МИНОБРНАУКИ РОССИИ

ВЛАДИВОСТОКСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

РАБОЧАЯ ПРОГРАММА УЧЕБНОЙ ДИСЦИПЛИНЫ

ОГСЭ.03 Иностранный язык в профессиональной деятельности

программы подготовки специалистов среднего звена
13.02.11 Техническая эксплуатация и обслуживание электрического и электромеханического оборудования
(по отраслям)

Форма обучения: очная

Владивосток 2023

Рабочая программа учебной дисциплины ОГСЭ.03 Иностранный язык в профессиональной деятельности разработана в соответствии с требованиями Федерального государственного образовательного стандарта среднего профессионального образования по специальности 13.02.11 Техническая эксплуатация и обслуживание электрического и электромеханического оборудования (по отраслям), утвержденного приказом Минобрнауки России от 07.12.2017, № 1196, примерной образовательной программой.

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Рассмотрена на заседании ЦМК Филологии
Протокол № 9 от «4» мая 2023 г.

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СОДЕРЖАНИЕ

1 ОБЩАЯ ХАРАКТЕРИСТИКА ПРОГРАММЫ УЧЕБНОЙ ДИСЦИПЛИНЫ

1.1 Место дисциплины в структуре основной образовательной программы

Учебная дисциплина ОГСЭ.03 Иностранный язык в профессиональной деятельности является частью общего гуманитарного и социально-экономического цикла основной образовательной программы (далее ООП) в соответствии с ФГОС СПО по специальности 13.02.11.Техническая эксплуатация и обслуживание электрического и электромеханического оборудования (по отраслям).

1.2 Цель и планируемые результаты освоения дисциплины

По итогам освоения дисциплины, обучающиеся должны продемонстрировать результаты обучения, соотнесённые с результатами освоения ООП СПО, приведенные в таблице.

Код компетенции	Умения	Знания
ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1	Выбирать способы решения задач профессиональной деятельности, применительно к различным контекстам. Работать в коллективе и команде, эффективно взаимодействовать с коллегами, руководством, клиентами. Пользоваться профессиональной документацией на государственном и иностранном языке. Анализировать техническое задание на разработку конструкции типовых деталей, узлов изделия и оснастки. Применять информационно-коммуникационные технологии для обеспечения жизненного цикла технической документации. Анализировать конструкторскую документацию.	Приемы аннотирования, реферирования и перевода специализированной литературы по профилю подготовки. Лексика по профилю подготовки. Основы проектной деятельности. Основы эффективного сотрудничества в коллективе. Правила чтения текстов профессиональной направленности на иностранном языке. Правила построения простых и сложных предложений на профессиональные темы. Основные общеупотребительные глаголы. Лексика, относящаяся к описанию предметов, средств и процессов профессиональной деятельности. Правила оформления документов. Перевод со словарём основной терминологии по профилю подготовки. Перевод со словарём основной терминологии по профилю подготовки. Правила оформления документов. Перевод, обобщение и анализ специализированной литературы по профилю подготовки.

2 СТРУКТУРА И СОДЕРЖАНИЕ УЧЕБНОЙ ДИСЦИПЛИНЫ

2.1 Объем учебной дисциплины и виды учебной работы

Вид учебной работы	Объем часов
Объем образовательной программы учебной дисциплины	**199**
в том числе:	
– теоретическое обучение	
– практические занятия *(если предусмотрено)*	**170**
– лабораторные занятия *(если предусмотрено)*	
– курсовая работа (проект) *(если предусмотрено)*	
– самостоятельная работа	**21**
– консультации	**8**
– промежуточная аттестация – *дифференцированный зачет*	

2.2 Тематический план и содержание учебной дисциплины

Наименование разделов и тем	Содержание учебного материала и формы организации деятельности обучающихся	Объем в часах	Коды компетенций, формированию которых способствует элемент программы
1	2	3	
Раздел 1. Вводно-корректив ный курс.		**12**	
Тема 1.1. Изучение иностранных языков. Этикет. О себе.	**Содержание учебного материала**		ОК 01 ОК 04 ОК 09
	Фонетический материал: Повторение основных правил чтения и произношения.		
	Лексический материал: Изучение иностранных языков. Страна изучаемого языка: Великобритания. Этикет: благодарность, извинение, прием гостей. Моя семья и я.		
	Грамматический материал: структура английского предложения; виды предложений. типы вопросов		
	Практическое занятие № 1 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 2 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 3 Развитие монологической и диалогической речи.		
	Практическое занятие № 4 Работа с текстом по теме.		
	Практическое занятие № 5 Аудирование		
	Практическое занятие № 6 Test		
Раздел 2. Основной курс.		**169**	
Тема 2.1. Из истории электричества**.**	**Содержание учебного материала**	**10**	ОК 01 ОК 04 ОК 09
	Лексический материал: Электричество. Алессандро Вольта.		
	Грамматический материал: простые нераспространенные и распространенные предложения; личные и притяжательные местоимения; употребление с существительным артикля (a/an, the); образование множественного числа существительных; притяжательный падеж существительных.		
	Практическое занятие № 7 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 8 Работа с текстом по теме. Аудирование.		
	Практическое занятие № 9 Выполнение упражнений на развитие лексико-		

	грамматических навыков, навыков устной речи.		
	Практическое занятие № 10 Выполнение грамматических тестов.		
	Практическое занятие № 11 Test		
Тема 2.2. Энергия**.**	**Содержание учебного материала**	**10**	ОК 01 ОК 04 ОК 09
	Лексический материал по теме: Энергия. Солнечная энергия. Полупроводники.		
	Грамматический материал: глагол, основные формы глагола; спряжение глагола to be; спряжение глагола to have;		
	Практическое занятие № 12 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 13 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи		
	Практическое занятие № 14 Выполнение грамматических тестов.		
	Практическое занятие № 15 Развитие монологической и диалогической речи.		
	Практическое занятие № 16 Аудирование.		
	Самостоятельная работа обучающихся Реферат на тему «Источники энергии»	**4**	
Тема 2.3. Проводники**.**	**Содержание учебного материала**	**12**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4
	Лексический материал: Основные инструменты.		
	Грамматический материал: местоимения (указательные, вопросительно-относительные, неопределённые); числительные – порядковые и количественные		
	Практическое занятие № 17 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 18 Работа с текстом по теме.		
	Практическое занятие № 19 Выполнение грамматических тестов.		
	Практическое занятие № 20 Аудирование.		
	Практическое занятие № 21 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 22 Test		
Тема 2.4. Электричество**.**	**Содержание учебного материала**	**10**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4
	Лексический материал: Потребление электричества. Мастерские.		
	Грамматический материал: времена группы Simple, имя прилагательное и степени сравнения прилагательных; наречие и степени сравнения наречий.		
	Практическое занятие № 23 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 24 Работа с текстом по теме.		
	Практическое занятие № 25 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		

	Практическое занятие № 26 Выполнение грамматических тестов		
	Практическое занятие № 27 Аудирование.		
Тема 2.5. Типы тока**.**	**Содержание учебного материала**	**12**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Переменный и постоянный ток.		
	Грамматический материал: времена группы Continuous; виды вопросительных предложений и порядок слов в них;		
	Практическое занятие № 28 Работа с текстом по теме.		
	Практическое занятие № 29 Выполнение грамматических тестов.		
	Практическое занятие № 30 Развитие монологической и диалогической речи.		
	Практическое занятие № 31 Аудирование.		
	Практическое занятие № 32 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 33 Test		
	Самостоятельная работа обучающихся составить инструкцию «Соблюдение безопасности в работе с электрическими приборами»		
Тема 2.6. Изоляторы.	**Содержание учебного материала**	**12**	ОК 01 ОК 04 ОК 09 ПК 2.1
	Лексический материал: Проводники. Изоляторы.		
	Грамматический материал: конструкция to be going to do smth; пассивный залог-настоящее время; пассивный залог-прошедшее время;		
	Практическое занятие № 34 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 35 Работа с текстом по теме.		
	Практическое занятие № 36 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 37 Выполнение грамматических тестов.		
	Практическое занятие № 38 Развитие монологической и диалогической речи.		
	Практическое занятие № 39 Test		
Тема 2.7. Электрическая цепь**.**	**Содержание учебного материала**	**12**	ОК 01 ОК 04 ОК 09 ПК 2.1
	Лексический материал: Последовательная цепь. Параллельная цепь. Короткое замыкание. Течение тока. Повреждение кабеля.		
	Грамматический материал: понятие прямая и косвенная речь; косвенная речь: сообщение; правило согласования времён.		
	Практическое занятие № 40 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 41 Выполнение упражнений на развитие лексико-		

	грамматических навыков, навыков устной речи.		
	Практическое занятие № 42 Выполнение грамматических тестов.		
	Практическое занятие № 43 Развитие монологической и диалогической речи.		
	Практическое занятие № 44 Аудирование.		
	Практическое занятие № 45 Test		
Тема 2.8. Знаменитые изобретатели.	**Содержание учебного материала**	**10**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Открытия. Томас Эдисон. Майкл Фарадей. Джеймс Максвелл.		
	Грамматический материал: времена группы Perfect, предложения с -wish.		
	Практическое занятие № 46 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 47 Работа с текстом по теме.		
	Практическое занятие № 48 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 49 Выполнение грамматических тестов.		
	Практическое занятие № 50 Аудирование.		
Тема 2.9. Электрические приборы Дом. Квартира.	**Содержание учебного материала**	**8**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Мой дом. Электрические приборы.		
	Грамматический материал: модальные глаголы- can/must/should/may, эквиваленты модальных глаголов;		
	Практическое занятие № 51 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 52 Работа с текстом по теме.		
	Практическое занятие № 53 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 54 Выполнение грамматических тестов.		
Тема 2.10. Резисторы.	**Содержание учебного материала**	**10**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Величина сопротивления. Мощность. Удельное сопротивление.		
	Грамматический материал: инфинитив; сложное дополнение (complex object); сложное подлежащее (complex subject).		
	Практическое занятие № 55 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 56 Работа с текстом по теме.		
	Практическое занятие № 57 Выполнение грамматических тестов.		
	Практическое занятие № 58 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		

	Практическое занятие № 59 Test		
Тема 2.11. Трансформаторы.	**Содержание учебного материала**	**10**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Источник питания. Прибор. Выходное напряжение. Постоянный ток.		
	Грамматический материал: сопоставление времен Present Simple и Present Continuous; сопоставление времен Past Simple и Past Continuous; сопоставление времён Past Simple и Present Perfect; сопоставление времён Past Simple и Past Perfect;		
	Практическое занятие № 60 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 61 Работа с текстом по теме.		
	Практическое занятие № 62 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 63 Выполнение грамматических тестов.		
	Практическое занятие № 64 Развитие монологической и диалогической речи.		
	Самостоятельная работа обучающихся выполнить перевод технического текста	**4**	
Тема 2.12. Конденсаторы.	**Содержание учебного материала**	**12**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Изолятор. Конденсатор. Колебания. Обратное напряжение.		
	Грамматический материал: причастие I; причастие II; конструкции с причастием; герундий; функции герундия, простые и сложные предложения; основные типы прида-точных предложений.		
	Практическое занятие № 65 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 66 Работа с текстом по теме.		
	Практическое занятие № 67 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 68 Выполнение грамматических тестов.		
	Практическое занятие № 69 Развитие диалогической речи.		
	Практическое занятие № 70 Аудирование.		
Тема 2.13. Метрическая си-стема.	**Содержание учебного материала**	**12**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Метрическая система мер и весов. Международные стандарты.		
	Грамматический материал: союзы и союзные слова; предложения с союзами neither…nor; -предложения с союзами either…or.		
	Практическое занятие № 71 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 72 Работа с текстом по теме.		
	Практическое занятие № 73 Выполнение грамматических тестов.		

	Практическое занятие № 74 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 75 Аудирование		
	Практическое занятие № 76 Test		
Тема 2.14. Роль технического прогресса. Знания, умения и навыки электромеханика.	**Содержание учебного материала**	**10**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Технический прогресс и его роль в жизни человека. Современная техника. Основные инструменты. Проводники и изоляторы.		
	Грамматический материал: сослагательное наклонение; употребление сослагательного наклонения; времена Present Simple, Present Continuous, Present Perfect и Present Perfect Continuous; времена Past Simple, Past Continuous, Past Perfect и Past Perfect Continuous; - времена Future Simple, Future Continuous, Future Perfect и Future Perfect Continuous; - систематизация знаний о временах действительного залога.		
	Практическое занятие № 77 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 78 Работа с текстом по теме.		
	Практическое занятие № 79 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 80 Аудирование.		
	Практическое занятие № 81 Test		
	Самостоятельная работа обучающихся написать сочинение «Man: a slave or a master of electronic devices».		
Тема 2.15 Профессиональная деятельность специалиста.	**Содержание учебного материала**	**8**	ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1
	Лексический материал: Официальная и неофициальная переписка. Виды писем. Правила оформления писем. Телефонные звонки. Деловые встречи. Переговоры. Составление и заполнение документов.		
	Грамматический материал: повторение времён страдательного залога; времена Future –in-the-Past; повторение правила согласования времён; систематизация знаний о косвенной речи; пунктуация.		
	Практическое занятие № 82 Введение лексики. Актуализация лексики в упражнениях.		
	Практическое занятие № 83 Работа с текстом по теме.		
	Практическое занятие № 84 Выполнение упражнений на развитие лексико-грамматических навыков, навыков устной речи.		
	Практическое занятие № 85 Выполнение грамматических тестов.		
Консультации		**8**	

Самостоятельная работа	**21**	
Всего	**199**	

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3 УСЛОВИЯ РЕАЛИЗАЦИИ ПРОГРАММЫ УЧЕБНОЙ ДИСЦИПЛИНЫ

3.1 Материально-техническое обеспечение

Для реализации программы учебной дисциплины предусмотрено наличие следующих специальных помещений:

Оборудование учебного кабинета «Иностранный язык»:

- посадочные места по количеству обучающихся;
- рабочее место преподавателя;
- комплект учебно-наглядных пособий «Страноведение»;
- грамматические таблицы;
- дидактические материалы;
- пособия для мультимедийного оборудования.
- методические рекомендации по созданию презентаций
-методические рекомендации по грамматике английского языка

Технические средства обучения:

Мультимедийный комплект (проектор CASIO XJ-V2, экран LUMIEN Eco Picture) – 1 шт., персональный компьютер Lenovo ThinkCentre – 21 шт., наушники Sanako SLHO7 – 21 шт., колонки Microlab 2.0 SOLO4C – 1 шт., стол – 21 шт., стул – 21 шт.

Лицензионное программное обеспечение:

ОС Windows 10, Microsoft Office 10, Nibelung 3.8, Toefl, словари – Multitran, ABBYY Lingvo

3.2 Информационное обеспечение реализации программы

Для реализации программы учебной дисциплины библиотечный фонд ВГУЭС укомплектован печатными и электронными изданиями.

Обучающиеся из числа инвалидов и лиц с ограниченными возможностями здоровья обеспечены печатными и (или) электронными образовательными ресурсами в формах, адаптированных к ограничениям их здоровья.

Основная литература

1. Байдикова, Н. Л. Английский язык для технических направлений (B1–B2) : учебное пособие для среднего профессионального образования / Н. Л. Байдикова, Е. С. Давиденко. — Москва : Издательство Юрайт, 2022. — 171 с. — (Профессиональное образование). — ISBN 978-5-534-10078-5. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/455909

2. Буренко, Л. В. Грамматика английского языка. Grammar in Levels Elementary – Pre-Intermediate : учебное пособие для среднего профессионального образования / Л. В. Буренко, О. С. Тарасенко, Г. А. Краснощекова ; под общей редакцией Г. А. Краснощековой. — Москва : Издательство Юрайт, 2022. — 227 с. — (Профессиональное образование). — ISBN 978-5-9916-9261-8. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/452909

3. Кузьменкова, Ю. Б. Английский язык для технических колледжей (A1) : учебное пособие для среднего профессионального образования / Ю. Б. Кузьменкова. — Москва : Издательство Юрайт, 2022. — 207 с. — (Профессиональное образование). — ISBN 978-5-534-12346-3. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/463497

4. Радиотехника=Radio Engineering : учебное пособие / Г.А. Краснощекова, М.Г. Бондарев, О.В. Ляхова и др. ; под общ. ред. Г.А. Краснощековой. – 4-е изд., стер. – Москва : Флинта, 2021. – 237 с. : табл., ил. – Режим доступа: по подписке. – URL: http://biblioclub.ru/index.php?page=book&id=567107 (дата обращения: 22.09.2020). – ISBN 978-5-9765-2131-5. – Текст : электронный.

Дополнительная литература

1.Куряева, Р. И. Английский язык. Лексико-грамматическое пособие в 2 ч. Часть 1 : учебное пособие для среднего профессионального образования / Р. И. Куряева. — 8-е изд., испр. и доп. — Москва : Издательство Юрайт, 2022. — 264 с. — (Профессиональное образование). — ISBN 978-5-534-09890-7. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/452245

2.Куряева, Р. И. Английский язык. Лексико-грамматическое пособие в 2 ч. Часть 2 : учебное пособие для среднего профессионального образования / Р. И. Куряева. — 8-е изд., испр. и доп. — Москва :

Издательство Юрайт, 2022. — 254 с. — (Профессиональное образование). — ISBN 978-5-534-09927-0. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/452246
3.Нужнова, Е. Е. Английский язык. Professional Reading: Law, Economics, Management : учебное пособие для среднего профессионального образования / Е. Е. Нужнова. — 2-е изд., испр. и доп. — Москва : Издательство Юрайт, 2020. — 149 с. — (Профессиональное образование). — ISBN 978-5-534-12993-9. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://urait.ru/bcode/448712

Электронные ресурсы

1. https://archive.org/details/radioelectronicsmagazine
2. https://archive.org/details/popularmechanics
3. http://www.studv.ru Портал для изучающих английский язык;
4. http://www.lanR.ru English Online = ресурсы для изучения английского языка;
5. http://www.englishonline.co.uk - ресурсы для изучения английского языка;
6. http://www.eslcafe.com - портал для студентов и преподавателей: грамматика, тесты, идиомы, сленг;
7. http://professionali.ru - сообщество "Профессионалы";
8. www.openclass.ru/ - сообщество "Открытый класс";
9. http://click.email.livemocha.com - обучающий сайт Livemocha;
10. www.angloforum.ru - специализированный Англофорум;
11. www.angloforum.ru/forum/6 - форум "Лексика";
12. 1 www.angloforum.ru/forum/16/ - форум "Аудирование";
13. www.angloforum.ru/forum/13 - форум «Деловой английский»

4 КОНТРОЛЬ И ОЦЕНКА РЕЗУЛЬТАТОВ ОСВОЕНИЯ УЧЕБНОЙ ДИСЦИПЛИНЫ

Результаты обучения	**Критерии оценки**	**Методы оценки**
Знания: Лексика по профилю подготовки. Приемы аннотирования, реферирования и перевода специализированной литературы по профилю подготовки. Приемы структурирования информации. Способы самостоятельной оценки и совершенствования уровня знаний по иностранному языку. Особенности произношения на иностранном языке. Возможные траектории профессионального развития и самообразования. Основы проектной деятельности. Основы эффективного сотрудничества в коллективе. Правила устной и письменной коммуникации при переводе с иностранного языка. Основные правила поведения и речевого этикета в сферах повседневного, официально-делового и профессионального общения. Правила экологической безопасности и ресурсосбережения при ведении профессиональной деятельности. Основы здорового образа жизни. Современные средства и устройства информатизации и их использование. Правила работы на компьютере и оргтехнике. Правила ведения переписки по электронной почте. Правила чтения текстов профессиональной направленности на иностранном языке. Правила построения простых и сложных предложений на профессиональные темы. Основные общеупотребительные глаголы (бытовая и профессиональная лексика). Лексика, относящаяся к описанию предметов, средств и процессов профессиональной деятельности.	- не имеет базовых знаний (1); - допускает существенные ошибки при раскрытии содержания и особенностей употребления изученного материала (2); - демонстрирует частичное знание содержания и особенностей употребления изученного материала (3); - демонстрирует знание содержания и особенностей употребления изученного материала, но дает не полное его обоснование (4); - демонстрирует полное правильное знание содержания и особенностей употребления изученного материала, аргументировано обосновывает тот или иной выбор при выполнении практического задания (5).	**Входной контроль:** тестирование **Текущий контроль:** устный опрос, беседа, сообщение, реферат, доклад, презентация, тестирование, контрольные работы **Промежуточный контроль:** контрольные работы

