_ battery is not connected yet.

3. \_\_\_ electric source produces energy.

4. The function of \_\_\_ insulators is to prevent a short.

5. A change of voltage on \_\_\_ first grid circuit results in an amplified plate current in \_\_\_ third stage

**7. Переведите предложения на английский язык, используя времена Simple.**

1. Даже проблема с одним компонентом приведет к сбою цепи.

2. Атом состоит из ядра и «облака» электронов, а его ядро – из протонов и нейтронов.

3. Открытие электрона и изучение его природы привело к революции в физике.

4. Диоды появились в начале 1900-х годов.

5. Оптоэлектроника – это раздел электроники, который изучает использование оптических и электрических методов обработки, хранения и передачи информации.

**8. Прочтите и письменно переведите текст.**

### **Semiconductors**

A semiconductor is often defined as an electrical conductor that has a conductivity intermediate between that of an insulator and that of a metal.

Some of the properties, which we now associate with semiconductors, have been known for a century or more. Little use was made of these properties, however, until the first decade of the last century, when practical semiconductor detectors were developed for radio reception.

Engineers and scientists turned their attention to semiconductors more than 40 years ago. They saw in them a means of solving an old engineering problem, namely, that of direct conversion of heat into electricity without boilers or machines.

Semiconductor devices are the electronic components, and their functionality is based on electronic properties of semiconductor materials. Such devices primarily made from thin slices of silicon,

germanium or organic semiconductors. Behaviour of semiconductor materials is manipulated easily by adding impurities, and their conductivity can be controlled by external factors (electric or magnetic field, exposure to heat or light, mechanical deformation, etc.).

The most important among the semiconductor devices, the transistors, were invented in 1948. Their invention and development resulted in the expanded use of semiconductor devices of all kinds. Semiconductor devices can usually perform all the elementary functions of oscillation, amplification, modulation and demodulation, rectification, etc. with greater economy of cost, space, and power, than can other devices such as vacuum tubes and relays. Semiconductor devices are used in measuring techniques, automatics, computers, radio and TV sets. A new industry – helioengineering – has appeared. Solar batteries are successfully operating on satellites and spaceships.

#### **9. Измените предложения, употребив глаголы в форме Past Continuous и Future Continuous.**

1. A program is considered incomplete until the programmer verifies that it performs as required.

2. The process requires the presence of a metal catalyst, and for this reason, it is also called catalytic reduction.

3. Two related physical principles underlie the operation of generators and motors.

4. Mathematical analysis studies concept related in some way to real numbers, so we begin our study of analysis with the real numbers system.

5. Programmers write programs in a form called source code.

#### **10. Раскройте скобки и поставьте глагол в форму Present Perfect, Past Perfect или Past Indefinite.**

1. There (be) space flights, the launching of interplanetary stations in the direction of Mars, radar contacts with the planets Mercury and Venus.

2. Some audio engineers are autodidacts with no formal training, but who (attain) professional skills in audio through extensive on-the-job experience.

3. While AM stereo transmitters and receivers exist, they (not achieve) the popularity of FM stereo.

4. Some communities publicly (control) cable television stations, allowing, citizen groups to put on programs.

5. There (be) many descriptions and characterizations of information through the years, some very broad, some narrow and some humorous.

6. The impact of electronics on modern life (be) pervasive.

7. Access to knowledge (be made) far easier by computerized indexes of scientific and technical journals, which are accessible from centralized services over telephone lines.

8. Flying and other things, like listening to music from thousands of miles away in the radio, would certainly have been thought impossible if people ever (imagine) them.

9. Today Wells' sword of heat (come) to reality in the laser.

10. Besides, it is reported that an optical equivalent of a transistor (be produced) and intensive research on optical electronic computers is underway at a number of US companies as well as in countries around the world.

### **11. Раскройте скобки, употребив глагол в форме Passive Voice.**

1. Radio astronomy (use) to detect celestial objects too distant and dim to be seen by optical telescopes.

2. Such waves radiate at the speed of light and (transmit) not only by line of sight but also by deflection from the ionosphere.

3. Until then wireless radiating transmitting and receiving elements (know) simply as "terminals".

4. The radio spectrum (divide) into a number of radio bands on the basis of frequency, allocated to different uses.

5. The transmitter (switch) on and off rapidly by the operator using a telegraph key, creating different length pulses of damped radio waves ("dots" and "dashes") to spell out text messages in Morse code.

6. In-ear systems, digital and analog mixing consoles, and a variety of speaker enclosures typically (use) by monitor engineers.

### **12. Трансформируйте предложения из Active Voice в Passive Voice.**

1. We employ a transmitter and receiver for the propagation and interception of radio waves.

2. We use radio for the transmission of sounds (voice and music) and pictures (television).

3. People received the first transatlantic radio signals early in the 20th century.

4. We apply one of those frequencies to an amplifier.

5. People use radio astronomy to detect celestial objects too distant and dim to be seen by optical telescopes.

6. Coherer is a radio detector in which passage of a high-frequency current improve the conductance between two conductors.

### **13. Заполните пропуски модальными глаголами или их эквивалентами.**

1. A transmitter ..... be a separate piece of electronic equipment, or an electrical circuit within another electronic device.

2. This meant that ships now ..... send messages from ship to shore if they were in distress.

3. The conversion to digital broadcasting means broadcast engineers ..... now be well-versed in digital television and digital radio, in addition to analogue principles.

4. However, some live events like sports television ..... include some of the aspects including slow-motion clips of important goals/hits, etc., in between the live television telecast.

5. Ground potential ..... be taken into consideration when placing equipment and facilities.

6. In addition power requirements ..... be calculated and provided to power any electronic equipment being placed in the field.

**14. Переведите предложения на русский язык, обращая внимание на модальный глагол would.**

1. The scientific principles of their invention would not be utilized for several decades, when they were first deployed in military and fiber-optic communications.

2. In December 1901, Guglielmo Marconi would go on to established wireless communication between Britain and Newfoundland, earning him the Nobel Prize in physics in 1909 (which he shared with Karl Braun).

3. Having summarized the results of his experiments, Popov expressed his hope that the device, after being perfected, would make possible transmitting signals at a distance by means of rapid electrical oscillations.

4. If the direction of either the magnetic or electrostatic flux were reversed, the direction of travel would be reversed, but reversing both sets of flux has no effect. 5. If nothing more happened, the first electrons to escape would soon have formed a negative space charge that would have kept others from being driven out because like charges repel.

**15. Переведите предложения, определите функцию причастий.**

1. In October 1925, Baird was successful in obtaining moving pictures with halftone shades, which were by most accounts the first true television pictures.

2. Made possible by the invention of the transistor and developed in the 1950s, transistor radios were hugely popular during the 1960s and early 1970s, and changed the public's listening habits.

3. Radio waves are generated artificially by transmitters and received by radio receivers, using antennas.

4. A receiving antenna may include not only the passive metal receiving elements, but also an integrated preamplifier or mixer.

5. Pulsars, believed to be rapidly rotating neutron stars, were discovered later in the decade.

6. Italian electrical engineer Guglielmo Marconi was the first to create a practical system communicating over long distances using radio signals.

## 2 СЕМЕСТР ОБУЧЕНИЯ

### КОНТРОЛЬНОЕ ЗАДАНИЕ № 2

#### COMPUTERS. TECHNOLOGICAL AGE

**Для того чтобы правильно выполнить Задание № 2, необходимо усвоить следующие разделы грамматики английского языка по любым учебникам и учебным пособиям:**

1. Пассивные формы (Passive Voice) глагола в трех временных группах – Indefinite, Continuous, Perfect. Страдательный залог с модальными глаголами.

2. Многозначность глаголов to be, to have, to do.

3. Неличные формы глагола: инфинитив (Infinitive) герундий (Gerund) Отличие герундия от причастия настоящего времени (Participle I).

4. Основные правила согласования времен. Перевод на русский язык главных и придаточных предложений при согласовании времен.

5. Прямая и косвенная речь. Перевод из прямой речи в косвенную.

6. Основные сведения о сослагательном наклонении. Аналитические и синтетические формы сослагательного наклонения. Сослагательное наклонение в условных придаточных предложениях.

7. Сложные формы инфинитива, герундия и причастия. Обороты, равнозначные придаточным предложениям: Объектный инфинитивный оборот (Complex Object); Субъектный инфинитивный оборот (Complex Subject); Самостоятельный (независимый) причастный оборот (Absolute Participial Construction); Конструкции с герундием (Gerundial Complexes).

8. Сложные предложения. Способы перевода придаточных определительных, обстоятельственных и дополнительных предложений. После изучения указанного выше материала можно приступить к выполнению задания.

**ТЕКСТЫ ДЛЯ ИЗУЧАЮЩЕГО ЧТЕНИЯ,  
ПЕРЕВОДА И ПОВТОРЕНИЯ  
ГРАММАТИЧЕСКОГО МАТЕРИАЛА**

**Text 2 (A). What is Computing?**

Suppose you sit down with pencil and paper and center your attention on adding figures. You add first all the digits in the right-hand column, then all the digits in the next column, and so on – until you finally arrive at the answer. When you do this, you are computing.

When you stop at a street corner, looking first to the left for any coming car, then to the right, to cross the street or to wait on the sidewalk– you are computing.

