МИНИСТЕРСТВО ОБРАЗОВАНИЯ, НАУКИ И МОЛОДЕЖНОЙ ПОЛИТИКИ КРАСНОДАРСКОГО КРАЯ

ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ПРОФЕССИОНАЛЬНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ КРАСНОДАРСКОГО КРАЯ

«НОВОРОССИЙСКИЙ КОЛЛЕДЖ РАДИОЭЛЕКТРОННОГО ПРИБОРОСТРОЕНИЯ» ИМЕНИ ГЕНЕРАЛ-МАЙОРА СУХОВЕЦКОГО А. А.

# Комплект оценочных средств

## для проведения аттестации в форме зачета/дифференцированного зачета

## по учебной дисциплине ОГСЭ.04 Иностранный язык (английский)

в рамках программы подготовки специалистов среднего звена (ППССЗ)

по специальности СПО

11.02.02 Техническое обслуживание и ремонт радиоэлектронной техники

(по отраслям)

2-5 курс

2023

СОГЛАСОВАНО

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01 07 2023 г.

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УМО филологических дисциплин

Протокол от 02.07.23 г. № 11

Председатель УМО

_____ Е. Н. Ткалина

Комплект оценочных средств для проведения текущего, рубежного контроля и промежуточной аттестации по учебной дисциплине ОГСЭ.04 Иностранный язык (английский) разработан на основе федерального государственного образовательного стандарта среднего профессионального образования по специальности 11.02.02 Техническое обслуживание и ремонт радиоэлектронной техники (утв. приказом Минобрнауки РФ от 15 мая 2014 г. № 541, зарегистрирован в Минюст Российской Федерации от 26 июня 2014 г. № 32870), рабочей программы дисциплины ОГСЭ.04 Иностранный язык (английский) (утв. директором колледжа), Положения по организации текущего контроля успеваемости и промежуточной аттестации обучающихся ГБПОУ КК НКРП (утв. директором колледжа), Положения по формированию КОС по дисциплине (утв. директором колледжа).

**Организация-разработчик:** ГБПОУ КК «Новороссийский колледж радиоэлектронного приборостроения» (далее ГБПОУ КК НКРП)

**Разработчик:**

преподаватель ГБПОУ КК НКРП (должность, место работы) _____ (подпись) М.А. Марарь

**Рецензенты:**

Парфенова Е.В., (Ф.И.О) — преподаватель ГАПОУ КК НКСЭ (должность, место работы); филолог, преподаватель по предмету «Иностранный язык» (английский) (квалификация по диплому)

Ткалина Е.Н. (Ф.И.О) — преподаватель высшей квалификационной категории ГБПОУ КК НКРП; Лингвист, преподаватель английского языка (ФИО, должность, место работы)

# Рецензия

На комплект оценочных средств общеобразовательной учебной дисциплины ОГСЭ.04 иностранный язык (английский) по специальности 11.02.02 Техническое обслуживание и ремонт радиоэлектронной техники (по отраслям)

Комплект оценочных средств разработан преподавателем иностранного языка высшей квалификационной категории ГБПОУ КК НКРП М.А. Марарь.

КОС учебной дисциплины ОГСЭ.04 иностранный язык (английский) разработан на основе рабочей программы учебной дисциплины специальности 11.02.02 Техническое обслуживание и ремонт радиоэлектронной техники (по отраслям) в соответствии с требованиями Федерального государственного образовательного стандарта СПО.

Предназначен для подготовки оценочных материалов, обеспечивающих проведение рубежного контроля в форме контрольных работ и промежуточной аттестации в форме зачета и дифференцированного зачета по общеобразовательной учебной дисциплине.

КОС состоит из следующих разделов:

- раздел «Паспорт комплекта оценочных средств», характеризующий область применения и нормативные основания разработки КОС; сводные сведения об объектах оценивания, показателях и критериях оценивания, типах заданий; формах аттестаций;

- раздел «Комплект оценочных средств», структура которого позволяет разрабатывать и комплектовать разные типы заданий для обучающихся. Данный раздел включает в себя разработанные комплексные задания (в том числе текстовые) для проведения текущего контроля, рубежного контроля в форме контрольной работы и промежуточной аттестации в форме зачета и дифференцированного зачета;

- раздел «Условия выполнения заданий» включает в себя место выполнения, время выполнения, оборудование, основные и дополнительные источники учебной литературы, критерии оценивания знаний и умений обучающихся.

Структура материала построена логично, последовательно, технически грамотно и позволяет проверить знания и умения по данной дисциплине.

Большое внимание уделено контролю лексических навыков, навыков чтения и перевода текстов технической направленности с элементами анализа, а также грамматических навыков.

Большим достоинством комплекта является многоуровневость, что позволяет использовать материал в группах разного уровня подготовки. При этом прослеживается преемственность уровней с точки зрения формируемых компетенций. КОС содержит в себе развивающий компонент.

КОС общеобразовательной учебной дисциплины ОГСЭ.04 Иностранный язык (английский) соответствует рабочей программе для специальностей технического профиля и может быть использована в образовательном процессе в ГБПОУ КК «Новороссийский колледж радиоэлектронного приборостроения».

**Рецензент:** 

Е. В. Парфенова
(Ф.И.О. рецензента)
преподаватель ГАПОУ КК НКСЭ
(должность, место работы)
филолог, преподаватель по предмету «Иностранный язык» (английский)
(квалификация по диплому)
30 июня 2023 г.

**РЕЦЕНЗИЯ**

на комплект оценочных средств учебной дисциплины ОГСЭ.04 Иностранный язык (английский)

Направление подготовки (специальность) 11.02.02 Техническое обслуживание и ремонт радиоэлектронной техники (по отраслям)

Комплект оценочных средств подготовлен преподавателем иностранного языка высшей квалификационной категории М.А. Мараръ.

КОС учебной дисциплины «Иностранный язык» (английский) разработан на основе рабочей программы учебной дисциплины общеобразовательного цикла ППССЗ.

Предназначен для подготовки оценочных материалов, обеспечивающих проведение рубежного контроля и промежуточной аттестации в форме зачёта и дифференцированного зачёта по учебной дисциплине.

КОС состоит из следующих разделов:

- раздел «Паспорт комплекта оценочных средств», характеризующий область применения и нормативные основания разработки КОС; сводные сведения об объектах оценивания, показателях и критериях оценивания, типах заданий; формах аттестации;

- раздел «Комплект оценочных средств», структура которого позволяет разрабатывать и комплектовать разные типы заданий для обучающихся.

В паспорте указаны знания и умения в соответствии с рабочей программой учебной дисциплины, показатели и критерии оценки знаний студентов по каждому объекту оценивания, а также формы и методы контроля.

Комплект оценочных средств включает в себя разработанные комплексные задания, задания для внеаудиторных самостоятельных работ, тестовые задания для проведения дифференцированного зачета по каждому объекту оценивания.

Задания разработаны конкретно, последовательно, технически грамотно и позволяют проверить знания и умения по данной дисциплине.

Таким образом, КОС учебной дисциплины «Иностранный язык (английский)» обеспечивает проведение текущего и промежуточного контроля знаний студентов и может быть использован в образовательном процессе в ГБПОУ КК «Новороссийский колледж радиоэлектронного приборостроения».

**Рецензент:**

Е.Н. Ткалина
(Ф.И.О. рецензента)
Преподаватель высшей квалификационной категории,
ГБПОУ КК НКРП
(должность, место работы)
Лингвист, преподаватель английского языка
(квалификация по диплому)
30 июня 2023 г.

1 Паспорт комплекта оценочных средств

1.1 Область применения комплекта оценочных средств

Комплект оценочных средств (КОС) предназначен для оценки результатов освоения дисциплины **ОГСЭ. 04 Иностранный язык (английский).**

КОС включает материалы для проведения рубежного контроля и промежуточной аттестации в форме в форме зачёта/дифференцированного зачёта.

| **Результаты освоения**[1] (объекты оценивания) | **Основные показатели оценки результата и их критерии**[2] | **Тип задания; № задания**[3] | **Форма аттестации (в соответствии с учебным планом)** |
|---|---|---|---|
| **Умение** переводить (со словарём) иностранные тексты профессиональной направленности | **Использование** общих и терминологических словарей; **понимание** читаемого текста | Устный/письменный опрос<br><br>Контрольная работа | Зачёт<br>Диф.зачёт |
| **Умение** самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас | **Использование** языковой догадки в случае затруднения понимания смысла читаемого;<br>применение полученной при прочтении текста информации для выполнения различного рода заданий | Выполнение индивидуальных заданий<br><br>Фронтальный/ индивидуальный опрос<br>Тестирование | Зачёт<br>Диф.зачёт |
| **Умение** общаться (устно и письменно) на иностранном языке на профессиональные и повседневные темы | **Понимание, извлечение** нужной информации из прослушанного **и воспроизведение** услышанного с опорой на ключевые слова учебного материала (речи преподавателя, носителя языка в аудиозаписи) согласно тематике рабочей программы;<br>**владение** монологической и диалогической речью;<br>**соблюдение** языковых и речевых норм при коммуникации | Устный опрос<br><br>Практические задания | Зачёт<br>Диф.зачёт |
| **Знание** лексического (1200-1400 лексических | **Узнавание** ЛЕ и их **применение** в текстах профессиональной | Индивидуальный опрос | Зачёт<br>Диф.зачёт |

[1] Указываются коды и наименования результатов обучения в соответствии с программой дисциплины (знания, умения) или профессионального модуля (общие, профессиональные компетенции, умения, знания, практический опыт). Подробнее см. разъяснения по разработке КОС

[2] Критерии указываются, если необходимы для того чтобы впоследствии эксперты могли дать ответ в экспертном листе, используя дуальную систему: «выполнил – не выполнил»; «да-нет» и т.п. Чаще всего помимо показателей требуются критерии при разработке оценочных средств по программам СПО.

[3] № задания указывается, если предусмотрен.

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| единиц) и грамматический минимум необходимый для чтения и перевода (со словарём) иностранных текстов профессиональной направленности | направленности.<br>**Перевод и воспроизведение** ЛЕ в устной и письменной речи.<br>**Нахождение** и **определение** терминов согласно теме урока (**обоснование** их употребления в определенном контексте) | Самостоятельная работа<br><br>Лексический диктант | |
| **Знание** грамматического материала, необходимого для чтения и перевода (со словарём), а также грамматических явлений в текстах профессиональной направленности | **Узнавание** и **нахождение** в текстах профессиональной направленности примеров использования определенных грамматических структур и явлений.<br>**Представление** своих примеров **использования** определенного грамматического материала с **применением** грамматических правил по теме урока<br>**Анализ и объяснение** выявленных грамматических структур, устойчивых грамматических выражений | Фронтальный опрос<br><br>Индивидуальный опрос<br><br>Тестирование<br><br>Контрольная работа | Зачёт<br>Диф.зачёт |

## Оценивание результатов освоения умений по показателям контроля:

| **Результаты освоения** (объекты оценивания) | **Основные показатели оценки результата и их критерии** | **Форма аттестации** | |
|---|---|---|---|
| | | Текущий контроль | Рубежный контроль |
| У.1. Переводить (со словарем) иностранные тексты профессиональной направленности | - грамотное чтение аутентичных текстов разных стилей (публицистические, художественные, научно-популярные и технические), с использованием основных видов чтения в зависимости от коммуникативной задачи;<br>- адекватная передача содержания переводимого текста в соответствии с нормами русского литературного языка;<br>- нахождение слова в иностранно-русском словаре, выбирая нужное значение слова;<br>- осуществление языковой и контекстуальной догадки. | Практические задания<br><br>Фронтальный опрос<br><br>Индивидуальный опрос | Контрольная работа |
| У.2. Самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас | - работа с терминами по специальности;<br>- перевод даташитов; работа с физическими терминами;<br>- выполнение перевода даташитов;<br>- работа со схемами и таблицами даташитов;<br>- изучение материала по теме, работа с текстом;<br>- выполнение перевода; ответы на вопросы по теме;<br>- конспектирование темы для заполнения таблицы;<br>- составление конспекта по теме;<br>- выполнение заданий по тексту;<br>- работа с техническим текстом;<br>- заполнение схемы;<br>- составление конспекта;<br>- заполнение таблицы измерений, описание работы на англ.яз.<br>- составление опорного конспекта по теме, обратный перевод технического текста;<br>- письменный перевод и запись конспекта по теме;<br>- работа с текстами по тематике раздела;<br>- выполнение технического перевода таблиц и схем. | Практические задания<br><br>Фронтальный опрос<br><br>Индивидуальный (устный/письменный) опрос | Контрольная работа |
| У.3. Общаться (устно и письменно) на | - свободное ведение диалога в ситуациях официального и | Устные/письменные задания | Контрольная работа |

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| иностранном языке на профессиональные и повседневные темы | неофициального общения в бытовой, социокультурной и учебно-трудовой сферах, с использованием аргументации, эмоционально-оценочных средств;<br>- практикум устной и письменной речи;<br>- чтение и перевод текстов; краткое монологическое высказывание о диодах;<br>- подготовка сообщений по теме;<br>- работа с текстом технической направленности;<br>- чтение и перевод научных статей по теме, научной статьи о радиоволнах;<br>- чтение и перевод по теме;<br>- краткий пересказ по конспекту. | Фронтальный/ индивидуальный опрос<br><br>Практические задания | |
| 3.1. Лексический материал (1200 - 1400 лексических единиц) | - знание новых лексических единиц, связанных с темой определенного урока и с определенными ситуациями общения;<br>-владение профессиональной информацией, расширенной за счет новой тематики и проблематики речевого общения;<br>- перевод текстов, построенных на языковом материале повседневного и профессионального общения, в том числе инструкции и нормативные документы | Практические задания Лексический диктант<br><br>Фронтальный опрос<br><br>Индивидуальный (устный/письменный) опрос | Контрольная работа |
| 3.2. Грамматический минимум, необходимый для чтения и перевода (со словарем) иностранных текстов профессиональной направленности | - использование новых значений изученных глагольных форм (видовременных, неличных), средства и способы выражения модальности, условия, предположения, причины, следствия, побуждения к действию;<br>- систематизация, объяснение примеров грамматических правил и явлений;<br>- применение в речи грамматических конструкций и структур. | Практические задания<br><br>Фронтальный опрос<br><br>Индивидуальный (устный/письменный) опрос | Контрольная работа |

2 Комплект оценочных средств для проведения рубежного контроля

***3 семестр***

2.1 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности» по теме «Элементы и узлы радиоэлектронной аппаратуры»; «Умение общаться (устно и письменно) на иностранном языке на профессиональные и повседневные темы» по теме «Резисторы»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Причастие II»

Контрольная работа № 1

*Время выполнения:* 50 мин

*Условия выполнения:* англо-русские, русско-английские словари/электронные переводчики (Google, Yandex); справочники, таблицы, схемы, раздаточный материал (тематический модуль)

**Variant 1**

**1. *Give the next words' equivalents:***

1. adjustable resistor
2. capacitance
3. to consist of
4. cross-sectional area
5. to depend on
6. to divide
7. electromotive force
8. to equal
9. essentially
10. to establish
11. fixed resistor
12. insulator
13. inductance
14. law
15. length

**2. *Choose the right variant:***

1. Current passes through . . . with great difficulty.

a) conductors; b) insulators; c) metals.

2. Fixed resistors have a . . . value.

a) varied; b) constant; c) changeable.

3. The value of a . . . is varied.

a) variable resistor; b) fixed resistor; c) very stable resistor (высокостабильное сопротивление)

4. Current equals . . . divided by resistance.

a) resistivity; b) inductance; c) voltage.

5. A . . . which is a good insulator at low temperature may be a good conductor at high temperatures. a) property; b) substance; c) source.

6. An ohmmeter is used to . . . the value of resistance in a circuit.

a) divide; b) measure; c) transmit.

7. An engineer must know physical and mechanical . . . of materials.

a) components; b) achievements; c) properties.

8. Mendeleyev discovered the periodic. . . .

a) application; b) unit; c) law.

**3. *Fill in the gaps with the words:***

Devices which have ___1____ to condense the charge are called condensers or capacitors. The simplest condenser consists of two ____2____ separated by an insulator. Its capacitance ___3___ its shape, size and material. Every condenser does not consist merely of two plates, there may be very many, but they _____4_____ in such a way that one group is separated from the other by ___5___. In practice the most common types of dielectrics are: air, mica, paper, plastics, etc. Two common types of condensers are in use nowadays: a fixed condenser and a variable one. There are three ___6___ which can be varied: the plate area, ___7___ between the plates and the dielectric.

the distance; depends on; are connected together; the ability; plates; the dielectric; quantities

**4. *Make the right sentence from the given words and translate the sentence marked **

*****1) electricity, makes it possible, to store, <u>*Capacitance*</u>, is the property, of which, a circuit, a charge of.

2) <u>*The main parts of*</u>, plates and insulators, are metal, a capacitor.

3) is measured, of a condenser, <u>*The capacitance*</u>, in farads.

## Variant 2

**1. *Give the next words' equivalents:***

| | |
|---|---|
| 1. to measure | 8. substance |
| 2. to oppose | 9. unit |
| 3. to perform an experiment | 10. value |
| 4. resistivity | 11. variable resistor |
| 5. semiconductor | 12. to vary |
| 6. series | 13. voltage |
| 7. source | 14. to weaken |

**2.** ***Choose the right variant:***

1. The unit of measurement of . . . is the Ohm.

a) capacitance; b) resistance; c) conductor.

2. The . . . of capacitance is called the farad.

a) device; b) pole; c) unit.

3. The main parts of a . . . are metal plates and insulators.

a) resistor; b) amplifier; c) capacitor.

4. The . . . of a variable capacitor move. a) insulators; b) plates; c) units. 5. Both electromotive force and . . . are measured in volts.

a) resistance; b) potential difference; b) capacitance.

6. The plates of a . . . cannot be moved.

a) variable capacitor; b) fixed capacitor; c) insulator.

7. Capacitance is the . . . of a circuit that opposes any change of voltage in a circuit.

a) property; b) application; c) source.

8. A fixed capacitor has . . . produced of paper, mica and other materials.

a) insulators; b) plates; c) oscillators.

**3.** ***Fill in the gaps with the words:***

Resistance equals ___1___ divided by current. The unit of __2__ is the Ohm. An ohmmeter is used to measure the value of resistance in ___3___. Different materials have different resistances. All substances may ___4____ three groups according to their resistivities: conductors, ___5__ and dielectrics or insulators. A good conductor is a material of low resistivity. An insulator is a material of very high resistivity. The resistance of a conductor depends on a) the length, b) ___6____, c) the material of the conductor and its temperature. A resistor is a device employed to limit the value of current. Resistors may be fixed or variable. Fixed resistors have a constant value. The value of variable or adjustable resistors may be varied. ____7____ is another type of a variable resistor.

_____

the crosssectional area; voltage; a circuit; semiconductors; be divided into; a rheostat; resistance

**4.** ***Make the right sentence from the given words and translate the sentence marked *:***

*****1) *Certain materials*, mainly metals, because, flows, easily, are conductors, an electric current, through them.

2) *The best conductors*, metallic conductors, silver and copper, are metals and carbon, are the best of.

3) voltage source, a wire conductor, *The main function of*, to a load resistance, is to connect.