Лексический минимум и нормы речевого поведения и делового этикета для построения устной и письменной речи на иностранном языке. Правила ведения деловой переписки. Правила оформления документов**.**		
Умения: - понимать общий смысл четко произнесенных высказываний на известные темы (профессиональные и бытовые); - понимать тексты на базовые профессиональные темы; - участвовать в диалогах на знакомые общие и профессиональные темы; - строить простые высказывания о себе и о своей профессиональной деятельности; - кратко обосновывать и объяснить свои действия (текущие и планируемые); - писать простые связные сообщения на знакомые или интересующие профессиональные темы; -читать, писать, воспринимать речь на слух и воспроизводить иноязычный текст по ключевым словам или по плану; - работать с бизнес статьями на иностранном языке с целью извлечения и переработки информации, ведения переговоров в деловой среде; - переводить со словарём основные термины по профилю подготовки; - переводить, обобщать и анализировать специализированную литературу по профилю подготовки.	- не умеет и не готов к взаимодействию на иностранном языке (1); - имея базовые знания, не умеет самостоятельно отбирать, систематизировать и применять усвоенную информацию для реализации чтения, письма, говорения и восприятия речи на слух на иностранном языке (2); - демонстрирует частичное владение чтением, письмом, говорением и восприятием речи на слух и допускает существенные ошибки при их реализации (3); - демонстрирует в целом успешное владение чтением, письмом, говорением и восприятием речи на слух, но допускает некоторые пробелы и неточности в конкретных заданных условиях(4); - демонстрирует правильное владение чтением, письмом, говорением и восприятием речи на слух на иностранном языке для обеспечения полноценной профессиональной деятельности (5).	**Входной контроль:** тестирование. **Текущий контроль:** устный опрос, беседа с экспертом, контрольные работы, тестирование, защита индивидуальных и групповых заданий проектного характера **Итоговый контроль:** дифференцированный зачет

МИНОБРНАУКИ РОССИИ

ВЛАДИВОСТОКСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

КОНТРОЛЬНО-ОЦЕНОЧНЫЕ СРЕДСТВА

для проведения текущего контроля и промежуточной аттестации

по учебной дисциплине

ОГСЭ.03 Иностранный язык в профессиональной деятельности

программы подготовки специалистов среднего звена
13.02.11 Техническая эксплуатация и обслуживание электрического и электромеханического оборудования
(по отраслям)

Форма обучения: очная

Владивосток 2023

Контрольно-оценочные средства для проведения текущего контроля и промежуточной аттестации по учебной дисциплине 13.02.11 Техническая эксплуатация и обслуживание электрического и электромеханического оборудования (по отраслям), утвержденного приказом Минобрнауки России от 07.12.2017, № 1196, примерной образовательной программой, рабочей программой учебной дисциплины.

Разработчик: И.А. Трушкина, преподаватель

Рассмотрена на заседании ЦМК Филологии
Протокол № 9 от «4» мая 2023 г.

Председатель ЦМК _____ И.А. Трушкина

1 Общие сведения

Контрольно-оценочные средства (далее – КОС) предназначены для контроля и оценки образовательных достижений обучающихся, освоивших программу учебной дисциплины ОГСЭ.03 Иностранный язык в профессиональной деятельности.

КОС включают в себя контрольные материалы для проведения текущего контроля успеваемости и промежуточной аттестации по дисциплине, которая проводится в форме дифференцированного зачёта (с использованием оценочного средства - устный опрос в форме ответов на вопросы билетов, устный опрос в форме собеседования, выполнение письменных заданий, тестирование и т.д.)

2 Планируемые результаты обучения по дисциплине, обеспечивающие результаты освоения образовательной программы

Код ОК	Код результата обучения	Наименование
ОК 01 ОК 04 ОК 09 ПК 1.1 ПК 1.4 ПК 2.1	З1	Приемы аннотирования, реферирования и перевода специализированной литературы по профилю подготовки. Лексика по профилю подготовки.
	З2	Основы проектной деятельности. Основы эффективного сотрудничества в коллективе.
	З3	Правила чтения текстов профессиональной направленности на иностранном языке. Правила построения простых и сложных предложений на профессиональные темы. Основные общеупотребительные глаголы. Лексика, относящаяся к описанию предметов, средств и процессов профессиональной деятельности. Правила оформления документов.
	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.
	У1	Выбирать способы решения задач профессиональной деятельности, применительно к различным контекстам.
	У2	Работать в коллективе и команде, эффективно взаимодействовать с коллегами, руководством, клиентами
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.
	У4	Анализировать техническое задание на разработку конструкции типовых деталей, узлов изделия и оснастки.
	У5	Применять информационно-коммуникационные технологии для обеспечения жизненного цикла технической документации. Анализировать конструкторскую документацию

3 Соответствие оценочных средств контролируемым результатам обучения

3.1 Средства, применяемые для оценки уровня практической подготовки

Краткое наименование раздела (модуля) / темы дисциплины	Код результата обучения	Показатель овладения результатами обучения	Наименование оценочного средства и представление его в КОС	
			Текущий контроль	Промежуточная аттестация
Раздел 1 Вводно-коррективный курс				
Тема 1.1 Практическое занятие № 1-6	З3	Правила чтения текстов профессиональной направленности на иностранном языке. Правила построения простых и сложных предложений на профессиональные темы. Основные общеупотребительные глаголы. Лексика, относящаяся к описанию предметов, средств и процессов профессиональной деятельности. Правила оформления документов.	Выполнение упражнений (п.5.1 Theme 1, п. 5.2 входной тест, п.2 в1, в2)	Выполнение упражнений (п. 6.1 в 1)
	У1	Выбирать способы решения задач профессиональной деятельности, применительно к различным контекстам.		
	У2	Работать в коллективе и команде, эффективно взаимодействовать с коллегами, руководством, клиентами		
Тема 2.1 Практическое занятие № 7-11	З2	Основы проектной деятельности. Основы эффективного сотрудничества в коллективе.	Выполнение упражнений (п. 5.2 в 3, в4, в5)	Выполнение упражнений (п. 6.1 в2, в13)
	З3	Правила чтения текстов профессиональной направленности на иностранном языке. Правила построения простых и сложных предложений на профессиональные темы. Основные общеупотребительные глаголы. Лексика, относящаяся к описанию предметов, средств и процессов профессиональной деятельности. Правила оформления документов.		

Краткое наименование раздела (модуля) / темы дисциплины	Код результата обучения	Показатель овладения результатами обучения	Наименование оценочного средства и представление его в КОС	
			Текущий контроль	Промежуточная аттестация
	У1	Выбирать способы решения задач профессиональной деятельности, применительно к различным контекстам.	Выполнение упражнений (п.5.3 Task 15)	
	У2	Работать в коллективе и команде, эффективно взаимодействовать с коллегами, руководством, клиентами		
Тема 2.2 Практическое занятие № 12-16	З1	Приемы аннотирования, реферирования и перевода специализированной литературы по профилю подготовки. Лексика по профилю подготовки.	Выполнение упражнений (п. 5.2 в6, в7; п. 5.3 Task8, Task 12)	Выполнение упражнений (п. 6.1 в3, в18)
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.3 Практическое занятие № 17-22	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 8, в9; п. 5.3 Task 3)	Выполнение упражнений (п. 6.1 в4, в 19)
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.		
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.4 Практическое занятие № 23-27	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 10, в11, в12; п. 5.3 Task 4)	Выполнение упражнений (п. 6.1 в5, в 16)
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.		
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.5 Практическое занятие № 28-	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 13, в14,	Выполнение упражнений

Краткое наименование раздела (модуля) / темы дисциплины	Код результата обучения	Показатель овладения результатами обучения	Наименование оценочного средства и представление его в КОС	
			Текущий контроль	Промежуточная аттестация
33	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.	в15; п. 5.3 Task 5, Task6)	(п. 6.1 в6, в 15)
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
	У2	Работать в коллективе и команде, эффективно взаимодействовать с коллегами, руководством, клиентами		
Тема 2.6 Практическое занятие № 34-39	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.	Выполнение упражнений (п 5.2 в 16, в17; п. 5.3 Task 7)	Выполнение упражнений (п. 6.1 в7)
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
	У2	Работать в коллективе и команде, эффективно взаимодействовать с коллегами, руководством, клиентами		
Тема 2.7 Практическое занятие № 40-45	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 18, в19, в20)	Выполнение упражнений (п. 6.1 в8)
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.		
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
	У2	Работать в коллективе и команде, эффективно взаимодействовать с коллегами, руководством, клиентами		
Тема 2.8 Практическое занятие № 46-50	З1	Приемы аннотирования, реферирования и перевода специализированной литературы по профилю подготовки. Лексика по профилю подготовки.	Выполнение упражнений (п.5.1 Theme 1, п 5.2 в 21, в22, в23)	Выполнение упражнений (п. 6.1 в9)
	У4	Анализировать техническое задание на разработку кон-		

Краткое наименование раздела (модуля) / темы дисциплины	Код результата обучения	Показатель овладения результатами обучения	Наименование оценочного средства и представление его в КОС	
			Текущий контроль	Промежуточная аттестация
		струкции типовых деталей, узлов изделия и оснастки.		
	У5	Применять информационно-коммуникационные технологии для обеспечения жизненного цикла технической документации. Анализировать конструкторскую документацию	Выполнение упражнений (п.5.1 Theme 1, п 5.2 в 21, в22, в23)	Выполнение упражнений (п. 6.1 в9)
Тема 2.9 Практическое занятие № 51-54	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 24, в25; п. 5.3 Task 9)	Выполнение упражнений (п. 6.1 в10, в14)
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.		
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.10 Практическое занятие № 55-59	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 26, в27; п. 5.3 Task 1, Task 10)	Выполнение упражнений (п. 6.1 в11)
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.		
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.11 Практическое занятие № 60-64	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 28, в29; п. 5.3 Task 13, Task 14)	Выполнение упражнений (п. 6.1 в12)
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.		
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		

Краткое наименование раздела (модуля) / темы дисциплины	Код результата обучения	Показатель овладения результатами обучения	Наименование оценочного средства и представление его в КОС	
			Текущий контроль	Промежуточная аттестация
Тема 2.12 Практическое занятие № 65 - 70	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.	Выполнение упражнений (п 5.2 в 30, в31, в32; п. 5.3 Task 2)	Выполнение упражнений (п. 6.1 в20)
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.13. Практическое занятие № 71 - 76	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.	Выполнение упражнений (п 5.2 в 33, в34; п. 5.3 Task 11)	Выполнение упражнений (п. 6.1 в17)
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.14 . Практическое занятие № 77-81	З4	Перевод со словарѐм основной терминологии по профилю подготовки. Правила оформления документов	Выполнение упражнений (п 5.2 в 35; п. 5.3 Task 16)	Выполнение упражнений (п. 6.1 в21; п.6.3 комплексный тест 1)
	З5	Перевод, обобщение и анализ специализированной литературы по профилю подготовки.		
	У3	Пользоваться профессиональной документацией на государственном и иностранном языке.		
Тема 2.15 Практическое занятие № 82-85	З2	Основы проектной деятельности. Основы эффективного сотрудничества в коллективе.	Выполнение упражнений (п 5.2 в 36, в37)	Выполнение упражнений (п. 6.1 в22; п.6.3 комплексный тест 2)
	З3	Правила чтения текстов профессиональной направленности на иностранном языке. Правила построения простых и сложных предложений на профессиональные темы. Основные общеупотребительные глаголы. Лексика, относящаяся к описанию предметов, средств и процессов профессиональной деятельности. Правила оформления документов.		
	У2	Работать в коллективе и команде, эффективно взаимо-		

Краткое наименование раздела (модуля) / темы дисциплины	Код результата обучения	Показатель овладения результатами обучения	Наименование оценочного средства и представление его в КОС	
			Текущий контроль	Промежуточная аттестация
		действовать с коллегами, руководством, клиентами		
	У5	Применять информационно-коммуникационные технологии для обеспечения жизненного цикла технической документации. Анализировать конструкторскую документацию		

5. Примеры оценочных средств для проведения текущей аттестации

5.1 Вопросы для собеседования (устного опроса):

Theme 1. My Family

1. Is your family large?
2. What members does it consist of?
3. What is your mother's name? (father's)
4. How old is she? (he)
5. What is your name?
6. What are you?
7. Where do you live?
8. Is your college far from your house?
9. What do you do in your spare time?
10. What do the members of your family like to do in the evening?

Theme 2.Science and technology

1. What is science?
2. What is technology?
3. Are they interconnected?
4. When did industrial technology begin?
5. When was the steam engine invented? Who invented it?
6. When was radio invented? Who invented it?
7. When was television invented? Who invented it?
8. When was the first car invented?
9. When was the first digital computer invented? Who invented it?
10. What famous scientists do you know?

5.2 Примеры тестовых заданий

Входной тест

Choose the right variant.

1. I don't remember ... that I'm sure you're mistaken.
a) to say; b) say; c) saying; d) to have said.
2. There were two answers, and ... was right.
a) neither; b) no one; c) no; d) not any.
3. This dress is ... as the one I had before.

a) plenty the same; b) very similar; c) very same; d) much the same.
4. He ... here from 1955 to 1960.
a) worked; b) works; c) has been working; d) has worked.
5. He's... his sister.
a) much taller that; b) much more taller than; c) much taller than; d) more taller than.
6. Be careful you don't... your keys!
a) lost; b) loosen; c) lose; d) loose.
7. What they say may be true; you never can...
a) say; b) tell; c) remember; d) recognise.
8. He didn't move, but just... where he fell.
a) lain; b) lay; c) laid; d) lied.
9. I haven't had a reply to the invitation I sent you last week. ... to my patty?
a) Shall you come; b) Are you coming; c) Do you come; d) Should you come,
10. That man reminds me ... my history teacher.
a) from; b) of; c) about; d) on.
11. The children hadn't met ... their grandparents or their uncle before.
a) or, b) neither; c) nor, d) either.
12. Before she started university, Jane ... in the States for six months working as a nanny.
a) lives; b) has been living; c) has lived; d) had lived.
13. He was ... tired to go on.
a) to; b) enough; c) so; d) too.
14. I ... saw Michael two years ago.
a) lastly; b) last time; c) last; d) the last time.
15. I like the red dress and the pink shoes. The trouble is that they don't ...very well.
a) match not each other; b) match themselves; c) go with each other; d) go on with the other.
16. He's as polite as his brother is ...polite. (подобрать префикс)
a) im; b) non; c) dis; d) un.
17. It's been quite a long time ... I had a holiday abroad,
a) ago; b) since; c) for; d) when.
18. You ... pay for this information. It's free.
a) oughtn't to; b) don't have to; c) shouldn't to; d) mustn't.
19. ... quite a lot of rain forecast for today.
a) It has; b) Is; c) It's; d) There's.
20. I'm free this evening. ... we go out to dinner?
a) Will; b) Would; c) Shall; d) Won't.
21. I need a holiday, ... I?
a) need not; b) aren't; c) don't; d) need.
22. Most of the cattle ... under the trees.
a) is laying; b) is lying; c) are lying; d) are laying.
23. Children seem to find computers easy, but many adults aren't used to ... with microtechnology.
a) work; b) working; c) a work; d) the work.
24. Parents were made ... the school reconstruction,
a) finance; b) to financing; c) to finance; d) financing.
25. The children have made lots of new friends since we ... to this town.
a) have moved; b) moving; c) moved; d) have been moved.
26. I don't understand this sentence. Could you tell me what …?
a) this word means; b) means this word; c) does mean this word; d) does this word mean.
27. ... of the three boys got a prize,
a) A few; b) Both; c) Each; d) Every.
28. The agency intended to let each applicant... in the interview.
a) participate; b) to participate; c) so as to participate; d) participating.
29. All the children in this family are gifted, but this one is … gifted of all.
a) little; b) the less; c) the least; d) un- .
30. He enjoyed ... computer games at first, but after a while he got bored with them.
a) to play; b) playing; c) make play; d) having played.
31. We haven't managed to meet... three years.
a) since; b) for; c) after; d) last.

32. Nothing is wrong,...?
a) can it; b) is it; c) isn't it; d) can't be.
33. A meeting of the society will be ... on Tuesday evening at 6 o'clock.
a) made; b) taken; c) held; d) placed.
34. May I apologize ... being so late?
a) myself for; b) for; c) -; d) myself.
35. All the furniture in this room ... antique.
a) are; b) are made of; c) have; d) is.
36. ... traffic in the city center.
a) There's always many; b) It is always heavy; c) There's always heavy; d) It is always much.
37. You'll find the travel agency ... the end of the street.
a) by; b) in; c) on; d) at.
38. She ... the piano since she was ten.
a) has been playing; b) is playing; c) has played; d) had played.
39. Doing these exercises may be good ... me, but I hate every minute of it.
a) to; b) for; c) on; d) at.
40. She heard Miss Drake … that Ann was really happy.
a) tell; b) to tell; c) say; d) to say.
41. You have bought a FIAT. You ... a BMW.
a) should have bought; b) would have bought; c) had better buy; d) would rather have bought.
42. Poor Jack — he lost his homework, and he ... do it again,
a) needs; b) ought; c) shall; d) has to.
43. The food at the party was horrible, I've never eaten ... awful food!
a) such a; b) such; c) such an d) so.
44. "I'm not very hungry". — "…"
a) Neither do I; b) I am; c) So am I; d) Nor I am.
45. The... from London to Bristol takes two hours by car.
a) travel; b) journey; c) voyage; d) driving.
46. Open the window, ... you?
a) must; b) need; c) will; d) do.
47. You must try not to ... so many mistakes.
a) do; b) tell; c) make; d) perform.
48. Helen asked me if... the film called "Star wars".
a) have I seen; b) have you seen; c) had I seen; d) I had seen.
49. I promise that I... to work on time every morning in future,
a) get; b) am getting; c) will get; d) would get.
50. I'm not going to tell you the reason ... my decision,
a) to; b) with; c) on; d) for.

USE OF GRAMMAR answers.

1-c; 2-a; 3-d; 4-a; 5-c; 6-c; 7-b; 8-b; 9-b; 10-b; 11-d; 12-d; 13-d; 14-c; 15-c; 16-a; 17-b; 18-b; 19-d; 20-c; 21-c; 22-c; 23-b; 24-c; 25-c; 26 — a; 27-c; 28-a; 29-c; 30-b; 31-b; 32-b; 33-c; 34-b; 35-d; 36-c; 37-d; 38-a; 39-b; 40-c; 41-a; 42-d; 43-b; 44-b; 45-b; 46-c; 47-c; 48-d; 49-c; 50-d.

Вариант 1

Read the dialogues and dramatize them in class

1. – Can you do me a favor, Jim? Would you mind introducing me to Miss Jones?
   - Oh, yes, with pleasure, though it's rather strange you don't know each other yet.
   - I just didn't have a chance to get acquainted with her. Is she a nice girl?
   - Yes, of course, and she has a very nice dog.
2. – James, may I introduce Henry Brown? Mr. Smith, a friend of mine.
   - How do you do, Mr. Richardson?
   - How do you do, Mr. Brown?

   (They shake hands)

Вариант 2

Expand the situation introduced by the opening

1. – How do you do, Mr. Jones?
   - How do you do, Mr. Hardy?
   - Sit down, please. What can I do for you?