When you are walking along a poorly marked path in the woods, thinking if you are really on the path or have lost it– you are computing.

When you are taking in information or data, performing reasonable operations (mathematical or logical) on the data, and are producing one or more answers – you are computing.

A machine can also do this. It can take in information or data, perform a sequence of reasonable operations (последовательность разумных операций) on the information, which it has received, and put out answers. When it does this, it is computing.

A very simple example of a computer is the ordinary business adding machine which prints on paper tape the number entered into its keyboard, and also prints a total when you press the total key. A complex example of a computer is a modern automatic digital computer, which in each second can perform more than 100,000,000,000 additions, subtractions, multiplications, or divisions.

A computing machine can take in and store information because the hardware inside the machine expresses arithmetical and logical relations, such as adding or subtracting, comparing or selecting. A computer can also put out information, display the answers when it receives them. Hardware is useless without software, which is computer instructions and programs.

The modern computers are of three kinds called analog, digital, and hybrid. An analog computer computes by using physical analogs of numerical measurements. A digital computer computes by using numbers (digits) and yes's and noes expressed usually in 1's and 0's . A hybrid computer is a machine, which combines some of the properties of digital and analog computers.

## **Text 2 (B). Electronic Computers**

### **1. The ENIAC (1943–1946)**

The first all-electronic computer, the Electronic Numerical Integrator and Calculator (ENIAC) was developed at the Moore School of Electrical Engineering of the University of Pennsylvania. It was developed as a result of a military need. J. Presper Eckert and John Mauchly proposed the machine to solve the problem of calculating firing tables for new weapons.

The ENIAC weighed 90 tons, its 18,000 vacuum tubes demanded 140 kilowatts of electric power. Although it was fully electronic, the ENIAC had two major shortcomings: it could store and manipulate only a very limited amount of information, and its programs were wired on board. Since its programs were hardwired – that is, the programs operating the computer were established by physically changing the patterns of the wires interconnecting the vacuum tubes – the machine was not so flexible in operation. These limitations made it difficult to detect errors and to change the programs. And yet, the project was successful and the ENIAC was used for many years to solve ballistic problems.

### **2. The EDVAC (1946–1952)**

Although the idea of an automatic computing engine occurred first to Charles Babbage in 1832, it was more than a century later, in 1945, that John von Neumann set out the principles that fixed the pattern of computer design. Dr. John von Neumann, professor of mathematics at the Princeton Institute of Advanced Study, together with P. Eckert, J. Mauchly and Goldstine became a project member of a new improved computer, the Electronic Discrete Variable Computer (EDVAC).

Von Neumann was a major contributor to the project as he developed the concept of storing instructions as well as data in the memory of the computer. As a result it became possible to replace the writing board, which so seriously handicapped the operation of the ENIAC. Von Neumann is also given a share of the credit for introducing the idea of storing both instructions and data in a binary code instead of decimal numbers or human-readable words.

### **3. The UNIVAC I (1951)**

P. Eckert and J. Mauchly left the EDVAC project to form their own company and built the UNIVAC I computer. UNIVAC stands for UNIVersal Automatic Computer. The first UNIVAC was installed in the Census Bureau in 1951, and it was used continuously for 10 years. From the University laboratories the computer finally

entered the wider world in 1951 with the invention of first UNIVAC I. It was the first digital computer which was not “one of a kind,” it was produced in quantity. In 1952 IBM (International Business Machine) introduced the 701 commercial computer. Although limited in storage capacity by modern standards, the 701 could add a column of 10-digit numbers as tall as the Empire State Building in one second. Very soon improved models of the UNIVAC I and other 701-series machines were introduced. In 1953 IBM produced the IBM 650, which used a magnetic drum for storage and was popular with business and science.

### **Text 2 (C). Cosmonautics**

The development of cosmonautics is closely connected with the achievements of pilots and spacemen, aircraft and spacecraft engineers and builders. Aviation has become the cradle of cosmonautics. And this was not accidental/ At the turn of the 20th century the Russian scientists Konstantin Tsiolkovsky solved several problems on the theory of reactive movement and substantiated the possibility of manned space flight. His theoretical calculations have been extensively used by scientists in all countries. In the 1920s several groups of scientists and engineers worked on the problems of rocketry in the Soviet Union. In 1934 a research Institute of reactive Propulsion was organized and all the fundamental works and investigations in rocketry were concentrated in it. It was this institute that trained many outstanding experts in rocketry, including S. Korolyov who subsequently became chief designer of powerful multi-stage rockets. Today, outer space is not merely an object of study; it is also an enormous laboratory where new materials and design structures are tested under natural conditions. Cosmonautics is becoming more international in nature, mainly for global scientific, engineering and economic reasons. A vital step towards understanding the Solar System and the Universe is the flight to another celestial body though such an exploration will take generations. Landing on the Moon is just the beginning – not the end – of a new era of discovery of new worlds. Manned flight to Mars seems to be the next logical step. From the scientific and engineering standpoint, a typical Mars landing mission might begin with the orbiting of the elements for either one or two identical spaceships by newly developed “space shuttles”. These are reusable carriers for transporting men and equipment between the ground and the Earth’s orbit. While the mission could be carried out with a single ship, the use of two would provide an additional safety factor, since each would be large enough to accommodate the astronauts of its sister ship in the event of a major failure. Furthermore, with two

ships, additional equipment could be carried. The nominal crew of each ship would be six men. The spaceship itself would be divided into major three sections: the forward compartment housing the Mars surface exploration module; the main mission module with living quarters, the control area, experimental laboratories, and a radiation shelter in which the crew could live during periods of intense solar activity; and the biological laboratory for receiving and analyzing surface samples from Mars. The entire spaceship would be continuously rotated. If two ships made the trip simultaneously, they could be docked end-to-end and rotated in the plane of the longitudinal axis. No doubt, the time will come when people will build and inhabit orbiting stations and reach other planets in order to harness outer space to serve the mankind.

### **Text 2 (D). Robotics: Japan Takes the Lead**

In the mid-1960s Prof. Hiroyasu Funakubo of Japan's Medical Precision Engineering Institute was handed a particularly challenging assignment: develop an artificial limb for thalidomide babies born without arms. Eight years later Funakubo produced an aluminum and carbon-fiber arm powered by eleven separate micromotors – which, on command, could duplicate almost any function of the human arm. Professor Funakubo's arm proved too expensive for its intended purpose. But it has turned out to be a key element in a generation of “mechatronic” robots. This class of robots seemed to cement Japan's position as world leader in the business for years to come. Japanese companies moved into the field and quickly conquered the market. By the end of 1980s Japanese producers had supplied about 70 % of the industrial robots working in the Western world. Nevertheless, industry leaders in Japan feel their biggest growth is yet to come. Much of the growth is likely to stem from research like Professor Funakubo's. The electrical arm is much more accurate than the hydraulic arms used in many robot models, and robot manufactures are now confident they will produce “intelligent robots” that will be able to “see” and “feel” and take over more production-line and commercial functions. For example, there has been developed a snake-like robot that can creep through pipes and other narrow openings to inspect and even do repair work in places inaccessible to humans. One Japanese company is getting ready to market a janitor-watchman<sup>3</sup> that is simultaneously able to clean the floor and send out radio signals warning against fires or intruders. In the prototype stage are even more sophisticated devices: a 25-fingered breast cancer detector, a Seeing Eye dog and a home-care system for invalids. Most of the new robots are expected to be used

in heavy industry, where the current generation of smart machines has already proved popular in automotive and other assembly plants, performing such tasks as spot welding and body painting. Industry around the world is looking for robots to save on labour costs. Nissan Motor says that its new light-truck plant in Smyrna, U.S., is equipped with more than 200 robots. Experts also point out that demographic trends show fewer people coming into the job market in the years ahead, making robots something of a necessity. Robots may also take over jobs that humans find undesirable – such as coal mining. While industry should continue to be the biggest markets for robotry, some of the more interesting developments are taking place in the medical field. Funakubo's arms, for example, have been mounted in pair on a bedside table and linked to a robot cart that shuttles back and forth between a storage cabinet and the patient's bed. That system can be activated by keyboard, voice command and even by whistles and gasps. The cart and the arms can find and deliver to the patient a newspaper or a piece of fruit – anything that is stored in the cabinet. As yet the fingers of the arms are not able to peel the fruit, but Funakubo thinks they will have that capacity. Among the other new robots under development is the Melkong, which can pick the patient gently off his bed, put him in a bathtub and deposit him back in bed again. Not all of the applications on the robotry drawing boards will prove to be practical. But the demand for new smart machines will continue. After all, they never go on vacation, take a break or ask for a rise.