Критерии оценивания контрольной работы 1:

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***5 семестр***

2.2 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас», «Умение общаться (устно и письменно) на иностранном языке на профессиональные и повседневные темы» по теме «Устройство антеннофидерных блоков» и «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive»

Контрольная работа № 2

*Время выполнения:* 50 мин

*Условия выполнения:* англо-русские, русско-английские словари/электронные переводчики (Google, Yandex); справочники, таблицы, схемы, раздаточный материал (тематический модуль)

**Variant 1**

***1. Translate the following words into Russian. Translate in writing:***

| |
|---|
| 1. *to convert* |
| 2. *converter tube* |
| 3. *wave range* |
| 4. *carrier wave* |
| 5. *insulating tape* |
| 6. *winding* |
| 7. *wire winding* |
| 8. *fidelity* |
| 9. *sensitivity* |
| 10. *tuned aerial* |
| 11. *rejector* |
| 12. *sensitivity control* |

| |
|---|
| 13. *fixed and variable capacitors* |
| 14. *induced drag* |
| 15. *induction* |

## *2. Translate the following passages into Russian. Translate in writing:*

| **1** |
|---|
| The aerial must be insulated from the ground and may occupy vertical or horizontal position. In case the transmitter aerial occupies vertical position, the receiver aerial must be also vertical and vice versa. It applies to all radio frequencies except short waves. In usual amplitude-modulated broadcasting the receiver aerial may consist of a wire wound on a core. |

| **2** |
|---|
| Most modern radio receivers are of superheterodyne type. In them an oscillator generates a radio-frequency wave that is mixed with the incoming signal. As a result, a radio-frequency wave of lower frequency (called intermediate frequency) is being produced. In order to tune the receiver to different frequencies, the frequency of oscillations changes but the intermediate frequency always remains the same. |

| **3** |
|---|
| Radio waves reach the aerial of a receiver and induce in it oscillations ofthe same frequency as those in the aerial of the transmitter. The oscillations produced in the aerial are weak since it receives only a small part of energy radiated by the transmitter. But the oscillations are amplified in case an oscillatory circuit is connected to the aerial circuit. Its coil and capacitor should be selected so that the circuit is tuned to the transmitter. Oscillations will be amplified in the receiving oscillator circuit because of the resonance. The receiving circuit is tuned to the frequency of the transmitter by means of a variable capacitor. |

## *3. Fill in the missing words. Follow the models. Translate the following words into Russian:*

***Model:*** *to extend – extension – extender*
*удлинять - удлинение- удлинитель*

| | | |
|---|---|---|
| **to select** | | |
| | | **rejector** |
| | **protection** | |
| **to indicate** | | |
| | | **inspector** |

## *4. Complete the following table:*

| ***Nouns*** | ***Verbs*** | ***Adjectives*** |
|---|---|---|
| | | |

As for amplifiers, they increase the intensity of oscillations produced by the oscillator and retain the definite frequency. The transducer converts the information to be transmitted into a varying electrical voltage. In case of sound transmission a microphone serves as a transducer. And in case of picture transmission a photoelectric device serves as the transducer.

## Variant 2

## *1. Translate the following combinations:*

| |
|---|
| **1.** frequency mixer |
| **2.** pentagrid converter |
| **3.** self-oscillating mixer |

| |
|---|
| **4.** rectifier stage |
| **5.** integrated gate-commutated thyristor |
| **6.** local oscillator |
| **7.** amplification |
| **8.** frequency converter |
| **9.** radio frequency signals |
| **10.** analog multiplier |

## *2. Translate the passage below in writing:*

A **frequency changer** is an electronic or electromechanical device that converts alternating current (AC) of one frequency to alternating current of another frequency. The device may also change the voltage, but if it does, that is incidental to its principal purpose, since voltage conversion of alternating current is much easier to achieve than frequency conversion.

Traditionally, these devices were electromechanical machines called a motor-generator set. Also devices with mercury arc rectifiers or vacuum tubes were in use. With the advent of solid state electronics, it has become possible to build completely electronic frequency changers. These devices usually consist of a rectifier stage (producing direct current) which is then inverted to produce AC of the desired frequency. The inverter may use thyristors, IGCTs or IGBTs. If voltage conversion is desired, a transformer will usually be included in either the ac input or output circuitry and this transformer may also provide galvanic isolation between the input and output ac circuits. A battery may also be added to the DC circuitry to improve the converter's ride-through of brief outages in the input power.

## *3. Give full forms of the following abbreviations:*

| **receiver (radio)/frequency changer** |
|---|
| **1.** IGCTs |
| **2.** FET |
| **3.** IGBTs |
| **4.** NASA |
| **5.** ampl |

## *4. Match up the terms in the box with the definitions given below:*

| |
|---|
| **A.** demodulation |
| **B.** isolation |
| **C.** fidelity |
| **D.** capability |
| **E.** amplifier |

**1)** An electronic device that strengthens the electric signal used to carry sound.
**2)** The ability or power to do something.
**3)** The fact that something is separate and not connected to other things.
**4)** An electronic circuit used to recover the information content from the modulated carrier wave.
**5)**The degree to which the detail and quality of an original, such as a picture, sound, or story, is copied exactly.

Критерии оценивания контрольной работы 2:

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***7 семестр***

2.3 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности» по теме «Методы настройки и регулировки электрических схем радиотелевизионной аппаратуры»; «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Транзисторные и диодные преобразователи частоты»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; пассивный залог»

Контрольная работа № 3

*Время выполнения:* 50 мин

*Условия выполнения:* англо-русские, русско-английские словари/электронные переводчики (Google, Yandex); справочники, таблицы, схемы, раздаточный материал (тематический модуль)

**Variant 1**

**1. *Translate the following combinations:***

| | |
|---|---|
| **1.** | frequency changer |
| **2.** | mercury arc rectifiers |
| **3.** | solid state electronics |
| **4.** | galvanic isolation |
| **5.** | power-handling capability |

***2. Translate the passage below in writing:***

**Alternate uses**

**Frequency converter** may also refer to a much-lower-powered circuit that converts radio frequency signals at one frequency to another frequency, especially in a Superheterodyne receiver. See Frequency mixer. The circuit usually consists of a local oscillator and frequency mixer (analog multiplier) that generates sum and difference frequencies from the input and local oscillator, of which one (the Intermediate frequency) will be required for further amplification, while the others are filtered out. The same result was achieved historically by the pentagrid converter or a Triode and Hexode in a single tube, but can be implemented in transistor radios economically by a single transistor functioning

| |
|---|
| as a self-oscillating mixer. |

### *3. Give full forms of the following abbreviations:*

| **receiver (radio)/frequency changer** |
|---|
| **1.** RF |
| **2.** RRS |
| **3.** DFIGs |
| **4.** CRT |
| **5.** IGCTs |

## Variant 2

### *1. Translate the following combinations:*

| |
|---|
| **1.** utility frequency |
| **2.** variable-frequency drive |
| **3.** renewable energy systems |
| **4.** doubly fed induction generators |
| **5.** superheterodyne receiver |

### *2. Match up the terms in the box with the definitions given below:*

| |
|---|
| **A.** inverter |
| **B.** oscillation |
| **C.** frequency |
| **D.** thyristor |
| **E.** rectifier |

**1)**A device, usually a semiconductor, that is used as a switch to control the amount of electricity passing through a particular point**.**
**2)**An electronic device or part of a circuit that changes direct current to alternating current.
**3)** An electronic device for changing AC to DC.
**4)**A regular change in strength or direction in a wave or electric current.
**5)**The number of times that a wave, especially a light, sound, or radio wave, is produced within a particular period, especially one second.

### *3. Put the words in the right order to make sentences:*

| |
|---|
| 1) sound/of radiotelegraphy/ is / broadcasting/the function/. |
| 2) by radio/modulation/ is the method/ of transmitting/ amplitude/ information/ waves. |
| 3) located/ in the radio/ these parts/ service/ are usually/ centre. |
| 4) of telegraph/in the system/ FM systems/ be controlled/ transmitters/ by a number/ may also/channels/ in AM or. |
| 5) amplitude-modulate/ waves in the other/ frequency/ is carried/ voice/ by radio. |

Критерии оценивания контрольной работы 3:

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***9 семестр***

2.4 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Диагностика обнаружения отказов и дефектов различных эффектов радиоэлектронной техники. Поиск неисправностей»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; простые и сложные предложения»

Контрольная работа №4

*Время выполнения:* 50 мин

*Условия выполнения:* англо-русские, русско-английские словари/электронные переводчики (Google, Yandex); справочники, таблицы, схемы, раздаточный материал (тематический модуль)

**VARIANT 1**

**1. *Translate the terms. What are their meanings?***

*REQUIRED TEST EQUIPMENT FOR RADIOS AND CASSETTE PLAYERS*

1. DMM
2. Volt-ohm-milliammeter (VOM)
3. Semiconductor tester
4. ESR meter
5. Signal tracer
6. Signal generator
7. Frequency counter
8. Test cassettes (1, 3, 10 kHz)
9. Soldering station
10. Isolation transformer
11. Dc power supply

**2. *Translate the text in the writing way. List all faultiness mentioned in the text and sequence in its troubleshooting***

**Isolation**

Look the chassis over for burned, damaged, or cracked components within the section that possibly can be the cause of the symptom. Inspect critical traces or printed circuit (PC) wiring on the bottom side of the chassis for overheated terminals and badly soldered spots. Usually a large blob of solder can cover up a poorly soldered terminal from a resistor or capacitor. Overheated parts can be isolated by touch. Touching the

chassis and parts can indicate the intermittent component. After isolating the potentially defective section, isolate the defective part with transistor, IC, resistance, scope, and continuity tests. Test the transistors in or out of the circuit with a transistor-diode test using a DMM or a beta transistor tester. Check all suspected ICs with signal in and out, voltage, and resistance measurements. Before you can pinpoint the defective part, you must locate it on the chassis without a schematic.

**3.** ***Insert the missed words in the text:***

Look over the CD chassis and try to locate the various_____. Go directly to the largest electrolytic capacitor when _____ is heard in the speakers with the volume turned down. Often the main filter_____ is from 2200 to 4300 F capacity and is the largest part on the chassis. _____ the lens assembly when the CD player starts skipping. Start at the _____ -to-analog (D/A) IC output when one channel of audio is _____ or intermittent. Take _____ voltage measurements on the suspected transistor or IC _____.

component; capacitor; CD parts; excessive hum; clean up; digital; weak; critical

**4.** ***Make up the sentences from the given word combinations. The sentence marked * should be translated:***

*****1) Speed problems, occur, at one time or another, within the cassette player, all radio-cassette players in virtually.

2) A stretched rubber drive belt, improper speed, or oil on the belt, can cause.

3) Worn rubber tires, slow or erratic speed, can cause, on the idler wheel.

4) A dry or worn, improper speed, spindle flywheel, can cause.

## VARIANT 2

**1.** ***Translate the terms. What are their meanings?***

*REQUIRED TEST EQUIPMENT FOR CD PLAYER TROUBLESHOOTING*

1. DMM
2. Semiconductor tester
3. ESR meter
4. Dual-trace oscilloscope
5. Optical power meter
6. Low-frequency audiofrequency (AF) oscillator
7. Signal generator
8. Frequency counter
9. Test discs
10. *Several special tools, manufacturers' jigs, wrist straps, etc.*
11. Variable isolation transformer

**2.** ***Translate the text in the writing way. List all faultiness mentioned in the text and sequence in its troubleshooting***

**Who's on first?**

What is the first thing you should do? What is the symptom? You must know how the unit is acting up before troubleshooting the chassis. For instance, a dead TV might

becaused by an open fuse, the low-voltage power supply, or the horizontal output circuits. A white line on the raster of a portable TV indicates a problem of insufficient sweep in the vertical section. Sides pulled in on the raster might indicate a defective low-voltage power supply, horizontal sweep, or pincushion circuits. A dead symptom in stereo radio circuits might indicate a defective low-voltage power supply to the audio output transistor, integrated circuit (IC), or speaker. Excessive hum within a large stereo amplifier might be caused by defective filter capacitors. Pickup hum might point to worn input cables or circuits. No rotation of the disc in a CD player might be caused by a bad spindle motor or drive circuits. Use all the symptoms to locate the defective section within the electronic product.

**3.** ***Insert the missed words in the text:***

After isolating the various _____, find the correct section in which the _____ might occur. Look for large components such as _____ for the low-voltage power source, transistors mounted on separate heat sinks inside the chassis for _____ output transistors or ICs, and horizontal output transistors on separate _____ or metal chassis for the horizontal output circuits. Another method for determining if you are in the correct section is to take the numbers located on the transistors and IC components and look them up in a semiconductor _____ manual.

*vertical; symptoms; trouble; filter capacitors; replacement; heat sinks*

**4.** ***Make up the sentences from the given word combinations. The sentence marked * should be translated:***

1) Check for, that might be operating, burned bias resistors, quite warm.

2) A dead high-powered amplifier, by a red hot output transistor, with a loud hum, can be caused.

*****3) Red hot output transistors, in a car radio, the fuse, and charred, the hot wire, to the receiver, may have burned open.

Критерии оценивания контрольной работы 4:

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

3 Комплект оценочных средств для проведения промежуточной аттестации

3.1 Перечень заданий к зачету/дифференцированному зачету

***3 семестр***

3.1.1 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности» по теме «Монтаж и сборка средней сложности узлов, блоков, приборов радиоэлектронной аппаратуры»; «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» по теме «Типы и виды транзисторов. Тиристоры» и «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive»

*Оценочный материал:*
Задания для проведения промежуточной аттестации в форме зачёта (практические; письменный опрос по темам семестра)

**Variant 1**

**1.** ***Define to what parts of speech these words belong:***

Normal, constructional, broadly, categories, electrical, firmly, diffusion, visualize, mathematical, available, conduction, usable, namely, periodic, rapidly

**2.** ***Find Russian equivalents for the English word combinations:***

| | |
|---|---|
| may be divided into | the number of charges is much smaller |
| are not firmly attached | than that in a conductor |
| any particular nucleus | charges compared with those available |
| may be thought of | in a conductor |
| fall into a category | |

***3.** ***Fill in the gaps with appropriate words:***

*TRANSISTORS AND SEMICONDUCTORS*

1. In recent years the transistor - an entirely new type of electron device - has come into its own and bids to replace the bulky electron tubes in many .... Transistors are far smaller than tubes, have no filament and hence need no heating power. They are mechanically rugged, have practically unlimited life, and can do some jobs better than electron tubes, while catching up fast in other respects.

2. In contrast to electron tubes which utilize the flow of free electrons through a vacuum or gas, the transistor relies for its operation on the movement of ... carriers through a solid substance, a semiconductor. Transistors are only one of the family of .... many other semiconductor applications are becoming increasingly popular and new ones are constantly being discovered.

**4.** ***Make up a summary of the text using the key words: advantages, efficiency, dimensions, ruggedness, sensitive, reliable, drawbacks, solve the problem.***

In comparison with those of vacuum tube, the advantages of the transistor are so great that it is reasonable to expect that transistors will replace vacuum tubes altogether. The main advantages of the transistor are the following:

1. Absence of filament power loss, transistors have much efficiency.
2. Long life. The life of the average transistor is 10,000 and even more operating hours.
3. Low operating voltages. Small batteries can be used.
4. Small dimensions. Circuits can be miniaturized.
5. Mechanical ruggedness.

One of the principle causes of damages in electronic circuitry is high temperature, the cathode of a vacuum tube being heated to several hundred degrees centigrade above the ambient temperature. Not only does this heat cause break-down of the tubes but it also heats other circuit elements (resistors, electrolitic capacitors and so on) that are very sensitive to this influence. The transistor, on the other hand, does not heat its surroundings to any appreciable extent.

## Variant 2

**1.** ***Define to what parts of speech these words belong:***

Critical, negative, resistivity, impurity, thermal, intrinsic, possible, conductance, complexity, simplified, modification, ability, consequence, characteristics, development.

**2.** ***Find Russian equivalents for the English word combinations:***

| | |
|---|---|
| due to thermal energy | is responsible for the operation |
| required for valency bonding | by modifying the density |
| behaving as though it were a crystal | is used to control the conductivity |
| balance is maintained | the types under development |

***3.** ***Fill in the gaps with appropriate words:***

1. It is known that materials are classed as semiconductors if their electrical conductivity is ... between metallic conductors, which have a large number of free electrons available as charge carriers, and non-metallic ..., which have practically no free electrons available to ... current. The two semiconductors frequently used in electronics and transistor manufacture are ... and .... Both elements have the same crystal structure and ... characteristics so that the discussion that follows for germanium is also applied to silicon. 2. It is known that outmost electron shell of an atom contains the loosely held ... electrons, which are easily dislodged to become electric current carriers. Germanium has four valence electrons in outer shell, and for our ..., the atom may be pictured as containing only these electrons and four protons in the ... to keep it electrically neutral.

**4.** ***Make up a summary of the text using the key words: advantages, efficiency, dimensions, ruggedness, sensitive, reliable, drawbacks, solve the problem***

The transistor is very reliable and is indispensable in professional equipment because of its long lifetime and ruggedness. However, the transistor has certain drawbacks:

1. A great sensitivity to temperature, either ambient or self-generated.
2. Production problems. It is difficult to reproduce the same electrical qualities in close tolerance for mass production.
3. A low gain at high frequencies.

Intensive research is being done to diminish or remove these drawbacks. Research has already produced the semiconductor materials that are not so sensitive to temperature. It is profitable that new technology (using the diffusion process) will solve the problems of inexpensive mass production, cut-off frequencies, and power dissipation of transistors. Progress is also being made with the internal noise of the transistors, which is now as much as 60 db below that of the earlier types. Make up a summary of the text using the key words: advantages, efficiency, dimensions, ruggedness, sensitive, reliable, drawbacks, solve the problem.

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Критерии оценивания письменной работы (письменный опрос по темам семестра):

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***<u>4 семестр</u>***

3.1.2 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас», «Умение общаться (устно и письменно) на иностранном языке на профессиональные и повседневные темы» и «Знание лексического материала (1200 - 1400 лексических единиц)» по темам «Электромонтажные работы», «Технология монтажа радиоэлектронных устройств»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности по теме «Present Simple Active и Passive»

*Оценочный материал:* Задания для проведения промежуточной аттестации в форме дифференцированного зачёта (практические; письменный опрос по темам семестра)

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**Variant 1**

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1) **TEXT 1.** Выпишите из текста 5 ключевых предложений, характеризующих типы кабеля.

Переведите следующее предложение. Что не так в этом предложении? Найдите его в тексте. Если надо, скорректируйте его. Обоснуйте свой ответ.

*A woven shield of silver surrounds the insulating layer spot, which is finally wound by an outmost plastic sheath. Coaxial cables differ in circuits board, performance, flexibility, power handling capabilities and cost.*

2) **TEXT 2.** Выпишите из текста только *технические данные*. Почему вы решили, что выбранные вами предложения технические? Обоснуйте свой ответ (3-4 предложения).
3) **TEXT 3.** В 7 предложениях перескажите текст на англ. яз.

Переведите выделенное слово, замените его синонимом. Поясните суть следующего предложения своими словами на англ. яз.:

*It is wiped across the stencil or screen with **a squeegee**, which pushes the paste through the openings, depositing it on the lands at the right places.*

## TEXT 1. Types of Electrical Cable

An electrical cable, or power cable, is used to transmit electrical power. Electrical cables provide connection and allow power stations, wired computer networks, televisions, telephones and other electricity-powered devices to work. There are many types of electrical cables that differ in configuration, size and performance.