Вариант 3

Вставьте в предложения подходящую форму местоимения, переведите предложения:

A – I	B – you	C – he	D – she	E – it	F – we	G – they
H – him	I – her	J – me	K – us	L – them	M – our	N – your
O – his	P – my	Q – their				

1. Mr. Stanley has a very friendly family. … sons live with …..
2. Men's health depends upon … life style.
3. Susan likes … friends.
4. The students have practice now. … plant different trees.
5. Alice asked … brother where … had to meet … friends.
6. Jane and … friend are painting the ceiling now. … are going to finish this work tomorrow.
7. Who is speaking? It's …., Peter
8. The teacher has corrected … composition.
9. Mary's parents went to see … friends.
10. Have … been to Niagara Falls? Yes, … have been there twice.
11. Is Pete at home? Can … speak to …?
12. Richard has passed his entrance examinations successfully and now … is a student.
13. Look up into the sky! … is so marvelous.
14. Primrose didn't know what to give grandfather on … birthday.
15. The man was very old, but … was strong and worked a lot.
16. … parents are so old. Who will look after ….?
17. Jessica can never see the blackboard because the tall boy always sits in front of ….
18. Mother said: "… spent all … money on … children's education."
19. Gregory met … wife when … was working at … hospital.
20. Don't worry! All … expenses will be paid.

Вариант 4

Form the plural of the nouns in brackets.

Поставьте данные в скобках существительные во множественное число.

"(Woman) ..... and (cat) ..... will do as they please, and (man) ..... and (dog) ..... should relax and get used to the idea." (Robert Heinlein)

How do the following nouns form their plural?

Как образуют множественное число следующие существительные?

shelf..... ,	bus.....
church .....,	lorry .....
sheep .....,	photo .....
foot .....,	baby .....
hero..... ,	berry .....
tomato .....,	pony .....
radio..... ,	toy.....
thief .....,	video .....
tooth..... ,	wife .....

Tick (∨) the words which normally have plurals in English.

Отметьте слова (∨), которые в английском языке имеют форму множественного числа.

□ wall □ air □ picture □machine
□ tea □ time (раз) □ hour □ river
□ friend □ copper □ cheese □teacher
□glass □ glass □ paper □ paper
(стакан) (стекло) (бумага) (газета)
□ music □ coffee □ armchair □ gold
□ ship □ milk □ ice □ furniture
□ butter □ happiness □ tree □ ink
□ money □ coin □ university □ meat
□ assistance □ assistant □ darkness □ time (время)
□ wood □ wood
(древесина) (лес)

Complete the sentences with the noun in brackets using A/AN or a plural form of the noun where possible. Поставьте существительное в скобках во множественное число или используйте артикль A/AN, где это возможно.

1. You never have ..... (time) to talk to me. I called you several ..... (time) yesterday.
2. Could you give me ..... (glass) of water, please? My husband has to wear ..... (glass). I can't send this thing to you by post, it is made of ..... (glass).
3. I need a piece of ..... (wood). The cottage is located nicely. There is ..... (wood) and a lake in the walking distance.
4. I'm allergic to ..... (chicken). I'll draw you ..... (chicken) if you eat your porridge, Mary.
5. ..... (beauty) is a great force. Your younger daughter is going to be ..... real (beauty). All my daughters are ..... (beauty).
6. Anne doesn't eat ..... (cake), it's too fattening, but she brought ..... (cake) and ..... (bottle) of wine to the party.
7. Is it made of ..... (iron) or plastic? I need ..... (iron) to press the suit.

Match the words. Make possessive forms of the words in List 1 to combine them with the words in List 2. Образуйте формы притяжательного падежа от слов в списке 1, в списке 2 найдите слово, сочетающееся с ним по смыслу.

List 1 teachers □ actress □ Tom □ hairdresser children □ our dog □ doctor □ women
girls □ Anne and Oliver □ Doris parents □ sheep
List 2 phone number □ habit □ last name toys □ surgery □ school □ club □ home
wool □ room □ career □ name □ car

Underline the correct noun group. Подчеркните правильное сочетание существительных.

1. a cake of chocolate / a chocolate cake
2. bar soap / a bar of soap
3. Russia's history / the Russia history
4. a telephone's box / a telephone box
5. soup of vegetables / vegetable soup
6. the company office / the company's office
7. the cat tail / the cat's tail
8. disks of a computer / computer disks;
9. Mr Green music lesson / Mr Green's music lesson
10. industry of oil / oil industry

Rewright each phrase using the correct genetive form. Напишите фразы, используя в каждой из них соответствующую форму, обозначающую принадлежность предмета.

1. (Oliver) son – Oliver's son;
2. (Canada) national football team .....
3. (the frame) picture .....
4. (a week) holiday .....
5. (bus) station .....
6. (Jeremy and Jessica) elder sister .....
7. (children) toys .....
8. (space) rocket .....
9. (the women) changing room .....
10. (the Walkers) party .....
11. (the key) the car .....

12. (fruit) tea .....
13. (the managers) meeting .....
14. (leather) shoe .....

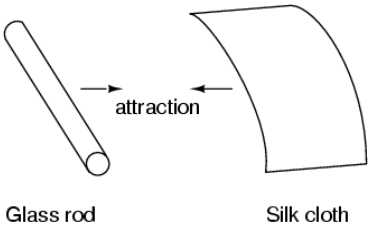
Вариант 5 From the History of Electricity

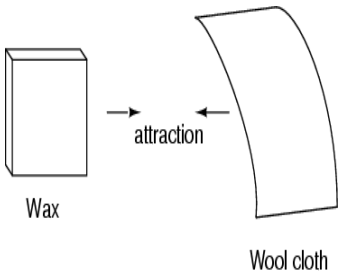
Before you start

1. What is a definite quantity of electricity?
2. What kind of experiments did Charles Dufay carry on?
3. What did Benjamin Franklin prove?

Read and translate the text.

It was discovered centuries ago that certain types of materials would mysteriously attract one another after being rubbed together. For example: after rubbing a piece of silk against a piece of glass, the silk and glass would tend to stick together. Indeed, there was an attractive force that could be demonstrated even when the two materials were separated.





Glass and silk aren't the only materials known to behave like this. Anyone who has ever brushed up against a latex balloon only to find that it tries to stick to them has experienced this same phenomenon. Paraffin wax and wool cloth are another pair of materials early experimenters recognized as manifesting attractive forces after being rubbed together.

This phenomenon became even more interesting when it was discovered that identical materials, after having been rubbed with their respective cloths, always repelled each other. It was also noted that when a piece of glass rubbed with silk was exposed to a piece of wax rubbed with wool, the two materials would attract one another.

Furthermore, it was found that any material demonstrating properties of attraction or repulsion after being rubbed could be classed into one of two distinct categories: attracted to glass and repelled by wax, or repelled by glass and attracted to wax. It was either one or the other: there were no materials found that would be attracted to or repelled by both glass and wax, or that reacted to one without reacting to the other.

More attention was directed toward the pieces of cloth used to do the rubbing. It was discovered that after rubbing two pieces of glass with two pieces of silk cloth, not only did the glass pieces repel each other, but so did the cloths. The same phenomenon held for the pieces of wool used to rub the wax.

Now, this was really strange to witness. After all, none of these objects were visibly altered by the rubbing, yet they definitely behaved differently than before they were rubbed. Whatever change took place to make these materials attract or repel one another was invisible.

Some experimenters speculated that invisible "fluids" were being transferred from one object to another during the process of rubbing, and that these "fluids" were able to effect a physical force over a distance. **Charles Dufay** was one of the early experimenters who demonstrated that there were definitely two different types of changes wrought by rubbing certain pairs of objects together. The fact that there was more than one type of change manifested in these materials was evident by the fact that there were two types of forces produced: *attraction* and *repulsion*. The hypothetical fluid transfer became known as a *charge*.

One pioneering researcher, **Benjamin Franklin**, came to the conclusion that there was only one fluid exchanged between rubbed objects, and that the two different "charges" were nothing more than either an excess or a deficiency of that one fluid. After experimenting with wax and wool, Franklin suggested that the coarse wool removed some of this invisible fluid from the smooth wax, causing an excess of fluid on the wool and a deficiency of fluid on the wax. The resulting disparity in fluid content between the wool and wax would then cause an attractive force, as the fluid tried to regain its former balance between the two materials.

Postulating the existence of a single "fluid" that was either gained or lost through rubbing accounted best for the observed behavior: that all these materials fell neatly into one of two categories when rubbed, and most importantly, that the two active materials rubbed against each other always fell into opposing categories as evidenced by their invariable attraction to one another. In other words, there was never a time where two materials rubbed against each other *both* became either positive or negative.

Following Franklin's speculation of the wool rubbing something off of the wax, the type of charge that was associated with rubbed wax became known as "negative" (because it was supposed to have a deficiency of fluid) while the type of charge associated with the rubbing wool became known as "positive" (because it was supposed to have an excess of fluid).

Precise measurements of electrical charge were carried out by the French physicist **Charles Coulomb** in the 1780's using a device called a *torsional balance* measuring the force generated between two electrically charged objects. The results of Coulomb's work led to the development of a unit of electrical charge named in his honor, the *coulomb*. The operational definition of a coulomb as the unit of electrical charge (in terms of force generated between point charges) was found to be equal to an excess or deficiency of about 6,250,000,000,000,000,000 electrons.

It was discovered much later that this "fluid" was actually composed of extremely small bits of matter called *electrons*, so named in honor of the ancient Greek word for amber: another material exhibiting charged properties when rubbed with cloth. Experimentation has since revealed that all objects are composed of extremely small "building-blocks" known as *atoms*, and that these atoms are in turn composed of smaller components known as *particles*. The three fundamental particles comprising most atoms are called *protons*, *neutrons* and *electrons*.

Transcribe the following words: Force, Phenomenon, Attraction, Repulsion, Fluid, Hypothetical, Charge, Existence, Category, Torsional, Balance, Measure, Coulomb, Particle, Neutron.

Translate the following sentences paying special attention to the underlined words.

1. <u>The static charges</u> are known to be at rest.
2. <u>The alternating current</u> changes its direction many times a second.
3. We know <u>the electric charges</u> to be positive and negative.
4. Some liquids are known <u>to conduct current</u> without any changes to themselves.
5. On the contrary <u>the electrolytes</u> are known to change greatly when <u>the current flows</u> through them.
6. One can <u>charge</u> dissimilar objects by rubbing them.

Put the words into the correct order to make sentences.

1. material It categories was any properties of or repulsion after rubbed be that by classed one of distinct: attracted to glass being and repelled by wax, could or repelled into found demonstrating glass and two attracted to attraction wax.
2. Some speculated invisible effect being from object were to that during the transferred of "fluids" rubbing, and that experimenters these another "fluids" were able to a process physical force over one a distance.
3. fact The type was materials attraction more the one of manifested in was there than evident by that there these were fact two that types of forces change: and produced repulsion.
4. removed suggested the wool some of invisible from the fluid wax, that an smooth excess this coarse of Franklin of fluid on wool the and a deficiency fluid on causing the wax.
5. amber cloth was much that this was of bits of composed matter actually called It, so extremely named in for later honor of small the ancient "fluid" word: another exhibiting material

charged Greek properties discovered when rubbed electrons with.

Вариант 6

Дополните предложения необходимой формой глагола to be (am, is, are) /to have (has), переведите предложение:

1. Philip … a student
2. In the evening he … dinner with his mother.
3. For breakfast she … tea, bread and butter and bacon and eggs.
4. We … English classes twice a week.
5. In front of the cottage there … a tennis court.
6. Stop talking. Our lesson …not over.
7. I … tired today.
8. You … a teacher, … not you?
9. All will agree that the dog … the best companion for children.
10. Your sister … not come yet.
11. Your new dress … nice, your shoes … nice too.
12. We … many interesting books on geodesy.
13. My mother … a very nice hat.
14. How old … you?
15. Excuse me, I … very late.
16. … you going to become a good specialist?
17. Her brother … two children.
18. This girl … many friends at university.
19. My younger son's name … Michael.
20. These rooms … very light.

Вариант 7 Energy Before you start

1. What do we call energy?
2. What unit is energy measured in?
3. What does 'energy is transferred' mean?

Read and translate the text.

Energy is a quantity of work done over a period of time, or the capacity to do work. Electricity is a form of energy that can be converted to and from mechanical energy, safelytransferred over long distances, harnessed, and used for specific purposes.

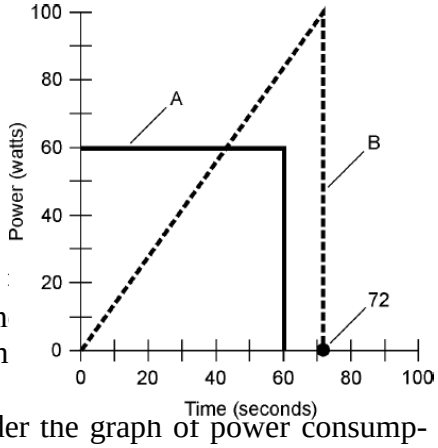
Energy and power are two distinct entities. Energy is the product of power and time.To illustrate the difference between the two, suppose that we have two road cases, one weighing 25 kilograms and the other weighing 50 kilograms. It takes twice the power to lift the 50-kilogram case, but it takes the same amount of energy to lift the 25-kilogram road case twice as high. In these cases, the energy expended is equal.

Physicists measure energy in units called joules. One joule (1 J) is the equivalent of a watt-second, which is the equivalent of 1 watt of power dissipated for 1 second of time(1 W s or Ws). In electricity, you'll more often encounter the *watt-hour* (symbolized W h or Wh) or the kilowatt-hour (symbolized kW h or kWh). As their names imply, a watt- hour is the equivalent of 1 W dissipated for 1 h, and 1 kWh is the equivalent of 1 kW of power dissipated for 1 h.

A watt-hour of energy can be dissipated in an infinite number of different ways. A 60-W bulb consumes 60 Wh in 1 h, the equivalent of a watt-hour per minute (1 Wh/min). A 100-W bulb consumes 1 Wh in 1/100 h, or 36 s. Besides these differences, the rate of power dissipation in real-life circuits often changes with time. This can make the determination of consumed energy complicated, indeed.

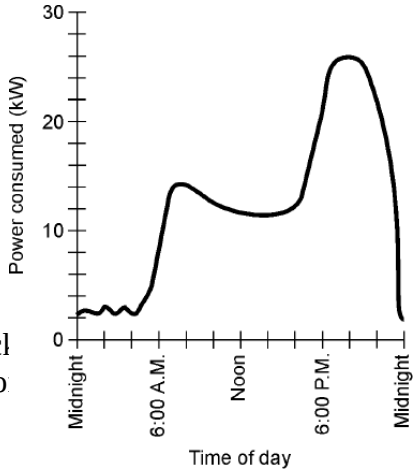
Figure 25 illustrates two hypothetical devices that consume 1 Wh of energy. Device A uses its power at a constant rate of 60 W, so it consumes 1 Wh in 1 min. The power

consumption rate of device B varies, starting at zero and ending up at quite a lot more than 60 W. How do you know that this second device really consumes 1 Wh of energy? You must determine the area under the curve in the graph. In this case, figuring out this area iseasy, because the enclosed object is a triangle. The area of a triangle is equal to half the product of the base length and the height. Device B is powered up for 72 s, or 1.2 min; this is 1.2/60 = 0.02 h. Then the area under the curve is 1/2



When calculating energy values, you must always remember th the unit is the watt-hour, so you must multiply watts by hours. If you m by seconds, you'll get the wrong kind of units in your answer.

Often, the curves in graphs like these are complicated. Consider the graph of power consumption in your home, versus time, for a day. It might look like the curve in Figure 26. Finding the area under this curve is not easy. But there is another way to determine the total energy burned by your household over a period of time. That is by means of a meter that measures electrical energy in kilowatt-hours. Every month, without fail, the power company sends its representative to read your electric meter. This person takes down the number of kilowatt-hours displayed, subtracts the number from the reading taken the previous month, and a few days later you get a bill. This meter automatically keeps tracl without anybody having to go through high-level mathematical calculatio regular curves such as the graph of Figure.



Compose 7 sentences using the words in the previous exercise. Eachsentence should contain 2 words or word expressions above.

Insert the missing words into the sentences below.

1. Electricity is a form of ….. that can be converted to and from mechanical ….,safely transferred over long distances, harnessed, and used for specific purposes.
2. It takes twice the …. to lift the 50-kilogram case, but it takes the same amount of …. to lift the 25-kilogram road case twice as high.
3. One joule (1 J) is the equivalent of a …., which is the equivalent of 1 watt of ….dissipated for 1 second of time (1 W s or Ws).
4. As their names imply, a watt-hour is the equivalent of 1 … dissipated for 1 …,and 1 …. is the equivalent of 1 …. of power dissipated for 1 ….
5. If you multiply …. by minutes or …. by seconds, you'll get the wrong kind ofunits in your answer.
6. This person takes down the number of …. displayed, subtracts the number fromthe reading taken the previous month, and a few days later you get a bill.

Вариант 8

Conductors and Insulators

Before you start

1. What materials are called conductors?
2. What is the most common function of wire conductors?

3. Why is a minimum voltage drop produced in copper conductors?
4. What materials are called insulators?
5. What are the most common insulators?
6. What are the two main functions of insulators?

Read and translate the text.

By now you should be well aware of the correlation between electrical conductivity and certain types of materials. Those materials allowing for easy passage of free electrons are called ***conductors***, while those materials impeding the passage of free electrons are called ***insulators***.

Unfortunately, the scientific theories explaining why certain materials conduct and others don't are quite complex, rooted in quantum mechanical explanations in how electrons are arranged around the nuclei of atoms. Contrary to the well-known "planetary" model of electrons whirling around an atom's nucleus as well-defined chunks of matter in circular or elliptical orbits, electrons in "orbit" don't really act like pieces of matter at all. Rather, they exhibit the characteristics of both particle and wave, their behavior constrained by placement within distinct zones around the nucleus referred to as "shells" and "subshells." Electrons can occupy these zones only in a limited range of energies depending on the particular zone and how occupied that zone is with other electrons. If electrons really did act like tiny planets held in orbit around the nucleus by electrostatic attraction, their actions described by the same laws describing the motions of real planets, there could be no real distinction between conductors and insulators, and chemical bonds between atoms would not exist in the way they do now. It is the discrete, "quantitized" nature of electron energy and placement described by quantum physics that gives these phenomena their regularity.

When an electron is free to assume higher energy states around an atom's nucleus (due to its placement in a particular "shell"), it may be free to break away from the atom and comprise part of an electric current through the substance. If the quantum limitations imposed on an electron deny it this freedom, however, the electron is considered to be "bound" and cannot break away (at least not easily) to constitute a current. The former scenario is typical of conducting materials, while the latter is typical of insulating materials.

Some textbooks will tell you that an element's conductivity or nonconductivity is exclusively determined by the number of electrons residing in the atoms' outer "shell" (called the *valence* shell), but this is an oversimplification, as any examination of conductivity versus valence electrons in a table of elements will confirm. The true complexity of the situation is further revealed when the conductivity of molecules (collections of atoms bound to one another by electron activity) is considered.

A good example of this is the element carbon, which comprises materials of vastly differing conductivity: graphite and diamond. Graphite is a fair conductor of electricity, while diamond is practically an insulator (stranger yet, it is technically classified as a ***semiconductor***, which in its pure form acts as an insulator, but can conduct under high temperatures and/or the influence of impurities). Both graphite and diamond are composed of the exact same types of atoms: carbon, with 6 protons, 6 neutrons and 6 electrons each. The fundamental difference between graphite and diamond being that graphite molecules are flat groupings of carbon atoms while diamond molecules are tetrahedral (pyramid-shaped) groupings of carbon atoms.

If atoms of carbon are joined to other types of atoms to form compounds, electrical conductivity becomes altered once again. Silicon carbide, a compound of the elements silicon and carbon, exhibits nonlinear behavior: its electrical resistance decreases with increases in applied voltage! Hydrocarbon compounds (such as the molecules found in oils) tend to be very good insulators. As you can see, a simple count of valence electrons in an atom is a poor indicator of a substance's electrical conductivity.