### **Text 2 (E). The Engineering Profession**

Engineering is one of the most ancient occupations in history. Without the skills included in the broad field of engineering, our present-day civilization never could have evoked. The first toolmakers that chipped arrows and spears from rock were forerunners of modern mechanical engineering. The craftsmen who discovered metals in the earth and found ways to refine and use them were ancestors of mining and metallurgical engineers. And the skilled technicians who devised irrigation systems and erected the marvelous buildings of the ancient world were the civil engineers of their time. Engineering is often defined as making practical application of theoretical sciences such as physics and mathematics. Many of the early branches of engineering were based not on science but on empirical information that depended on observation and experience. The great engineering works of ancient times were constructed and operated largely by means of slave labour. During the Middle Ages people began to seek devices and methods

of work that were more efficient and humane. Wind, water and animals were used to provide energy for some of these devices. This led to the Industrial Revolution, which began in the 18th century. First steam engines and then all kinds of machines took over more and more of the work that had previously been done by human beings or by animals. By the end of the 19th century not only were mechanical, civil, and mining and metallurgical engineering established but newer specialties of chemical and electrical engineering also emerged. This growth in the number of specialists is continuing with the establishment of such disciplines as aerospace, nuclear, petroleum, and electronic engineering. Engineering has become a profession. Today technological and industrial progress depends on it and the engineer must combine many of the characteristics of the scientists, research engineer and technologist. His interest must be in combining the abstract-theoretical world and the technical-practical world.

## КОНТРОЛЬНАЯ РАБОТА № 2

### Вариант 1

**1. Поставьте глагол-сказуемое в одну из неличных форм глагола (Indefinite, Continuous, Perfect) в страдательном или пассивном залоге.**

1. A printer is an example of a device (to produce) output in a human-readable format.

2. The high-speed devices (to use) as secondary storage are both input and output devices.

3. The progress of electronics (to result) in the invention of electronic computers was a breakthrough (прорыв) of the second part of the 20th century.

4. Mendeleev's periodic law (to accepted) as a universal law of nature is of great importance nowadays.

5. When output is available, output interfaces must be designed (to reverse) the process and (to adopt) the output to the external environment.

6. The memory stores the instructions and the data quickly (to retrieve) on demand by the CPU.

7. Computers (to design) originally for arithmetic purposes are applicable for great variety of tasks at present.

8. The CPU of a computer (to arrange) in a single or very small number of integrated circuits is called a microprocessor.

9. Russia was the first country (to start) the cosmic era.

**2. Из данных слов постройте предложения. Глаголы в скобках поставьте в нужную форму страдательного залога.**

1. in a great – (use) – computers – people – variety of fields

2. operations – different – (perform) – computers

3. the Internet – computers – to access – students – (use)

4. TV stations – workstations – in the race buses – the timing system to – (provide)

5. scientists – last – (invent) – century – computers

6. (use) – managers – for administrative – computers – purposes

**3. Передайте диалог, пересказанный в косвенной речи, в прямой речи.**

When Alec and Bob met Alec said that he had some questions about the computer interface. So he wanted Bob to explain some aspects to him. Bob answered in the positive.

The first question Alec asked concerned the notion of an interface. He added that people often used the English equivalent of that term

and seemed not to differentiate between the types of interfaces. Bob explained that the interface was an interconnection between hardware, software and people. When Alec inquired what hardware interface consisted of Bob told that that type of the interface consisted of physical channels, cables, or wires that connected and exchanged electronic signals between CPU and peripherals or between any two units.

Then Alec was interested to learn what software interfaces connected in particular and Bob told that they were specific messages established between programs. Alec remembered that software interfaces were application programs, Data Base Management Systems and the operating programs. He thanked Bob and added that he felt ready to pass his exam in programming successfully.

**4. Переведите предложения, обращая внимание на инфинитив.**

1. Engineers try to place greater and greater numbers of circuit elements onto smaller and smaller chips.
2. Computer is used to convert data into information.
3. It is a very hard undertaking to seek to please everybody.
4. To construct an experiment of this kind seems nearly impossible.
5. We attempted to carry out this investigation.
6. Robots can be used here as these tools are too heavy to handle.
7. Nowadays robots continue to expand their applications.
8. Spray painting is the manipulation of a spray-painting gun over the surface of the object to be coated.
9. The system must tell us if someone tries to get into the system.
10. To perform this work one must have all the necessary equipment.

**5. Определите, является ли Ving форма причастием настоящего времени или герундием. Переведите предложения на русский язык.**

1. While decoding was taking place, other parts of the control section were prepared for the following operation.
2. We can get a better idea of the use and operation of a computer by looking at an example.
3. Programming with machine language requires knowledge of the computer and its internal connections.
4. Assembly language programming is easier to use.
5. Everything we supply to the computer for processing must be converted into binary form.
6. The cells are arranged as groups, storing a number of bits together as a byte.
7. Obtaining a byte from storage and moving it to the control block is called the fetch part of the computation cycle.

8. Input to the register is called data, and is in the form of one binary digit following the other.

9. The register is capable of processing four bits.

10. The table accompanying Fig.1 will help follow data through the register.

**6. Переведите на русский язык следующий текст.**

Computers may have a short history but prior to their development, there were many other ways of doing calculations. These calculations were done using devices that are still used today; the slide rule being a perfect example, not to mention the ten fingers of the hands. These machines, unlike computers, are non-electronic and were replaced by faster calculating devices. It wasn't until the mid-1940s that the first digital computer was built. The post-war industrial boom saw the development of computers take shape. By the 1960s, computers were faster than their predecessors and semiconductors had replaced vacuum tubes only to be replaced in a few years by tiny integrated circuit boards. Due to microminiaturization in the 1970s, these circuits were etched onto wafer- thin rectangular pieces of silicon. This integrated circuitry is known as a chip and is used in microcomputers of all types.

It has been forecasted that exceptionally faster and smaller computers will replace those in use today.

**7. Переведите предложения на английский язык с помощью герундия, инфинитива и причастия.**

1. Поскольку компьютерная революция еще так нова, нам еще предстоит многое открыть.

2. Первые двигатели появились в XVII веке, и люди начали использовать их для управления фабрик, орошения земель, подачи воды в города и так далее.

3. Знание английского полезно для любого программиста.

4. Мы хотим хранить информацию о наших клиентах в базе данных.

5. Используя микрокомпьютер, вы постоянно делаете выбор – открыть файл, закрыть файл и так далее.

6. Научиться пользоваться компьютером важно для каждого образованного человека.

**8. Перепишите и письменно переведите данные ниже предложения, учитывая особенности употребления сослагательного наклонения в английском языке:**

1. If we were to make a journey in a plane to the nearest star, we should have to travel for several thousand centuries.

2. Were electric motors used, cars would not pollute the air, would be practically noiseless and very easy to control.

3. Were the design of cars improved, the fuel consumption would be greatly reduced.

4. Were it possible to learn how birds find their way, people would use the principle to develop a navigation system for aviation.

5. If you looked at the equipment of 1946, you would notice the difference with that available at present.

6. In zero-gravity there is no «up» position and the cosmonaut is oriented in the sleeping bag as if he or she were sleeping up.

**9. Перепишите и письменно переведите данные предложения, содержащие придаточные условные. Определите тип условного предложения (реальное или нереальное условие):**

1. Ground-based GPS/GNSS can also provide a higher temporal resolution, especially if the repeat time increases.

2. These irregularities of the geoid would bring about serious errors in the surveyed location of control points if astronomical methods, which involve use of the local horizon, were used solely in determining locations.

3. Inductors are used in some high frequency analog circuits; they occupy a large chip area if used at low frequencies.

4. If just two telescopes are observing the same source, then only two components of the Earth's rotation can be determined.

5. If the system is connected with previously determined stations, the new system must fit the established measurements.

6. If the instruction requires an ALU or specialized hardware to complete, instruct the hardware to perform the requested operation.

7. There are quite a few topics in geodesy which only can be explored successfully, if a particular effect is regularly monitored.

8. Of these the first is the most accurate; the second is next in accuracy but faster; the third is least accurate but can be fastest if heights are to be measured at well-separated points. The last two techniques require sophisticated equipment that is still very expensive.

**10. Перепишите и письменно переведите данные ниже предложения, учитывая особенности перевода зависимого и независимого причастного оборота:**

1. The rate of change of silicon technology is so fast that making a choice is like trying to hit a moving target; the parameters are continually but predictably changing with the technology advancing all the time.

2. Having been asked for such a book, the librarian promised to look for it.

3. A lot of information being delivered, some form of “memory” must be provided.

4. Nearly all components and interconnections for data-processing equipment are fabricated by automated printing techniques, with the information for the manufacturing data being in digital form.

5. There were some reports concerning electric waves at the Congress of 1896, Popov's report of the new type of communication being the center of attention.

6. Computers handling large amounts of information rapidly and accurately, the future of the world may be described in a very short phrase "computer and change".

7. When using a computer, we can perform any information-processing task.

8. When falling, the more massive bodies have more inertia to overcome.

9. We can widely use computers to give the automatic solution, quite a little probability of error being possible.

10. All the necessary preparations having been done, the lab technician began testing the operating parameters of a radio receiver.

11. An electron computer forms an impressively complex device, when viewed as a whole.

12. Any numerical problem being solved, the digital computer has become a significant instrument in our days.

**11. Перепишите и письменно переведите предложения, содержащие инфинитивные конструкции:**

1. To avoid data loss, do not replace a battery while the computer is turned on unless the computer is connected to an electrical outlet or a second battery is installed.

2. CD-rewritable (CD-RW) technology allows personal computer users to replace their diskettes with high-capacity CDs that can be written upon and edited over.

3. If the fuse is blown, replace it with one of the same type and rating before going any further.

4. When room air is dehumidified and recirculated, the system is said to operate in the recirculating mode.

5. The structural joints in a machine tool have long been known to be a source of damping by the mechanisms of friction and microslip.