**Components of Electrical Cables** All electrical cables consist of at least two conducting wires and an outer protective jacket. For medium to high power cables that carry high voltages, the conducting wires within the outer protective jacket may individually be enclosed in insulating sheaths. Electrical conductors are commonly made of copper. Synthetic polymers make the outer jacket and protective, insulating material.

**Coaxial Cable** A coaxial electrical cable has a copper-plated core, surrounded by a dielectric insulator. A woven shield of copper surrounds the insulating layer, which is finally wound by an outmost plastic sheath. Coaxial cables differ in size, performance, flexibility, power handling capabilities and cost. They are used to connect home audio and video equipment, television networks and components of a local area network. Hard line, leaky cable, RG/6, twin-axial, biaxial and semi-rigid are types of coaxial cables.

**Ribbon Cable** A ribbon electrical cable (also called multi-wire planar electrical cable or flat twin cables) is made up of multiple insulated wires running parallel to each other. These parallel wires allow the simultaneous transmission of multiple signals of data. According to “Optical Communications Essentials,” a typical ribbon cable consists of four to 12 wires. It is commonly used to interconnect network devices. Ribbon cables also connect the motherboard with other core CPU (central processing unit) components in computers.

**Twisted Pair Cable** A twisted pair electrical cable consists of pairs of insulated copper wires (that are color coded), which are twisted around each other. The diameter of each wire ranges from 0.4 to 0.8 mm, and the number of pairs vary in different types of twisted pair cables. The greater the number of pairs, the higher the resistance of the cable will be to external noise and cross-talk. Twisted pair cables are easy to install, flexible and inexpensive. They are used for telephone cabling and to wire local area networks.

**Shielded Cable** A shielded electrical cable is made of one or more insulated wires that are collectively enclosed by an aluminum Mylar foil or woven braid shielding. The shielding prevents the cable from external radio and power frequency interference, allowing the signal transmission to proceed smoothly. High-voltage power cables are commonly shielded.

## TEXT 2. The Basics of Wiring Harnesses for Industrial Engines

Acting as the central nervous system to many vehicle electronics designs, wiring harnesses for engines and rotating machines are used in the transmission of signals or electrical power. As applications become increasingly complex, innovation in the design and manufacturing process becomes even more critical. Bound tightly together, these harnesses provide advantages over loose wires and cables. Commonly used in automobiles, marine vessels and off-highway vehicles, they act as an efficient space saver. If the wires in these vehicles were stretched out, they would be over several miles long fully extended. Binding the cables with the use of a wiring harness, they are better protected from adverse effects caused by vibrations, moisture and abrasions. Biding the wires also decreases the risk of the wires short-circuiting.

The creation of electrical harness has traditionally been planned through a combination of desktop documentation and 2D drawings. The size of the harness segments was typically derived from actual physical measurements of a prototype. These techniques for the development of the electrical harness are labor intensive and highly inaccurate. But harness development in 3D CAD has been a demanding and formidable task that is prone to error, and typically still requires separate documentation for electrical interconnect information.

Designed according to both geometric and electrical requirements, wiring harnesses can be fully customized. Wires are first cut to the specified length using a special machine. The ends of the wires are then stripped to expose the metal, or core, of the wires. The core of the wire is then fitted for any required terminals or connector housings. There are many ***types of harnesses***:

· **Open Bundles**: The wires are attached to connectors, terminal lugs, and are then tied into bundles with multiple breakouts by means of plastic tie wraps or waxed lacing twine.

· **Closed Bundles**: Wires are bundled with a covering, such as pulled-on braided tubing, braided-on Nomex or nylon, or in some cases, metal braid.

· **Waterproof Harnesses:** The legs are covered with tubing, such as neoprene. The junctions between the legs and back shells of the connectors are over molded with a material such as urethane or rubber compounds. In some cases, PVC tubing and molding are used.

## TEXT 3. Requirements of Solder Pastes

Solder pastes must meet the following requirements: The individual powder particles of the solder alloy should have a homogeneous distribution of the metal within the paste as well as a fair equality of shape and surface roughness of the individual powder particles. It should develop an adhesive action in order to hold the components in place until the reflow operation has been finished. It must not tend to solder balling; if they become detached on the substrate, they may cause short circuits. It has to maintain its shape during curing and reflow and must remain on the pads, not leaking to unsolderable parts of the PCB. It must have sufficient activity as the solder paste is sometimes in contact with the parts for several hours.

### Solder Paste Application

The reflow soldering process starts mostly with the application of solder paste to the specific areas of the circuit board where the components will be attached. Solder paste printing is commonly applied by stencil or screen-printing. It is wiped across the stencil or screen with a squeegee, which pushes the paste through the openings, depositing it on the lands at the right places. With solder paste printing, the entire amount of solder is deposited on the PCB in one operational step. Solder paste application with dispenser is generally used for laboratory applications because of its flexibility. With a dispenser, the

solder paste can be applied not only in form of dots, but also in stripes, which may be more useful and accurate in certain cases.

### Handling of Solder Paste

Solder paste ages and changes with temperature, humidity and light. The following precautions may be taken while handling solder paste, keeping in view the recommendations of the paste supplier; Store solder paste in a clean, cool, dry and dark location. Before opening refrigerated solder paste, keep it for 24 hours at room temperature to avoid water condensation. Do not mix old and new pastes since the fluxes and thinners will evaporate at different rates. Stir solder paste at least 30 seconds before applying to the stencil/screen. Use only clean and inert tools (Such as made of stainless steel, Teflon, Polyethylene). Apply to the stencil/screen the amount of paste just required for printing.

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## Variant 2

1) **TEXT 4.** Укажите главную идею текста (выпишете предложения, где выражается суть).

Переведите данное ниже предложение. Два слова стоят не на своих местах. Меняют ли они смысл всего предложения? Исправьте, если считаете, что меняют.

*Woven are cheaper, but the high dielectric constant of glass may not be reinforcements favorable for many higher-frequency applications. The nonhomogeneous spatially structure also introduces local variations in electrical parameters, due to different resin/glass ratio at different areas of the weave pattern.*;

2) **TEXT 5.** Как можно проверить плату? В 5 предложениях на англ. яз. опишите процесс.
3) **TEXT 6.** Выпишите 5 важных терминов текста, без которых было бы невозможно понять смысл текста. Почему вы так решили? Обоснуйте свой выбор (1-2 предложения в обосновании)

**Переведите словосочетание -** *eutectic solder*. Это термин, два слова, образующие термин, или просто слова, передающие значение? Обоснуйте ваш ответ на англ. яз.

Переведите **выделенные** слова **отдельно**, потом в **контексте**. Объясните своими (английскими) словами **смысл описанного процесса**.

*A highly active flux will **remove** oxides. However, the corrosiveness of acids desirable to remove the reaction layer of the tarnish may damage the electronic components. Even **mild acids**, if not removed, leave a **residue** that continues to corrode after the soldering process is complete, leading **to future failure.***

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## TEXT 4. Printed circuit board. Materials (Part 1)

**Key substrate parameters**

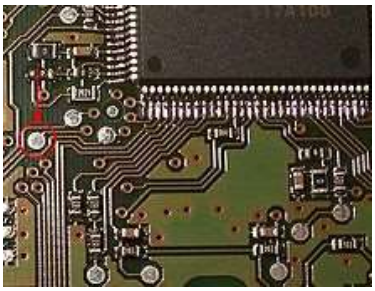
The circuit board substrates are usually dielectric composite materials. The composites contain a matrix (usually an epoxy resin) and a reinforcement (usually a woven, sometimes nonwoven, glass fibers, sometimes even paper), and in some cases a filler is added to the resin (e.g. ceramics; titanate ceramics can be used to increase the dielectric constant). The reinforcement type defines two major classes of materials: woven and non-woven. Woven reinforcements are cheaper, but the high dielectric constant of glass may not be favorable for many higher-frequency applications. The spatially nonhomogeneous structure also introduces local variations in electrical parameters, due to different

resin/glass ratio at different areas of the weave pattern. Nonwoven reinforcements, or materials with low or no reinforcement, are more expensive but more suitable for some RF/analog applications.

The substrates are characterized by several key parameters, chiefly thermomechanical (glass transition temperature, tensile strength, shear strength, thermal expansion), electrical (dielectric constant, loss tangent, dielectric breakdown voltage, leakage current, tracking resistance...), and others (e.g. moisture absorption). At the glass transition temperature the resin in the composite softens and significantly increases thermal expansion; exceeding $T_g$ then exerts mechanical overload on the board components - e.g. the joints and the vias. Below $T_g$ the thermal expansion of the resin roughly matches copper and glass, above it gets significantly higher. As the reinforcement and copper confine the board along the plane, virtually all volume expansion projects to the thickness and stresses the plated-through holes. Repeated soldering or other exposition to higher temperatures can cause failure of the plating, especially with thicker boards; thick boards therefore require a matrix with a high $T_g$. The materials used determine the substrate's dielectric constant. This constant is also dependent on frequency, usually decreasing with frequency. As this constant determines the signal propagation speed, frequency dependence introduces phase distortion in wideband applications; as flat a dielectric constant vs frequency characteristic as is achievable is important here. The impedance of transmission lines decreases with frequency, therefore faster edges of signals reflect more than slower ones. *Dielectric breakdown voltage determines* the maximum voltage gradient the material can be subjected to before suffering a breakdown (conduction, or arcing, through the dielectric). Tracking resistance determines how the material resists high voltage electrical discharges creeping over the board surface.

## TEXT 5. Printed circuit board. Design (Part 2)

**Assembly**



*PCB with test connection pads*

In assembly the bare board is populated (or "stuffed") with electronic components to form a functional *printed circuit assembly* (PCA), sometimes called a "printed circuit board assembly" (PCBA). In through-hole technology, the component leads are inserted in holes surrounded by conductive *pads*; the holes keep the components in place. In surface-mount technology (SMT), the component is placed on the PCB so that the pins line up with the conductive *pads*or *lands* on the surfaces of the PCB; solder paste, which was previously applied to the pads, holds the components in place temporarily; if surface-mount components are applied to both sides of the board, the bottom-side components are glued to the board. In both through hole and surface mount, the components are then soldered; once cooled and solidified, the solder holds the components in place permanently and electrically connects them to the board. There are a variety of soldering techniques used to attach components to a PCB. High volume production is usually done with a "Pick and place machine" or SMT placement machine and bulk wave soldering or reflow ovens, but skilled technicians are able to hand-solder very tiny parts (for instance 0201 packages which are 0.02 in. by 0.01 in.) under a microscope, using tweezers and a fine-tip soldering iron, for small volume prototypes. Some SMT parts cannot be soldered by hand, such as BGA packages. All through-hole components can be hand soldered, making them favored for prototyping where size, weight, and the use of the exact components that would be used in high volume production are not concerns. Often, through-hole and surface-mount construction must be combined in a single assembly because some required components are available only in surface-mount packages, while others are available only in through-hole packages.

## TEXT 6. Surface Tension

We are familiar with the surface tension of water as a force that retains the cold water in globules on a greasy plate. The adhesive force that tends to spread the liquid on the solid is, in this case, less than the cohesive force. Washing with warm water and using a detergent reduces the surface tension and the water wets the greasy plate and flows out into a thin layer. It happens if the adhesive force is stronger than the cohesive force. The cohesive force of tin/lead solder is even higher than that of water and also draws the solder into spheres, as it tends to minimize the surface area (a sphere has

the smallest surface of any geometric configuration with equal volume in order to satisfy the requirements of the lowest state of energy). Flux acts similarly as the detergent does with the greasy plate. Further, surface tension is highly dependent on any contamination on the surface, as well as, on temperature. Only if the adhesion energy becomes much stronger than the surface energy (cohesive force), ideal wetting will occur.

**Tarnish-free Surface**

The solder will wet the metal only when the metal to be soldered is free from any tarnish. Although the surfaces to be soldered may look clean, there is always a thin film of oxide covering it. The outer layer of the metal attracts water and various gases get physically bound and below it, they may be chemically bound with oxides, sulphides and carbonates. For a good solder bond, all dirt, grease and surface oxides must be removed before and with the help of flux during the soldering process.

**Application of Right Flux and Proper Solder**

Fluxes should remove the tarnish from base metals and prevent them from reforming oxides while soldering. The effectiveness of the flux in removing oxide is called “activity” which depends on the activators that are used. A highly active flux will remove oxides. However, the corrosiveness of acids desirable to remove the reaction layer of the tarnish may damage the electronic components. Even mild acids, if not removed, leave a residue that continues to corrode after the soldering process is complete, leading to future failure. The selection of the flux depends on the soldering process chosen, the metal being soldered and on the cleanness of the metal. The plastic range of a solder varies, depending upon the ratio of the metals forming the solder alloy, e.g. tin to lead. The 63/37 ratio, known as eutectic solder has practically no plastic range, and melts almost instantly at 183 °C and therefore is usually recommended. Besides, the purity of solder is very important. The presence of more than 0.5 per cent of contaminants within common soft solders may not give the required quality.

Критерии оценивания:

– чтение

| | |
|---|---|
| Оценка «5» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, догадался о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценивать важность, новизну, достоверность информации. У него развита языковая догадка, он не затрудняется в понимании незнакомых слов, он не испытывает необходимости обращаться к словарю и делает это 1-2 раза. Скорость чтения иноязычного текста может быть незначительно замедленной по сравнению с той, с которой студент читает на родном языке. |
| Оценка «4» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, сумел догадаться о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. Однако у него недостаточно развита языковая догадка, и он затрудняется в понимании некоторых незнакомых слов, он вынужден чаще обращаться к словарю, а темп чтения заметно замедлен по сравнению с родным языком. |
| Оценка «3» | ставится студенту, который неточно понял основное содержание прочитанного текста, сумел выделить в тексте только небольшое количество фактов. У него совсем не развита языковая догадка, он не сумел догадаться о значении незнакомых слов из контекста, крайне |

| | |
|---|---|
| | затруднялся в понимании многих незнакомых слов, был вынужден многократно обращаться к словарю, а темп чтения был слишком замедлен по сравнению с родным языком. Он не мог установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. |
| Оценка «2» | ставится студенту, если он не понял текст или понял содержание текста неправильно, не ориентировался в тексте при поиске определенных фактов, абсолютно не сумел семантизировать незнакомую лексику. |

- письменная работа (письменный опрос по темам семестра):

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***5 семестр***

3.1.3 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Технология производства радиоэлектронных устройств»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; модальные глаголы; причастия I,II; перевод словосочетаний типа A+N, N+N»

*Оценочный материал:*

Задания для проведения промежуточной аттестации в форме зачёта (практические; письменный опрос по темам семестра)

## Variant 1

### *TEXT I. Read and translate the text. Then look it through again to do the tasks*

A basic PCB consists of a flat sheet of insulating material and a layer of copper foil, laminated to the substrate. Chemical etching divides the copper into separate conducting lines called tracks or *circuit traces*, pads for connections, vias to pass connections between layers of copper, and features such as solid conductive areas for EM shielding or other purposes. The tracks function as wires fixed in place, and are insulated from each other by air and the board substrate material. The surface of a PCB may have a coating that protects the copper from corrosion and reduces the chances of solder shorts between traces or undesired electrical contact with stray bare wires. For its function in helping to prevent solder shorts, the coating is called solder resist or solder mask.

A printed circuit board can have multiple copper layers. A two-layer board has copper on both sides; multilayer boards sandwich additional copper layers between layers of insulating material. Conductors on different layers are connected with vias, which are copper-plated holes that function as electrical tunnels through the insulating substrate. Through-hole component leads sometimes also effectively function as vias. After two-layer PCBs, the next step up is usually four-layer. Often two layers are dedicated as power supply and ground planes, and the other two are used for signal wiring between components.

"Through hole" components are mounted by their wire leads passing through the board and soldered to traces on the other side. "Surface mount" components are attached by their leads to copper traces on the same side of the board. A board may use both methods for mounting components. PCBs with only through-hole mounted components are now uncommon. Surface mounting is used for transistors, diodes, IC chips, resistors and capacitors. Through-hole mounting may be used for some large components such as electrolytic capacitors and connectors.

The pattern to be etched into each copper layer of a PCB is called the "artwork". The etching is usually done using photoresist which is coated onto the PCB, then exposed to light projected in the pattern of the artwork. The resist material protects the copper from dissolution into the etching solution. The etched board is then cleaned. A PCB design can be mass-reproduced in a way similar to the way photographs can be mass-duplicated from film negatives using a photographic printer.

In multi-layer boards, the layers of material are laminated together in an alternating sandwich: copper, substrate, copper, substrate, copper, etc.; each plane of copper is etched, and any internal vias (that will not extend to both outer surfaces of the finished multilayer board) are plated-through, before the layers are laminated together. Only the outer layers need be coated; the inner copper layers are protected by the adjacent substrate layers.

When a PCB has no components installed, it is less ambiguously called a *printed wiring board* (*PWB*) or *etched wiring board*. However, the term "printed wiring board" has fallen into disuse. A PCB populated with electronic components is called a *printed circuit assembly* (*PCA*), *printed circuit board assembly* or *PCB assembly* (*PCBA*). In informal usage, the term "printed circuit board" most commonly means "printed circuit assembly" (with components). The IPC preferred term for assembled boards is *circuit card assembly* (*CCA*), and for assembled backplanes it is *backplane assemblies*. "Card" is another widely used informal term for a "printed circuit assembly". For example, expansion card.

A PCB may be "silkscreen" printed with a legend identifying the components, test points, or identifying text. Originally, an actual silkscreen printing process was used for this purpose, but today other, finer quality printing methods are usually used instead. Normally the screen printing is not significant to the function of the PCBA.

A minimal PCB for a single component, used for prototyping, is called a *breakout board*. The purpose of a breakout board is to "break out" the leads of a component on separate terminals so that manual connections to them can be made easily. Breakout boards are especially used for surface-mount components or any components with fine lead pitch. Advanced PCBs may contain components embedded in the substrate.

**Task I. Translate word-combinations into Russian:**

1. insulating material (substrate)
2. copper foil
3. chemical etching,
4. separate conducting lines
5. board substrate material
6. bare wire
7. undesired electrical contact
8. additional copper layers
9. through-hole component leads
10. mass-produced design
11. inner copper layers
12. adjacent protect layers
13. printed wiring board
14. actual silkscreen printing process
15. surface-mount components

**Task II. Answer the questions on the text:**

1. What are tracks?
2. What is their function?
3. What is the role of coating?
4. How is the coating called?
5. What are vias and what is their function?
6. How many copper layers can a PCB have?
7. What methods can be used for mounting components?
8. Where is surface mounting used?
9. Where is through-hole mounting used?
10. What is called artwork?

11. How is etching done?
12. What does the resist material protect the copper from?
13. What can you say about multi-layer boards?
14. What board is called etched wiring board?
15. What do the abbreviations PCA and PCBA mean?
16. What informal terms are used for PCB?
17. What is called a breakout board?
18. What is its purpose?
19. What are breakout boards used for?