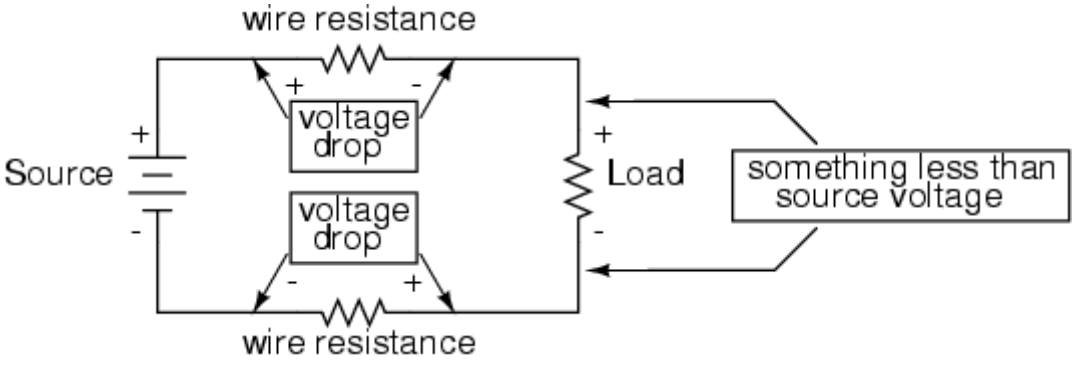
All metallic elements are good conductors of electricity, due to the way the atoms bond with each other. The electrons of the atoms comprising a mass of metal are so uninhibited in their allowable energy states that they float freely between the different nuclei in the substance, readily motivated by any electric field. The electrons are so mobile, in fact, that they are sometimes described by scientists as an *electron gas*, or even an *electron sea* in which the atomic nuclei rest. This electron mobility ac-

counts for some of the other common properties of metals: good heat conductivity, malleability and ductility (easily formed into different shapes), and a lustrous finish when pure.

Thankfully, the physics behind all this is mostly irrelevant to our purposes here. Suffice it to say that some materials are good conductors, some are poor conductors, andsome are in between. For now it is good enough to simply understand that thesedistinctions are determined by the configuration of the electrons around the constituent atoms of the material.

An important step in getting electricity to do our bidding is to be able to construct paths for electrons to flow with controlled amounts of resistance. It is also vitally important that we be able to prevent electrons from flowing where we don‘t want them to, by using insulating materials. However, not all conductors are the same, and neither are all insulators. We need to understand some of the characteristics of common conductors and insulators, and be able to apply these characteristics to specific applications.

Almost all conductors possess a certain, measurable resistance (special types of materials called ***superconductors*** possess absolutely no electrical resistance, but theseare not ordinary materials, and they must be held in special conditions in order to be super conductive). Typically, we assume the resistance of the conductors in a circuit to be zero, and we expect that current passes through them without producing any appreciable voltage drop. In reality, however, there will almost always be a voltage drop along the (normal) conductive pathways of an electric circuit, whether we want a voltage drop to be there or not. In order to calculate what these voltage drops will be in any particular circuit, we must be able to ascertain the resistance of ordinary wire, knowing the wire size and diameter.



Transcribe the following words: Correlation, Passage, Explanation, Mechanical, Characteristics, Chemical, Quantum, Impurity, Malleability, Distinction, Appreciable, Ascertain, Measurable, Exhibit, Configuration

Put the words into the correct order to make sentences.

1. Those free materials for those are conductors easy of electrons called, whileallowing impeding the passage of free are electrons passage called materials insulators.
2. Electrons energies occupy these only in a limited range zones electrons of on the particular zone and how depending occupied that is can with zone other.
3. If types atoms of are compounds joined to other of carbon atoms to form, electrical conductivity again becomes altered once.
4. An electricity amounts step in important flow getting to do our is to be to paths for electrons to construct controlled of bidding resistance.
5. Typically, we the without any through resistance of the conductors in a assume circuit to be, and we drop producing expect that appreciable current passes zero them voltage.

Вариант 9 Numerals

Choose the correct variant

1.145 _____ live in the Russian Federation.

a) millions people
b) millions of people
c) million of people
d) million people

2._____ are starving in the world today.

a) Thousands people

b) Thousands of people

3.You are _____ who asks me this stupid question.
a) fifth
b) the fiveth
c) the fifth
d) five

4.Two _____ of my income I spend on my pet's food.
a) twelve
b) twelfth
c) twelves
d) twelfths

5.Every _____ person in our company is not satisfied with his salary.
a) three
b) the third
c) third

6.Ok! See you on _____ of April.
a) the twentyth-seventh
b) twenty-seven
c) the twenty-seventh

7.It is _____ hit. I like such songs.
a) his the third
b) his third
c) the third his

8._____ of the territory is covered with ice.
a) one thirds
b) one third

9.This bouquet costs _____ dollars!
a) two hundreds
b) two hundred
c) two hundred of

10.Two thirds of my work _____ dedicated to the theory of the subject.
a) are
b) is

11.Two _____ two is four.
a) on
b) to
c) by

12.I need _____ of your annual turnover.
a) three-nineths
b) three-ninths
c) three-nine

13.So, this will be two _____ five.
a) point
b) comma

14._____ can save the situation.
a) ten percent
b) ten percents

15.A fortnight means _____ weeks.
a) two
b) three
c) four

16._____ we need to think this problem over.
a) the first of all
b) first of all

17.Have you ever experienced love _____ ?
a) first sight
b) at the first sight
c) at first sight

18.The length of this avenue is 5 kilometers _____ four hundred _____ fifty meters.
a) and ... and
b) and ...
c) ... and

19.I wonder what the world will be at the end of _____ century?
a) twenty one
b) the twentieth-first
c) the twenty-first

20. Personally, I prefer music of _____ .
a) nineteen seventys
b) the nineteen seventies
c) the nineteen seventeens

Выберите правильный вариант ответа.

1. This magnificent cathedral was built in ... century.
- the eighty
- the eighteenth
- eighteens

2. The village appeared in ... on the left bank of the river.
- the seventies
- the seventith
- seventies

3. All the passanges are asked to go to ... .
- sixs gates
- sixth gate
- gate six

4. There are more than ... species of birds on the island.
- a hundred and twenty
- one hundred twenty

- one hundred-twenty

5. The manager was a tall man in his early ... .

- forties
- fourtith
- fourteenth

6. Our friends moved into this house in ... .

- nineteen and seventy-six
- nineteen seventy-six
- nineteen seventy-sixth

7. They got married on ... of April.

- twenty-five
- twenty-fifth
- the twenty-fifth

8. The menu included ... national dishes.

- two hundreds
- two hundreds of
- two hundred

9. I shall always remember the day when I ... flew by plane.

- first
- the first
- first of all

10. The lesson is over at 11.15 - it is at ... .

- quarter past twelve
- a quarter past eleven
- a quarter to twelve

Заполните пропуски данными в скобках количественными числительными в словесной форме.

1. The division of the circle into _____ (360) parts occurred in ancient India, as evidenced in the Rigveda
2. _____ (22 200) donors from Manchester have been honoured at an awards ceremony for donating.
3. The newly elected board of directors consists of_____ (42) new members.
4. Chelsea won_____ (2:0) against Marseille at Stamford Bridge.
5. Russia is the largest country in the world by surface area, covering more than _____ (1/8) of the Earth's inhabited land area, with over _____ (144 000 000) people at the end of March _____2016.

Заполните пропуски данными в скобках существительными hundred, thousand, million, billion в единственном числе (с артиклем или без артикля) или во множественном числе.

1. Over the past two years, over_____ (million) immigrants found work, many illegally.
2. _____ (thousand) of bees have been stolen from a British university.
3. Two_____ (hundred) years after the Constitution was signed, free-enterprise economics had produced doubtful results.
4. State prosecutors investigate more than_____ (thousand) cases of stolen babies in Spain.
5. According to the estimate, the world population has exceeded the number of seven_____ (billion) people
6. Officials issued public warnings after_____ (hundred) of sharks were spotted in the waters.
7. Roman Abramovich threw a party costing five_____ (million) pounds.
8. _____ (million) of people in West Africa must be protected from a serious food crisis.
9. It has been found that walking ten_____ (thousand) steps a day will help you drop undesired pounds.

Choose the correct form.

1. It happened in the middle of the twentyth/twentieth century.
2. I usually go to school by bus six/bus sixth.
3. He is now ranked hundred/hundredth in the world of tennis.
4. 1999 was the second hundred/the two hundredth anniversary of; Pushkin's birth.
5. The car changed the life of people in the 20th/the 20s century.
6. At least two third/two thirds of the novel is about the life of people in the 19th century.
7. He was the third/the thirdth to arrive.
8. 8 The USA ranks third/three in population.
9. I am the one hundred and first/one hundredth and first in this huge line.
10. Vincent Van Gogh's paintings are among the most famous of the 19 century / the 19th century.

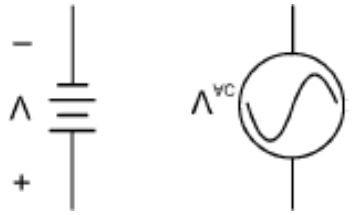
Вариант 10

Read and translate the text.

When the electrons are poised in that static condition (just like water sitting still, high in a reservoir), the energy stored there is called *potential energy*. This potential energy, stored in the form of an electric charge imbalance and capable of provoking electrons to flow through a conductor, can be expressed as a term called ***voltage***, which technically is a measure of potential energy per unit charge of electrons, or something a physicist would call *specific potential energy*. Defined in the context of static electricity,voltage is the measure of work required to move a unit charge from one location to another, against the force which tries to keep electric charges balanced. In the context of electrical power sources, voltage is the amount of potential energy available (work to be done) per unit charge, to move electrons through a conductor.

A battery is an example of an energy storage device that is used to supply a constantvoltage to a circuit (as long as it is sufficiently charged)

When a battery is charging it is storing energy, and whenit is discharging it is supplying energy. If it is charged but not connected to a circuit, then it has the potential to supply energy by applying voltage to it.



Voltage is measured in *volts*. The abbreviation for volt (or volts) is V. Sometimes, smaller units are used. The millivolt (mV) is equal to a thousandth (0.001) of a volt. The microvolt (μV) is equal to a millionth (0.000001) of a volt. It is sometimes necessary to use units larger than the volt. One kilovolt (kV) is one thousand volts (1000 V). One megavolt (MV) is 1 million volts (1,000,000 V) or one thousand kilovolts (1000 kV).

In a dry cell, the voltage is usually between 1.2 and 1.7 V; in a car battery, it is 12 to14 V. In household utility wiring, it is a low-frequency alternating current of about 117 V for electric lights and most appliances, and 234 V for a washing machine, dryer, oven, or stove. In television sets, transformers convert 117 V to around 450 V for the operation of the picture tube. In some broadcast transmitters, the voltage can be several kilovolts.

The largest voltages on our planet occur between clouds, or between clouds and the ground, in thundershowers. This potential difference can build up to several tens ofmegavolts. The existence of a voltage always means that charge carriers, which areelectrons in a conventional circuit, flow between two points if a conductive path isprovided. Voltage represents the driving force that impels charge carriers to move. If all other factors are held constant, high voltages produce a faster flow of charge carriers, and therefore larger currents, than low voltages. But that's an oversimplification in most real- life scenarios, where other factors are hardly ever constant!

Match the words to their definitions.

1. static	a. to put or keep
2. potential	b. someone or something with the same quantity or value, or someone having thesame rights as another
3. store	c. of or producing stationary electrical
4. provoke	d. to put into action
5. unit	e. to give or provide something needed
6. amount	f. a piece of machinery that is used toperform a task
7. device	g. that can, but has not yet, come into being;possible; latent; unrealized; undeveloped
8. supply	h. something that can conduct or transferheat, sound or electricity
9. constant	i. any fixed quantity, amount, distance, measure, etc. used as a standard; specif.
10. apply	j. a receptacle containing electrodes and an electrolyte either for generating electricityby chemical action or for use in electrolysis
11. equal	k. to excite to some action or feeling
12. cell	l. a tool or technique used to do a task

13. conductive	m. an electronic device in which conduction by electrons takes place through a vacuumor a gaseous medium within a sealed glassor metal container and which has various uses based on the controlled flow of electrons
14. appliance	n. the entire mass of something
15. tube	o. something that doesn't change or

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Insert the missing words.

- ….. is the measure of specific potential energy (potential energy per unit charge) between two locations. In layman's terms, it is the measure of "push" available to motivate ……..
- Voltage, as an expression of potential energy, is always relative between two locations, or …….
- When a voltage source is connected to a circuit, the voltage will cause a uniform flow of electrons through that circuit called a …….
- In a single (one loop) circuit, the amount of …… at any point is the same asthe amount of ….. at any other point.
- If a circuit containing a voltage source is ….., the full voltage of that sourcewill appear across the points of the break.
- The +/- orientation of a voltage drop is called the ……. It is also relativebetween two points.

Вариант 11

Ex. 1. Put the following sentences into interrogative and negative forms.

1. Tunnel diodes work well as amplifiers in microwave receivers. 2. Tunnel diodes generate very little unwanted noise. 3. Some semiconductor diodes emit radiant energy. 4. As the current rises, the brightness increases. 5. The LCD technology has advantages over LED technology. 6. Some modern telephone systems make use of modulated light. 7. A basic fiber-optic system consists of a transmitting device, an optical-fiber cable and a receiver. 8. Fiber optics makes use of certain special conditions, under which all of thelight encountering the surface between two materials is reflected, to reduce loss. 9. A light bulb converts electricity into radiant energy that you can see. 10. A changing magnetic field creates a fluctuating electric field.

Ex. 2. Put the verbs in brackets into the present simple form.

Electric Cells

An electric cell is used to produce and supply electric energy. It … (to consist) of an electrolyte and two electrodes. Electrodes are used as terminals, they … (to connect) the cell to the circuit – current … (to pass) through the terminals and the bulb lights. Cells can be connected in series, in parallel and in series-parallel. In case a cell … (to have) a trouble it … (to stop) operating or … (to operate) badly. This cell should be substituted by another one.

Audio-Taper Potentiometer

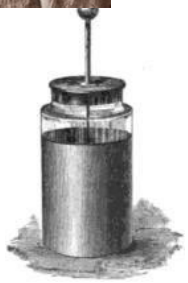
In some applications, linear taper potentiometers … (not to work) well. The volume control of a radio receiver or hi-fi audio amplifier … (to be) a good example. Humans … (to perceive) sound intensity according to the logarithm of the actual sound power. If you
… (to use) a linear-taper potentiometer as the volume control for a radio or other sound system, the sound volume will vary too slowly in some parts of the control range, and too fast in other parts of the control range. To compensate for the way in which people … (to perceive) sound level, an audio-taper potenti-

ometer is used. In this device, the resistance between the center and end terminal … (to increase) as a nonlinear function of the angular
shaft position. The device is sometimes called a logarithmic-taper potentiometer or log- taper potentiometer because the nonlinear function … (to be) logarithmic. This precisely
… (to compensate) for the way the human ear-and-brain "machine" … (to respond) to sounds of variable intensity.

Audio-taper potentiometers are manufactured so that as you … (to turn) the shaft, the sound intensity … (to seem) to increase in a smooth, natural way. Figure 6-10 … (to be) a graph of relative resistance versus relative angular shaft displacement for an audio- taper potentiometer.

Вариант 12
Render the text

Benjamin Franklin (figure 3) (1706—1790) and his friends did extensive experimenting with what is known as a **Leyden jar** (figure 4). Leyden jars were created by Dutch scientist **Pieter van Musschenbroek** of Leiden, the Netherlandsand were named after this city. Leyden jars were commonly used in Franklin's day to **store** and **transfer electric charge**.



The design of a typical Leyden jar was a glass bottle partially filled with water with a **metal foil** coating the inside of the bottle and another metal foil covering the outside of the bottle with a metal wire extending from the inside of the bottle to the outside through a **cork plug**.

Electrical charge was stored up in the jar by touching the conducting wire to an electrical source such as the
aforementioned **electric tube**. Positive electrons would gather on
the inside foil, negative on the outside, thus making a **perfect electronic storage device**.

It was initially thought that the electricity was stored in the water, but **Benjamin Franklin** found that it was actually stored in the glass. Later it was determined that just about any item could act as the storage device, but that different items would **conduct andstore electricity** at different rates.

In a letter written in 1748, Franklin described to Collinson how the Leyden jar couldbe **positively** and **negatively charged**, the first time these terms were used in relation to electricity. He also, for the first time, used the terms **charging** and **discharging** when describing the transfer of electricity from one object to another. He described his discoverythat the charge was held in the glass of the jar itself.

In order to further study the properties of the electrical storage of glass, Franklin constructed what he called an **electric battery** of glass window panes and thin lead plates. With them he demonstrated how electricity could be passed through and stored in the glassitself. This is the first description of an electrical battery and the first time such a term was used.

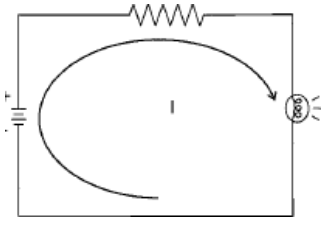
Вариант 13

Direct-current Circuit Basics

Read and translate the text.

The DC Circuit

A simple direct current (DC) circuit is shown in Figure 1. A battery provides the voltage that makes the current flow, provided there is a complete path of conductive material, like copper wire, from one terminal of the battery to the other. The wiring provides such a path, which completes the circuit. If there is no wire, or if the wire does not return to the other terminal, then it is an incomplete circuit.



In addition to a battery and a lamp, the circuit also has a resistor. The function of theresistor is to limit the amount of current flowing through the circuit. Without it, the only factors limiting the current are the size of the copper wire, the resistance of the lamp filament, and the voltage of the battery. If the circuit resistance is too low, a very large current will flow and the wire and lamp filament will heat up, possibly to the point of destruction. The resistor prevents that from happening. The load in this case is a lamp, but it might just as easily be a fog machine or anything that uses electricity.

Ohm's Law

Ohm's law is one of the most important and useful fundamental relationships in electricity and electronics. If you have a good understanding of what it means and howto use it, then you will have taken a large step toward demystifying electricity and electronics.

Ohm's law describes the relationship between voltage, current, and resistance. It simply says that voltage is the product of current and resistance.

Ohm's law: V (volts) = I (amps) × R (ohms)

What this tells us is that for a given resistance, the current is directly proportional to the voltage: the higher the voltage, the higher the current and vice versa. Alternatively, for a given voltage, the current is inversely proportional to the resistancein a circuit: the higher the resistance, the lower the value of the current.

DC Power

Power is the rate at which work is being done. When it comes to electricity, work is being done any time current is flowing. The greater the flow of current, the more workthat is being done. The same can be said of the voltage: the higher the voltage, the more work that is being done (assuming there is a complete circuit and current is flowing).

In a DC circuit, the power in watts is equal to the voltage times the current. For a fixed voltage, a higher current means that more power is being used, and for a fixed current, a higher voltage also means that more power is being used. The power formula for a DC circuit can be expressed in terms of the voltage and current as follows:

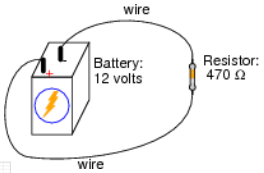
P (watts) =V (volts) × I (amps)

Put the words into the correct order to make sentences.

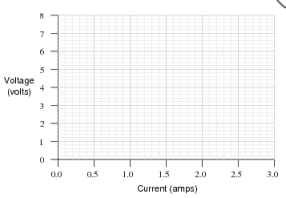
1. is an wire there is no or if the wire does not return If to the other incompleteterminal, then it, circuit.
2. the will lamp circuit is low, a very flow and the wire and heat up, currentfilament possibly to the large point too of will resistance If destruction.
3. relationships is of the and useful one in electricity Ohm's and law electronicsmost fundamental important.
4. it, the are of the copper wire, the limiting resistance of the size the current lampthe filament, and the voltage factors Without of the only battery.
5. inversely for a value the higher, the proportional the resistance current is to in acircuit: the given voltage resistance, the lower the of

Alternatively, the current.