6. Be sure that nothing rests on your adapter's power cable and that the cable is not located where it can be tripped over or stepped on.

**12. Перепишите и письменно переведите предложения, содержащие конструкции с герундием:**

1. Developing information systems to meet business needs is highly complex and difficult – so much so that it is common for information

systems projects to overrun budgets and exceed scheduled completion dates.

2. Providing information to customers can also help companies increase revenues and profits.

3. Turning produces external cylindrical surfaces by removing material from a rotating workpiece; boring is this same process applied for finishing internal surfaces of revolution.

4. A coprocessor speeds processing by executing specific types of instructions while the CPU works on another processing activity.

5. Computer systems can be upgraded by installing additional memory, additional processors (such as a math coprocessor), more hard disk storage, a memory card, or other devices.

6. Conceptually, a synergy is the extra effect due to putting two or more features in combination that cannot be predicted by knowing the effects of the two features separately.

**13. Перепишите следующие сложноподчиненные предложения, подчеркните в них придаточные и укажите, являются ли они дополнительными (Д) или определительными (О):**

1. It is interesting to know if this circuit is a low-level noise device.

2. The paper he has read concerns crystals.

3. The emission from an X-ray tube of the kind we have described consists largely of continuous radiation.

4. The latest investigations show how this deflection system works.

5. The method you have described has some advantages.

6. Some of the properties, which we now associate with semiconductors, have been known for a century or more.

7. We know the current is a path of an electric current.

8. One of the Al-Jazari's robots was originally a boat with four automatic musicians that floated on a lake to entertain Guests at royal drinking parties.

**14. Перепишите и переведите следующие сложносочиненные предложения:**

1. Nuclear reactors decrease air and land pollution but they increase thermal and radiation pollution

2. A mechanical engineer designs not only the machines that make products but the products themselves, and must design for both economy and efficiency.

3. His theory looks solid, yet it can be improved.

4. Symbolic coding consists in writing a code not in terms of specific numerical addresses, but rather in terms of some name description or other symbolism to represent the addresses.

5. Numbers are assigned to the symbols, and the final code is prepared.

6. There are many software companies in the world and selling software can be quite a profitable industry.

7. With less water imbedded in your clothing, your dryer doesn't have to work as hard, thus providing additional energy savings.

8. There is no playback picture, or the playback picture is noisy or contains streaks.

**15. Перепишите следующие предложения, найдите и подчеркните конструкцию COMPLEX OBJECT или COMPLEX SUBJECT, письменно переведите предложения на русский язык:**

1. Scientists believe new laser devices to be widely used in medicine.

2. A Dutch physicist found a superconducting material to return to normal state when a strong magnetic field was applied.

3. Torvalds then invited others to add to the kernel provided that they keep their contributions free.

4. A system of satellites is provided for people to watch the central TV program.

5. Engineers suppose a new «night vision» system to enable drivers to see better after dark.

6. A method for recording information on crystal by means of a laser is known to have been developed by a Russian researcher.

7. The latest achievements in the field of superconductivity are certain to make a revolution in technology and industry.

8. Computer is known to be one of the most important discoveries of the 20th century.

9. The electrical resistivity of a mercury wire was found to disappear when cooled to  $-269^{\circ}\text{C}$ .

10. Optical technology has been found to be cost-effective.

## Вариант 2

**1. Поставьте глагол-сказуемое в одну из неличных форм глагола (Indefinite, Continuous, Perfect) в страдательном или пассивном залоге.**

1. When keyed, the data (to held) in a small memory called buffer.

2. (To transmit) to the central processing unit, the instruction made arithmetic-logical unit perform some computations.

3. Keyboard enables (to input) numerical and text data.

4. The mouse provides the cursor control (to simplify) user's orientation on the display.

5. Input devices (to use) to enter data into primary storage.
6. These data appeared (to investigate) long ago.
7. We are glad (to obtain) such valuable results.
8. You should (to know) wonderful features of computers long ago.

**2. Из данных слов постройте предложения. Глаголы в скобках поставьте в нужную форму страдательного залога.**

1. ENIAC (be) – the first programmable – electronic digital computer – general-purpose

2. pilots – airplane – control the plane – computers – (use) – to help them

3. next week – we – the delegation – of foreign scientists – (meet)

4. the heart of – (be) its transistors – the electronic computer

5. the word computer – which means to count – (come) from a Latin word

6. the basic job of – the processing of information – computers (be)

**3. Передайте диалог, пересказанный в косвенной речи, в прямой речи.**

When Alec met his friend David he said that he was interested to know what a programming language was. He knew each computer had a repertoire of operations to perform. So he wanted David to explain him if the notions a “machine language” and a “programming language” were the same.

David agreed and began. He said that to perform a task a user must choose the appropriate instructions from the repertoire and sequence them properly. So the means of specifying the instructions and their sequencing was called the “programming language”.

Then Alec guessed that machine language was in reality a programming language and David said that his friend was quite right. He only emphasized that it was the lowest level programming language, the language of binary 1's and 0's. Alec remembered that computer hardware understood only a binary program but he wanted if there were any drawbacks to machine level coding.

David answered that the drawbacks were numerous. The most inconvenient thing about the machine level coding was that it took a long time to learn, write and debug. He added that errors would very likely occur and the most unpleasant thing was that corrections were difficult to make.

When Alec asked why Davis replied that the language itself was abstract and perhaps Assembly Language was easier in use. Alec thanked his friend and said he would have to go to the library and read some manual on programming languages.

**4. Переведите предложения, обращая внимание на инфинитив.**

1. To be an ideal engineer means to have knowledge, to improve one's ability to analyze, synthesize and develop insight into one's field.

2. To be an ideal engineer one is to have knowledge, to improve one's ability to analyze, synthesize and develop insight into one's field.

3. To master a foreign language is necessary for all students.

4. To master English you must work hard.

5. To measure temperature is quite simple.

6. To measure temperature it is necessary to choose some kind of temperature scale.

7. It is too urgent a matter to be postponed.

8. Thomas was the first to focus attention on this type of reaction.

9. Some molecules are large enough to be seen on the electron microscope.

**5. Определите, является ли Ving форма причастием настоящего времени или герундием. Переведите предложения на русский язык.**

1. Heating the gas increases the speed of the molecules.

2. Having made the experiment, the research engineer recorded the data.

3. Translating from one language to another we can use electronic dictionaries.

4. Translating from one language to another has been accomplished by a qualified engineer.

5. The failure was due to the operator's having been careless in using the instrument.

6. Most applications requiring storage and manipulation of small amounts of digital information use registers.

7. The numbers must be carefully stored for arithmetic processing.

8. The home remote control system operates by transmitting coded information on the power lines running throughout the house.

9. The task is performed by starting with the first step in the program, then proceeding immediately to the next step.

10. Very soon the microprocessor will be integrating various energy sources for most efficient environmental control.

**6. Перепишите и переведите на русский язык следующий текст.**

There has long been an interest in language translation and, in particular, in the prospects of automatic translation by computer.

In the 1960s when the translation studies began, there was already considerable stirring among professional linguists and others about

the efficiency of translation by computer or machine translation (MT). At that time different modes of translation were compared. That is, human translations against different versions of MT. Soon the researchers conducting the studies were able to add to their observations from the output of the latest MT system that had become operational. Within a year, they submitted a Russian paper for translation by the then operational MT system. Two characteristics of MT output are: 1) untranslated words and 2) translated words that have two or more meanings in the target language<sup>1</sup>. An examination of the post-translation editing showed that many corrections had been made: each of the approximately 80 sentences had had some corrections and modifications, most of them being extensive. About 35 % of the English words had been altered by the editor.

It would be unwise to conclude on a less-than-optimistic note. However, it is apparent that little progress has been made during recent years. There are no demonstrated advantages of MT over human translations. Other methods should be applied to determine the readability of translation. Researchers are now collecting such data.

<sup>1</sup> the target language – зд. язык, на который делался перевод

#### **7. Переведите предложения на английский язык с помощью герундия, инфинитива и причастия.**

1. Машину обеспечили необходимыми фактами, чтобы она решила проблему.

2. Первая машина для вычисления математических проблем была Марк I.

3. Первые компьютеры, использующие электронные лампы, могли выполнять вычисления в течение миллисекунд.

4. Изобретенные Нойманом вакуумные лампы регулировали и усиливали электрические сигналы.

5. Компьютеры были созданы, чтобы выполнять вычисления для военных и научных целей.

#### **8. Перепишите и письменно переведите данные ниже предложения, учитывая особенности употребления сослагательного наклонения в английском языке:**

1. If we had been told about the lecture on reliability in spacecraft production, we should have come by all means.

2. Superconductivity can be obtained in some materials if the temperature is very low and close to absolute zero.

3. If we look around, we can see that electricity is serving us in one way or another.

4. If ordinary gases are greatly compressed, they become liquids.

5. If there is a pressure change in the tires, a transmitter signals to adjust the pressure.

6. It is that sort of research that will be necessary if people are ever to establish settlements far beyond Earth.

**9. Перепишите и письменно переведите данные предложения, содержащие придаточные условные. Определите тип условного предложения (реальное или нереальное условие):**

1. A table or platen, with a lighted spot in the middle, can be moved around the model and raised or lowered so that the spot appears to touch the ground while the operator scans any feature, even if it is located on a steep hillside.