**Task III. Divide the words into V/ N/ A/ Adv.**

chemical, separate, connection, conductive, solder, effectively, capacitor, mount, usually, assemble, adjacent, assembly, originally, coat, normally, electronic, commonly, actual, quality, especially, manual, supply, connector, resist, widely, attach, function, prefer, protect

**Task IV. Join logically connected parts of these sentences:**

| | |
|---|---|
| 1.A basic PCB consists of | *between layers of insulating material. |
| 2.A printed circuit board can have | *****copper, substrate, copper, substrate, copper, etc. |
| 3.Multilayer boards sandwich additional copper layers | *****a printed wiring board (PWB) or etched wiring board. |
| 4. Conductors on different layers | *****multiple copper layers. |
| 5.In multilayer boards the layers of material are laminated together in an alternating sandwich: | *****embedded in the substrate. |
| 6. “Through hole” components are mounted by their leads passing through | *****are connected with vias. |
| 7.When a PCB has no components installed, it is called | *****a flat sheet of insulating material and a layer of copper foil laminated on a substrate. |
| 8.Advanced PCBs may contain components | *****the board and soldered to trace on the other side. |

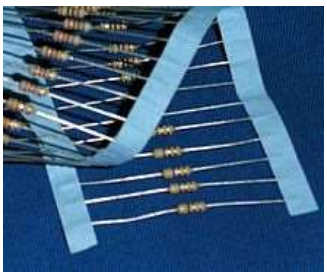
**Task V. Put the verbs in brackets into Passive Voice.**

1. Copper (to divide) into separate conducting lines called tracks.
2. The tracks (to insulate) from each other by air and the board substrate material.
3. Conductors on different layers (to connect) with vias, which are copper-plated holes.
4. “Through hole” components (to solder) to traces on the other side.
5. Surface mounting (to use) for transistors, diodes, IC chips, resistors and capacitors.
6. Copper (to protect) from dissolution into the etching solution by the resist material.
7. The layers (to laminate) together in an alternating sandwich.
8. The inner copper layers (to protect) by the adjacent substrate layers.
9. Breakout boards (to use) for surface-mount components or any components with fine lead pitch.

## Variant 2

***TEXT II. Read and translate the text. Then look it through again to do the tasks***

### Through-hole technology



The first PCBs used through-hole technology, mounting electronic components by leads inserted through holes on one side of the board and soldered onto copper traces on the other side. Boards may be single-sided, with an unplated component side, or more compact double-sided boards, with components soldered on both sides. Horizontal installation of through-hole parts with two axial leads (such as resistors, capacitors, and diodes) is done by bending the leads 90 degrees in the same direction, inserting the part in the board (often bending leads located on the back of the board in opposite

directions to improve the part's mechanical strength), soldering the leads, and trimming off the ends. Leads may be soldered either manually or by a wave soldering machine.

Through-hole manufacture adds to board cost by requiring many holes to be drilled accurately, and it limits the available routing area for signal traces on layers immediately below the top layer on multi-layer boards, since the holes must pass through all layers to the opposite side. Once surface-mounting came into use, small-sized SMD components were used where possible, with through-hole mounting only of components unsuitably large for surface-mounting due to power requirements or mechanical limitations, or subject to mechanical stress which might damage the PCB (e.g. by lifting the copper off the board surface).

Through-hole devices mounted on the circuit board of a mid-1980s Commodore 64 home computer.

A box of drill bits used for making holes in printed circuit boards. While tungsten-carbide bits are very hard, they eventually wear out or break. Drilling is a considerable part of the cost of a through-hole printed circuit board.

**Task I. Translate the word-combinations with Participles into Russian:**

1. mounting electronic components
2. leads inserted through holes on one side of the board
3. leads soldered onto copper traces on the other side
4. single-sided boards
5. unplated component side
6. compact double-sided boards
7. components soldered on both sides
8. reducing labor costs
9. greatly increasing production rates
10. wire-ended components
11. through-hole printed circuit board

**Task II. Are these statements true or false?**

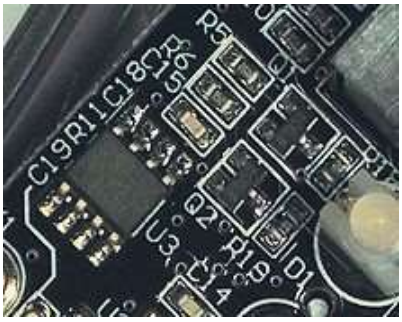
1. The first PCBs used surface-mount technology.
2. Electronic components were mounted by leads inserted through holes on one side of the board and soldered onto copper traces on the other side.
3. Horizontal installation of through-hole parts with two axial leads is done by bending the leads 120 degrees in the same direction, inserting the part in the board soldering the leads and trimming off the ends.
4. Leads may be soldered either manually or by a wave soldering machine.
5. Holes to be drilled accurately.
6. The holes must pass through all layers to the opposite side.
7. Mechanical stress may damage the PCB.
8. The copper can be lifted off the board surface.
9. Drilling is a considerable part of the cost of a through-hole printed circuit board.
10. Tungsten-carbide bits are very fragile.

## Variant 3

***TEXT III. Read and translate the text. Then look it through again to do the tasks***

## Surface-mount technology

**Surface mount components, including resistors, transistors and an integrated circuit**




Surface-mount technology emerged in the 1960s, gained momentum in the early 1980s and became widely used by the mid-1990s. Components were mechanically redesigned to have small metal tabs or end caps that could be soldered directly onto the PCB surface, instead of wire leads to pass through holes. Components became much smaller and component placement on both sides of the board became more common than with through-hole mounting, allowing much smaller PCB assemblies with much higher circuit densities. Surface mounting lends itself well to a high degree of automation, reducing labor costs and greatly increasing production rates compared with through-hole circuit boards. Components can be supplied mounted on carrier tapes. Surface mount components can be about one-quarter to one-tenth of the size and weight of through-hole components, and passive components much cheaper. However, prices of semiconductor surface mount devices (SMDs) are determined more by the chip itself than the package, with little price advantage over larger packages, and some wire-ended components, such as 1N4148 small-signal switch diodes, are actually significantly cheaper than SMD equivalents.

***A PCB in a computer mouse: the component side (left) and the printed side (right)***

**Task I. Make up a list of terms for the text:**

1. surface mount technology
2. to redesign
3. metal tab
4. end cap
5. instead of
6. to pass through holes
7. to place – placement
8. high circuit density
9. high degree of automation
10. to reduce labor costs
11. to increase production rate
12. carrier tape
13. weight
14. package
15. price advantage
16. significantly

**Task II. Insert the omitted words. Read and translate the sentences.**

1. Surface-mount … emerged in the 1960s.
2. Surface mounting lends itself well to a high …of automation.
3. Components became much smaller and component … on both sides of the board became more common than with through-hole mounting.
4. Components were mechanically … to have small metal tabs or end caps.
5. Surface mount components can be about one-quarter to one-tenth of the size.
6. Prices of semiconductor surface mount devices (SMDs) are determined more by the chip itself than the...

---

package * degree * redesigned * technology * placement

**Task III. Make up sentences:**

| | |
|---|---|
| 1. Surface-mount technology | • with through-hole mounting. |
| 2. Surface mount components can be about one-quarter to | • reducing labor costs and greatly increasing production rates compared with through-hole circuit boards. |
| 3. Component placement on both sides of the board became more common than | • by the chip itself than the package. |
| 4. Components were mechanically redesigned to have | • emerged in the 1960s. |
| 5. Surface mounting lends itself well | • small metal tabs or end caps that could be |

| | |
|---|---|
| to a high degree of automation | soldered directly onto the PCB surface. |
| 6. Prices of semiconductor surface mount devices (SMDs) are determined more | • one-tenth of the size and weight of through-hole components. |

## Variant 4

### *TEXT IV. Read and translate the text. Then look it through again to do the tasks*

**Circuit properties of the PC**

Each trace consists of a flat, narrow part of the copper foil that remains after etching. Its resistance, determined by its width, thickness, and length, must be sufficiently low for the current the conductor will carry. Power and ground traces may need to be wider than signal traces. In a multi-layer board one entire layer may be mostly solid copper to act as a ground plane for shielding and power return. For microwave circuits, transmission lines can be laid out in a planar form such as stripline or microstrip with carefully controlled dimensions to assure a consistent impedance. In radio-frequency and fast switching circuits the inductance and capacitance of the printed circuit board conductors become significant circuit elements, usually undesired; conversely, they can be used as a deliberate part of the circuit design, as in distributed element filters, antennae, and fuses, obviating the need for additional discrete components.

**Task I. Translate the text in written form.**

### *TEXT V. Read and translate the text. Then look it through again to do the tasks*

**Key substrate parameters**

The circuit board substrates are usually dielectric composite materials. The composites contain a ***matrix*** (usually ***an epoxy resin***) and ***a reinforcement*** (usually a ***woven***, sometimes nonwoven, ***glass fibers***, sometimes even paper), and in some cases a filler is added to the resin (e.g. ***ceramics;*** titanate ceramics can be used ***to increase the dielectric constant***).

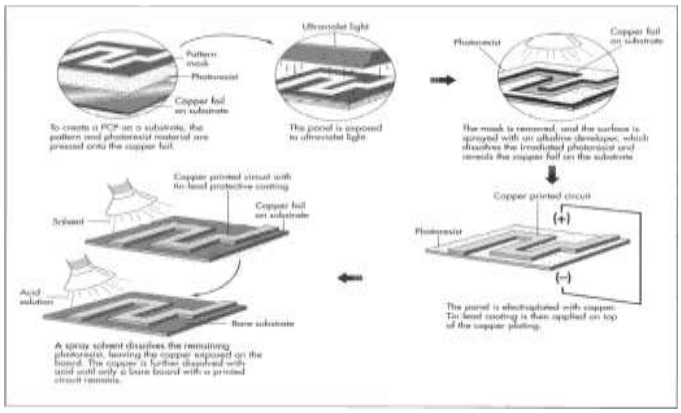
The reinforcement type defines two major classes of materials: woven and non-woven. Woven reinforcements are cheaper, but the high dielectric constant of glass may not be ***favorable*** for many higher-frequency applications. The spatially nonhomogeneous structure also introduces local variations in electrical parameters, due to different resin/glass ratio at different areas of the weave pattern. Nonwoven reinforcements, or materials with low or no reinforcement, are more ***expensive*** but more ***suitable for*** some RF/analog applications. The substrates are characterized by several key parameters, chiefly thermomechanical (***glass transition temperature, tensile strength, shear strength, thermal expansion***), electrical (***dielectric constant, loss tangent, dielectric breakdown voltage, leakage current, tracking resistance***...), and others (e.g. ***moisture absorption***).

The materials used determine the substrate's dielectric constant. This constant is also ***dependent on frequency***, usually ***decreas***ing with frequency. As this constant determines the ***signal propagation speed,*** frequency dependence introduces ***phase distortion*** in ***wideband applications***; as flat a dielectric constant vs frequency characteristics as is achievable is important here. ***The impedance of transmission lines*** decreases with frequency, therefore faster edges of signals reflect more than slower ones.

***Dielectric breakdown voltage*** determines the maximum voltage gradient the material can be subjected to before ***suffering a breakdown*** (conduction, or arcing, through the dielectric).

***Tracking resistance*** determines how the material resists high voltage electrical discharges ***creep***ing over the board surface.

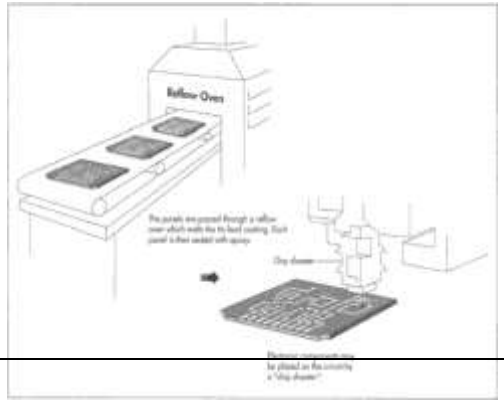
***Loss tangent*** determines how much of the electromagnetic energy from the signals in the conductors is ***absorb***ed in the board material. This factor is important for high frequencies. Low-loss materials are more expensive. Choosing unnecessarily ***low-loss material*** is a common engineering error in ***high-frequency digital design***; it ***increases the cost of the boards*** without a corresponding benefit. Signal degradation by loss tangent and dielectric constant can be easily ***assess***ed by an eye pattern.




## The Manufacturing Process

Printed circuit board processing and assembly are done in an extremely clean environment where the air and components can be kept free of contamination. Most electronic manufacturers have their own proprietary processes, but the following steps might typically be used to make a two-sided printed circuit board. **Making the substrate**

- Woven glass fiber is unwound from a roll and fed through a process station
- The substrate material passes through an oven where it is semicured. After the oven, the material is cut into large panels.
- The panels are stacked in layers, alternating with layers of adhesive-backed copper foil. The stacks are placed in a press where they are subjected to temperatures of about 340°F (170°C) and pressures of 1500 psi for an hour or more. This fully cures the resin and tightly bonds the copper foil to the surface of the substrate material.
- Several panels of substrate, each large enough to make several printed circuit boards, are stacked on top of each other and pinned together to keep them from moving. The stacked panels are placed in a CNC machine, and the holes are drilled according to the pattern determined when the boards were laid out. The holes are deburred to remove any excess material clinging to the edges of the holes.
- The inside surfaces of the holes designed to provide a conductive circuit from one side of the board to the other are plated with copper. Non-conducting holes are plugged to keep them from being plated or are drilled after the individual boards are cut from the larger pannel.
- The foil surface of the substrate is degreased. The panels pass through a vacuum chamber where a layer of positive photoresist material is pressed firmly onto the entire surface of the foil. A positive photoresist material is a polymer that has the property of becoming more soluble when exposed to ultraviolet light. The vacuum ensures that no air bubbles are trapped between the foil and the photoresist. The printed circuit pattern mask is laid on top of the photoresist and the panels are exposed to an intense ultraviolet light. Because the mask is clear in the areas of the printed circuit pattern, the photoresist in those areas is irradiated and becomes very soluble.
- 7 The mask is removed, and the surface of the panels is sprayed with an alkaline developer that dissolves the irradiated photoresist in the areas of the printed circuit pattern, leaving the copper foil exposed on the surface of the substrate.
- 8 The panels are then electroplated with copper. The foil on the surface of the substrate acts as the cathode in this process, and the copper is plated in the exposed foil areas to a thickness of about 0.001-0.002 inches (0.025-0.050 mm). The areas still covered with photoresist cannot act as a cathode and are not plated. Tin-lead or another protective coating is plated on top of the copper plating to prevent the copper from oxidizing and as a resist for the next manufacturing step.
- 9 The photoresist is stripped from the boards with a solvent to expose the substrate's copper foil between the plated printed circuit pattern. The boards are sprayed with an acid solution which eats away the copper foil. The copper plating on the printed circuit pattern is protected by the tin-lead coating and is unaffected by the acid.
-




**Creating the printed circuit pattern on the substrate**

The printed circuit pattern may be created by an "additive" process or a "subtractive" process. In the additive process, copper is plated, or added, onto the surface of the substrate in the desired pattern, leaving the rest of the surface unplated.

In the subtractive process, the entire surface of the substrate is first plated, and then the areas that are not part of the desired pattern are etched away, or subtracted. We shall describe the additive process.

**Task I. Make up a list of terms for the text**

---

Критерии оценивания:

– чтение

| | |
|---|---|
| Оценка «5» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, догадался о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценивать важность, новизну, достоверность информации. У него развита языковая догадка, он не затрудняется в понимании незнакомых слов, он не испытывает необходимости обращаться к словарю и делает это 1-2 раза. Скорость чтения иноязычного текста может быть незначительно замедленной по сравнению с той, с которой студент читает на родном языке. |
| Оценка «4» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, сумел догадаться о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. Однако у него недостаточно развита языковая догадка, и он затрудняется в понимании некоторых незнакомых слов, он вынужден чаще обращаться к словарю, а темп чтения заметно замедлен по сравнению с родным языком. |
| Оценка «3» | ставится студенту, который неточно понял основное содержание прочитанного текста, сумел выделить в тексте только небольшое количество фактов. У него совсем не развита языковая догадка, он не сумел догадаться о значении незнакомых слов из контекста, крайне затруднялся в понимании многих незнакомых слов, был вынужден многократно обращаться к словарю, а темп чтения был слишком замедлен по сравнению с родным языком. Он не мог установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. |
| Оценка «2» | ставится студенту, если он не понял текст или понял содержание текста неправильно, не ориентировался в тексте при поиске определенных фактов, абсолютно не сумел семантизировать незнакомую лексику. |

- письменная работа (письменный опрос по темам семестра):

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |

| | | | | |
|---|---|---|---|---|
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***6 семестр***

3.1.4 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Технология монтажа устройств, блоков и приборов бытовой радиоэлектронной аппаратуры»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; простые предложения»

*Оценочный материал:*

Задания для проведения промежуточной аттестации в форме дифференцированного зачёта (практические; письменный опрос по темам семестра)

**VARIANT 1**

***I. Translate the sentences into Russian***

1. Digital recording stores audio as a series of binary numbers (zeros and ones) representing samples of the amplitude of the audio signal at equal time intervals.

2. Acoustic analog recording is achieved by a microphone diaphragm that senses changes in atmospheric pressure caused by acoustic sound waves and records them as a mechanical representation of the sound waves on a medium such as a phonograph record.

3. AFC (**Automatic Frequency Control)** was mainly used in radios and television sets around the mid-20th century.

4. AFC is primarily used in radio receivers to keep the receiver tuned to the frequency of the desired station.

***II. Find the verbs in Passive in the following sentences. Define the tense***

1. A tuned radio frequency receiver (or TRF receiver) is a type of radio receiver that is composed of one or more tuned radio frequency (RF) amplifier stages.

2. The EDA industry is closely related to the semiconductor manufacturing industry.

3. A variable capacitor was used, with a knob on the front panel to tune the receiver.

4. The industry is divided up into a number of segments.

5. A regenerative detector was used to increase selectivity.

6. As the size of the designs grew, automation was required.

7. The TRF design has been largely superseded by the superheterodyne receiver.

8. The power is disconnected safely before installation of a CT.

***III. Form nouns***

| Verbs (V) | Nouns (N) |
|---|---|
| to protect | |
| to construct | |
| to adjust | |
| to equip | |
| to verify | |
| to supply | |
| to implement | |
| to install | |
| to connect | |
| to oscillate | |
| to resist | |
| to emit | |

***IV. Divide the following words into 4 columns***

| Verbs (V) | Nouns (N) | Adjectives (A) | Adverbs (Adv.) |
|---|---|---|---|
| | | | |

feed, realizable, constant, conveniently, arrange, electrically, amplifier, mount, largely, capacitor, provide, tune, frequency, replace, variable, selectivity, increase, hobbyist, occasionally, perform, mechanically, rectify, loudspeaker, simplify, convert

## VARIANT 2

***I. Translate the sentences into Russian***

1. Digital recording and reproduction converts the analog sound signal picked up by the microphone to a digital form by the process of sampling.

2. Sound recording and reproduction is an electrical, mechanical, electronic, or digital inscription and re-creation of sound waves, such as spoken voice, singing, instrumental music, or sound effects.

3. In radio equipment, **Automatic Frequency Control** (AFC), also called **Automatic Fine Tuning** (AFT), is a method or circuit to automatically keep a resonant circuit tuned to the frequency of an incoming radio signal.