Solve the following problems:



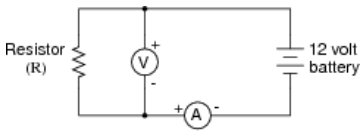
1. Explain, step by step, how to calculate the amount of current (I) that will go through the resistor in this circuit.



2. Plot the relationships between voltage and current for resistors of three different values (1 Ω, 2 Ω, and 3 Ω), all on the same graph.

What pattern do you see represented by your three plots? What relationship is there between the amount of resistance and the nature of the voltage/current function as it appears on the graph?

3. What is the value of this resistor, in *ohms* (Ω)?



Voltmeter indication = 12.3 volts
Ammeter indication = 4.556 milliamps

Вариант 14

Retell the text "The DC Circuit" according to the notes below.

Notes for retelling:

1. Look through the text. What is its main topic? What field is it in? What is its main idea?

2. Now read the text more carefully. What parts can you divide it into? How many parts are there? Work on each part of the text (the parts the text falls into may show as paragraphs). What is the main idea of each part? Try to find the key statements in each part and put them down. They may be 1-2 sentences from each paragraph/part of the text.

3. Now add some details to the skeleton. They can be from the text - some interesting facts that illustrate the theory or what not. Think of some opinions of your own: what do you think of this or that idea of the author? Is this matter interesting for you? Does it go with your own research? Do you agree with the hypotheses presented? Let your statements be noticeable and attracting attention so as to wake those who are listening.

Вариант 15

Ex. 1. Rewrite the sentences putting the verbs into the present continuous tense if possible.

1. Digital systems replace analog ones at the same time that fiber optics supersedes copper cables. 2. This voltage decreases again to zero as the loop reaches "1/2 cycle". 3. From this action the motor derives its name.4. The current flows in the opposite direction on this side. 5. In motors a load consists of mechanical work to do, such as driving machinery or vehicles.6. The compound generator furnishes power for motors for running machine tools, fans, elevators, streetcars, and paper mills and for ship propulsion.7. The direction of movement depends upon the direction of the current. 8. The same current passes through brushes and commutator.

Ex. 2. Put the verbs in brackets either in the present simple or the present continuous form.

1. The watt … (to be) the rate at which electric energy … (to be supplied) whena current of one ampere … (to pass) at a potential difference of one volt. 2. … the energy industry (to decrease) its activity? 3. The energy industry … (to undergo) considerable development. 4. Particles having opposite electric charge from the protons … (to surround) the nucleus of an atom. 5. Compounds often, but not always … (to appear) greatly different from any of the elements that … (to make) them up. 6. All matter, whether solid, liquid, or gas … (to be made of) molecules. These particles … always (to move). 7. Sometimes an insulating material … (to get charred), or … (to melt down), or
… (to get perforated) by a spark. 8. A changing magnetic field … (to create) a fluctuating electric field, and a fluctuating electric field … (to produce) a changing magnetic field. 9. When calculating energy values, you must always remember the units you … (to use). 10. Now we… (to produce) heat by an electric current. 11. Russian people …. (to play) an outstanding part in the development of world science. 12. These students….. (to work) in the laboratory at the moment. 13. When circuits are indirect-inductively coupled energy is transferred from one circuit to another using electromagnetic field of the inductance through which a varying current….. (to flow). 14. When the device …. (to operate) d.c.
…(to flow) in the same direction. 15. Any electrochemical cell or battery…… (to have) acertain amount of electrical energy that can be obtained from it.

Ex. 3. Make up your own sentences in the present continuous tense using the following vocabulary.

1. The motor, to convert, energy, into, mechanical, energy. 2. Current, to flow, through, the coil. 3. The armature, to rotate. 4. The motor's, brushes, to spark. 5. The speed, the motor, to slow down. 6. The workers, to repair, shorting, the mechanism. 7. A transformer, substation, to transmit, and, to distribute, electric, power.

Вариант 16

Read the text and then make questions so that the words in bold provide answers.

Superconductivity

Conductors lose all of their electrical resistance when cooled to super-low temperatures (near absolute zero, about -273^{o} Celsius). It must be understood that superconductivity is not merely an extrapolation of most conductors‘ tendency to gradually lose resistance with decreasing temperature; rather, it is a sudden, quantum leap in resistivity from finite to nothing. **A superconducting material** has absolutely zero electrical resistance, not just some small amount.

Superconductivity was first discovered by **H. Kamerlingh Onnes** at the University of Leiden, Netherlands in 1911. Just three years earlier, in 1908, Onnes had developed a method of liquefying helium gas, which provided a medium with which to **supercool experimental objects** to just a few degrees above absolute zero. Deciding to investigate changes in electrical resistance of mercury when cooled to this low of a temperature, he discovered that its resistance dropped to *nothing* just below the boiling point of helium.

There is some debate over exactly how and why superconducting materials superconduct. One theory holds that electrons group together and travel in pairs (called *Cooper pairs*) within a superconductor rather than travel independently, and that has something to do with their frictionless flow. Interestingly enough, another phenomenon of super-cold temperatures, *superfluidity*, happens with certain liquids (especially liquid helium), resulting in frictionless flow of molecules.

Superconductivity promises extraordinary capabilities for electric circuits. If conductor resistance could be eliminated entirely, there would be no power losses or inefficiencies in electric power systems due to stray resistances. Electric motors could be made almost perfectly (100%) efficient. Components such as capacitors and inductors, whose ideal characteristics are normally spoiled by inherent wire resistances, could be made ideal in a practical sense. Already, some practical **superconducting conductors**, motors, and capacitors have been developed, but their use at this present time is limited due to the practical problems intrinsic to maintaining super-cold temperatures.

The threshold temperature for a superconductor to switch from normal conductionto superconductivity is called **the transition temperature**. Transition temperatures for ~~“c~~lassic‖ superconductors are in the cryogenic range (near absolute zero), but much progress has been made in developing ~~“hi~~gh-temperature‖ superconductors which superconduct at warmer temperatures. One type is a ceramic mixture of yttrium, barium, copper, and oxygen which transitions at a relatively balmy -160^{o} Celsius. Ideally, a superconductor should be able to operate within the range of ambient temperatures, or atleast within the range of **inexpensive refrigeration equipment**.

The critical temperatures for a few common substances are shown here in this table. Temperatures are given in kelvins, which has the same incremental span asdegrees Celsius (an increase or decrease of 1 kelvin is the same amount of temperature change as 1^{o} Celsius), only offset so that 0 K is absolute zero. This way, we don‘t haveto deal with a lot of negative figures.

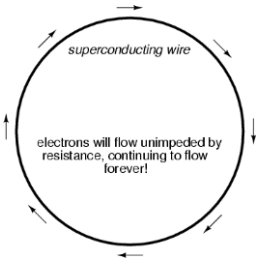
Material	Element/Alloy	Critical temp.(K)
Aluminum	Element	1.20
Cadmium	Element	0.56

Lead	Element	7.2
Mercury	Element	4.16
Niobium	Element	8.70
Thorium	Element	1.37
Tin	Element	3.72
Titanium	Element	0.39
Uranium	Element	1.0
Zinc	Element	0.91
Niobium/Tin	Alloy	18.1

Superconducting materials also interact in interesting ways with magnetic fields. While in the superconducting state, a superconducting material will tend to exclude all magnetic fields, a phenomenon known as **the *Meissner effect***. However, if the magnetic field strength intensifies beyond a critical level, the superconducting material will be rendered non-superconductive. In other words, superconducting materials **will lose** their superconductivity (no matter how cold you make them) if exposed to too strong of a magnetic field. In fact, the presence of *any* magnetic field tends to lower the critical temperature of any superconducting material: the more magnetic field present, the colderyou have to make the material before it will superconduct.

This is another practical limitation to superconductors in circuit design, since electric current through any conductor **produces a magnetic field**. Even though asuperconducting wire would have zero resistance to oppose current, there will still be a *limit* of how much current could practically go through that wire due to its critical magnetic field limit.

There are already a few industrial applications of superconductors, especially since the recent (1987) advent of the yttrium-barium-copper-oxygen ceramic, which only requires liquid nitrogen to cool, as opposed to liquid helium. It is even possible to order superconductivity kits from educational suppliers which can be operated in **high school labs** (liquid nitrogen not included). Typically, these kits exhibit superconductivity by the Meissner effect, suspending a tiny magnet in mid-air over **a superconducting disk** cooled by a bath of liquid nitrogen.



The zero resistance offered by superconducting circuits leads to unique consequences. In a superconducting short- circuit, it is possible to maintain large currents indefinitely with zero applied voltage!

Rings of superconducting material have been experimentally proven to sustain continuous current for years with no applied voltage. So far as anyone knows, there is notheoretical time limit to how long an unaided current could be sustained in a superconducting circuit. If you‘re thinking this appears to be a form of *perpetual motion*,you‘re correct! Contrary to popular belief, there is no law of physics prohibiting perpetual motion; rather, the prohibition stands against any machine or system generating more energy than it consumes (what would be referred to as an *over-unity* device). At best, all a perpetual motion machine (like the superconducting ring) wouldbe good for is to ***store* energy**, not *generate* it freely!

Superconductors also offer some strange possibilities having nothing to do with Ohm‘s Law. One such possibility is the construction of a device called a **Josephson Junction**, which acts as a relay of sorts, controlling one current with another current (with no moving parts, of course). The small size and fast switching time of Josephson Junctions may lead to new computer circuit designs: an alternative to using **semiconductor transistors**.

Вариант 17

Put the words into the correct order to make sentences.

1. Those free materials for those are conductors easy of electrons called, whileallowing impeding the passage of free are electrons passage called materials insulators.

2. Electrons energies occupy these only in a limited range zones electrons of on the particular zone and how depending occupied that is can with zone other.

3 If types atoms of are compounds joined to other of carbon atoms to form, electrical conductivity again becomes altered once.

4. An electricity amounts step in important flow getting to do our is to be to paths for electrons to construct controlled of bidding resistance.

5. Typically, we the without any through resistance of the conductors in a assume circuit to be, and we drop producing expect that appreciable current passes zero them voltage.

Which of the following items are more likely conductors or insulators?

 **Eraser** Conductor Insulator	 **Metal Pen** Conductor Insulator	 **Paper Envelope** Conductor Insulator
 **Pencil** Conductor Insulator	 **Paper clip** Conductor Insulator	 **Chalk** Conductor Insulator
 **Penny** Conductor Insulator	 **Metal Spoon** Conductor Insulator	 **Nail** Conductor Insulator

Solve the following problems. Discuss them with your partner.

1. Which of the following materials are likely to exhibit more conductiveproperties than insulating properties?_____Explain your answers.

a. rubber
b. aluminum
c. silver
d. plastic
e. wet skin

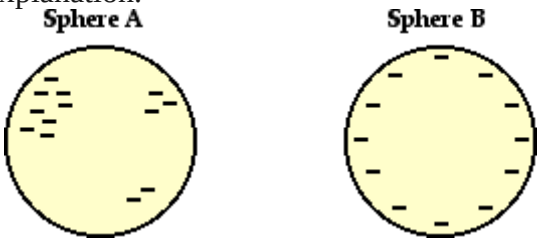
2. A conductor differs from an insulator in that a conductor_____.

a. has an excess of protons
b. has an excess of electrons
c. can become charged and an insulator cannot
d. has faster moving molecules
e. does not have any neutrons to get in the way of electron flow
f. none of these

3. Suppose that a conducting sphere is charged positively by some method. The charge is initially deposited on the left side of the sphere. Yet because the object is conductive, the charge spreads uniformly throughout the surface of the sphere. The uniform distribution of charge is explained by the fact that_.

a. the charged atoms at the location of charge move throughout the surface of the sphere
b. the excess protons move from the location of charge to the rest of the sphere
c. excess electrons from the rest of the sphere are attracted towards the excess protons

4. One of these isolated charged spheres is copper and the other is rubber. The diagram below depicts the distribution of excess negative charge over the surface of two spheres. Label which is which and support your answer with an explanation.



5. When an oil tanker car has arrived at its destination, it prepares to empty its fuelinto a reservoir or tank. Part of the preparation involves connecting the body of thetanker car with a metal wire to the ground. Suggest a reason for why is this done.

Вариант 18

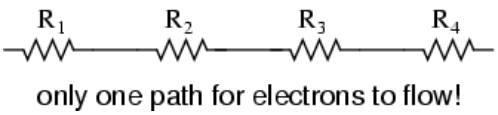
Read and translate the text.

Circuits consisting of just one battery and one load resistance are very simple to analyze, but they are not often found in practical applications. Usually, we find circuits where more than two components are connected together.

There are two basic ways in which to connect more than two circuit components: series and parallel.

The basic idea of a ―*series*‖ connection is that components are connected end-to-end in a line to form a single path for electrons to flow:

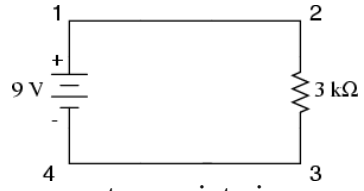
Series connection



only one path for electrons to flow!

The first principle to understand about series circuits is that the amount of current is the same through any component in the circuit. This is because there is only one path for electrons to flow in a series circuit, and because free electrons flow through conductorslike marbles in a tube, the rate of flow (marble speed) at any point in the circuit (tube) at any specific point in time must be equal.

From the way that the 9 volt battery is arranged, we can tell that the electrons in this circuit will flow in a counter-clockwise direction, from point 4 to 3 to 2 to 1 and back to 4.However, we have one source of voltage and three resistances. How do we use Ohm‘sLaw here?



An important caveat to Ohm‘s Law is that all quantities (voltage, current, resistance, and power) mustrelate to each other in terms of the same two points in a circuit. For instance, with a single-battery, single-resistor
circuit, we could easily calculate any quantity because they all applied to the same two points in the circuit:

Since points 1 and 2 are connected together with wire of negligible resistance, as are points 3 and 4, we can say that point 1 is electrically common to point 2, and that point 3 is electrically common to point 4. Since we know we have 9 volts of electromotive force between points 1 and 4 (directly across the battery), and since point 2 is common to point 1 and point 3 common to point 4, we must also have 9 volts between points 2 and 3 (directly across the resistor). Therefore, we can apply Ohm‘s Law (I = E/R) to the current throughthe resistor, because we know the voltage (E) across the resistor and the resistance (R) ofthat resistor. All terms (E, I, R) apply to the same two points in the circuit, to that same resistor, so we can use the Ohm‘s Law formula with no reservation.

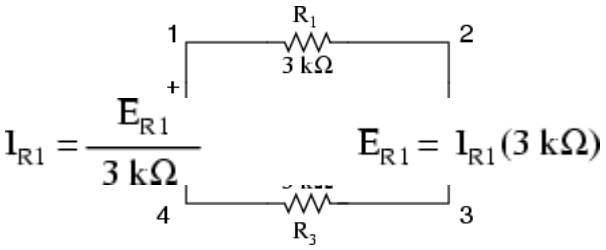
$$I = \frac{E}{R}$$

$$I = \frac{9 \text{ volts}}{3 \text{ k}\Omega} = 3 \text{ mA}$$

However, in circuits containing more than one resistor, we must be careful in how we apply Ohm‘s Law. In the three-resistor example circuit below, we know that we have
9 volts between points 1 and 4, which is the amount of electromotive force trying to push electrons through the series combination of R_1, R_2, and R_3. However, we cannot take the value of 9 volts and divide it by 3k, 10k or 5k Ω to try to find a current value, because we don‘t know how much voltage is across any one of those resistors, individually.

The figure of 9 volts is a *total* quantity for the whole circuit, whereas the figuresof 3k, 10k, and 5k Ω are *individual* quantities for individual resistors. If we were to plug a figure for total voltage into an Ohm‘s Law equation with a figure for individual resistance, the result would not relate accurately to any quantity in the real circuit.

For R_1, Ohm‘s Law will relate the amount of voltage across R_1 with the current through R_1, given



$$I_{R1} = \frac{E_{R1}}{3 \text{ k}\Omega} \qquad E_{R1} = I_{R1}(3 \text{ k}\Omega)$$

R_1_s resistance, 3kΩ:

But, since we don‘t know the voltage across R_1 (only the total voltage supplied by the battery across the three-resistor series combination) and we don‘t know the current through R_1, we can‘t do any calculations with either formula. The same goes for R_2 and R_3: we can apply the Ohm‘s Law equations if and only if all terms are representative of their respective quantities between the same two points in the circuit.

So what can we do? We know the voltage of the source (9 volts) applied acrossthe series combination of R_1, R_2, and R_3, and we know the resistances of each resistor, but since those quantities aren‘t in the same context, we can‘t use Ohm‘s Law to determine the circuit current. If only we knew what the *total* resistance was for the circuit: then we could calculate *total* current with our figure for *total* voltage (I=E/R).

This brings us to the second principle of series circuits: the total resistance of any series circuit is equal to the sum of the individual resistances. This should make intuitive sense: the more resistors in series that the electrons must flow through, the more difficult it will be for those electrons to flow. In the example problem, we had a 3 kΩ, 10 kΩ, and 5 kΩ resistor in series, giving us a total resistance of 18 kΩ:

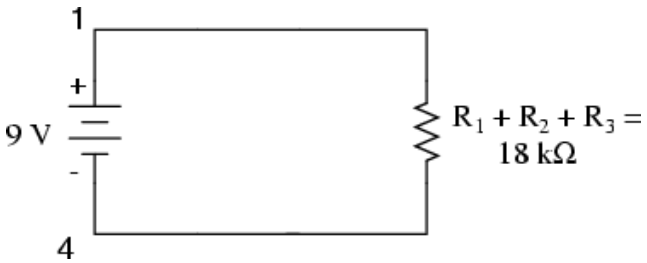
In essence, we've calculated the equivalent resistance of R_1, R_2, and R_3 combined. Knowing this,

$$R_{total} = R_1 + R_2 + R_3$$

$$R_{total} = 3\ k\Omega + 10\ k\Omega + 5\ k\Omega$$

$$R_{total} = 18\ k\Omega$$

we could re-draw the circuit with a single equivalent resistor representing the series combination of R_1, R_2, and R_3:



Now we have all the necessary information to calculate circuit current, because we have the voltage between points 1 and 4 (9 volts) and the resistance between points 1 and 4 (18 kΩ):

Now that we know the amount of current through each resistor, we can use Ohm's Law to determine the voltage drop across each one (applying Ohm's Law in its proper context):

$$I_{total} = \frac{E_{total}}{R_{total}}$$

$$I_{total} = \frac{9\ volts}{18\ k\Omega} = 500\ \mu A$$

$$E_{R1} = I_{R1}\ R_1 \qquad E_{R2} = I_{R2}\ R_2 \qquad E_{R3} = I_{R3}\ R_3$$

$$E_{R1} = (500\ \mu A)(3\ k\Omega) = 1.5\ V$$

$$E_{R2} = (500\ \mu A)(10\ k\Omega) = 5\ V$$

$$E_{R3} = (500\ \mu A)(5\ k\Omega) = 2.5\ V$$

Notice the voltage drops across each resistor, and how the sum of the voltage drops (1.5 + 5 + 2.5) is equal to the battery (supply) voltage: 9 volts. This is the third principle of series circuits: that the supply voltage is equal to the sum of the individual voltage drops.

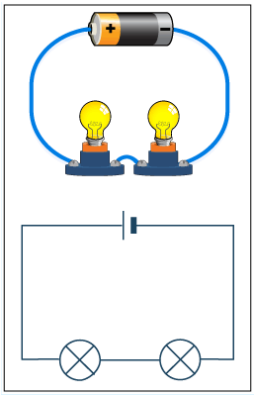
In summary, a series circuit is defined as having only one path for electrons to flow. From this definition, three rules of series circuits follow: all components share the same current; resistances add to equal a larger, total resistance; and voltage drops add to equal a larger, total voltage. All of these rules find root in the definition of a series circuit. If you understand that definition fully, then the rules are nothing more than footnotes to the definition.