2. An IAG service is created, if measurements and products are well defined, regularly generated, and of importance for a large user community.

3. If governments decide to expand the activity in space of their armed forces, space could become another major military theatre – like the land, the sea, and the Air or Earth – for waging war and deploying weapons.

4. Electronic circuitry detects this phase shift and converts it to units of time; the use of more than one modulating frequency eliminates ambiguities that could arise if only a single frequency had been employed.

5. If a program is waiting for the user to click on the mouse or press a key 26 on the keyboard, then it will not take a “time slice” until the event it is waiting for has occurred.

6. Indeed the number of 3D products is huge and if one hand the cost of these technologies is slowly reducing, on the other hand it’s difficult, in particular for nonspecialists, to select the right product due to a lack of standard terminology and specifications.

7. If other commercial ventures equal or surpass the success of the Satellite communications sector, space could become a major centre of business activity.

8. A difficulty with scanning technology is that the resulting image takes up a great deal of disk space if high resolution is desired.

**10. Перепишите и письменно переведите данные ниже предложения, учитывая особенности перевода зависимого и независимого причастного оборота:**

1. While used, precision instruments require very delicate handling.

2. My father, being an engineer himself, was very pleased when he heard me speaking to my schoolmates about the methods of making various kinds of steel.

3. Personal computers being used for many purposes, scientists go on improving their characteristics.

4. New computers are rapidly developed, digital computers being among the most widely spread.

5. The demands for instant data growing, the use of electronic computer systems increases.

6. The machines arriving to day, we shall proceed to mount them.

7. The new instrument being designed in our laboratory will be used in radio engineering research.

8. The students were heard speaking about the results of their last test.

9. With pure aluminum having a comparatively low strength, duralumin is generally used in the aircraft industry.

10. While working at his new computer, the inventor made numerous improvements.

11. The acid tank was made of steel, lead having been used as a lining.

12. The temperature being increased, the resistivity of the semiconductor decreases.

**11. Перепишите и письменно переведите предложения, содержащие инфинитивные конструкции:**

1. LCD monitors are flat displays that use liquid crystals—organic, oil-like material placed between two polarizers – to form characters and graphic images on a back-lit screen.

2. A digital versatile disk (DVD) is a five-inch CD-ROM look-alike with the ability to store about 135 minutes of digital video or several gigabytes of data.

3. Unix also makes it much easier to move programs and data among computers or to connect mainframes and personal computers to share resources.

4. The question of software support is known to be the biggest stumbling block to the acceptance of open source software at the corporate level.

5. These keyboards, such as the split keyboard by Microsoft and others, are designed to avoid wrist and hand injuries caused by hours of keyboarding.

6. Do not carry a battery pack in your pocket, purse, or other container where metal objects (such as car keys) could short-circuit the battery terminals; the resulting excessive current flow can cause extremely high temperatures and may result in damage from burns.

**12. Перепишите и письменно переведите предложения, содержащие конструкции с герундием:**

1. One of the main deterrents to deploying broadband to hotel guest rooms is the limitation of twisted-pair wiring used in most properties.

2. Depending on how you set your power management modes for Windows, place the laptop computer in hibernate mode by clicking the Start button, clicking Shut Down, and clicking Hibernate; or closing the display.

3. Businesses are learning that by improving the flow of information within their organization, they can become more efficient and effective.

4. TQM involves developing a keen awareness of customer needs, adopting a strategic vision for quality, empowering employees, and rewarding employees and managers for producing high-quality products.

5. A high-quality product will satisfy customers by functioning correctly and reliably, meeting needs and expectations, and being delivered on time with courtesy and respect.

6. The network computer is a cheaper-to-buy and cheaper-to-run version of the personal computer that is used primarily for accessing the Internet and e-mail.

**13. Перепишите следующие сложноподчиненные предложения, подчеркните в них придаточные и укажите, являются ли они дополнительными (Д) или определительными (О):**

1. Some of the main reasons for the growth of integrated circuits are that they are small and light, more reliable than discrete circuits, have fewer connections, can be mass-produced and therefore are cheap.

2. Professor asked us what we thought of this new method of calculation.

3. The design we used will cause an increase in collector current.

4. It is necessary to know whether or not the molecules can still rotate freely in the crystal at the lowest temperature.

5. We learned quite recently the instrument was not of the highest quality.

6. The asymmetry we observe indicates that the electrons strike the plate with a tendency to spin to the right rather than to the left.

7. In this case we can suppose that a molecule consists of two equal atoms.

8. One of the wonders of our age is the “electronic brain”, or the giant calculating machine, which can to some extent duplicate human senses

**14. Перепишите и переведите следующие сложносочиненные предложения:**

1. For instance, Bill Gates, the founder of Microsoft was the second richest man in the world in 2008 largely by selling the Microsoft Windows and Microsoft Office software programs and the same goes for Larry Ellison largely through his Oracle data base software.

2. For computers are programmed by human beings, computer programs will be subject to errors.

3. Object code needs further processing to become machine code and machine code is the Central Processing Unit's native code, ready for execution.

4. The materials may also have permanent deformation or they may fracture.

5. Vacuum tubes were replaced by solid-state electronic devices, but they may still be used in the transmitters of radio stations you listen to, many guitar amplifiers and some audiophile equipment.

6. Do not throw into fire, short-circuit, disassemble, or subject to excessive heat.

7. SMS/EMS Chat allows you to easily send and receive instant text messages, and the chat history stays on screen allowing you to read it as you reply.

8. Most professors do not just give classes but also conduct scientific research.

**15. Перепишите следующие предложения, найдите и подчеркните конструкцию COMPLEX OBJECT или COMPLEX SUBJECT, письменно переведите предложения на русский язык:**

1. Recent discoveries in superconductivity made scientists look for new conducting materials and for practical applications of the phenomenon.

2. The laser is known to be a device producing an intensive beam of light by amplifying radiation.

3. The optical equivalent of a transistor is reported to have been produced.

4. The annual output of personal computers is expected to reach millions in the near future.

5. In some countries, the nuclear power plants are believed to produce about 80 per cent of the whole amount of energy

6. We know Morse to have been a painter by profession.

7. We know the first digital optical disks to have been produced as disks for music.

8. M. Faraday supposed a beam of light to reverse its polarization as it passed through a magnetized crystal.

9. Recommendations from physicists will allow the necessary measures to be taken to protect the air from pollution.

10. Scientists expect lasers to solve the problem of controlled thermonuclear reaction.

### Вариант 3

**1. Поставьте глагол-сказуемое в одну из неличных форм глагола (Indefinite, Continuous, Perfect) в страдательном или пассивном залоге.**

1. (to construct) recently, a new electronic device has important applications in space exploration.

2. (to supply) with a special appliance, a television set may have a remote control.

3. (The control) unit operates by reading one instruction at a time.

4. Improved methods of obtaining three-dimensional television pictures (to work) on the basis of holography.

5. The first amplifying semiconductor devices (to know) to have been developed in the USA in 1948.

6. He ordered these devices (to repair) as soon as possible.

7. The problem (to solve) is of great importance to the development of this branch of industry.

8. (to regulate) by the operator, the equipment operated well.

9. (to code), the instruction was transmitted to the central processing unit.

**2. Из данных слов постройте предложения. Глаголы в скобках поставьте в нужную форму страдательного залога.**

1. (to be) – the digital computers – very large – may – and powerful

2. (teach) – this professor – foreign – two – languages

3. many – the students – the teacher – questions – (ask)

4. to use computers – many people – (have) an opportunity

5. solve problems – there is no doubt – that computers – very quickly

6. social changes – computers (bring) with them – and – both economic

**3. Передайте диалог, пересказанный в косвенной речи, в прямой речи.**

One day David met his friend John and asked him whether John knew something about translating machines. John replied that translating machines had been built many times but none of them, however, had done its job well enough. That was the reason why research on translating machines had gone continuously.

Then David said that one day he had seen a CD with some programs, which might help to translate from Russian into English.

John advised David not to waste money and time because all these programs were unable to produce intelligible translation. They merely substituted Russian words with English equivalents and did not analyze the relations between the words of each sentence.

David exclaimed that when translating so many logical processes were involved. He added that the machine must know much about grammar, and Russian grammar was so different from English.

John also said that the commonest problem was where a word could have more than one meaning. A human translator would know which meaning to choose from the context. But machines had been known to make the wrong choice because if a machine was to make usable translations, it itself must be able to extract some, at least, of the meaning of the text. So John concluded that such machines were much further off and recommended David to study English hard.

**4. Переведите предложения, обращая внимание на инфинитив.**

1. Engineers try to place greater and greater numbers of circuit elements onto smaller and smaller chips.

2. Computer is used to convert data into information.

3. It is a very hard undertaking to seek to please everybody.

4. To construct an experiment of this kind seems nearly impossible.

5. We attempted to carry out this investigation.

6. Robots can be used here as these tools are too heavy to handle.

7. Nowadays robots continue to expand their applications.

8. Spray painting is the manipulation of a spray-painting gun over the surface of the object to be coated.

9. The system must tell us if someone tries to get into the system.

10. To perform this work one must have all the necessary equipment.

**5. Определите, является ли Ving форма причастием настоящего времени или герундием. Переведите предложения на русский язык.**

1. This can be illustrated by examining the memory chip.

2. Then a final process known as metalisation completes the chip, thus reducing the processing time for a new design by two-thirds.