4. In the 1970s, receivers began to be designed using frequency synthesizer circuits.

***II. Find the verbs in Passive in the following sentences. Define the tense***

1. Many of the tools were developed in the companies developing the electronics.

2. By the mid 1930s, it was replaced by the superheterodyne receiver patented by Edwin

Armstrong.

3. In the early days, integrated circuits were designed by hand.

4. In some later sets the capacitors were "ganged", mounted on the same shaft.

5. Rogowski coils are sometimes referred to as “rope Cts”.

6. Some TRF sets that were listened to with earphones didn't need an audio amplifier.

7. Hall Effect sensors are based on the “Hall Effect”, named after Edwin Hall.

8. Hall Effect circuitry is placed perpendicular in the core the magnetic field.

***III. Form nouns***

| **Verbs (V)** | **Nouns (N)** |
|---|---|
| to measure | |
| to resist | |
| to isolate | |
| to equip | |
| to saturate | |
| to apply | |
| to conduct | |
| to transform | |
| to dissipate | |
| to operate | |
| to amplify | |
| to differ | |

***IV. Divide the following words into 4 columns***

| **Verbs (V)** | **Nouns (N)** | **Adjectives (A)** | **Adverbs (Adv.)** |
|---|---|---|---|
| | | | |

Employ, capacitor, reduce, easily, distortion, overheat, amplifier, complementary, practical, thermally, couple, directly, compare, voltage, typically, possibility, internally, minimize, automatically, provide, negative, calculate, firmly, frequency, achieve

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Критерии оценивания письменной работы (письменного опроса по темам семестра):

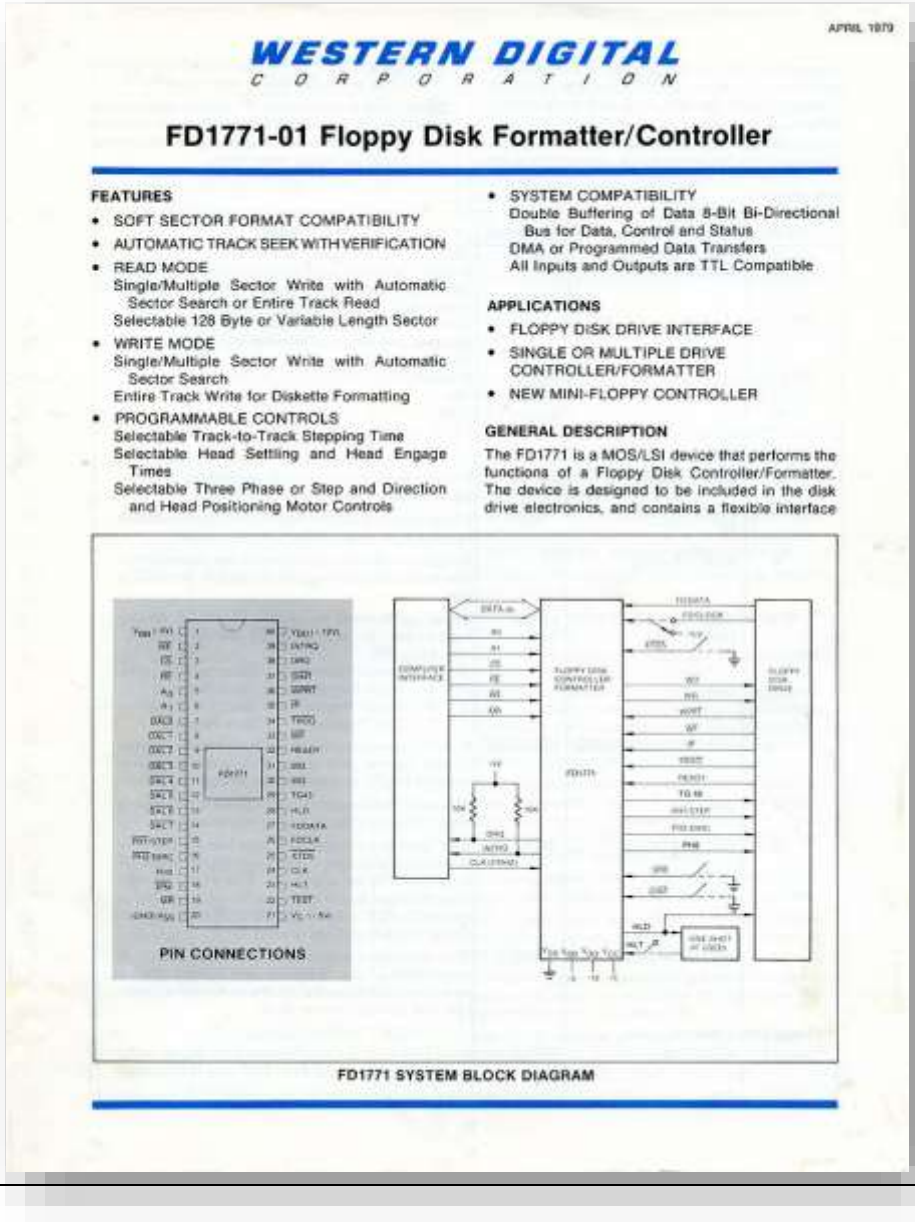
| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***<u>7 семестр</u>***

3.1.5 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Практикум технического перевода. Даташиты»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; причастия I, II»

*Оценочный материал:* Задания для проведения промежуточной аттестации в форме зачёта (практические; письменный опрос по темам семестра)



APRIL 1979

WESTERN DIGITAL
CORPORATION

FD1771-01 Floppy Disk Formatter/Controller

FEATURES

- SOFT SECTOR FORMAT COMPATIBILITY
- AUTOMATIC TRACK SEEK WITH VERIFICATION
- READ MODE
  Single/Multiple Sector Write with Automatic Sector Search or Entire Track Read
  Selectable 128 Byte or Variable Length Sector
- WRITE MODE
  Single/Multiple Sector Write with Automatic Sector Search
  Entire Track Write for Diskette Formatting
- PROGRAMMABLE CONTROLS
  Selectable Track-to-Track Stepping Time
  Selectable Head Settling and Head Engage Times
  Selectable Three Phase or Step and Direction and Head Positioning Motor Controls
- SYSTEM COMPATIBILITY
  Double Buffering of Data 8-Bit Bi-Directional Bus for Data, Control and Status
  DMA or Programmed Data Transfers
  All Inputs and Outputs are TTL Compatible

APPLICATIONS

- FLOPPY DISK DRIVE INTERFACE
- SINGLE OR MULTIPLE DRIVE CONTROLLER/FORMATTER
- NEW MINI-FLOPPY CONTROLLER

GENERAL DESCRIPTION

The FD1771 is a MOS/LSI device that performs the functions of a Floppy Disk Controller/Formatter. The device is designed to be included in the disk drive electronics, and contains a flexible interface

PIN CONNECTIONS

FD1771 SYSTEM BLOCK DIAGRAM

## Variant 1

### <u>Task 1</u> *Rewrite the following Data Sheet in Russian*

**A datasheet** is an important document that is included in every equipment or material purchase. It showcases the technical aspects of an object and it also allows buyers to be more aware on how they can use what they have bought to its maximum potential.

### <u>Task 2</u> *Translate the following terms (16) into English*

**Example,**

1) **ток синхронизации -** sync current;
2) **земля –**
3) **напряжение питания -**

| Контакт | Обозначение | Функция |
|---|---|---|
| 1 | $I_{sync}$ | Ток синхронизации |
| 2 | GND | Земля |
| 3 | $V_s$ | Напряжение питания |
| 4 | Output | Импульсный выход управления |
| 5 | $V_{RP}$ | Регулировка тока разгона |
| 6 | $C_p$ | Регулировка напряжения разгона |
| 7 | F/V | Преобразователь частоты в напряжение |
| 8 | $C_{RV}$ | Генератор подкачки заряда |
| 9 | OP- | Инвертирующий вход ОР |
| 10 | OP+ | Неинвертирующий вход ОР |
| 11 | CTR/OPO | Управляющий вход / выход ОР |
| 12 | $C_{soft}$ | Плавный пуск |
| 13 | $I_{sense}$ | Измерение тока нагрузки |
| 14 | OVL | Регулировка перегрузки |
| 15 | $V_{Ref}$ | Опорное напряжение |
| 16 | $V_{sync}$ | Синхронизация напряжения |

## <u>Task 3</u> *Translate the following passage into Russian in writing*

**Product datasheet information**

A product datasheet (PDS), like any datasheet, has a different data model per category. It typically contains:

- Identifiers like manufacturer & manufacturer product code, GTIN
- Classification data, such as UNSPSC
- Descriptions such as marketing texts
- Specifications
- Product images
- Feature logos
- Reasons-to-buy
- Leaflets, typically as PDFs
- Manuals, typically in PDF.
- Product videos, 3D objects, and other rich media assets

In Open Icecat, the global open catalogue or open content project in which hundreds of manufacturers and thousands of e-commerce sellers participate, the data models of tens of thousands of taxonomy classes are defined, and millions of free PDSs can be found conforming these data-sheet data models.

**Material Safety Data Sheets**

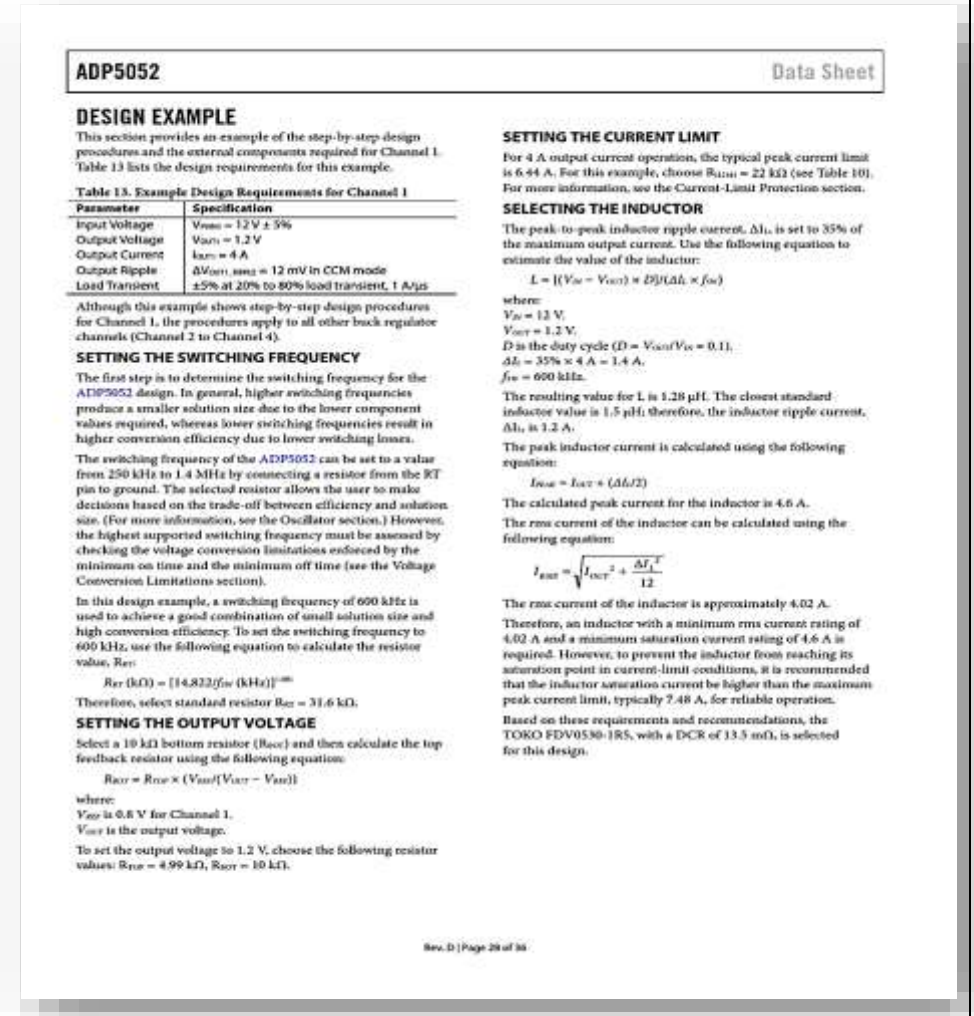
A Material Safety Data Sheet (MSDS), Safety Data Sheet (SDS), or Product Safety Data Sheet (PSDS) is an important component of product stewardship and occupational safety and health. These are required by agencies such as OSHA in its Hazard Communication Standard, 29 C.F.R. 1910.1200. It provides workers with ways to allow them to work in a safe manner and gives them physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. The MSDSs differ from country to country, as different countries have different regulations. In some jurisdictions, it is compulsory for the SDS to state the chemical's risks, safety, and effect on the environment.

The SDSs are a commonly used classification for logging information on chemicals, chemical compounds, and chemical mixtures. The SDSs often include the safe use of the chemical and the hazardous nature of the chemical. Anytime chemicals are used these data sheets will be found.
There is a need to have an internationally recognized symbol when describing hazardous substances. Labels can include hazard symbols such as the European Union standard black diagonal cross on an orange background, used to denote a harmful substance.
The purpose of an SDS is not so that the general public will have a knowledge of how to read and understand it, but more so that it can be used in an occupational setting to allow workers to be able to work with it.

## Variant 2

## Task 1 *Rewrite the following Data Sheet in Russian*

**A datasheet** is an important document that is included in every equipment or material purchase. It showcases the technical aspects of an object and it also allows buyers to be more aware on how they can use what they have bought to its maximum potential.



ADP5052 Data Sheet

### DESIGN EXAMPLE

This section provides an example of the step-by-step design procedures and the external components required for Channel 1. Table 13 lists the design requirements for this example.

**Table 13. Example Design Requirements for Channel 1**

| Parameter | Specification |
|---|---|
| Input Voltage | $V_{IN(DC)}$ = 12 V ± 5% |
| Output Voltage | $V_{OUT1}$ = 1.2 V |
| Output Current | $I_{OUT1}$ = 4 A |
| Output Ripple | $\Delta V_{OUT1\_RMS}$ = 12 mV in CCM mode |
| Load Transient | ±5% at 20% to 80% load transient, 1 A/µs |

Although this example shows step-by-step design procedures for Channel 1, the procedures apply to all other buck regulator channels (Channel 2 to Channel 4).

### SETTING THE SWITCHING FREQUENCY

The first step is to determine the switching frequency for the ADP5052 design. In general, higher switching frequencies produce a smaller solution size due to the lower component values required, whereas lower switching frequencies result in higher conversion efficiency due to lower switching losses.

The switching frequency of the ADP5052 can be set to a value from 250 kHz to 1.4 MHz by connecting a resistor from the RT pin to ground. The selected resistor allows the user to make decisions based on the trade-off between efficiency and solution size. (For more information, see the Oscillator section.) However, the highest supported switching frequency must be assessed by checking the voltage conversion limitations enforced by the minimum on time and the minimum off time (see the Voltage Conversion Limitations section).

In this design example, a switching frequency of 600 kHz is used to achieve a good combination of small solution size and high conversion efficiency. To set the switching frequency to 600 kHz, use the following equation to calculate the resistor value, $R_{RT}$:

$$R_{RT}\ (k\Omega) = [14,822/f_{SW}\ (kHz)]^{1.006}$$

Therefore, select standard resistor $R_{RT}$ = 31.6 kΩ.

### SETTING THE OUTPUT VOLTAGE

Select a 10 kΩ bottom resistor ($R_{BOT}$) and then calculate the top feedback resistor using the following equation:

$$R_{TOP} = R_{BOT} \times (V_{OUT}/(V_{OUT} - V_{FB}))$$

where:
$V_{FB}$ is 0.8 V for Channel 1.
$V_{OUT}$ is the output voltage.

To set the output voltage to 1.2 V, choose the following resistor values: $R_{TOP}$ = 4.99 kΩ, $R_{BOT}$ = 10 kΩ.

### SETTING THE CURRENT LIMIT

For 4 A output current operation, the typical peak current limit is 6.44 A. For this example, choose $R_{ILIM}$ = 22 kΩ (see Table 10). For more information, see the Current-Limit Protection section.

### SELECTING THE INDUCTOR

The peak-to-peak inductor ripple current, $\Delta I_L$, is set to 35% of the maximum output current. Use the following equation to estimate the value of the inductor:

$$L = [(V_{IN} - V_{OUT}) \times D]/(\Delta I_L \times f_{SW})$$

where:
$V_{IN}$ = 12 V.
$V_{OUT}$ = 1.2 V.
$D$ is the duty cycle ($D = V_{OUT}/V_{IN}$ = 0.1).
$\Delta I_L$ = 35% × 4 A = 1.4 A.
$f_{SW}$ = 600 kHz.

The resulting value for L is 1.28 µH. The closest standard inductor value is 1.5 µH; therefore, the inductor ripple current, $\Delta I_L$, is 1.2 A.

The peak inductor current is calculated using the following equation:

$$I_{PEAK} = I_{OUT} + (\Delta I_L/2)$$

The calculated peak current for the inductor is 4.6 A.

The rms current of the inductor can be calculated using the following equation:

$$I_{RMS} = \sqrt{I_{OUT}^2 + \frac{\Delta I_L^2}{12}}$$

The rms current of the inductor is approximately 4.02 A.

Therefore, an inductor with a minimum rms current rating of 4.02 A and a minimum saturation current rating of 4.6 A is required. However, to prevent the inductor from reaching its saturation point in current-limit conditions, it is recommended that the inductor saturation current be higher than the maximum peak current limit, typically 7.48 A, for reliable operation.

Based on these requirements and recommendations, the TOKO FDV0530-1R5, with a DCR of 13.5 mΩ, is selected for this design.

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## Task 2 *Translate the following terms (18) into English*

**Example,**

1) **ток синхронизации - sync current;**
2) **земля –**
3) **напряжение питания –**

| Контакт | Обозначение | Функция |
|---|---|---|
| 1 | $I_{sync}$ | Ток синхронизации |
| 2 | GND | Земля |
| 3 | $V_s$ | Напряжение питания |
| 4 | Output | Импульсный выход управления |
| 5 | Retr | Программный перезапуск |
| 6 | $V_{RP}$ | Регулировка тока разгона |
| 7 | $C_p$ | Регулировка напряжения разгона |
| 8 | F/V | Преобразователь частоты в напряжение |
| 9 | $C_{RV}$ | Генератор подкачки заряда |
| 10 | OP- | Инвертирующий вход ОР |
| 11 | OP+ | Неинвертирующий вход ОР |
| 12 | CTR/OPO | Управляющий вход / выход ОР |
| 13 | $C_{soft}$ | Плавный пуск |
| 14 | $I_{sense}$ | Измерение тока нагрузки |
| 15 | OVL | Регулировка перегрузки |
| 16 | $V_{Ref}$ | Опорное напряжение |
| 17 | $V_{sync}$ | Синхронизация напряжения |
| 18 | PB/TM | Блокирование импульсов / Мониторинг тахометра |

**<u>Task 3</u>** ***Translate the following passage into Russian in writing***

A **datasheet**, **data-sheet**, or **spec sheet** is a document that summarizes the performance and other characteristics of a product, machine, component (e.g., an electronic component), material, subsystem (e.g., a power supply), or software in sufficient detail that allows a buyer to understand what the product is and a design engineer to understand the role of the component in the overall system. Typically, a datasheet is created by the manufacturer and begins with an introductory page describing the rest of the document, followed by listings of specific characteristics, with further information on the connectivity of the devices. In cases where there is relevant source code to include, it is usually attached near the end of the document or separated into another file. Datasheets are created, stored, and distributed via product information management or product data management systems. Depending on the specific purpose, a datasheet may offer an average value, a typical value, a typical range, engineering tolerances, or a nominal value. The type and source of data are usually stated on the datasheet. A datasheet is usually used for commercial or technical communication to describe the characteristics of an item or product. It can be published by the manufacturer to help people choose products or to help use the products. By contrast, a technical specification is an explicit set of requirements to be satisfied by a material, product, or service.