Вариант 19

The following statements are not true to fact. Correct them.

1. In a series circuit, not all components are connected end-to-end, forming a singlepath for electrons to flow.
2. Components in a series circuit share the same voltage: I (total) = I1 = I2 = . . . In
3. Total resistance in a series circuit isn‘t equal to the sum of the individualresistances: R (total) = R1 + R2 + . . . Rn
4. Total voltage in a series circuit is equal to the difference of the individual voltagedrops: E (total) = E1 - E2 - . . . En
5. If you turn off any electrical devices in a series circuit, you will turn some ofthem off. If you turn these devices back on, you will turn on some of them as well.

Look at Figure. Then answer the questions.



1. In this circuit, the electricity has one/ two path(s) to follow.
2. This circuit is complete/incomplete.
3. Where does the electricity have to go before it reaches bulb #2?
4. If bulb #1 were to go out, bulb #2 would stay lit/go out.
5. If bulb #2 were to go out, bulb #1 would stay lit/ go out.
6. In this circuit, each bulb is/is not getting the full electricalpressure.
7. If more bulbs were added to this circuit, each bulb would giveoff more/ less light.
8. If this circuit had only one bulb, it would give off more/less light.

Вариант 20

Transform the following sentences using the rules of reported speech andthe models “They say…” and “They said…”.

1. Engineers and technicians usually connect an ohmmeter in a circuit with themeter set for the highest resistance range first. 2. Have you ever pulled out an old store receipt and found that it was washed-out or blank? 3. Which of the following is a serial- access medium? 4. All the electrons might be removed from an atom, leaving only the nucleus. 5. How might this problem be resolved? 6. Have you used orange bug lights whencamping to keep the flying pests from coming around at night, or those UV devices that attract bugs and then zap them? 7. How will a robot be able to feel something and transmit these impulses to the human brain? 8. An ohmmeter must be calibrated at the factory where it is made, or in an electronics lab. 9. How can this sense of texture be realistically transmitted to the human brain? 10. It also eliminates the possibility that the meter sensitivity will change in case the strength of the permanent magnet deteriorates. 11. Would that begin to approach the level of sophistication in your body’s nervous system?

12. It works well when the value of the quantity does not change often or fast. 13. Is the human brain nothing more than an amazingly complicated digital switching network? 14. The compass needle will not give a clear deflection. 15. This resistor must be capable of carrying the current without burning up. 16. That means their values must actually be whatthe manufacturer claims they are. 17. For each meter scale,

take down the number that the pointer has most recently passed. 18. Then refer to it frequently in the future, especially when you see a symbol you don't remember or recognize. 19. Write down the rest as you go. 20. There are some situations in which a digital meter is a disadvantage. 21. The amplifier volume should be kept down so that the meter doesn't go past the zero mark and into the red range. 22. Each electron flows only a short distance before transferring its energy to another, and another, and so on around a circuit, eventually leading back to the source. 23. Electric current in a wire, measured in amperes, is the simultaneous motion in the same direction of enumerable electrons. 24. The first function of the transmission system is to use "step-up transformers" to raise the voltage produced by the electricity generator, typically about 20,000 volts, to the levels required for long-distance transport, which is generally 230,000 volts or greater. 25. Energy is the elemental force upon which all civilizations are built, and technology provides the means to harness that energy.

Ex. 2. Transform the sentences back into the direct speech.

1. He explained that an element might be both an ion and an isotope different from the usual isotope. 2. He told us that we might think of it as a positive ion. 3. She said that meters with a scale and pointer were known as analog meters. 4. He mentioned that it had extremely high input resistance, along with good sensitivity and amplification. 5. We said that the spark might jump an inch, 2 inches, or even 6 inches. 6. I told him that the resistor would draw half the current. 7. The teacher asked what the resulting atomic weight was. 8. He asked if we had noticed any strange things about the notation yet. 9. I asked whether they had heard the terms "power" and "energy" used interchangeably. 10. He said that thatkept the diagram neat and easy to read. 11. She mentioned that sometimes it was desirable to have an ammeter that would allow for a wide range of current measurements. 12. You asked me what the conductance of a span of the wire that was 3 km long was. 13. Heasked how much power that represented. 14. The teacher said that Lomonosov organized the first chemical laboratory in our country. 15. He said that by means of a transformer we could change current.

Вариант 21

Ex. 1. Fill in the gaps with *recently, yet, already, just or since*.

1. They have …. determined the main properties of the substance. 2. I have known this scientist ….. 1970. 3. They have …. applied new methods in their research. 4. Our country hasn't developed into a powerful state….. 5. The introduction of the new equipment has ……increased production. 6. Overvoltages which we have …. described rarely exceed three to five times the normal phase to neutral «peak» voltage of the system. 7. Computer technology has …..made household appliances smarter and feature richer. 8. The light bulb has undergone various improvements …. Edison's work.

Ex. 2. Put the verbs in brackets into the correct form of the present perfect tense.

1. Gagarin's flight (to mark) the beginning of space exploration and thus (to open) a new epoch in human history. 2. Engineers (to make) an electric car of originalconstruction. 3. The workers (to improve) methods of their work and (to get) good results. 4. Women (to make) a great contribution to education and scientific progress. 5. Otherindividuals (to use) computers to electronically embezzle funds and alter credit histories.6. The direct study of the lunar surface (to begin) with Moon landing by automatic spacestations.

Ex.3. Choose some scientific problem and make up a summary on its history, using the perfect tenses.

Ex. 4. Put the verbs in brackets into the past simple or present perfect form.

1. In 1878 British scientist Sir Joseph Wilson Swan (to invent) the modern light bulb, which (to use) carbon filaments in evacuated glass bulbs. 2. The latest laser devices (to find) application in medicine. 3. Electricity (to provide) mankind with the most efficient source of energy. 4. In experimenting with magnetism, Faraday (to make) two discoveries of great importance; one (to be) the existence of diamagnetism. 5. The consumption of electricity (to double) every ten years. 6. Our scientists (to succeed) in obtaining a new generation of solid-state lasers. 7. Engineers (to carry) out experimental work long before they (to proceed) with the design. 8. He independently (to discover) the same device a year later in his work on the development of the electrical infrastructure that(to enable) incandescent lamps to be widely used as a lighting system.

Вариант 22

Read the text and then make questions so that the words in bold provide answers.

Charles Augustin de Coulomb (figure 7) (1736-1806), French physicist, pioneer in electrical theory, born in Angouleme. He served as a military engineer for France in the West Indies, but retired to Blois, France, at the time of the French Revolution to continue research in magnetism, friction, and electricity. In 1777 he invented the **torsion balance** for measuring the force of magneticand electrical attraction. With this invention, Coulomb was able to formulate the principle, now known as **Coulomb's law**, governing the interaction between electric charges. In 1779 Coulomb published the treatise *Theorie des machines simples* (**Theory of Simple Machines**), an analysis of friction in machinery. After the war Coulomb came out of retirement and assisted the new government in devising a metric system of weights and measures. The unit of quantity used to measure electrical charges, the ***coulomb***, was named for him.

Prepare a short report about Charles Augustin de Coulomb according to the plan:

- Biography;
- Scientific discoveries;
- The importance of his works.

Вариант 23

Read the text and then make questions so that the words in bold provide answers.

Alessandro Volta (figure 14) (1745-1827), born in Como, Italy, is best known for discovering **current electricity** and for developing the **voltaic pile**, which became an invaluable tool in electrochemistry.

Volta found that a current was produced when two different **metal disks** such as silver and zinc were separatedby a **moist conductor**, such as paper soaked in salt water, and brought into contact by a wire. By stacking a collection of silver-moist paper-zinc units, in effect forming a pile, Volta determined that the current intensified. If someone touched the top of such a "voltaicpile" (as this early battery was called) and put his or her other hand in a dish of salt water that was connected to the bottom metal disk by **a strip of metal**, that person would feel a continuous, if weak, **shock**.

Volta made his discovery of the current electricity–**generating voltaic pile** knownto the scientific community by 1800. His invention gave rise to new fields of scientific inquiry, including electrochemistry, **electromagnetism**, and the modern applications of electricity. The first chemists to use the voltaic pile were William Nicholson and Anthony Carlisle, who built a pile and used it to **decompose water. Humphry Davy** (1778–1829) used the voltaic pile to decompose many substances, such as **potash** and soda. Davy was also able to **isolate** for the first time several elements, including **calcium** and magnesium, using the voltaic pile.

The voltaic pile also had applications in other fields of science. **William Cruikshank** discovered the process of **electroplating** while working with a voltaic pile. **Davy** constructed the first **crude electric light** with the pile in 1820.

Prepare a short report about A. Volta according to the plan:

- Biography;
- Scientific discoveries;
- The importance of his works.

Вариант 24

Ex. 1. Fill in *can, can't, must, mustn't, needn't, should* or *have to*. Translate the sentences into Russian.

1. And the electrician …. do his or her part to make sure there are no technological glitches. 2. Fortunately, we ….. count electrons or measure the strength of magnetic fields in order to measure current in the real world. 3. Everything in the system …. be oversized to deliver the same amount of power - the generator, power distribution cables, transmission towers, switches, transformers, breakers, and connectors all …. be oversized to handle the increase in current. 4. Once the nature of the atom is understood, then we …..begin to understand the relationship between voltage, current, and resistance, which is the fundamental relationship known as Ohm's law. 5. The formulas for these calculations ….. take into account the phase angle or power factor. 6. So, while they're good at conventional phase-control - switching on during the voltage cycle - they …..be used for reverse phase-control dimming - switching the voltage off during the voltage cycle. 7. Just as with forward phase-control dimming, the two half cycles ….. mirror each other or a DC offset will be produced, possibly damaging circuit components. 8. Make no mistake about it: electricity ….. kill. 9. According to the standard, it …. trip at 6 milliamps of leakage current and ….. trip below 4 milliamps of leakage current. 10. Each and every circuit ….. be properly grounded and have a safety grounding wire bonded between conductive metallic enclosures and a grounding rod to ensure the safety of the system. 11. Feeder cable …..be sized according to the "maximum load that the switchboard is intended to control in a given situation," meaning that a dimmer rack, breaker panel, or portable power distribution unit ….. be fed to its full nameplate capacity if it is not fully loaded. 12. When switchgear malfunctions or another problem causes a dead short it …… create a huge ball of fire with intense heat that engulfs the immediate surroundings and then dissipates in a fraction of a second. 13. The spare capacity of the load curve …… determine the size of units. 14. If we have a run of 300 feet, then we ….. pay attention to the voltage drop caused by the resistance of the length of wire. 15. It uses this type of switching device because a triac or SCR ….. only turn on during the voltage cycle but …… turn off until the voltage is at zero.

Ex. 2. Translate from Russian into English using different modal verbs and their substitutes.

1. Малейшее изменение в атоме может вызвать громадные изменения в его поведении. 2. Вы можете жить, вдыхая чистый кислород, но вы не сможете выжить в чистом азоте. 3. Дерево быстро сгорит в атмосфере из чистого кислорода, но даже не воспламенится в чистом азоте. 4. Электроны могут довольно свободно переходить от одного атома к другому в некоторых материалах. 5. Напряжение не может взяться ниоткуда! 6. Высокого напряжения можно достичь, соединив последовательно гигантские панели солнечных батарей. 7. В математическом и философском курсах, которые включают в себя логику, вы можете увидеть другие символы для обозначения сцепления и дизъюнкции. 8. Усилитель может включать в себя полную интегральную схему. 9. Инженеры по акустике должны это учитывать при разработке звуковых систем и концертных залов. 10. Робот, который работает при ярком солнечном свете, не нуждается в умении хорошо видеть в темной пещере. 11. Для этого курса вам не нужны математические либо другие научные знания. 12. Сердечник должен быть железный или из другого какого-либо материала, который легко магнитится. 13. В одном из своих ранних научно-

фантастических рассказов известный писатель Айзек Азимов впервые упомянул слово «робототехника», а также сформулировал три фундаментальных правила, которым, по его мнению, должны следовать все роботы. 14. Это гарантирует, например, то, что усилитель или осциллятор будет функционировать самым возможно эффективным, надежным способом. 15. Важно помнить, что все единицы измерения должны быть приведеныв соответствие при подсчетах.

Вариант 25

Fill in the gaps in the sentences with the words from the box.

maintenance, combustibles, overheat, electrical fires, flicker, fixed wiring

1. (1)…. are caused by faulty wiring.
2. It is important for wires to have proper (2)… .
3. Do not place wiring in an area where it can (3)… .
4. Bulbs that (4)… should be replaced immediately.
5. Wherenever possible, it is best to install (5)… .
6. People sometimes place (6)… too close to appliances.

Translate the sentences into Russian and make your ownsentences according to the model.

1. It is important to follow electrical safety rules.
2. It is useful to de-energise power sources before working.
3. It is dangerous to touch faulty wiring.
4. It was easy to replace flicker bulbs.
5. It is advisable to carry out lockout procedures.
6. It is necessary to avoid electrical hazards.
7. It was possible to install fixed wiring.
8. It is impossible to reduce electrical load in winter.
9. It must be interesting to study electricity.
10. It can be risky to deal with any type of electricity.

The following statements are not true to fact. Correct them.

1. Broken or damaged tools should be labeled with DAMAGED DO NOT USE. Theinstructor should be notified so that the tool may be repaired or replaced.
2. You should use safety glasses whenever around chemicals that may splash orobjects that can be thrown.
3. Small wires can easily puncture the skin.
4. Pulling out Integrated Circuits incorrectly will not cause harm.
5. Avoid damp and wet areas when working with electricity.
6. Avoid wearing jewelry or baggy clothing.

Insert the proper word into the sentence.

1. An emergency is a situation which threatens by serious (разрушение) to life.
2. Emergency planning is the way (уменьшение) threats.
3. One of emergency management steps is (установление) and classification of allthreats.
4. The usual emergency threats are (пожар и наводнение).
5. The other threat can be (поломка) of equipment and (нарушение) of security
6. Evacuation plan makes the staff know the alarms and how (справляться сбедствием).
7. Training implies (репетиция) of emergency procedures.
8. The recovery period starts after (последствия) of the incident are known.

For questions (1-10) choose the correct answer.

1. When working with electrical components you should
   A. Run around the room
   B. Sing

C. Check your facebook
D. Follow all written procedures
E. Don‘t follow all written procedures

2. Assume circuits are on and check with voltmeter before handling_____.
A. The t.v remote
B. The computer

3. What is the maximum current level a human can withstand without gettinginjured?
A. 1mA
B. 15mA
C. 100-300mA
D. 6 A
E. None of these

4. Which of the following will burn your skin upon contact?
A. Shorted components
B. Soldering Irons

5. Which of the following cause injuries
A. Smoke from burning or metal components
B. Battery chemicals
C. Older, lead based solder
D. Printed Circuit board etching materials
E. All of the above

6. If someone is getting an electric shock inside a house, what is the first thing youshould do?
A. Pull them away
B. Tell an adult– so they can turn off the main power switch
C. Turn the power off at the power point

7. If there is a small electrical fire, you should get an adult to put it out. What do youthink would be the best thing they could use to put out an electrical fire?
A. Water
B. Fire blanket
C. Dry powder extinguisher

8. Why can a bird sit on a power line and not get an electric shock?
A. They are electricity insulators
B. They have
C. They are only touching one wire and nothing else, so the electricity cannotmake a circuit

9. If your ball should accidentally go into a substation you should:
A. Carefully climb the fence to get it
B. Stay away and tell an adult to contact the electricity authority
C. Allow your friend to get it for you

10. If you see a fallen power line across a footpath, you should:
A. Stay at least 8 metres away from it and anything it may be touching
B. Tell an adult
C. Both of the above.

Вариант 26

Read and translate the text.

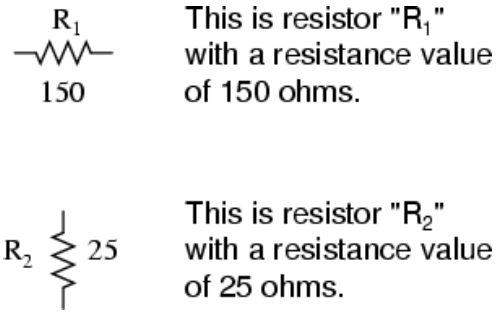
Because the relationship between voltage, current, and resistance in any circuit is so regular, we can reliably control any variable in a circuit simply by controlling the other two. Perhaps the easiest variable in any circuit to control is its resistance. This can be doneby changing the material, size, and shape of its conductive components.

Special components called ***resistors*** are made for the express purpose of creating a precise quantity of resistance for insertion into a circuit. They are typically constructed of metal wire or carbon, and engineered to maintain a stable resistance value over a wide range of environmental conditions. Unlike

lamps, they do not produce light, but they do produce heat as electric power is dissipated by them in a working circuit. Typically, though, the purpose of a resistor is not to produce usable heat, but simply to provide a precise quantity of electrical resistance.

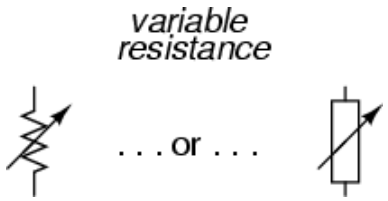
The most common schematic symbol for a resistor is a zig-zag line. Resistor values in ohms are usually shown as an adjacent number, and if several resistors are present in a circuit, they will be labeled with a unique identifier number such as R1, R2, R3, etc. As you can see, resistor symbols can be shown either horizontally or vertically:

In keeping more with their physical appearance, an alternative schematic symbol for a resistor



looks like a small, rectangular box:

Resistors can also be shown to have varying rather than fixed resistances. This might be for the purpose of describing an actual physical device designed for the purpose of providing an adjustable resistance, or it could be to show some component that just happens to have an unstable resistance:



In fact, any time you see a component symbol drawn with a diagonal arrow through it, that component has a variable rather than a fixed value. This symbol ―modifier‖ (the diagonal arrow) is standard electronic symbol convention.

Variable resistors must have some physical means of adjustment, either a rotating shaft or lever that can be moved to vary the amount of electrical resistance.

Because resistors dissipate heat energy as the electric currents through them overcome the ―friction‖ of their resistance, resistors are also rated in terms of how much heat energy they can dissipate without overheating and sustaining damage. Naturally, this power rating is specified in the physical unit of ―watts.‖ Most resistors found in small electronic devices such as portable radios are rated at 1/4 (0.25) watt or less. The power rating of any resistor is roughly proportional to its physical size. Note in the first resistor photograph how the power ratings relate with size: the bigger the resistor, the higher its power dissipation rating. Also note how resistances (in ohms) have nothing to do withsize!

Although it may seem pointless now to have a device doing nothing but resisting electric current, resistors are extremely useful devices in circuits. Because they are simple and so commonly used throughout the world of electricity and electronics, we‘ll spend a considerable amount of time analyzing circuits composed of nothing but resistors and batteries.

In schematic diagrams, resistor symbols are sometimes used to illustrate any generaltype of device in a circuit doing something useful with electrical energy. Any non-specific electrical device is generally called a load, so if you see a schematic diagram showing a resistor symbol labeled ‖load,‖ especially in a tutorial circuit diagram explaining some concept unrelated to the actual use of electrical power, that symbol may just be a kind of shorthand representation of something else more practical than a resistor.

Insert the missing words.

1. Devices called resistors are built to provide precise amounts of…….in electric circuits.
2. …… are rated both in terms of their resistance (ohms) and their ability todissipate heat energy (……).
3. The..... the resistor is, the more power it can safely dissipate without suffering damage.
4. Any device that performs some useful task with electric power is generallyknown as a ……..
5. Sometimes resistor …….. are used in schematic diagrams to designate a non-specific load, rather than an actual resistor.