3. For systems requiring lower performance there is a choice: choice of technology and choice of design.

4. The designers have aimed at gaining performance by reducing the complexity of the control logic.

5. Solving these complex equations may require a digital computer.

6. The advantages of the new equipment is functioning under wide changes of temperature and pressure.

7. This represents a set of programs concerned with displaying, analyzing, checking and simulating the design.

8. Nearly all components and interconnections for data-processing equipment are fabricated by automated printing techniques, with the information for the manufacturing data being in digital form.

9. When applying these two methods, consideration should be given to the physical phenomenon.

10. The automated landing system must ensure landing the passenger airplane at night.

**6. Переведите на русский язык следующий текст.**

There are several advantages in making computers as small as possible. Sometimes weight is particularly important. A modern aircraft, for example, carries quite a load of electronic apparatus. If it is possible to make any of these smaller, and therefore lighter, the aircraft can carry a bigger load. This kind of consideration applies to space satellites and to all kinds of computers that have to be carried about.

But weight is not the only factor. The smaller the computer the faster it can work. The signals go to and from at a very high but almost constant speed. So if one can scale down all dimensions to, let us say, one tenth, the average lengths of the current paths will be reduced to one tenths. So, very roughly speaking, scaling down of all linear dimensions in the ration of one to ten also gives a valuable advantage, the speed of operation is scaled up to 10 times. Other techniques allow even further speed increase.

The increase of operation is a real advantage. Another advantage is that less power is required to run the computer. In space satellites this is an important matter. Another advantage is reliability. Mini-computers have been made possible by the development of integrated circuits. Repair of any kind is no longer needed. If one component circuit develops a fault, all that is needed is to locate the faulty unit, throw it away and plug in a new one.

**7. Переведите предложения на английский язык с помощью герундия, инфинитива и причастия.**

1. Эту машину обеспечили необходимой информацией о решаемой задаче.

2. Марк I была первой машиной, которая вычисляла математические задачи.

3. Ранние компьютеры использовали вакуумные лампы, которые выполняли вычисления за миллисекунды.

4. Электронные лампы, которые регулировали и усиливали электрические сигналы, были изобретены Нойманом.

5. Американский служащий изобрел средство шифрования информации путем пробивания отверстий в карте.

**8. Перепишите и письменно переведите данные ниже предложения, учитывая особенности употребления сослагательного наклонения в английском языке:**

1. If you think that a computer never makes mistakes, you are wrong.
2. If we had tested this material, we should have used it in our work.
3. If their dreams had been realized and such a craft had been constructed, mankind would have known about the secrets of Ocean much earlier.
4. Had submersibles been developed since the time of Alexander the Great, mankind would have used natural resources from the ocean floor and cultivated plants and fish there.
5. If extreme temperatures generated by atmospheric friction were not so high, a hypersonic craft would not require complicated cooling measures.
6. If I were you, I should stop the experiment.

**9. Перепишите и письменно переведите данные предложения, содержащие придаточные условные. Определите тип условного предложения (реальное или нереальное условие):**

1. The reading on a graduated vertical staff is observed through the telescope. If such staffs are placed on successive ground points, and the telescope is truly level, the difference between the readings at the cross hairs will equal that between the heights of the points.

2. If several programs are running "at the same time", then the interrupt generator might cause several hundred interrupts per second, switching a program each time.

3. If you format a hard drive that has files on it, the files will be deleted.

4. More shades of colour can be generated if the intensity of the dots can be varied.

5. If observing Earth from space becomes crucial for effective planetary management, an assortment of increasingly varied and specialized observations satellites could be launched.

6. If a problem cannot be solved by following one route, the computer can search its memory for another set of instructions until a solution is found.

7. Modern computer chips can provide updated position, velocity, and time as often as 40 times per second, if desired.

8. The surveyor may record measurements made in the field and plot them there on a sketch board or in the office afterward, but if the country is open and hilly, or even mountainous, the plane table offers the best way of recording the data

**10. Перепишите и письменно переведите данные ниже предложения, учитывая особенности перевода зависимого и независимого причастного оборота:**

1. The experiments having been carried out, we started new investigation.

2. There are several different types of mixtures, some being homogeneous and others heterogeneous.

3. For systems requiring lower performance there is a choice: a choice of technology and a choice of design.

4. Other conditions being equal, iron heats up faster than aluminum.

5. When calculating the weight of a body, we have to multiply its specific gravity by its volume.

6. When translating some new text he used to write out all new words.

7. When using a controller on a modern military aircraft, it can perform automatic testing of aircraft equipment.

8. The box is then turned, with its lid being gradually raised.

9. When working in the laboratory, the engineer obtained very important data for his investigation.

10. Some mathematical problems being solved, we have to substitute the numbers for letters in formulas.

11. A great number of operations are available with Pascal, bit manipulation being one of them.

12. When being in motion, the motor rotates the disk.

**11. Перепишите и письменно переведите предложения, содержащие инфинитивные конструкции:**

1. To keep electrical performance and package sizes reasonable, the lead pitch decreased, and fine-pitch leaded devices were introduced.

2. Never pull the power lead to unplug the computer.

3. Continuous improvement involves constantly improving and modifying products and services to remain competitive and to keep a strong customer base.

4. The material is then said to be temper embrittled, and premature cracking may follow.

5. To help prevent electric shock, plug the AC adapter and peripheral power cables into properly grounded power sources; these cables are equipped with three-prong plugs to help ensure proper grounding.

6. To highlight results, a common approach is to construct a bar chart to represent the results graphically.

**12. Перепишите и письменно переведите предложения, содержащие конструкции с герундием:**

1. Secondary storage (permanent storage) devices are used for storing larger amounts of data, instructions, and information more permanently than allowed with main memory.

2. Overcoming resistance to change can be the hardest part of bringing information systems into a business.

3. Building programs and applications using object-oriented programming languages is like constructing a building using prefabricated modules or parts.

4. The Internet is the world's largest computer network, actually consisting of thousands of interconnected networks, all freely exchanging information.

5. Since the number of independent control inputs is less than the number of the output variables in the case of flexible-link arms, the control problem is characterized as having reduced control effectiveness.

6. Special heat treatments enable operation at higher temperatures, with successful operation at temperatures as high as 200°C (390°F) having been achieved in cases involving low loads.

**13. Перепишите следующие сложноподчиненные предложения, подчеркните в них придаточные и укажите, являются ли они дополнительными (Д) или определительными (О):**

1. We know the germanium use in those rectifiers is not completely pure.

2. We may expect a short circuit results in wire fault and cable fault.

3. The device involving diodes is limited in the variety of functions it can produce.

4. The computer, which can utilize both analog and digital data is called hybrid computer.

5. Perhaps, the most important uses of radar are those that give greater reliability to sea and air travel.

6. We know this type of cathode has greater emission efficiency.

7. These three factors we have spoken about are the tube characteristics.

8. Flow chart is a diagram, or picture, of a code that is often helpful for visualizing interrelationship between various parts of a code.

**14. Перепишите и переведите следующие сложносочиненные предложения:**

1. Companies now bring together representatives from each stage of the process and, in this way, they try to achieve more cross-functional communication and participation.

2. Do not peel off the covering on batteries and do not use if the covering has been peeled off.

3. Water and wind-operated engines do not need fuel in order to function, but they are dependent on the weather.

4. There are many types of product on the market, but ideally the one you want has at least a 12v motor, though 14v is better and 18v is fantastic.

5. As a result, universities are now giving more importance to the development of these skills, and companies are looking for ways to foster these attributes in training programs for their employees.

6. Automatic machine tools are not new, but they have increased in numbers and types at a great rate since the end of World War II.

7. There are different drill bits for different materials, and using the wrong one will quickly ruin whichever one is fitted into the drill at the time.

8. An expanding rule 'Measure twice, cut once' they say, but no one ever mentions that you need to measure with something accurate and robust.

**15. Перепишите следующие предложения, найдите и подчеркните конструкцию COMPLEX OBJECT или COMPLEX SUBJECT, письменно переведите предложения на русский язык:**

1. A force applied to a body causes it to move in a straight line.

2. Japanese designers believe a new ceramic engine to replace the conventional one.

3. Very high temperatures often cause certain materials to break.

4. They believed him to be capable.

5. Designers expect dirigibles to be used for exploration of new territories.

6. The phenomenon of superconductivity appears to have been discovered as early as 1911.

7. Intensive research on optical-electronic computer is said to be going on in a number of US companies.

8. Properties of materials obtained in space prove to be much better than those produced on Earth.

9. Before 1911 superconductivity was assumed to be impossible.

10. The first pocket-size colour television sets were reported to have been developed.

**ТЕКСТЫ**  
**ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ**  
**ДЛЯ СТУДЕНТОВ**  
**1 СЕМЕСТРА ОБУЧЕНИЯ**

**Text 1. Types of Electric Current**

The electric current was born in the year 1800 when A. Volta constructed the first source of continuous current. Since that time numerous scientists and inventors, Russian and foreign, have contributed to its development and practical application. According to<sup>1</sup> electronic theory it is the electron that sets up a flow of electric current. In other words an electric current is a flow of electrons in a circuit per second of time. The flow of electricity through a circuit is called the electric current and is measured in amperes. The instrument for measuring electric current is called an ammeter.