The ideal datasheet specifies characteristics in a formal structure, according to a strict taxonomy, that allows the information to be processed by a machine. Such machine readable descriptions can facilitate information retrieval, display, design, testing,

interfacing, verification, system discovery, and e-commerce.

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Критерии оценивания:
- письменной речи

| | |
|---|---|
| Оценка «5» | Письменное высказывание выстроено в определенной логике, было связным и логически последовательным.<br>Языковые средства были употреблены правильно, отсутствовали ошибки, нарушающие коммуникацию, или они были незначительны (1-4). Используемая лексика соответствовала поставленной коммуникативной задаче. Письменное высказывание отличалось широким диапазоном используемой лексики и языковых средств, включающих клише и устойчивые словосочетания. Демонстрировалось умение преодолевать лексические трудности. При наличии ошибки студент сам ее исправлял. Использовались простые и сложные грамматические явления в различных сочетаниях, разные грамматические времена, простые и сложные предложения. Письменное высказывание было понятно носителю языка. |
| Оценка «4» | Студент в целом справился с поставленными речевыми задачами. Его письменное высказывание было связанным и логически последовательным. Использовался большой объем языковых средств, которые были употреблены правильно. Однако были сделаны отдельные языковые ошибки (5-10), не нарушившие понимание. Используемая лексика соответствовала поставленной коммуникативной задаче. Письменное высказывание отличалось широким диапазоном используемой лексики и языковых средств, включающих клише и устойчивые словосочетания. Демонстрировалось умение преодолевать лексические трудности. При наличии ошибки студент сам ее исправлял. Использовались простые и сложные грамматические явления в различных сочетаниях, разные грамматические времена, простые и сложные предложения. Письменное высказывание было понятно носителю языка. |
| Оценка «3» | Работа студента не соответствовала нормативным требованиям: 50% объёма – предел. Студент сумел в основном решить поставленную речевую задачу, но диапазон языковых средств был ограничен. Допускались достаточно грубые языковые ошибки, нарушающие понимание (11-15). В некоторых местах нарушалась последовательность высказывания. |
| Оценка «2» | Студент сумел в очень малом объёме оформить письменное высказывание и только частично справился с решением коммуникативной задачи. Содержание высказывания не раскрывает или раскрывает лишь частично затронутую тему. Письменное высказывание было небольшим по объему (не соответствовало требованиям программы: ниже 50%). Наблюдалось использование минимального количества изученной лексики. Студент допускал большое количество языковых (лексических, грамматических) ошибок (более 15), нарушивших понимание. |

- письменной работы (письменного опроса по темам семестра):

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***8 семестр***

3.1.6 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Анализ электрических схем радиотелевизионной аппаратуры. Методы настройки и регулировки электрических схем радиотелевизионной аппаратуры»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; простые и сложные предложения»

*Материал оценивания:* Задания для проведения промежуточной аттестации в форме дифференцированного зачёта (практические; письменный опрос по темам семестра)

**Variant 1**

1) **TEXT 1.** Выпишете из текста 5 терминов, не имеющих отношения к данной теме, и обоснуйте, почему вы так решили на англ. яз. (не менее 2 предложений в обосновании);
2) **TEXT 2.** Выпишите из текста только *технические данные*. Почему вы решили, что выбранные вами предложения технические? Обоснуйте свой ответ (3-4 предложения).
3) **TEXT 3.** В 10 предложениях перескажите текст на англ. яз.

   Почему система так называется?

   Кто автор правила, указанного в тексте?

   Поясните суть следующего предложения своими словами на англ. яз.:

*The Iridium system was designed to perform communication with terrestrial networks using up to 250 gateways and two network control stations.;*

4) **TEXT 4.** Укажите главную идею текста (выпишете предложения, где выражается суть)

   Поясните, почему, на ваш взгляд, так важен указанный угол? Как вы думаете, почему нельзя, чтоб он был другой?

*For the elevation angle between 0° and 20°, the satellite channel has similar properties to the terrestrial mobile channel and suffers from the multipath phenomenon. For the elevation angle between 20° and 40° the multipath occurs due to diffuse reflections only.*

## TEXT 1. DECT/GSM interworking

As we have already mentioned, the DECT systems are installed not only in a residential areas or in private companies but also in public places characterized by particularly high traffic density, such as airports, railway stations or city centers. However, it is also possible to apply DECT in co-operation with a cellular system, in particular with the GSM. It is possible if dual-mode GSM/DECT mobile stations are used. A dual-mode phone operates as a GSM phone in places where the GSM system is accessible or if the subscriber moves at a high speed. In the traffic spots covered by DECT in which the GSM system is not able to serve all subscribers, a dual-mode phone can switch to the DECT mode. In the area covered by GSM, the DECT-islands can be additionally placed. Figure 13.8 presents DECT/GSM interworking architecture. The DECT fixed system (DFS) is connected via the *Interworking Unit* (IWU) with the mobile switching center (MSC). The interface between the IWU and MSC is a GSM *A*-interface. The task of the IWU is to translate the DECT system mobility management protocol and the call control protocol into the appropriate GSM protocols. The reverse process takes place as well. The DECT DFS block is seen by the GSM MSC as a base station controller. The cooperation of both systems has been standardized by ETSI by defining the *GSM Interworking protocol*. In the joint DECT/GSM system data transmission and SMS services are provided.

## TEXT 2. PERSONAL ACCESS COMMUNICATIONS SYSTEM (PACS)

The PACS *(Personal Access Communications System)* is a counterpart of DECT in America. The PACS standards are mostly based on the Bell Communcations Research wireless communications system (WACS). There are three versions of PACS:

• the version denoted mostly as PACS, which operates in a FDD mode in the licensed *Personal Communications System* (PCS) bands 1850–1910 and 1930- 1990MHz,

• the version known as PACS-UB, which operates in a TDD mode in the unlicensed band 1910–1930 MHz in the same way as the PACS system for the licensed band,

• the PACS-WUPE (*Wireless User Premises Equipment)* based on the Japanese PHS system (see the next paragraph). The basic system parameters were listed in Table 13.1. PACS has similar advantages as DECT. It features small, inexpensive base stations (RP - *Radio Ports)* with a small coverage area, low-DSP-complexity and low-power small mobile handsets, the capability to provide telecommunication network access whose quality, privacy and reliability are the same as in wireline access. PACS has been optimized for services provided in indoor environment, and high-density traffic environments. As a result, it is a cost-effective solution in high traffic areas. The simplicity of the applied radio protocol allows for easy integration of the PACS unit with any cellular mobile station used in America, such as AMPS, IS-95, IS-136 or PCS 1900.

## TEXT 3. Iridium

The Iridium system is one of two systems applying a combination of FDMA/TDMA. Its name comes from the element Iridium. One atom of Iridium has 77 orbiting electrons. At first, 77 satellites were to be used in the system. Later, after optimization of the constellation resulting in cost reduction, the number of 66 satellites appeared to be sufficient to ensure reliable communication. The concept of Iridium appeared first in 1987 and was presented to the public by the Motorola Corporation in 1990. The companies from many countries including Russia and China participate in the Iridium consortium. The Iridium satellites have been placed in six orbital planes inclined at 86° with respect to the equatorial plane. Thus, the satellites rotate almost between the geographic poles. In each orbital plane 11 evenly spaced satellites rotate in the circular orbit at the altitude of 780 km. The satellites located in the neighboring planes rotate in the same direction but are shifted in phase.

The satellites which rotate in the first plane and the last (sixth) plane are the exception, because they rotate in opposite directions. The angular distance between orbital planes is equal to 31.6°, only the angular distance between the sixth and first plane is equal to 22°. The satellite constellation was selected according to the rule developed by Adams and Rider. Each satellite can communicate and

route the traffic to two satellites from the same orbit: the preceding one and the following one, and two satellites from each neighboring orbits. The intersatellite links operate in the 23 GHz band and use four antennas. Therefore at any given moment, four intersatellite connections can be maintained by a given satellite, although there are six satellites located in its direct vicinity. The Iridium system was designed to perform communication with terrestrial networks using up to 250 gateways and two network control stations. Such a system provides sufficient redundancy to ensure reliability; however, 15 gateways are sufficient for the system operation. Each gateway has two tracking antennas communicating in the 20/30 GHz band with the currently active satellite and with the forthcoming satellite. The Iridium subscriber is connected with a PSTN through one of the earth gateways. Intersatellite links allow for setting up a connection between two Iridium subscribers without using a terrestrial network. In a connection between an Iridium terminal and a terrestrial network subscriber, intersatellite links are used to minimize the route in the terrestrial network. The connection "goes down" to the terrestrial network through the gateway closest to the terrestrial subscriber.

## TEXT 4. GLOBALSTAR

The GLOBALSTAR system was the initiative of Loral Communications. The system concept differs from that of Iridium in many aspects. The research on the selection of LEO orbits showed that two approaches to setting their positions are possible:

- the orbits are located in the polar planes, which allows for full earth coverage,
- the orbits are located in the planes properly inclined with respect to the equatorial plane.

The first approach was applied in Iridium. The second approach has been used in GLOBALSTAR. The satellites will cover the area of the earth surface up to the determined latitude. The coverage of the GLOBALSTAR system has been set between ±70° of latitude. The northern part of Greenland, Spitzbergen and the islands of Northern Canada remain outside the system coverage.

To ensure high transmission quality, the satellite elevation angle must be sufficiently large. The value of this angle determines the transmission channel quality on the path between the satellite and a terrestrial terminal. For the elevation angle between 0° and 20°, the satellite channel has similar properties to the terrestrial mobile channel and suffers from the multipath phenomenon. For the elevation angle between 20° and 40° the multipath occurs due to diffuse reflections only. For higher elevation angles the channel quality is gradually improving. High quality transmission can be achieved above 70° of elevation. In order to obtain good propagation properties, the orbits inclined at 52° have been selected. The satellites rotate in eight planes with the phase shift of 7.5° between each two successive planes. The rotation period is equal to 114 minutes.

## Variant 2

1) **TEXT 5.** Зачем нужен трансформатор? Поясните на англ. яз. суть работы стабилизатора.
2) **TEXT 6.** Выпишите 5 важных терминов текста, без которых было бы невозможно понять смысл текста. Почему вы так решили? Обоснуйте свой выбор (1-2 предложения в обосновании)

   **Переведите словосочетание -** *omnidirectional coverage*. Это термин, два слова, образующие термин, или просто слова, передающие значение? Обоснуйте ваш ответ на англ. яз.
3) **TEXT 7.** Передайте суть текста в 3 ключевых предложениях на англ. яз.

Переведите **выделенные** слова **отдельно**, потом в **контексте**. Объясните своими словами **смысл описанного процесса**.

*The **processing** of data must respect the relative data timing by e.g. **stretching** between or **interpolation** of received data. If the processing does not respect the AV-sync error, it will increase whenever data gets lost because of transmission errors or because of missing or **mis-timed processing**.*

4) **TEXT 8.** Переведите предложение:

*Essentially, this can convert a computer to a television, and depending on the owner's cable service, it may allow him or her to watch a wide number of television stations.*

Может ли это предложение отображать суть всего текста? Если нет, найдите в тексте **ключевое предложение** отображения сути.

5) **TEXT 9.** Выберите из перечисленных в тексте наиболее **важные** для вас **преимущества OLEDs**, и **их самый явный недостаток**. Согласны ли вы с утверждением или оно уже неактуально на сегодняшний день? Ответьте на вопрос на англ. яз.

*OLED Research and development is moving forward at a rapid pace and may soon lead to applications in heads-up displays (HUD), automotive dashboards, billboard-type displays, home and office lighting, and flexible displays.*

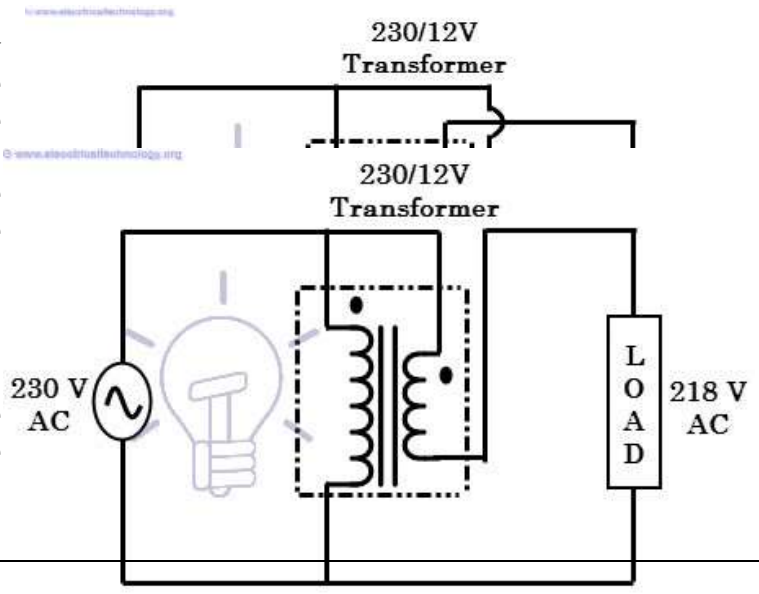
## TEXT 5. How Voltage Stabilizer Works? Basic Principle of voltage stabilizer to Perform Buck and Boost Operations

In a voltage stabilizer, voltage correction from over and under voltage conditions is performed through two essential operations, namely b*oost and buck operations*. These operations can be carried manually by switches or automatically through electronic circuitry. During under voltage condition, boost operation increases the voltage to a rated level while buck operation reduces the voltage level during over voltage condition.

The concept of stabilization involves in adding or subtracting the voltage to and from the mains supply. For performing such task stabilizer uses a transformer which is connected in different configurations with switching relays. Some stabilizers use a transformer with taps on winding to provide different voltage corrections while servo stabilizers use an auto transformer to have wide range of correction.

To understand this concept, let us consider simple step down transformer of 230/12V rating and its connection with these operations are given below.

The figure above illustrates the boosting configuration in which the polarity of the secondary winding is oriented in such a way that its voltage is directly added to the primary voltage. Therefore, in case of under voltage condition, transformer (whether it can be tap changing or autotransformer) is switched by the relays or solid state switches such that additional volts are appended to the input voltage.




In the figure above, transformer is connected in bucking configuration, wherein the polarity of secondary coil is oriented in such a way that its voltage subtracts from the primary voltage. The switching circuit shifts the connection to

the load to this configuration during over voltage condition.

The figure above shows two stage voltage stabilizer which uses two relays to provide constant AC supply to the load during overvoltage and under voltage conditions. By switching the relays, buck and boost operations for two specific voltage fluctuations (one is under voltage, for instance, say 195V and another for overvoltage, say 245V) can be performed.

In case of tapping transformer type stabilizers, different taps are switched based on the required amount of boost or buck voltages. But, in case of auto transformer type stabilizers, motors (servo motor) are used along with sliding contact to obtain boost or buck voltages from the auto transformer as it contains only one winding.

## TEXT 6. CORDLESS TELEPHONY IN THE REALIZATION OF WLL

Cordless telephony standards have been also applied in the realization of wireless local loops. There are solutions using CT2, DECT and PACS as the basis of the wireless local loop system. We will concentrate on the application of the DECT standard. As we know, the DECT system has been optimized for urban and suburban environments with high traffic density. The nominal range of the DECT base station is around a few hundred meters if the omnidirectional antenna is applied and the subscribers can move. However, if the end stations are stationary and directional antennas are used, the range of DECT base stations can be extended to 5 km. The range is limited by the structure of the TDMA frame and the propagation time which has to be contained in the guard time of a DECT burst, which is equivalent to the duration of 60 bits. In the case of terrain obstacles or if the range extension is necessary, the DECT *Wireless Repeater Station* (WRS) can be applied. In this manner the range is further extended by 5 km the architecture of the WLL system based on the DECT standard. The *Radio Network Controller* (RNC) is connected with the set of base stations DANs *(DECT Access Nodes)* using 2 Mbit/s link realized by the radio relay systems or by wired connection. The DANs contain a set of directional antennas usually mounted in such a way that joint **omnidirectional coverage** is obtained. Subscribers are equipped with the *Fixed Access Units* (FAUs), which allow for connection of one or several telephone lines and which communicate with the base station (DAN)through a directional antenna. The application of the WRS has been standardized by ETSI. The WRSs can be applied in different ways. If several directional antennas are applied, they can be used to ensure coverage in the area which otherwise would not be accessible for the system.

## TEXT 7. Audio-to-video synchronization

**Audio-to-video synchronization** (also known as **lip sync**, or by the lack of it: **lip sync error**, **lip flap**) refers to the relative timing of audio (sound) and video (image) parts during creation, post-production (mixing), transmission, reception and play-back processing. AV synchronization can be an issue in television, videoconferencing, or film.

In industry terminology the lip sync error is expressed as an amount of time the audio departs from perfect synchronization with the video where a positive time number indicates the audio leads the video and a negative number indicates the audio lags the video. This terminology and standardization of the numeric lip sync error is utilized in the professional broadcast industry as evidenced by the various professional papers, standards such as ITU-R BT.1359-1, and other references below.

Digital or analog audio video streams or video files usually contain some sort of synchronization mechanism, either in the form of interleaved video and audio data or by explicit relative timestamping of data. The processing of data must respect the relative data timing by e.g. stretching between or interpolation of received data. If the processing does not respect the AV-sync error, it will increase whenever data gets lost because of transmission errors or because of missing or mis-timed processing.

### Viewer experience of incorrectly synchronized AV-sync

The result typically leaves a filmed or televised character moving his or her mouth when there is no spoken dialog to accompany it, hence the term "lip flap" or "lip-sync error". The resulting audio-video sync error can be annoying to the viewer and may even cause the viewer to not enjoy the program, decrease the effectiveness of the program or lead to a negative perception of the speaker on the part of the viewer.[6] The potential loss of effectiveness is of particular concern for product commercials and

political candidates. Television industry standards organizations, such as the Advanced Television Systems Committee, have become involved in setting standards for audio-video sync errors. Because of these annoyances, AV-sync error is a concern to the television programming industry, including television stations, networks, advertisers and program production companies. Unfortunately, the advent of high-definition flat-panel display technologies (LCD, DLP and plasma), which can delay video more than audio, has moved the problem into the viewer's home and beyond control of the television programming industry alone. Consumer product companies now offer audio-delay adjustments to compensate for video-delay changes in TVs and A/V receivers, and several companies manufacture dedicated digital audio delays made exclusively for lip-sync error correction.

## TEXT 8. A TV tuner

- allows a person to receive signals on his or her television, and therefore receive different channels. It converts signals into pictures and sounds. The oldest type of tuner was simply the dial used to change channels and allow the television to pick up different analog signals broadcast over the air. Sometimes, in order to get certain cable channels, a TV needs a special box purchased or rented from a cable company.