Retell the text "Resistors" according to the written outline.

Вариант 27

Match the fragments of the sentences. Then translate payingattention to participles.

1 It consists of a *dc* voltage source, avoltmeter, some wire, an ammeter,	A. they aren't connected at the crossing point unless a heavy black dot is placedwhere the two lines meet.
2 That's a little less than the voltage	B. and a calibrated, wide-rangepotentiometer.
3 Suppose this potentiometer is set to 100Ω,	C.also called the rule of significant digits.
4 After that, you can convert the calculated current, voltage, or resistancevalue to	D.dissipated by the potentiometer?
5 The total power consumed	E.named after the scientist whosupposedly first quantified it.
6 What is the power	F.connected in parallel, produce a netresistance R.
7 Then you have to find out which bulb isbad,	G.whatever size unit you want.
8 Five resistors of values R_1through R_5,	H.and replace it to get the lights workingagain.
9 When two conductor lines cross,	I. the total resistance is equal to theresistance of any one component divided by the number of components.

10 Competent engineers and scientists goby the rule of significant figures,	J. produced by a flashlight cell.
11 The interdependence among current, voltage, and resistance in *dc* circuits iscalled Ohm's Law,	K. and the measured current is 10 mA.
12 When you have two or more resistors connected in parallel and their resistances are all the same,	L.by this network of resistors is 250 mW.

1	2	3	4	5	6	7	8	9	10	11	12

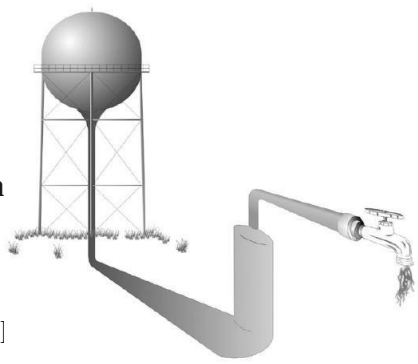
Вариант 28

Read the text and then make questions so that the words in bold provide answers.

Voltage, resistance, and current are not always easy concepts to grasp because electrons are far too small to see. Imagine how our perception of water might change if wecouldn't see it. People would appear to magically fly through the air when they were swimming, and ocean waves would appear to be **unexplainable forces** that could knock you over at seemingly random times. But since we can see water we can easily understand the concepts of water pressure and water flow.

A helpful way to conceptualize electrical concepts is to relate them to a more familiar concept like **the flow of water**. Water pressure, water flow, and flow resistance ina hydraulic system are **very similar** to the voltage, current, and resistance in an electric circuit. The water pressure, much like voltage, is the force that **pushes water through a pipe**. Without it, no water flows. By the same token, without voltage, electrical current will not flow.

The amount of water that flows through a pipe is analogous to the amount of current flowing in **a conductor**, and the pipe is analogous to the conductor. The bigger the pipe, the easier the water flows; the smaller the pipe, the less water can flow. A small pipe, then, is analogous to a small conductor or **aconductor with a high resistance**. A large pipe is **analogous** to a large conductor or a conductor with low resistance.



A complete water distribution system is analogous to ɔred in a reservoir is like **a battery with a stored charge**. A tank that hol roduces **a tremendous amount of water pressure**, much like the ‑electrical pressure,‖ or voltage in a battery, ready to deliver water or electricity on demand. The pipe that carries water to a subdivision is like the wire that carries electricity from the battery to a light bulb. Along the way there are switches and valves that turn the water or electricity on and off. When **the tap is on**, the water flows, and when the light switch is on, the current flows.

Give headings to each paragraph of the text.

Вариант 29

Ex.1. Solve the following problems and develop them into situations to be discussed. Use the future continuous form.

1. What will you be doing if the temperature rises high? 2. What will you be doing ifthere is no electricity? 3. What will you be doing if the frame is unearthed? 4. What will you be doing if the screen voltage rises? 5. What will you be doing if the line is under the tension? 6. What will you be doing if a lead-covered cable is used? 7. What will you be doing if the continuity and earthing of the conduit have not been previously tested.

Ex.2. Open the brackets and put the verb into the correct tense, either the Present Indefinite, the Present Continuous or the Present Perfect.

1. As a rule, I (have) porridge for breakfast, but this morning I (order) an omelette. 2. This is the house where I (live). I (live) here since childhood. 3. Stop smoking! The room (be) full of smoke which (come) from your pipe. Usually nobody (smoke) here as Mother (not let) it. 4.1 (write) letters home once a week, but I (not write) one this week, so my next letter must be rather long. 5. No wonder she (look) tired after the strain under which she (be) for a month. 6. Why you (not shave) this morning? — I (shave) every other day. 7. Research (show) that lots of people (absorb) new information more efficiently at some times of day than at others. A biological rhythm (affect) different people in different ways. 8.1 just (look) at the barometer and (see) that it (fall) very quickly. 9. Don't shout so loudly. Father (not finish) work and he hates if anybody (make a noise) while he (work). 10.1 regularly (see) him at the tram stop, but I (not see) him these two or three days.

Ex.3. Choose che correct variant.

1 ___ever___ to this museum? — Yes, I___it once when I___a youth, and the pictures___ a deep impression on me. Since then I___there.

a) did you be, visited, was, made, was not
b) were you, visited, was, have made, was not
c) have you been, have visited, were, have made, have not been
d) have you been, visited, was, made, have not been

2.1___Jack lately. When___him last? — I___ mm two days ago. I___ that he ___very much.

a) did not see, have you seen, met, thought, changes
b) have not seen, did you see, met, think, changed
c) have not seen, you saw, met, think, changed
d) do not see, have you seen, have met, thought, would change

3, The Egyptian civilization.___ the oldest which___ us art. It___about five thousand years ago. The story of Egyptian art___three thousand years and__ the art of different periods.

a) is, left, began, covers, includes
b) was, leaves, has begun, covered, included
c) is, has left, \vas began, has covered$_9$ has included
d) has be?n, left, began, covers, included

4,___ your tennis racket with you? — Yes, I am going to show you how much I __ since last summer. I ___tennis lessons now. Now it___for you to judge if I ___ any progress,

a) did you bring, improved, take, is, have made
b) have you brought, improved, take, was, have made
c) did you bring, have improved, am taking, is, made
d) have you brought, have improved, am taking, is, have made

5.___lunch already? — No, not yet. The waitress my order fifteen minutes ago and___me anything yet.

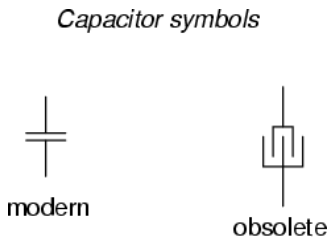
a) have you, took, has not brought
b) have you had, took, has not brought
c) did you have, has taken, did not bring
d) have you have, was taken, was not brought

Вариант 30

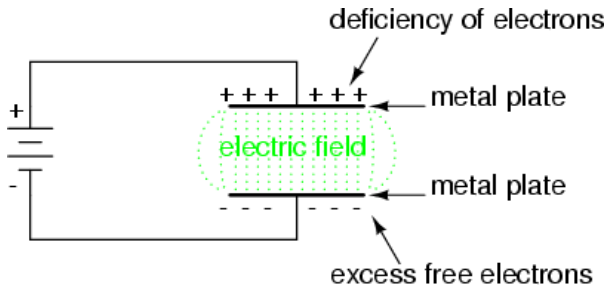
Read and translate the text.

Capacitors are components designed to take advantage of this phenomenon by placing two conductive plates (usually metal) in close proximity with each other. There are many different styles of capacitor construction, each one suited for particular ratings and purposes. For very small capacitors, two circular plates sandwiching an insulating material will suffice. For larger capacitor values, the ~~‖p~~lates‖ may be strips of metal foil, sandwiched around a flexible insulating medium and rolled up for compactness. The highest capacitance values are obtained by using a microscopic-thickness layer of insulating oxide separating two conductive surfaces. In any case, though, the general idea is the same: two conductors, separated by an insulator.

The schematic symbol for a capacitor is quite simple, being little more than two short, parallel lines (representing the plates) separated by a gap. Wires attach to the respective plates for connection to other components. An older, obsolete schematic symbol for capacitors showed interleaved plates, which is actually a more accurate way of representing the real construction of most capacitors:



When a voltage is applied across the two plates of a capacitor, a concentrated field flux is created between them, allowing a significant difference of free electrons (a charge) to develop between the two plates:

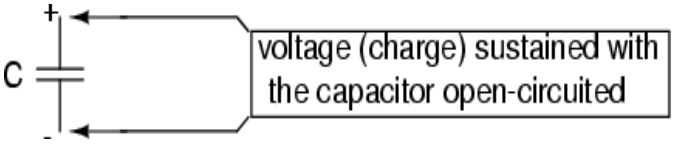


As the electric field is established by the applied voltage, extra free electrons are forced to collect on the negative conductor, while free electrons are ~~"ro~~bbed" from the positive conductor. This differential charge equates to a storage of energy in the capacitor, representing the potential charge of the electrons between the two plates. The greater the difference of electrons on opposing plates of a capacitor, the greater the field flux, and the greater ~~"c~~harge" of energy the capacitor will store.

Because capacitors store the potential energy of accumulated electrons in the form of an electric field, they behave quite differently than resistors (which simply dissipate energy in the form of heat) in a circuit. Energy storage in a capacitor is a function of the voltage between the plates, as well as other factors which we will discuss later in this chapter. A capacitor's ability to store energy as a function of voltage (potential difference between the two leads) results in a tendency to try to maintain voltage at a constant level. In other words, capacitors tend to resist *changes* in voltage drop. When voltage across a capacitor is increased or decreased, the capacitor ~~"r~~esists" the *change* by drawing current from or supplying current to the source of the voltage change, in opposition to the *change*.

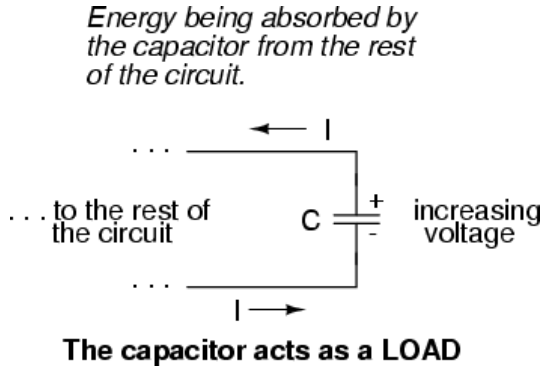
To store more energy in a capacitor, the voltage across it must be increased. This means that more electrons must be added to the (-) plate and more taken away from the (+) plate, necessitating a current in that direction. Conversely, to release energy from a capacitor, the voltage across it must be decreased. This means some of the excess electrons on the (-) plate must be returned to the (+) plate, necessitating a current in the other direction.

Just as Isaac Newton's first Law of Motion (~~"a~~n object in motion tends to stay in motion; an object at rest tends to stay at rest") describes the tendency of a mass to oppose changes in velocity, we can state a capacitor's tendency to oppose changes in voltage as such: ~~"A~~ charged capacitor tends to stay charged; a discharged capacitor tends to stay discharged." Hypothetically, a capacitor left untouched will indefinitely maintain whatever state of voltage charge that it's been left it. Only an outside source (or drain) ofcurrent can alter the voltage charge stored by a perfect capacitor:



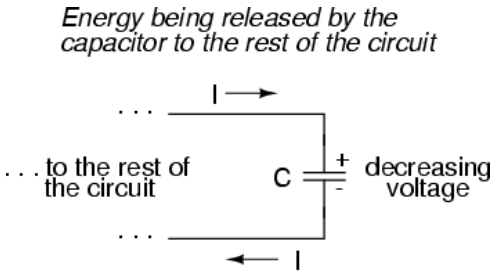
Practically speaking, however, capacitors will eventually lose their stored voltage charges due to internal leakage paths for electrons to flow from one plate to the other. Depending on the specific type of capacitor, the time it takes for a stored voltage charge to self-dissipate can be a *long* time (several years with the capacitor sitting on a shelf!).

When the voltage across a capacitor is increased, it draws current from the rest of the circuit, acting as a power load. In this condition the capacitor is said to be *charging*, because there is an increasing amount of energy being stored in its electric field. Note the direction of electron current with regard to the voltage polarity:



The capacitor acts as a LOAD

Conversely, when the voltage across a capacitor is decreased, the capacitor supplies current to the rest of the circuit, acting as a power source. In this condition the capacitor is said to be *discharging*. Its store of energy—held in the electric field—is decreasing now as energy is released to the rest of the circuit. Note the direction of electron current with regard to the voltage polarity:



The capacitor acts as a SOURCE

If a source of voltage is suddenly applied to an uncharged capacitor (a sudden increase of voltage), the capacitor will draw current from that source, absorbing energy from it, until the capacitor‘s voltage equals that of the source. Once the capacitor voltage reached this final (charged) state, its current decays to zero. Conversely, if a loadresistance is connected to a charged capacitor, the capacitor will supply current to the load, until it has released all its stored energy and its voltage decays to zero. Once the capacitor voltage reaches this final (discharged) state, its current decays to zero. In their ability to be charged and discharged, capacitors can be thought of as acting somewhat - cell batteries.

Вариант 31

Read the text and then make questions so that the words in bold provideanswers.

Types of Capacitors

Capacitors are used in electric circuits for various purposes. Different types of capacitors make use of **different types of dielectrics**. The choice of the dielectric usually depends on the value of the capacitance and the stability required for the capacitor that is the way its capacitance will vary as it ages.

For every dielectric there is a specific potential gradient or a maximum potential above which the capacitance of the capacitor will break down. **The breaking potential** usually depends upon the permittivity and the thickness of the dielectric. **Liquid and gaseous capacitors** usually recover their original properties whenever the applied Pd is reduced below the breaking voltage, but this is not the case with many solid dielectrics.

Paper, plastic, ceramic and mica capacitors

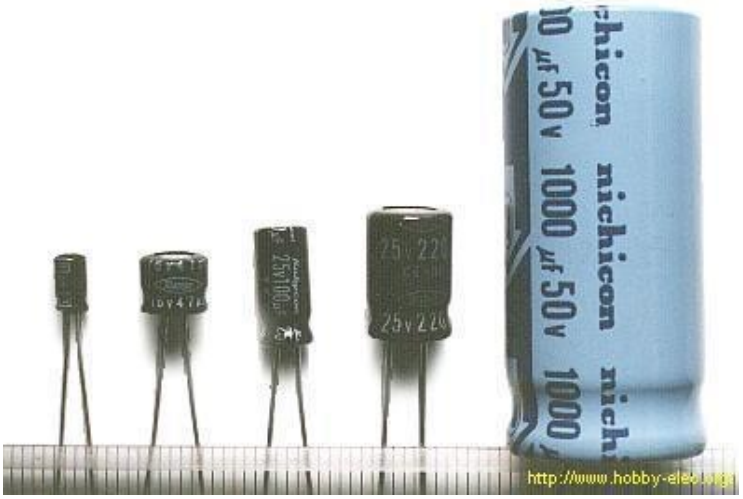
Uniform layers of waxed paper, plastics (like polystyrene), ceramics (like talc with barium titanate) and mica are all used for as dielectrics. Capacitance for these types of capacitors rarely exceeds a few microfarads and in the case of mica the upper limit isabout 0.01μF.

Electrolytic Capacitors

These have capacitances up to 10000 μF and are quiet compact because they employvery thin layers of dielectrics typically in the region of 10-3mm and can withstand very high voltages without breaking down. The problem with electrolytic capacitors is that theyhave dedicated terminals and reversing the connections of **an electrolytic capacitor** would cause it breakdown beyond repair.

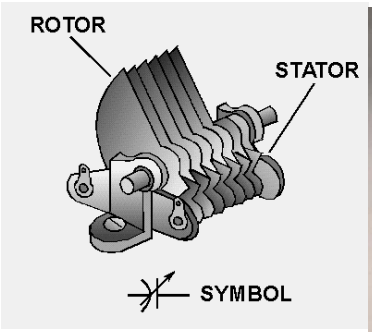
The film applied would usually involve **a thin aluminium oxide film** formed by passing a small current through a paper soaked with an aluminium borate solution separating two aluminium electrodes. The oxide forming on one of the electrodes wouldact as one of the plates of the capacitor.

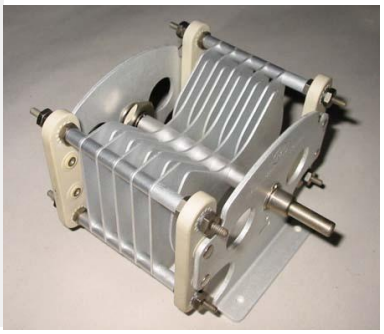

Element for Electrolytic Capacitors



Air Capacitors

Such capacitors find their use in radio tuning circuits. Air is used as **the dielectric invariable capacitors**. These consist of two sets of parallel a set of which is fixed while the other being able to be rotated on **a spindle**. Changing the area of overlap between the plates would vary the capacitance of the capacitor.





Вариант 32

Ex.1. Open the brackets and use the correct form of Participle I.

1. That night, (go) up to his room he thought of his unpleasant duty. 2. She smiled (remember) the joke. 3. A new road will soon be built (connect) the plant with the railway station. 4. He speaks like a man (take) his opinion of everything. 5. (Not know) that she could trust them she did not know what to do. 6. And (say) this he threw himself back in the armchair. 7.1 spent about ten minutes (turn) over the sixteen pages of *The Guardian* before I found the main news and articles. 8. (Be) so far away he still feels himself part of the community. 9. The boy came out of the water (shake) from top to toe. 10. (Support) her by the arm he helped her out of the taxi.

Ex.2. Open the brackets and use the correct form of Participle II.

1. She looked at the table. There was a loaf of brown bread (divide) into two halves. 2. There was another pause (break) by a fit of laughing of one of the old men sitting in the first row. 3. The child (leave) alone in the large room began screaming. 4. The centre of the cotton industry is Manchester (connect) with Liverpool by a canal. 5. The story (tell) by the old captain made the young girl cry. 6. He did not doubt that the information (receive) by morning mail was of great interest for his competitors. 7. The equipment (install) in the shop is rather sophisticated. 8. We've got a great variety of products, which are in great demand. Here are some samples (send) to our distributors last month. 9. The methods that were applied in the building of the new metro stations proved to be efficient. 10. She warmed over the dinner that she cooked yesterday.

Вариант 33

Read and translate the text.

A ***meter*** is any device built to accurately detect and display an electrical quantityin a form readable by a human being. Usually this "readable form" is visual: motion of a pointer on a scale, a series of lights arranged to form a "bargraph," or some sort of display composed of numerical figures.

Most modern meters are "digital" in design, meaning that their readable display is in the form of numerical digits. Older designs of meters are mechanical in nature, using some kind of pointer device to show quantity of measurement. In either case, the principles applied in adapting a display unit to the measurement of (relatively) large quantities of voltage, current, or resistance are the same.

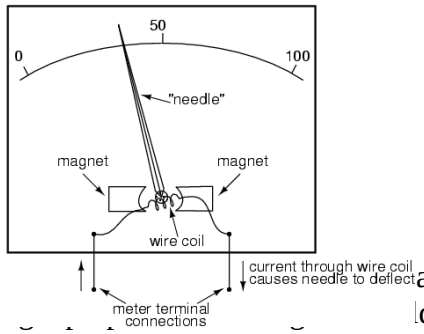
The display mechanism of a meter is often referred to as a *movement*, borrowing from its mechanical nature to *move* a pointer along a scale so that a measured value may be read. Though modern digital meters have no moving parts, the term "movement" maybe applied to the same basic device performing the display function.

Most mechanical movements are based on the principle of electromagnetism: that electric current through a conductor produces a magnetic field perpendicular to the axis of electron flow. The greater the electric current, the stronger the magnetic field produced. If the magnetic field formed by the conductor is allowed to interact with another magnetic field, a physical force will be generated between the two sources of fields. If one of these sources is free to move with respect to the other, it will do so as current is conducted through the wire, the motion (usually against the resistance of a spring) being proportional to strength of current.