The electric current flows in circuits formed of metallic conductors. Sometimes the circuit includes, in addition to<sup>2</sup> metal conductors, electrolytes (as in batteries), gaseous conductors (as in fluorescent lamps), and streams of electrons and ions (as in electric tubes). In all these cases the passage of the current results in the production of heat and light, or both and in the case of electrolytes it causes chemical changes.

There are different types of current having great importance for our industry, but we shall discuss only some of them. An electric current, which always flows in the same direction through a conductor and does not change its polarity, is called a direct current (d.c. or D.C.). A direct current generally remains at constant voltage, that is, the voltage neither rises nor falls. A pulsating direct current is that kind of electric current that flows in the same direction through a circuit but varies in its voltage value.

An alternating current is an electric current, alternating or varying both in amount and direction, its abbreviation is A.C. The alternation may occur (take place) from a few per second up to several million per second. Two alternations make a cycle. The number of cycles in one second is called the frequency of an alternating current.

An oscillating current is similar to A.C. in shape but has a constant frequency and its amplitude is damped. Transient currents usually damp away extremely rapidly. One should mention unidirectional transient and A.C. transient types of electric current.

<sup>1</sup> according to – согласно, в соответствии с.

<sup>2</sup> in addition to – кроме.

## **Text 2. Sources of Electrical Energy**

To produce an electric current requires employing a chemical, as in the battery, or a mechanical, as in the electromagnetic generator, source of energy.

Energy is not created by an electric energy source, but is only converted into an electrical form from another one, such as mechanical, chemical, thermal or radiant energy. In waterpower plants, the energy of falling water is converted into electrical or into heat when coal is burnt. Chemical sources of current have limited application as great quantities of electric energy generated today come from various forms of mechanical energy.

For the first time mechanical energy was converted into electrical one by means of electrostatic machines. As industrial application of energy increases greater amount of energy is needed every year. The energy needs will continue to grow while the energy sources of the world are decreasing.

Coal oil and gas have been man's main sources of heat from ancient times and today they are our basic sources of energy. However, coal and other kinds of fuel are often replaced by atomic energy. Man has learned to split atoms with the help of a nuclear reactor in order to get great quantities of energy. For example, a ton of uranium can give us as much energy as about 3 million tons of coal.

The Earth contains inside it a practically inexhaustible supply of thermal energy, which can be used for economic needs.

Another unlimited source of energy is the Sun. But at present only a small part of solar energy is being used. Solar power station will permit to generate cheap electricity in large quantities in the near future.

An enormous energy of the wind, exceeding millions of kilowatt-hours, has not yet found effective application. Utilization of tidal energy has been studied in many countries. Using tidal forces and wind energy will certainly make considerable contribution to future electricity production.

## **Text 3. Properties of Electric Current and Electric Circuit**

The flow of electrons through a circuit is called electric current. The strength of the current depends on the rate at which electrons move in the conductor. But we cannot see the effect produced by the electric current apart from<sup>1</sup> the conductor through which it flows. If a magnet is suspended near a conductor carrying current, the magnet will deflect. Any piece of iron put near a conductor will become magnetized. A body

carrying electric current becomes magnetized. Thus, to deflect a magnet, to magnetize iron and to heat the body are properties of electric current.

The properties influencing the flow of electricity in the circuit are resistance, inductance and capacitance.

Resistance is a property of a circuit to oppose the flow of electricity through it. The resistance of a conductor to the flow of electric current depends on a number of factors. First of all<sup>2</sup> that is the material of the conductor. Different materials offer different resistance to the flow of current. Metals generally have resistance and are good conductors. Materials, which offer a very high resistance, are used as insulators. Resistance is also affected by the length of the conductor. The longer the conductor, the greater is the resistance. The unit of resistance is the Ohm.

Inductance shows the ability of an electric current to create a magnetic field. If the current is alternating, the magnetic field formed by this current produces in the circuit the current of self-induction, which flows in the direction opposite to that of the current in this electric circuit. Inductance depends on the properties of the core and the structure of the coil. The unit of inductance is the Henry.

Capacitance is the property of the electric circuit to store electricity. The device designed to store electric charges is called a condenser or a capacitor. The capacitance of that condenser depends on the area of the plates, the distance between the plates and the nature of dielectric insulating the plates. Capacitance is measured in Farads.

<sup>1</sup> apart from – вне

<sup>2</sup> first of all – прежде всего

#### **Text 4. Elements of Electric and Radio Circuits**

An electric circuit is a path along which electricity can flow. An electric circuit consists of a source of energy or power source, a receiver of energy and two conductors connecting the receiver and the power source terminals. The electric source produces the necessary electromotive force (e.m.f.) required for the flow of current through the circuit. The circuit should be complete; otherwise no electric current can flow through it.

Fundamentally, two types of circuits are possible, according to the way in which the circuit elements are joined. To understand the difference between the circuit connections is not difficult. When electrical devices are connected one after another so that the current flows successively through each element, we say they are connected in series. Under such conditions the current flow is the same in all parts of the circuit, as there

is only a single path along which it may flow. The electric bell circuit is a typical example of a series circuit.

The parallel circuit provides two or more paths for electric current. The parallel circuit elements are connected side by side<sup>1</sup> in such a way<sup>2</sup> that the total current flowing through the circuit is the sum of currents flowing through each circuit element individually. The lamps in your room are generally connected in parallel.

Any radio circuit is an electric circuit including radioelements. Radio differs from other means of communication in the means used to connect the transmitting and receiving points. The basic elements of any radio system are a transmitter used for generating radio frequency, a modulator used for impressing intelligence upon the carrier, and a transmitting antenna used for radiating the modulated carrier wave. At the receiving end there must be a receiving antenna, a receiver and a loudspeaker.

<sup>1</sup>side by side – рядом

<sup>2</sup>in such a way – таким образом

### **Text 5. From the History of Electricity**

Do you know that the first ever man-made electric light illuminated the laboratory of the St. Petersburg physicist Vasily Petrov in 1802? He had discovered the electric arc, a form of the gas discharge. But in Petrov's experiments the arc flame lasted for only a short time..

In 1876 Pavel Yablochkov invented an arc that burned like a candle for a long time and it was called "Yablochkov's candle". The source of light invented by Yablochkov won worldwide recognition. But while he and several other inventors were improving the arc light, some engineers were working along entirely different lines. They sought to develop an incandescent lamp<sup>1</sup>. It was a young Russian engineer, Alexander Lodygin, who made the first successful incandescent lamp. The famous American inventor Thomas Edison improved the lamp having used a carbon filament. But it was again Lodygin who made another important improvement in the incandescent lamp, having invented a lamp with a tungsten filament, the lamp we use today.

Automation, which is one of the main factors of technical progress today, is impossible without electricity.

Our life cannot be imagined without telephone, telegraph and radio communications. But it is also electricity that gives them life. In recent years electricity has made a great contribution to radio communication between the spaceships and also between the astronauts and the earth.

Little could be done in modern research laboratory without the aid of electricity. Nearly all of the measuring devices used in developing nuclear power for the use of mankind are electrically operated.

<sup>1</sup> incandescent lamp – лампочка накаливания

### **Text 6. Radar**

The word “radar” is an abbreviation for the phrase “radio detection and ranging”, that is, the use of radio waves to detect the presence and determine the precise position of any stationary or moving object capable of reflecting them. Radio waves can be reflected by large solid objects in much the same manner as light. They are, however, able to travel greater distances than light in the Earth’s atmosphere, because they are not reflected or diffused by small dust particles in the atmosphere. Radar works on the so-called “echo” principle. It sends out radio waves and then measures the amount of time that it takes the waves to return.

Radar set includes a transmitter and a receiver. If a transmitter sends out a beam of waves, an adjacent receiver operating like a television receiver translates the echoed radio waves into a kind of picture. These radio waves can penetrate clouds and sea depths. They continue to move out in a straight line from a transmitter until they strike something solid. Then they are reflected back. The reflected waves moving back to the radar set are received and translated into a tiny spot on the cathode-ray-tube screen or display. The display may resemble a map of the surroundings and the objects are as bright spots on a dark background.

The most important uses of radar are known to be in ship and air navigation. Radar set on board a ship can provide the captain with complete information about the objects around the ship. It will show the distances and positions of other ships, islands or land so that a safe course can be steered.

There are many types of radar intended for use on ships and planes. The electrical features of radar for use in airplanes are similar to those used on ships. Special types of radar provide air-traffic control, “blind landing” and ground-controlled approach.<sup>1</sup> Radar provides information for meteorology and astronomy, such as detecting meteors and studying cosmic environments.

<sup>1</sup>ground-controlled approach – наземное управление при заходе на посадку

**ТЕКСТЫ  
ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ  
ДЛЯ СТУДЕНТОВ  
2 СЕМЕСТРА ОБУЧЕНИЯ**

**Text 1. From the history of computers**

The introduction of agriculture revolutionized ancient man's social, economic, and cultural potential. This was the first great step in the evolution of civilization. The more recent Industrial Revolution, vastly increasing man's productive capabilities, was the next great step and brought forth our present highly mechanized economic and interdependent social civilization.