A basic tuner is available in most TVs, or through most cable companies. Televisions sold in the US as of mid-2007 were required to include a digital tuner to allow the set to pick up digital television signals by antenna. In addition, many people have a TV tuner card, or exterior tuner that allows them to receive television programming on a computer screen. Essentially, this can convert a computer to a television, and depending on the owner's cable service, it may allow him or her to watch a wide number of television stations.

Many people use tuner cards to watch free, over the air television on their computers without using a cable service. To receive digital television broadcast signals with this card, the user will usually need to attach an antenna.

Care is required when purchasing a card or an exterior TV tuner, since not all tuners work with all computer systems. Some are specifically designed for Macs or PCs, and many require additional software in order to view images. They may also require a certain amount of memory to work correctly.

## TEXT 9. OLED: An emerging display technology

### OLED Advantages

The LCD is currently the display of choice in small devices and is also popular in large-screen TVs. Regular LEDs often form the digits on digital clocks and other electronic devices. OLEDs offer many advantages over both LCDs and LEDs, including:

• The plastic, organic layers of an OLED are thinner, lighter and more flexible than the crystalline layers in an LED or LCD.

• Because the light-emitting layers of an OLED are lighter, the substrate of an OLED can be flexible instead of rigid.

OLED substrates can be plastic rather than the glass used for LEDs and LCDs.

• OLEDs are brighter than LEDs. Because the organic layers of an OLED are much thinner than the corresponding inorganic crystal layers of an LED, the conductive and emissive layers of an OLED can be multi-layered. Also, LEDs and LCDs require glass for support, and glass absorbs some light.

OLEDs do not require glass.

• OLEDs do not require backlighting like LCDs. LCDs work by selectively blocking areas of the backlight to make the images that you see, while OLEDs generate light themselves. Because OLEDs do not require backlighting, they consume much less power than LCDs (most of the LCD power goes to the backlighting). This is especially important for battery-operated devices such as cell phones.

• OLEDs are easier to produce and can be made to larger sizes. Because OLEDs are essentially plastics, they can be made into large, thin sheets. It is much more difficult to grow and lay down so many liquid crystals.

• OLEDs have large fields of view, about 170 degrees. Because LCDs work by blocking light, they have an inherent viewing obstacle from certain angles. OLEDs produce their own light, so they have a much wider viewing range.

## OLED Disadvsantages

OLED seem to be the perfect technology for all types of displays, however, they do have some problems, including:

• Lifetime. While red and green OLED films have long lifetimes (10,000 to 40,000 hours), blue organics currently have much shorter lifetimes (only about 1000 hours).

• Manufacturing. Processes are expensive right now.

• Water. Water can easily damage OLEDs.

**OLED Applications**

OLED technology was invented by Eastman Kodak in the early 1980s and, currently, OLEDs are used in small-screen devices such as cell phones, PDAs and digital cameras. In March 2003, the company introduced the world's first digital camera with an OLED display. In September 2004, Sony Corporation announced that it was beginning mass production of OLED screens for its CLIE PEG-VZ90 model of personal-entertainment handhelds. Several companies have already built prototype computer monitors and large-screen TVs. In May 2005, Samsung Electronics announced that it had developed the first 40" OLED-based, ultra slim TV. OLED Research and development is moving forward at a rapid pace and may soon lead to applications in heads-up displays (HUD), automotive dashboards, billboard-type displays, home and office lighting, and flexible displays. OLEDs refresh approximately 1000 times faster than LCDs. Although a device with an OLED display could change information in real time, the eye cannot perceive changes to video faster than about 13ms. Refresh rate is also not the end-all in display products. Many of the highend monitors take advantage of advanced engineering in scalers and other components to make the view more pleasing to the eye.

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Критерии оценивания:

- письменной речи

| | |
|---|---|
| Оценка «5» | Письменное высказывание выстроено в определенной логике, было связным и логически последовательным. Языковые средства были употреблены правильно, отсутствовали ошибки, нарушающие коммуникацию, или они были незначительны (1-4). Используемая лексика соответствовала поставленной коммуникативной задаче. Письменное высказывание отличалось широким диапазоном используемой лексики и языковых средств, включающих клише и устойчивые словосочетания. Демонстрировалось умение преодолевать лексические трудности. При наличии ошибки студент сам ее исправлял. Использовались простые и сложные грамматические явления в различных сочетаниях, разные грамматические времена, простые и сложные предложения. Письменное высказывание было понятно носителю языка. |
| Оценка «4» | Студент в целом справился с поставленными речевыми задачами. Его письменное высказывание было связанным и логически последовательным. Использовался большой объем языковых средств, которые были употреблены правильно. Однако были сделаны отдельные языковые ошибки (5-10), не нарушившие понимание. Используемая лексика соответствовала поставленной коммуникативной задаче. Письменное высказывание отличалось широким диапазоном используемой лексики и языковых средств, включающих клише и устойчивые словосочетания. Демонстрировалось умение преодолевать лексические трудности. При наличии ошибки студент сам ее исправлял. Использовались простые и сложные грамматические явления в различных сочетаниях, разные грамматические времена, простые и сложные предложения. Письменное высказывание было понятно носителю языка. |

| | |
|---|---|
| Оценка «3» | Работа студента не соответствовала нормативным требованиям: 50% объёма – предел. Студент сумел в основном решить поставленную речевую задачу, но диапазон языковых средств был ограничен. Допускались достаточно грубые языковые ошибки, нарушающие понимание (11-15). В некоторых местах нарушалась последовательность высказывания. |
| Оценка «2» | Студент сумел в очень малом объёме оформить письменное высказывание и только частично справился с решением коммуникативной задачи. Содержание высказывания не раскрывает или раскрывает лишь частично затронутую тему. Письменное высказывание было небольшим по объему (не соответствовало требованиям программы: ниже 50%). Наблюдалось использование минимального количества изученной лексики. Студент допускал большое количество языковых (лексических, грамматических) ошибок (более 15), нарушивших понимание. |

- письменной работы (письменного опроса по темам семестра):

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***9 семестр***

3.1.7 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Эксплуатация, сервис и техническое обслуживание радиоэлектронной техники»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; употребление модальных глаголов в разных временных формах»

*Материал оценивания:* Задания для проведения промежуточной аттестации в форме зачёта (практические; письменный опрос по темам семестра)

**Variant 1**

**1. *Read the text. Write English in short the main idea of it and your opinion from the future troubleshooter's point of view***

*ALL EQUIPMENT CHECK THE OBVIOUS*

Try the easy things first. If you are able to solve the problem by replacing a fuse or reconnecting a loose cable, you might be able to avoid a lot of effort. Many experienced technicians have spent hours troubleshooting a piece of equipment only to learn the hard way that the on/off switch was "off" or the squelch control was set too high, or that they were not using the equipment properly. Read the manual! Your equipment may be working as designed. Many electronic "problems" are caused by a switch that is set in the wrong position, or a unit that is being asked to do something it was not designed to do. Before you open up your equipment for major surgery, make sure you are using it correctly. Next, make sure the equipment is plugged in, that the ac outlet does indeed have power, that the equipment is switched "on" and that all of the fuses are good. If the equipment uses batteries or an external power supply, make sure these are working. Check that all wires, cables and accessories are working and

plugged in to the right connectors or jacks. In a "system," it is often difficult to be sure which component or subsystem is bad. Your transmitter may not work on SSB because the transmitter is bad, but it could also be a bad microphone. Connector faults are more common than component troubles. Consider poor connections as prime suspects in your troubleshooting detective work. Do a thorough inspection of the connections. Is the antenna connected? How about the speaker, fuses and TR switch? Are transistors and ICs firmly seated in their sockets? Are all interconnection cables sound and securely connected? Many of these problems are obvious to the eye, so look around carefully.

## *2. Find the missed sentences in the text. Translate the sentence (1)*

DOCUMENTATION

Once you have determined that a piece of equipment is indeed broken, you need to do some preparation before you diagnose and fix it. _____(1)_____

The original equipment manufacturer is the best source of a manual or schematic. However, many old manufacturers have gone out of business. Several sources of equipment manuals can be located by a Web search. _____2_____

If you have access to the data books for the active devices used in the circuit, the pin-out diagrams and_____3_____.

1) if all else fails, you can sometimes reverse engineer a simple circuit by tracing wiring paths and identifying components to draw your own schematic.

2) applications notes will sometimes be enough to help you understand and troubleshoot the circuit

3) first, locate a schematic diagram and service manual. It is possible to troubleshoot without a service manual, but a schematic is almost indispensable.

## 3. *Below you have the scheme to begin troubleshooting. Imagine you have a problem device and should start right now. Write the answers to the questions*

*DEFINE PROBLEMS*

To begin troubleshooting, define the problem accurately. Ask yourself these questions:

1. What functions of the equipment do not work as they should; what does not work at all?
2. What kind of performance can you realistically expect?
3. Has the trouble occurred in the past? (Keep a record of troubles and maintenance in the owner's manual, shack notebook or log book.)

The information will help with your work, and may help service personnel if their advice or professional service is required.

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# Variant 2

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## 1. *Read the text. Write English in short the main idea of it and your opinion from the future troubleshooter's point of view*

*LOOK AROUND*

Many service problems are visible, if you look for them carefully. Many a technician has spent hours tracking down a failure, only to find a bad solder joint or burned component that would have been spotted in careful inspection of the printed circuit board. Start troubleshooting by carefully inspecting the equipment. It is time consuming, but you really need to look at every connector, every wire, every solder joint and every component. A connector may have loosened, resulting in an open circuit. You may spot broken wires or see a bad solder joint. Flexing the printed circuit board or tugging on components a bit while looking at their solder joints will often locate a defective solder job. Look for scorched components. Make sure all of the screws securing the printed-circuit board are tight and

making good electrical contact. (Do not tighten the adjusting screws, however! You will ruin the alignment.) See if you can find evidence of previous repair jobs; these may not have been done properly. Make sure that each IC is firmly seated in its socket. Look for pins folded underneath the IC rather than making contact with the socket. If you are troubleshooting a newly constructed circuit, make sure each part is of the correct value or type number and is installed correctly. If your careful inspection doesn't reveal anything, it is time to apply power to the unit under test and continue the process. Observe all safety precautions while troubleshooting equipment. There are voltages inside some equipment that can kill you. If you are not qualified to work safely with the voltages and conditions inside of the equipment, do not proceed.

## *2. Find the missed sentences in the text. Translate the sentence (2)*

*Various Approaches*

There are two fundamental approaches to troubleshooting: _____1_____.The systematic approach _____**2**_____. An instinctive approach relies on troubleshooting experience to guide you in selecting which _____3_____. The systematic approach is usually chosen by _____4____ .

1) uses a defined process to analyze and isolate the problem

2) circuits to test and which tests to perform.

3) beginning troubleshooters

4) the systematic approach and the instinctive approach

## *3. Below you have the information about Equipment. **Answer, please, in English next questions as if you would be a top technician now. Your answers should be full and without "Yes/No/Don't know" statements***

1) Can Low-level signals be measured accurately with a voltmeter?
2) What can be observed when the junction drop of the diode in the probe will not register?
3) What can be judged by ear and by whom?
4) Is Signal tracing suitable for tracing FM signals or oscillators?
5) What offers high input impedance, variable sensitivity, and a constant display of the traced waveform?
6) What can simultaneously display the waveforms?

A voltmeter, with an RF probe, is the most common instrument used for signal tracing. Low-level signals cannot be measured accurately with this instrument. Signals that do not exceed the junction drop of the diode in the probe will not register at all, but the presence, or absence, of larger signals can be observed. A dedicated signal tracer can also be used. It is essentially an audio amplifier. An experienced technician can usually judge the level and distortion of the signal by ear. You cannot use a dedicated signal tracer to follow a signal that is not amplitude modulated (single sideband is a form of AM). Signal tracing is not suitable for tracing CW signals, FM signals or oscillators. To trace these, you will have to use a voltmeter and RF probe or an oscilloscope. An oscilloscope is the most versatile signal tracer. It offers high input impedance, variable sensitivity, and a constant display of the traced waveform. If the oscilloscope has sufficient bandwidth, RF signals can be observed directly. Alternatively, a demodulator probe can be used to show demodulated RF signals on a low-bandwidth 'scope. Dual-trace scopes can simultaneously display the waveforms, including their phase relationship, present at the input and output of a circuit.

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Критерии оценивания:

– чтение

| | |
|---|---|
| Оценка «5» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, догадался о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценивать важность, новизну, достоверность информации. У него развита языковая догадка, он не затрудняется в понимании незнакомых слов, он не испытывает необходимости обращаться к словарю и делает это 1-2 раза. Скорость чтения иноязычного текста может быть незначительно замедленной по сравнению с той, с которой студент читает на родном языке. |
| Оценка «4» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, сумел догадаться о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. Однако у него недостаточно развита языковая догадка, и он затрудняется в понимании некоторых незнакомых слов, он вынужден чаще обращаться к словарю, а темп чтения заметно замедлен по сравнению с родным языком. |
| Оценка «3» | ставится студенту, который неточно понял основное содержание прочитанного текста, сумел выделить в тексте только небольшое количество фактов. У него совсем не развита языковая догадка, он не сумел догадаться о значении незнакомых слов из контекста, крайне затруднялся в понимании многих незнакомых слов, был вынужден многократно обращаться к словарю, а темп чтения был слишком замедлен по сравнению с родным языком. Он не мог установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. |
| Оценка «2» | ставится студенту, если он не понял текст или понял содержание текста неправильно, не ориентировался в тексте при поиске определенных фактов, абсолютно не сумел семантизировать незнакомую лексику. |

- письменная работа (письменный опрос по темам семестра):

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

***10 семестр***

3.1.8 Объект оценивания «Умение переводить (со словарем) иностранные тексты профессиональной направленности», «Умение самостоятельно совершенствовать устную и письменную речь, пополнять словарный запас» и «Знание лексического материала (1200 - 1400 лексических единиц)» по теме «Применение

специализированного программного обеспечения при выполнении технических заданий по обслуживанию радиоэлектронной техники. Моделирование радиоэлектронной аппаратуры **(CAD)**»; «Знание грамматического минимума, необходимого для чтения и перевода (со словарем) иностранных текстов профессиональной направленности» по теме «Present Simple Active и Passive; простые и сложные предложения»

*Материал оценивания:* Задания для проведения промежуточной аттестации в форме дифференцированного зачёта (практические; письменный опрос по темам семестра)

## VARIANT 1

### 1. *Read the text. Write English in short the main idea of it and your opinion from the future troubleshooter's point of view*

**Computer-aided design (CAD)** is the use of computer technology to aid in the design and drafting (drafting involves the production of technical or engineering drawings and is the industrial arts sub-discipline that underlies technical endeavors) of a practical product or artistic creation. It is both a visual and symbol-based method of communication, and is a useful tool for engineers, architects, artists, and draftsmen.

Current CAD software packages range from two-dimensional (2D) vector-based drafting systems to three-dimensional (3D) solid and surface modelers. Modern CAD packages frequently allow rotations in three dimensions, so that a designed object can be viewed from any desired angle, even from the inside looking out. CAD has become an especially important technology within the scope of computer-aided technologies, with benefits such as lower product development costs and a greatly shortened design cycle. CAD enables designers to lay out and develop work on screen, print it out and save it for future editing, saving time on their drawings. Some CAD software is capable of dynamic, mathematical modeling, in which case it may be marketed as **CADD**, for "computer-aided design and drafting."

### 2. *Read the text. Write in 8 sentences the point of it, the use of CAD in engineering, about the possibilities of 2 and 3D systems, its advantages and drawbacks (if they are lack in the text formulate them yourselves)*

*Using CAD*

CAD is an important tool used in various ways by engineers and designers. Its use depends on the profession of the user and the type of software in question. Each of the different types of CAD systems requires the operator to think differently about how he or she will use them and he or she must design their virtual components in a different manner for each.

There are many producers of the lower-end 2D systems, including a number of free and open source programs. These provide an approach to the drawing process without all the fuss over scale and placement on the drawing sheet that accompanied hand drafting, since these can be adjusted as required during the creation of the final draft.

3D wireframe is basically an extension of 2D drafting. Each line has to be manually inserted into the drawing. The final product has no mass properties associated with it and cannot have features directly added to it, such as holes. The operator approaches these in a similar fashion to the 2D systems, although many 3D systems allow using the wireframe model to make the final engineering drawing views.

3D "dumb" solids (programs incorporating this technology include AutoCAD and Cadkey 19) are created in a way analogous to manipulations of real word objects. Basic three-dimensional geometric

forms (prisms, cylinders, spheres, and so on) have solid volumes added or subtracted from them, as if assembling or cutting real-world objects. Two-dimensional projected views can easily be generated from the models. Basic 3D solids don't usually include tools to easily allow motion of components, set limits to their motion, or identify interference between components.
3D parametric solid modeling (programs incorporating this technology include NX, the combination of UniGraphics and IDeas, Autodesk Inventor, Alibre Design, TopSolid, T-FLEX CAD, SolidWorks, and Solid Edge) require the operator to use what is referred to as "design intent." The objects and features created are adjustable. Any future modifications will be simple, difficult, or nearly impossible, depending on how the original part was created. One must think of this as being a "perfect world" representation of the component. If a feature was intended to be located from the center of the part, the operator needs to locate it from the center of the model, not, perhaps, from a more convenient edge or an arbitrary point, as he could when using "dumb" solids. Parametric solids require the operator to consider the consequences of his actions carefully. What may be simplest today could be worst case tomorrow.

## 3. *The order of the text broke, renovate the point of it rangering the text parts in a right order. Translate Part 2*

**1)** Another consequence had been that since the latest advances were often quite expensive, small and even mid-size firms often could not compete against large firms who could use their computational edge for competitive purposes. Today, however, hardware and software costs have come down. Even high-end packages work on less expensive platforms and some even support multiple platforms. The costs associated with CAD implementation now are more heavily weighted to the costs of training in the use of these high level tools, the cost of integrating a CAD/CAM/CAE PLM using enterprise across multi-CAD and multi-platform environments and the costs of modifying design workflows to exploit the full advantage of CAD tools.

**2)** CAD vendors have been effective in providing tools to lower these training costs. These tools have operated in three CAD arenas:

1. Improved and simplified user interfaces. This includes the availability of “role” specific tailorable user interfaces through which commands are presented to users in a form appropriate to their function and expertise.
2. Enhancements to application software. One such example is improved design-in-context, through the ability to model/edit a design component from within the context of a large, even multi-CAD, active digital mockup.
3. User oriented modeling options. This includes the ability to free the user from the need to understand the design intent history of a complex intelligent model.
4. Starting in the late 1980s, the development of readily affordable CAD programs that could be run on personal computers began a trend of massive downsizing in drafting departments in many small to mid-size companies. As a general rule, one CAD operator could readily replace at least three to five drafters using traditional methods. Additionally, many engineers began to do their own drafting work, further eliminating the need for traditional drafting departments. This trend mirrored that of the elimination of many office jobs traditionally performed by a secretary as word processors, spreadsheets, databases, and so forth became standard software packages that "everyone" was expected to learn.

## 4. *The words in the text are mixed. Correct and write the sentences*

*Mechanical Engineering*

Engineers mechanical are with concerned improvement the and of mechanical modification and systems components. research They, design, and test develop devices mechanical. they Additionally, research and make designs based on recommendations standards industry regulations and.

comes CAD in handy as engineers design can and assemblies components their strict to fit specifications technical. CAD programs Some generate can also automatically materials (BOM) a bill of for a particular design, on a library of components based. engineers can also make use Mechanical of simulation to test from stress everything to vibrations in order get measuring the perfect to create output without having and real-world prototypes modify.

## VARIANT 2

### 1. *Read the text. Write English in short the main idea of it and your opinion from the future troubleshooter's point of view*

*Concept of CAD*

**Computer-aided design (CAD)** is the use of computer systems to assist in the creation, modification, analysis, or optimization of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing. CAD output is often in the form of electronic files for print, machining, or other manufacturing operations.

CAD software for mechanical design uses either vector-based graphics to depict the objects of traditional drafting, or may also produce raster graphics showing the overall appearance of designed objects. However, it involves more than just shapes. As in the manual drafting of technical and engineering drawings, the output of CAD must convey information, such as materials, processes, dimensions, and tolerances, according to application-specific conventions. CAD may be used to design curves and figures in two-dimensional (2D) space; or curves, surfaces, and solids in three-dimensional (3D) space.

**Computer-aided manufacturing (CAM)** is the use of computer software to control machine tools and related machinery in the manufacturing of work pieces. This is not the only definition for CAM, but it is the most common; CAM may also refer to the use of a computer to assist in all operations of a manufacturing plant, including planning, management, transportation and storage.

Its primary purpose is to create a faster production process and components and tooling with more precise dimensions and material consistency, which in some cases, uses only the required amount of raw material (thus minimizing waste), while simultaneously reducing energy consumption.

CAM is now a system used in schools and lower educational purposes. CAM is a subsequent computer-aided process after computer-aided design (CAD) and sometimes computer-aided engineering (CAE), as the model generated in CAD and verified in CAE can be input into CAM software, which then controls the machine tool.

### 2. *Read the text. Write in 8 sentences the point of it, the use of CAD in engineering, about the possibilities of 3 and 4D parametric solid modeling, its advantages and drawbacks (if they are lack in the text formulate them yourselves)*

3D parametric solid modeling (programs incorporating this technology include NX, the combination of UniGraphics and IDeas, Autodesk Inventor, Alibre Design, TopSolid, T-FLEX CAD, SolidWorks, and Solid Edge) require the operator to use what is referred to as "design intent." The objects and features created are adjustable. Any future modifications will be simple, difficult, or nearly impossible, depending on how the original part was created. One must think of this as being a "perfect world" representation of the component. If a feature was intended to be located from the center of the part, the operator needs to locate it from the center of the model, not, perhaps, from a more convenient edge or an arbitrary point, as he could when using "dumb" solids. Parametric solids require the operator to consider the consequences of his actions carefully. What may be simplest today could be worst case tomorrow.

Some software packages provide the ability to edit parametric and non-parametric geometry without the need to understand or undo the design intent history of the geometry by use of direct modeling

functionality. This ability may also include the additional ability to infer the correct relationships between selected geometry (for example, tangency, concentricity) which makes the editing process less time- and labor-intensive while freeing the engineer from the burden of understanding the model's design intent history. These kinds of non-history-based systems are called Explicit Modellers. The first Explicit Modeling system was introduced at the end of the 1980s, by Hewlett-Packard and was named SolidDesigner. It was followed by many later versions.

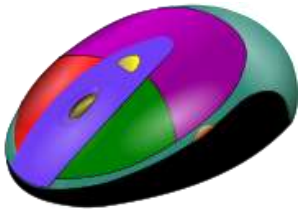
Draft views can be generated easily from the models. Assemblies usually incorporate tools to represent the motions of components, set their limits, and identify interference. The tool kits available for these systems are ever increasing; including 3D piping and injection mold designing packages.

Mid-range software was integrating parametric solids more easily to the end user: Integrating more intuitive functions (SketchUp), going to the best of both worlds with 3D dumb solids with parametric characteristics (VectorWorks) or making very real-view scenes in relative few steps (Cinema4D).

Top end systems offer the capabilities to incorporate more organic, aesthetics and ergonomic features into designs (Catia, GenerativeComponents). Freeform surface modelling is often combined with solids to allow the designer to create products that fit the human form and visual requirements as well as they interface with the machine.

## 3. *The order of the text broke, renovate the point of it rangering the text parts in a right order. Translate Part 1*

*Software technologies*



A CAD model of a mouse

1) Unexpected capabilities of these associative relationships have led to a new form of prototyping called digital prototyping. In contrast to physical prototypes, which entail manufacturing time and material costs, digital prototypes allow for design verification and testing on screen, speeding up time-to-market and decreasing costs. As technology evolves in this way, CAD has moved beyond a documentation tool (representing designs in graphical format) into a more robust designing tool that assists in the design process.

2) Originally *software* for CAD systems was developed with computer language such as Fortran, but with the advancement of object-oriented programming methods, this has radically changed. Typical modern parametric feature based modeler and freeform surface systems are built around a number of key C programming language modules with their own application programming interfaces (APIs).

3)A CAD system can be seen as built up from the interaction of a graphical user interface (GUI) with NURBS geometry and/or boundary representation (B-rep) data via a geometric modeling kernel. A geometry constraint engine may also be employed to manage the associative relationships between geometry, such as wireframe geometry in a sketch or components in an assembly.

## 4. *The words in the text are mixed. Correct and write the sentences*

*Electrical Engineering*

engineers Electrical design, and test develop of electrical equipment the manufacturing. CAD enables engineers to create these and electronic diagrams electrical, diagrams control circuit, schematics and documentation.

CAD with libraries of parts typically comes and which allow electrical symbols engineers to automate and generate design tasks bills of materials (BOM) reports. possible to create electrical schematic It's designs based on wire material type, maximum voltage drop temperature and. CAD certainly the productivity of electrical engineers improves as are able to build they default circuits reuse them later and.

**Sub-disciplines include:**

Electronics: and testing of electronic circuits involves the design the properties of component that use to achieve a certain functionality such as resistors.

Microelectronics: and micro-fabrication circuit components for deals with the design of small electronic use in as a general electronic component an integrated circuit or.
Telecommunications: and enhance telecommunication systems seeks to support. to strategic mass developments It involves anything from basic circuit design.
Computers: with the design of computers and computer systems concerned. of PDAs, It may involve the design tablets, that control industrial plants supercomputers or computers.

Критерии оценивания:

– чтение

| | |
|---|---|
| Оценка «5» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, догадался о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценивать важность, новизну, достоверность информации. У него развита языковая догадка, он не затрудняется в понимании незнакомых слов, он не испытывает необходимости обращаться к словарю и делает это 1-2 раза. Скорость чтения иноязычного текста может быть незначительно замедленной по сравнению с той, с которой студент читает на родном языке. |
| Оценка «4» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, сумел догадаться о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. Однако у него недостаточно развита языковая догадка, и он затрудняется в понимании некоторых незнакомых слов, он вынужден чаще обращаться к словарю, а темп чтения заметно замедлен по сравнению с родным языком. |
| Оценка «3» | ставится студенту, который неточно понял основное содержание прочитанного текста, сумел выделить в тексте только небольшое количество фактов. У него совсем не развита языковая догадка, он не сумел догадаться о значении незнакомых слов из контекста, крайне затруднялся в понимании многих незнакомых слов, был вынужден многократно обращаться к словарю, а темп чтения был слишком замедлен по сравнению с родным языком. Он не мог установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. |
| Оценка «2» | ставится студенту, если он не понял текст или понял содержание текста неправильно, не ориентировался в тексте при поиске определенных фактов, абсолютно не сумел семантизировать незнакомую лексику. |

- письменная работа (письменный опрос по темам семестра):

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные контрольные работы | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |

| | | | | |
|---|---|---|---|---|
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |

## 4 Пакет экзаменатора

### 4.1 УСЛОВИЯ

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Форма проведения: устно-письменная форма
Условия: англо-русские, русско-английские словари/электронные переводчики (Google, Yandex); справочники, таблицы, схемы, раздаточный материал (тематический модуль)
Количество вариантов: 2 (4)
Время выполнения каждого задания: 10 мин
Оборудование:
- ноутбук с лицензионным программным обеспечением: MS WINDOWS 2013, MICROSOFT OFFICE;

– библиотечный фонд: учебники, пособия;

– схемы, таблицы; презентации на электронных носителях.

Раздаточный материал:

- 4 папки с тематическим модулем со 2 по 5 курс учебной дисциплины ОГСЭ.04 «Иностранный язык»

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Литература для обучающегося:

Учебные пособия:

1. А. А. Галкина «Communication networks: Учебное пособие по дисциплине «Иностранный язык» (английский) для студентов технических специальностей: Учебное пособие.-СПб.: Издательство «Лань», 2016. – 144 с.
2. В. А. Радовель «Английский язык в сфере информационных технологий/English in the Field of Information Technology». – М.: КНОРУС, 2017. – 232 с.
3. А. А. Новикова «Английский язык. Электроэнергетика и электротехника». – Инфра-М, 2019. – 246 с.
4. И. П. Агабекян Английский язык для ссузов: учебное пособие. - Москва: Проспект, 2019 – 280с.
5. Ю. Б. Голицынский Грамматика. Сборник упражнений. – СПб.: КАРО, 2020. – 576 с.

Справочная литература:

1. А. Л. Луговая «Современные средства связи». – М.: Высшая школа, 2015
2. The ARRL Handbook for Radio Com V2- ARRL, Additional Contributors to the 2019 Edition
3. Brian Scaddan Electrical Installation Work © 2019 Brian Scaddan

4. ARRL s Hands-On Radio Experiments Volume 3 by ARRL Inc & Ward Silver, Copyright © 2018 by The American Radio Relay League
5. Terry Edwards Technologies for RF Systems © 2018 Artech House
6. Francois de Dieuleveult Amplifiers and Oscillators Optimization by Simulation, first published 2018 in Great Britain and the United States by ISTE Press Ltd and Elsevier Ltd.
7. The ARRL Handbook for Radio Communications, Additional Contributors to the 2011 Edition
8. Brian Elliott Electromechanical Devices and Components, Copyright © 2007 by The McGraw-Hill Companies
9. Eugene R. Hnatek, Practical Reliability of Electronic Equipment and Products Copyright © 2003 by Marcel Dekker, Inc.
10. Steven W. Smith Digital Signal Processing, second edition Copyright © 1997-1999 by California Technical Publishing
11. Herbert H. Woodson Electromechanical Dynamics, Part II: Fields, Forces and Motion
12. John Crisp, Barry Elliott Introduction to Fiber Optics, 2nd Edition © John Crisp 1996, 2001
13. Joseph A. Eichmeier Manfred K. Thumm (Eds.) Vacuum Electronics Components and Devices © Springer-Verlag Berlin Heidelberg 2008
14. Krzysztof_Wesolowski Mobile Communication System Copyright © 2002 by John Wiley & Sons, Ltd Baffins Lane, Chichester, West Sussex, PO19 1UD, England
15. Balbir Kumar and Shail B. Jain ELECTRONIC DEVICES AND CIRCUITS, Second Edition© 2014 by PHI Learning Private Limited, Delhi
16. Tony Kuphaldt Lessons In Electric Circuits, Volume II – AC, Sixth Edition, 2007
17. MICHEL E. MARHIC Fiber Optical Parametric Amplifiers, Oscillators and Related Devices © Cambridge University Press 2008
18. Paul Horowitz, Winfield Hill The Art of Electron © Cambridge University Press 1989
19. R. Khandpur Printed Circuit Boards Design, Fabrication Copyright © 2006 by The McGraw-Hill Companies, Inc.
20. Fabio Rocha Radio and TV Electronics
21. Sergey E. Lyshevski Electromechanical Systems and Devices © 2008 by Taylor & Francis Group, LLC
22. The ARRL Antenna Book, 21st Edition, Copyright © 2007 by The ARRL, Inc
23. Homer L. Davidson Troubleshooting and Repairing Consumer Electronics, 3rd Edition, Copyright © 2004, 1997, 1994 by The McGraw-Hill Companies, Inc
24. Daniel R. Tomal, Ph.D. Aram S. Agajanian, Ph.D. Electronic Troubleshooting, Copyright © 2014 by McGraw-Hill Education
25. Wilfried_Sauer, Martin Oppermann, Gerald Weigert Electronics Process Technology© Springer-Verlag London Limited 2006

26. Anatoly Rembovsky · Alexander Ashikhmin · Vladimir Kozmin · Sergey Smolskiy Radio Monitoring Problems, Methods, and Equipment © Springer Science+Business Media, LLC 2009
27. ТЕКСТЫ ДЛЯ РЕФЕРИРОВАНИЯ ПО РАДИОТЕХНИКЕ И ЭЛЕКТРОНИКЕ (сборник текстов)

Интернет- ресурсы:

1. Learnabout Electronics- Semiconductors - http://www.learnabout-electronics.org/Semiconductors/thyristors_60.php
2. Learnabout Electronics- Semiconductors - http://www.learnabout-electronics.org/Semiconductors/opto_50.php
3. Learnabout Electronics- Semiconductors - http://www.learnabout-electronics.org/Semiconductors/thyristors_66.php
4. https://trendexmexico.com/tehnologii/106529-obschiy-princip-raboty-acp.html
5. https://encyclopedia2.thefreedictionary.com/Electrical+Installation+Work
6. http://www.electronicsandyou.com/blog/printed-circuit-board-design-diagram-and-assembly.html
7. http://www.brats-qth.org/training/ilc/faa.htm
8. https://www.industrial-electronics.com/et-4e_1.html
9. https://www.amazing1.com/content/download/hvdc-information.pdf
10. https://www.wisegeek.com/what-is-a-tv-tuner.htm
11. https://www.necdisplay.com/Documents/WhitePapers/OLED.pdf
12. https://www.engineersgarage.com/articles/touchscreen-technology-working
13. https://ecomputernotes.com/computernetworkingnotes/communication-networks/optical-fiber
14. http://www.learnabout-electronics.org/Semiconductors/diodes_26.php
15. https://www.fiberoptics4sale.com/blogs/archive-posts/95047814-101-guidelines-for-fiber-optic-cable-installation
16. https://www.electricaltechnology.org/2016/11/what-is-voltage-stabilizer-how-it-works.html
17. http://www.talkingelectronics.com/Download%20eBooks/Principles%20of%20electronics/CH-16.pdf
18. https://www.headendinfo.com/headend-equipment-cable-tv-equipment/
19. http://www.deltronics.ru/images/manual/ASD-B2_M_EN_20141217.pdf
20. https://industrial.panasonic.com/content/data/MT/PDF/minas_a_e.pdf
21. https://www.industrial-electronics.com/et-4e_1.html
22. http://www.newworldencyclopedia.org/entry/Computer-aided_design
23. https://www.scan2cad.com/cad/how-engineers-use-cad/
24. https://www.analog.com/en/analog-dialogue/articles/high-speed-printed-circuit-board-layout.html
25. https://memim.com/technical-documentation.html

## 4.2 КРИТЕРИИ ОЦЕНКИ

Критерии оценивания работ обучающихся заключаются в следующих видах деятельности:

– Чтение

| | |
|---|---|
| Оценка «5» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, догадался о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценивать важность, новизну, достоверность информации. У него развита языковая догадка, он не затрудняется в понимании незнакомых слов, он не испытывает необходимости обращаться к словарю и делает это 1-2 раза. Скорость чтения иноязычного текста может быть незначительно замедленной по сравнению с той, с которой студент читает на родном языке. |
| Оценка «4» | ставится студенту, если он понял основное содержание оригинального текста, выделил основную мысль, определил основные факты, сумел догадаться о значении незнакомых слов из контекста (либо по словообразовательным элементам, либо по сходству с родным языком), сумел установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. Однако у него недостаточно развита языковая догадка, и он затрудняется в понимании некоторых незнакомых слов, он вынужден чаще обращаться к словарю, а темп чтения заметно замедлен по сравнению с родным языком. |
| Оценка «3» | ставится студенту, который неточно понял основное содержание прочитанного текста, сумел выделить в тексте только небольшое количество фактов. У него совсем не развита языковая догадка, он не сумел догадаться о значении незнакомых слов из контекста, крайне затруднялся в понимании многих незнакомых слов, был вынужден многократно обращаться к словарю, а темп чтения был слишком замедлен по сравнению с родным языком. Он не мог установить временную и причинно-следственную взаимосвязь событий и явлений, оценить важность, новизну, достоверность информации. |
| Оценка «2» | ставится студенту, если он не понял текст или понял содержание текста неправильно, не ориентировался в тексте при поиске определенных фактов, абсолютно не сумел семантизировать незнакомую лексику. |

– Письмо:

Написание письменного высказывания по предложенной тематике

| | |
|---|---|
| Оценка «5» | Письменное высказывание выстроено в определенной логике, было связным и логически последовательным.<br>Языковые средства были употреблены правильно, отсутствовали |

| | |
|---|---|
| | ошибки, нарушающие коммуникацию, или они были незначительны (1-4). Используемая лексика соответствовала поставленной коммуникативной задаче. Письменное высказывание отличалось широким диапазоном используемой лексики и языковых средств, включающих клише и устойчивые словосочетания. Демонстрировалось умение преодолевать лексические трудности. При наличии ошибки студент сам ее исправлял. Использовались простые и сложные грамматические явления в различных сочетаниях, разные грамматические времена, простые и сложные предложения. Письменное высказывание было понятно носителю языка. |
| Оценка «4» | Студент в целом справился с поставленными речевыми задачами. Его письменное высказывание было связанным и логически последовательным. Использовался большой объем языковых средств, которые были употреблены правильно. Однако были сделаны отдельные языковые ошибки (5-10), не нарушившие понимание. Используемая лексика соответствовала поставленной коммуникативной задаче. Письменное высказывание отличалось широким диапазоном используемой лексики и языковых средств, включающих клише и устойчивые словосочетания. Демонстрировалось умение преодолевать лексические трудности. При наличии ошибки студент сам ее исправлял. Использовались простые и сложные грамматические явления в различных сочетаниях, разные грамматические времена, простые и сложные предложения. Письменное высказывание было понятно носителю языка. |
| Оценка «3» | Работа студента не соответствовала нормативным требованиям: 50% объёма – предел. Студент сумел в основном решить поставленную речевую задачу, но диапазон языковых средств был ограничен. Допускались достаточно грубые языковые ошибки, нарушающие понимание (11-15). В некоторых местах нарушалась последовательность высказывания. |
| Оценка «2» | Студент сумел в очень малом объёме оформить письменное высказывание и только частично справился с решением коммуникативной задачи. Содержание высказывания не раскрывает или раскрывает лишь частично затронутую тему. Письменное высказывание было небольшим по объему (не соответствовало требованиям программы: ниже 50%). Наблюдалось использование минимального количества изученной лексики. Студент допускал большое количество языковых (лексических, грамматических) ошибок (более 15), нарушивших понимание. |

- Письменные работы
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За письменные работы (контрольные работы, административные контрольные работы, тестовые работы) оценка вычисляется исходя из процента правильных ответов:

| Виды работ | Отметка «2» | Отметка «3» | Отметка «4» | Отметка «5» |
|---|---|---|---|---|
| Контрольные работы, Административные | От 20% до 49% | От 50% до 69% | От 70% до 90% | От 91% до 100% |

| | | | | |
|---|---|---|---|---|
| контрольные работы | | | | |
| Тестовые работы | От 20% до 59% | От 60% до 74% | От 75% до 94% | От 95% до 100% |