Nowadays we have another new kind of revolution, based on machines that greatly increase man's thinking capabilities of planning, analyzing, computing, and controlling. Hundreds of millions of computers are already in daily use penetrating almost all spheres of our modern society, from nuclear energy production and missile design to the processing of bank checks and medical diagnoses.

The development of mechanical calculating machines made the digital computers necessary. An ordinary arithmometer and a desk key calculator have given rise to electronic digital computers. Digital computers came into being in the first half of the 17<sup>th</sup> century. Many outstanding Russian and foreign mathematicians of that time created mechanical calculating devices.

The famous Russian scientist M. V. Lomonosov compiled a lot of calculating tables and several computing devices concerning different fields of science and engineering.

In 1874 the Russian engineer V. T. Odner invented a special counter wheel<sup>1</sup> named after him the Odner's wheel, which is used in modern arithmometers and calculators.

P. L. Chebyshev, academician, made a valuable contribution to the field of computing machines. He is known<sup>2</sup> to have many good ideas in mathematics, some of which have been named after him. For example, the Chebyshev's polynomials play a unique role in the field of orthogonal functions. In 1878 he constructed an original computing machine, which was exhibited in Paris. In 1882 P. L. Chebyshev invented an arithmometer performing automatically multiplication and division. The automation principle put into this computing machine is still widely used all over the world for developing modern computers.

In 1884 Russia began manufacturing computing machines. During World War I the output of computing machines was stopped but soon it continued.

At the end of the 1930s computing engineering began the new era. There appeared computers operating at high speed. The rapid advance of computers resulted from the success achieved by electronics. There appeared a possibility to solve complex mathematical problems within an unusually short time. Modern engineering enables to do the amount of calculations and researches within a very short period of time, which would have required years of laborious work of large groups of people before<sup>3</sup>.

The first electronic digital computer was developed in Russia under the supervision of S. A. Lebedev in 1950. Then, in 1953 BESM (High-Speed Electronic Computer) was designed by the Academy of Sciences. This machine could perform about 250 million operations. A human being could do this work during 300 years of continuous labour.

BESM was followed by a number of large-, medium-, and small-size general and special purpose computers<sup>4</sup>. It was the first generation of computers constructed on electronic tubes.

The second-generation computers were solid-state large-powered machines.

Computers made on integrated circuits containing hundreds of thousands of active electronic devices in tiny elements are of the third and fourth generations.

Computers of the fifth generation contain high-level user interfaces based on VLSI and SLSI<sup>5</sup>, optical fibers, videodisks, and artificial intelligence<sup>6</sup> approaches for interaction via natural languages, including speech input.

A major advance in the development of computer technologies was the creation of microprocessors and microcomputers. These tiny computer devices are able to control complex operations.

So we see that the significance of the electronic computers invention can be compared with the invention of the steam engine at the end of the 18<sup>th</sup> century and the utilization of atomic energy.

NOTES: <sup>1</sup> a special counter wheel – специальное счетное колесо

<sup>2</sup> He is known to.... – известно, что он .....

<sup>3</sup> which would require years of laborious work of large groups of people before – которые потребовали бы раньше годы трудоемкой работы большой группы людей

<sup>4</sup> general and special purpose computers – универсальные и специализированные компьютеры

<sup>5</sup> VLSI (Very Large-Scale Integration) – интеграция очень высокого уровня, SLSI (Super Large-Scale Integration) – интеграция сверх высокого уровня

<sup>6</sup> artificial intelligence – искусственный интеллект

## **Text 2. Computer as a concept**

In the developed world of the 20<sup>th</sup> century, man lives surrounded by a bewildering variety of machines on which his way of life and even life itself depends. These machines can be simple or complex, minute or enormous. Some, like a sewing machine, are for specific applications while other, like electric drill, can be used for a variety of purposes. Some machines, though designed for a specific purpose, are components in many different machines; for instance, the electric motor gives the electric drill its flexibility. This is because the purpose of the motor – to provide power – is fundamental in many applications.

Another fundamental aspect of twentieth-century life is the vast amount and variety of information that surrounds man from media such as the telephone and radio. This has transformed everyday life as much as engines and motors. There are many machines developed to handle the information, for example television cameras to record pictures, transmitters to send these pictures to television receivers in people's homes.

The ease of using machines also varies and is not always related to their complexity. For example, some, like refrigerators, can work untended, and little skill or training is required to use a television set or a tin-opener; whereas considerable aptitude, instruction and practice is needed to fly an airplane or use a potter's wheel. The amount of skill and training required might depend on the circumstances of use – driving a motorcar on a country road is a skill relatively easily acquired compared to driving a racing car on a grand prix circuit. Knowledge of the principles behind the operation of a machine may be useful. It is possible to drive a car without knowing anything about what happens under the bonnet, although one can probably drive better for knowing something about mechanics.

Computers are machines, which handle information, and they are based on relatively simple principles. Knowledge of these principles helps one to understand computers and make better use of them.

Computers which deal with numerical information can be divided into three classes: (1) digital, in which the representation of numbers and the calculations on them are performed by counting processes (e.g. by counting teeth on gear wheels or counting electrical impulses); (2) analogue, in which the representation of numbers and the calculations on them are performed by measuring processes (e.g. in electronic

computers by measuring voltages); and (3) hybrid, in which both kinds of process are used. Nowadays the word computer, unless qualified, normally means ‘electronic digital computer’; ‘electronic’ because in most computers electronic processes have replaced all others because of their speed, reliability and cheapness, “digital” because the exactness of digital processes implies a greater potential for accuracy.

### **Text 3. The Internet**

The Internet, a global computer network that embraces millions of users all over the world, began in the US in 1969 as a military experiment. It was designed to survive a nuclear war. Information sent over the Internet takes the shortest path available from one computer to another. Because of this, any two computers on the Internet will be able to stay in touch with each other as long as there is a single route between them.

Most of the Internet host computers (more than 50 %) are in the US, while the rest are located in more than 100 other countries. Although the number of host computers can be counted fairly accurately, nobody knows exactly how many people use the Internet, there are millions, and their number is growing.

The most popular Internet service is e-mail. Most of the people, who have access to the Internet, use the network only for sending and receiving e-mail messages. However, other popular services are available on the Internet: reading USENET News, using the World-Wide Web, telnet, FTP, and Gopher.

In many developing countries the Internet may provide businessmen with a reliable alternative to the expensive and unreliable telecommunication systems of these countries. Commercial users can communicate over the Internet with the rest of the world and can do it very cheaply. When they send e-mail messages, they only have to pay the phone calls to their local service providers, not for calls across their countries or around the world. But who actually pays for sending e-mail messages over the Internet long distances, around the world? The answer is very simple: a user pays his/her service provider a monthly or hourly fee. Part of this fee goes towards its cost to connect to a larger service provider. And part of the fee got by the larger provider goes to cover its cost of running worldwide network of wires and wireless stations.

But saving money is only the first step. If people see that they can make money from the Internet, commercial use of this network will drastically increase. For example, some western architecture companies and garment centers already transmit their basic designs and concepts over the Internet into China, where they are reworked and refined by skilled – but inexpensive – Chinese computer-aided-design specialists.

However, some problems remain. The most important is security. When you send an e-mail message to somebody, this message can travel through many different networks and computers. The data is constantly being directed towards its destination by special computers called routers. Because of this, it is possible to get into any of computers along the route, intercept and even change the data being sent over the Internet. In spite of the fact that there are many strong encoding programs available, nearly all the information being sent over the Internet is transmitted without any form of encoding, i.e. “in the clear”. But when it becomes necessary to send important information over the network, these encoding programs may be useful. Some American banks and companies even conduct transactions over the Internet. However, there are still both commercial and technical problems, which will take time to be resolved.

#### **Text 4. A bold plunge into the digital youth market**

Samsung Electronics is keen to make a big splash in the Information Technology (IT) world. It has a number of new digital consumer products and has plans for more. Many of them – incorporating multimedia, Internet and e-mail functions in small portable devices – are aimed at the young, whom the company regards as its market of the new future in the compressed timescale of the Internet age.

Samsung talks enthusiastically about generation Y (the 13 to 25 year-olds) and generation N (Internet consumers). Today’s children, teenagers and students are the customers of the future, says Mt. Chin, chief technology officer and executive vice-president of Samsung Electronics. “When they grow up, they will really use our products. So we are actually searching for the needs, habits and tastes of this younger generation”.

Mr. Chin sees the time when the PC will play a smaller role. “There will be an embedded computer somewhere. Internet connectivity can be achieved with many other products – mobile phones, PDAs (personal digital assistants), digital TVs. Even a microwave oven can be connected to the Internet”.

Among the latest and planned offerings, mostly using Samsung’s digital Smart Media card, area portable digital audio player using MP3 compression technology, as well as one for downloading music and videos; a digital photo album; a web pad for easy Internet and e-mail access; a web video phone, an e-diary with wireless access to the Internet; and the world’s first watch phone. The new products represent, as Mr. Chin says, “a basic shift in strategy, demonstrating our deep conviction that digital connectivity is the future of our industry”.

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