The first meter movements built were known as *galvanometers*, and were usually designed with maximum sensitivity in mind. A very simple galvanometer may be made from a magnetized needle (such as the needle from a magnetic compass) suspended from a string, and positioned within a coil of wire. Current through the wire coil will produce a magnetic field which will deflect the needle from pointing in the direction of earth's magnetic field. An antique string galvanometer is shown in the following photograph.

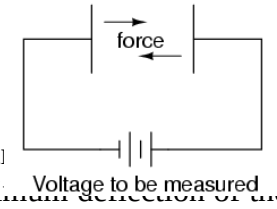
Now, the term “galvanometer” usually refers to any design of electromagnetic meter movement built for exceptional sensitivity, and not necessarily a crude device such as that shown in the photograph. Practical electromagnetic meter movements can be made now where a pivoting wire coil is suspended in a strong magnetic field, shielded from the majority of outside influences. Such an instrument design is generally known as a *permanent-magnet, moving coil*, or *PMMC* movement.

Permanent magnet, moving coil (PMMC) meter movement



While most electromagnetic meter movements are based on electromagnetism (electron flow through a conductor creating a magnetic field), a few are based on electrostatics: that is, the attractive or repulsive force generated by electric charges across space. This is the same phenomenon exhibited by certain materials (such as wax and wool) when rubbed together. If a voltage is applied between two conductive surfaces across an air gap, there will be a physical force attracting the two surfaces together capable of moving some kind of indicating mechanism. That physical force is directly proportional to the voltage applied between the plates, and inversely proportional to the square of the distance between the plates. The force is also irrespective of polarity, making this a polarity-insensitive type of meter movement (figure 33).

Electrostatic meter movement



Whatever the type of meter or size of meter movement, there will be a rated value of voltage or current necessary to give full-scale indication. In electromagnetic movements, this will be the “full-scale deflection current” which will rotate the needle so that it points to the exact end of the indicating scale. In electrostatic meters, the full-scale rating will be expressed as the value of voltage resulting in the maximum deflection of the needle actuated by the plates, or the value of voltage in a cathode-ray tube which deflects the electron beam to the edge of the indicating screen. In digital “movements,” it is the amount of voltage resulting in a “full-count” indication on the numerical display: when the digits cannot display a larger quantity.

The task of the meter designer is to take a given meter movement and design the necessary external circuitry for full-scale indication at some specified amount of voltage or current. Most meter movements (electrostatic movements excepted) are quite sensitive, giving full-scale indication at only a small fraction of a volt or an amp. This is impractical for most tasks of voltage and current measurement. What the technician often requires is a meter capable of measuring high voltages and currents.

Вариант 34

Ex.1.

Fill in the blanks with the forms is or are.

1. Neither he nor she___there. 2. Neither they nor she___there. 3. Neither he nor they___there. 4. Both Alice and Kate___in time. 5. Either you or she___ right. 6. Both the old and the young___having a good time at the party. 7. Either Jack or Jane___going on business to London. 8. Neither Pete nor his parents___ aware of the coming danger. 9. Neither he nor his relatives___present at the wedding. 10. Either he or they___ going to do it. 11. Both Mom and Dad ___at home. 12. Neither Nick nor Mary___in class today. 13. Both ___present, but neither___helpful.

Ex.2.

Open the brackets and translate into English short replies with So ... cr Neither/Nor ...

Example: He knows English. — (Она тоже). — So does she. She is not going there. — (Они тоже). — Neither/Nor are they.

1.1 am dead with hunger. — (Мы тоже). 2. We are very grateful to him. — (Я тоже). 3. My brother can't draw. — (Мой тоже). 4. We'll be meeting in the hall. —(Они тоже). 5, My father always gives me good advice. ~_ (Мой тоже). 6, She did not *go* to the country because the weather was awful. — (Он тоже). 7. My sister's son

has made much progress in English lately. — (Наш тоже). 8. We'll soon join them. — (Мы тоже). 9.1 am not at all upset. — (Я тоже). 10. They enjoyed themselves at Ann's party. — (Мы тоже). 11Л never watch TV. — (Я тоже). 12. She has to get up early — (Они тоже). 13. He hasn't got a car. — (Она тоже). 14. He is on the phone now. — (Мы тоже). 15. Nick can afford to buy a new house, — (Анна тоже).

Вариант 35

Ex.1.*Use the subjunctive mood in the following sentences.*

Example: I will be glad to meet you again. — / would be glad to meet you again.

1.I will apologize to him for being late. 2. Everybody will be glad to go there. 3. I'll eat something sweet. 4. It does not make much difference. 5.I won't go to Egypt in summer. *6.* She will do her best to improve the situation. 7. He will give you a different answer. 8. Nobody blames them. 9. Do you find it inconvenient? 10. He will warn you of the danger. 11. A true friend will never fail you. 12. They will accept the invitation for Sunday. 13.I will never agree to it. 14. A wise man will find a way out of the situation. 15, It will be interesting to find out who is right.

Ex.2. Open the brackets and use the subjunctive mood.

Example: Why didn't you tell me? I (close) the window long ago. — / would have closed the window long ago.

1. In your place I (arrange) everything yesterday. 2. At that time he (take) the necessary steps. 3. Why did you wash up? I (do) it myself. 4. She (buy) the dress, but she had no money. 5. He (advise) them what to do, but he couldn't get in touch with them. 6. We (go) to the country rain or shine, but he was busy last weekend. 7.1 (come) to see him last week, but I got ill and had to stay in bed. 8. It (be) important then but not now. 9. They (take) a taxi, but there was none. 10. Why didn't you ask them to discuss your problem then? They (not postpone) it.

Ex.3. Choose the right variant.

1.1 would (have brought/bring) the book, but you did not tell me you needed it. 2. It would (be/have been) wise of you to consult a dentist twice a year. 3.1 think nobody would (object/have objected) to having a party tomorrow. 4.1 did not know that it was so important for you. I would (do/have done) it long ago. 5. In your place I wouldn't (argue/have argued) with her yesterday. She is your boss. 6. Last year he wouldn't (say/have said) so of John. *1,1* wouldn't (worry/have worried) about it now. Everything will clear up soon. 8. We would (stay/have stayed) for an hour, but it is rather late. 9. We did not know that we would come to the lake. We would (take/have taken) our rods. 10.1 would (go/have gone) to sea, but my father wanted me to be a lawyer.

Вариант 36

1. Расположите части делового письма в правильном порядке:

1. John L. Davis, President
   Autocomp. Inc.
   8100 South Jackson Street
   Detroit, MI 48220
2. We recently purchased $ 250,000 worth of automated material-handling equipment from your company. This equipment was purchased from you because of the fine reputation you have for quality and service to your customers.
3. We look forward to doing business with your company in the future.
   Sincerely,
   Victor Boyd,
   Plant Manager
4. Dear Mr. Davis:
5. Rusk Seed, Inc.
   400 National Highway

Decatur, Illinois 62525
April 15, 2007

2. Расположите части письма в правильном порядке:

1) 7 Maple Estate, Hlarbour Road, Melbourn, Australia. (Sender's address)
Ref. JK/RS
Telephone 041-336-3692
7 May 2007
2) Dear Sirs,
3) We await your instructions, which shall have our careful attention
Yours faithfully
Richard Smith
Sales Manager
4) We recently had the honour of sending you a catalogue of our goods, and trust that you duly received the same.

As we have not yet been favoured with your order, we venture to enquire if you have reached a decision, and whether you require further information about our product.

5) Purchasing Department
Sunrise Boulevard
Riverton, MI 44444 (Addressee's address)

3. Read and translate the dialogues. Learn the dialogues by heart.

1. - Could you possibly give me a lift to the station?
   - Sorry, there's something wrong with my car.
2. - But it's only half past ten. Stay and have a cup of coffee.
   - We'd better be going. It's getting late.
3. - How do you feel today?
   - So-so
4. - I'm sorry to trouble you, but could you lend me your car for the weekend?
   - Yes, certainly. With pleasure.

4. Ответьте на вопросы, пользуясь информацией на конверте.

New York Power Company
3638 North 25 Road
(1) Summerfield, (2) NK 09346
(3) Mr. Paul Brown
Director of Purchasing Department
Smith Electronic Company
360 (5) Fifth Avenue
Roanoke, (4) VA 24040

1. What is the ZIP Code in the return address?
2. What is the ZIP Code in the mailing address?
3. Who is the addressee?
4. What town does the letter come from?
5. What is the street name in the mailing address?

5. Перед вами конверт:

Amtorg Trading Corporation
5695 South 23 Madison Avenue
(1) New York, (2) NJ 08887
(3) Mr. R. Calvert
Director of Marketing
(4) Smith Printing Company
590 (5) Lincoln Street

Chicago, WI 53216

Соотнесите информацию под определенным номером на конверте с тем, что она обозначает:

1) the addressee's company name
2) the town the letter comes from
3) the addressee
4) the ZIP Code in the return address
5) the street name in the mailing address

6. Ответьте на вопросы, пользуясь информацией на конверте:

New Jersey Power Company
5695South 23 Road
(1) Ridgefield, (2) NJ 08887
Mr. Frederick Wolf
Director of Marketing
(3) Smith Printing Company
590 (4) Sixth Avenue
Milwaukee, (5) WI 53216

1) What is the ZIP code in the return address?
2) What is the ZIP code in the mailing address?
3) What town does the letter come from?
4) What is addressee's company name?
5) What is the street name in the mailing address?

Вариант 37

Проанализируйте образец резюме

***Образец резюме*:**

Alexander Bermann
376 West 186th Street, Apartment #6-3
New York, N.Y. 10033
Tel.(212) 973-6792

OBJECTIVE	A position as a mechanical engineer
SUMMARY	15 years varied experience in mechanical engineering. Designed and developed both automatic and special machines. Installed machinery and equipment. Familiar with use of industrial engineering techniques and machine shop practices.
EXPERIMENCE	BROWN MMANUFACTURING Co
1986-1988	Paterson,N.J. Design Engineer. Planed and designed both automatic and special machines, instrumental system, and pneumatics .
1974-1986	KHARKOV MACHINE WORKS Kharkov,USSR. Design Engineer at the Automation Department Designed various automatic machines. Installed machinery and equipment
EDUCATION	KRARKOV POLYTECHIC INSTITUTE.
1969-1974	Kharkov,USSR M.S. in Mechanical Engineering.
PERSONAL	Arrived in the United States August 1989. Permanent US resident. Married, two children.
REFERENNCES	Furnished upon request

5.3 Примеры текстов для аннотирования

Task 1 Render the text

Electronic Circuit Elements

Resistors. A resistor is a circuit element designed to insert resistance in the circuit. A resistor may be of low value or of high value. Resistors in electronic circuits are made in a variety of sizes and shapes.

They are generally classed as fixed, adjustable or variable, depending upon their construction and use.

The resistance value of small fixed resistors is sometimes indicated by a code colour. Resistors required to carry a comparatively high current and dissipate high power are usually of the wire-wound ceramic type.

Adjustable and variable resistors. An adjustable resistor is usually of the wire-wound type with a metal collar which may be moved along the resistance wire to vary the value of the resistance placed in the circuit. In order to change the resistance, the contact band must be loosened and moved to the desired position and then tightened so that it will not slip. In this way the resistor becomes, for all practical purposes, a fixed resistor during operation.

A variable resistor is arranged so that it may be changed in value at any time by the operator of the electronic circuit. This change is usually accompanied by rotating a small adjustment knob or by turning a screw adjustment. Variable resistors are commonly known as **rheostats** or **potentiometers.**

It must be pointed out that the use of a resistor of any type must be very carefully considered. The capacity of a fixed resistor, rheostat or potentiometer must be such that it can handle the current through the circuit without damage computing the current by means of Ohm's law.

Inductors. The purpose of an inductor, or inductance coil, is to insert inductance into a circuit. The effect of an inductance is to oppose any change in the existing current flow in a circuit. The opposition to current flow in an a. c. circuit by an inductor is called inductive reactance and is measured in ohms.

Inductors are made in many shapes and designs. An inductor used in extremely high-frequency circuits may consist of only one turn or even less than one turn of wire. On the other hand, an inductor used as a choke coil in a low-frequency circuit or in a filter circuit may contain many turns of wire and also be wound on an iron core to increase the inductance.

Inductors are often used in radio in connection with capacitors to provide tuned circuits. These tuned circuits are most valuable in radio and television for filtering out unwanted frequencies and passing the desired frequencies.

Inductance coils are rated as to value in henrys. One henry is a comparatively large inductance. Therefore, many of the inductors used in electronic circuits are rated in millihenrys. One millihenry (mh) is one thousandth of a henry. One henry is the inductance of a coil which will produce a back voltage of 1 volt when the current change is at the rate of 1 amp per second.

Task 2 Render the text

A capacitor may be defined as a device consisting of two or more conductor plates separated from one another by a dielectric and used for receiving and storing an electric charge. The effect of a capacitor in an electric circuit is to oppose any change in the existing voltage.

Capacitors are commonly used in d. c. circuits to reduce the effects of transient voltages and currents. Electrical transients are high voltages developed from time to time when the circuit is broken or reconnected, as when a switch is turned on or off. These transient voltages are usually caused by the inductance of a circuit. In an a. c. circuit the capacitor is often used to block the direct current but permit the flow of the alternating current. In effect, the alternating current appears to flow through the capacitor but is actually being stored first on one plate of the capacitor and then on the other.

Like many other electronic units, capacitors are manufactured in a wide variety of sizes and styles. Some very low-capacity capacitors are merely tiny wafers of metal separated by an insulator; large capacitors may weigh several pounds. Fixed capacitors are of two general types. One is the dry capacitor which consists of metal plates separated by a dry dielectric such as mica or waxed paper, and the other is the electrolytic capacitor, whose dielectric is a chemical paste or one electrolyte. The electrolytic capacitor is effective in only one direction. This means that it must be connected in such a manner that the positive and negative polarities are correct. If it is connected in reverse, the current will flow through the capacitor and destroy it. Fixed capacitors

of both the dry and electrolytic type are manufactured in a wide variety of shapes and sizes. The electrolytic capacitors are marked to indicate the correct method of connection into a circuit.

The unit of capacitance is a farad. A capacitor which will store 1 coulomb of electricity under an e. m. f. of 1 volt has a capacitance of 1 farad. The farad is an extremely high value of capacitance; therefore capacitors used in standard electronic circuits are rated in[9] microfarads (1 mf = one millionth of a farad) or micromicrofarads (1 mf = one millionth of a microfarad).

Task 3 Render the text

Lithium-ion batteries are incredibly popular these days. You can find them in laptops, PDAs, cell phones and iPODs. They're so common because, they're some of the most energetic rechargeable batteries available.

Lithium-ion batteries have also been in the news lately. That's because these batteries have the ability to burst into flames occasionally. It's not very common – just two or three battery packs per million have a problem -- but when it happens, it's extreme. In some situations, the failure rate can rise, and when that happens you end up with a worldwide battery recall that can cost manufacturers millions of dollars.

So the question is, what makes these batteries so energetic and so popular? How do they burst into flame? And is there anything you can do to prevent the problem or help your batteries last longer? In this article, we'll answer these questions and more.

Lithium-ion batteries are popular because they have a number of important advantages over competing technologies:

1) They're generally much lighter than other types of rechargeable batteries of the same size.

The electrodes of a lithium-ion battery are made of lightweight **lithium** and **carbon**. Lithium is also a highly reactive element, meaning that a lot of energy can be stored in its atomic bonds. This translates into a very high **energy density** for lithium-ion batteries.

2) Here is a way to get a perspective on the energy density. A typical lithium-ion battery can store 150 watt-hours of electricity in 1 kilogram of battery. A **NiMH (nickel-metal hydride) battery** pack can store perhaps 100 watt-hours per kilogram, although 60 to 70 watt-hours might be more typical. A **lead-acid battery** can store only 25 watt-hours per kilogram. Using lead-acid technology, it takes 6 kilograms to store the same amount of energy that a 1 kilogram lithium-ion battery can handle. That's a huge difference.

1) They hold their charge. A lithium-ion battery pack loses only about 5 percent of its charge per month, compared to a 20 percent loss per month for NiMH batteries.
2) They have no **memory effect**, which means that you do not have to completely discharge them before recharging, as with some other battery chemistries.
3) Lithium-ion batteries can handle hundreds of charge/discharge cycles.

That is not to say that lithium-ion batteries are flawless. They have a few disadvantages as well:

1) They start degrading as soon as they leave the factory. They will only last two or three years from the date of manufacture whether you use them or not.
2) They are extremely sensitive to high temperatures. Heat causes lithium-ion battery packs to degrade much faster than they normally would.
3) If you completely discharge a lithium-ion battery, it is ruined.
4) A lithium-ion battery pack must have an on-board computer to manage the battery. This makes them even more expensive than they already are.
5) There is a small chance that, if a lithium-ion battery pack fails, it will burst into flame.

Many of these characteristics can be understood by looking at the chemistry inside a lithium-ion cell.

Inside a Lithium-ion Battery Pack and Cell

Lithium-ion battery packs come in all shapes and sizes, but they all look about the same on the inside. If you were to take apart a laptop battery pack (something that we **DO NOT** recommend because of the possibility of shorting out a battery and starting a fire) you would find the following:

The **lithium-ion cells** can be either cylindrical batteries that look almost identical to AA cells, or they can be **prismatic**, which means they are square or rectangular.

The computer, which comprises:

1) One or more **temperature sensors** to monitor the battery temperature
2) A **voltage converter and regulator circuit** to maintain safe levels of voltage and current
3) A shielded **notebook connector** that lets power and information flow in and out of the battery pack

4) A **voltage tap**, which monitors the energy capacity of individual cells in the battery pack
5) A **battery charge state monitor**, which is a small computer that handles the whole charging process to make sure the batteries charge as quickly and fully as possible.

If the battery pack gets too hot during charging or use, the computer will shut down the flow of power to try to cool things down. If you leave your laptop in an extremely hot car and try to use the laptop, this computer may prevent you from powering up until things cool off. If the cells ever become completely discharged, the battery pack will shut down because the cells are ruined. It may also keep track of the number of charge/discharge cycles and send out information so the laptop's battery meter can tell you how much charge is left in the battery.

It's a pretty sophisticated little computer, and it draws power from the batteries. This power draw is one reason why lithium-ion batteries lose 5 percent of their power every month when sitting idle.

Task 4 Render the text

As with most batteries you have an outer case made of metal. The use of metal is particularly important here because the battery is pressurized. This metal case has some kind of pressure-sensitive **vent hole**. If the battery ever gets so hot that it risks exploding from over-pressure, this vent will release the extra pressure. The battery will probably be useless afterwards, so this is something to avoid. The vent is strictly there as a safety measure. So is the **Positive Temperature Coefficient (PTC)** switch, a device that is supposed to keep the battery from overheating.

This metal case holds a long spiral comprising three thin sheets pressed together:

- A **Positive electrode**
- A **Negative electrode**
- A **separator**

Inside the case these sheets are submerged in an organic solvent that acts as the electrolyte. Ether is one common solvent.

The separator is a very thin sheet of microperforated plastic. As the name implies, it separates the positive and negative electrodes while allowing ions to pass through.

The positive electrode is made of Lithium cobalt oxide, or $LiCoO_2$. The negative electrode is made of carbon. When the battery charges, ions of lithium move through the electrolyte from the positive electrode to the negative electrode and attach to the carbon. During discharge, the lithium ions move back to the $LiCoO_2$ from the carbon.

The movement of these lithium ions happens at a fairly high voltage, so each cell produces 3.7 volts. This is much higher than the 1.5 volts typical of a normal AA alkaline cell that you buy at the supermarket and helps make lithium-ion batteries more compact in small devices like cell phones. See **How Battery works** for details on different battery chemistries.

We'll look at how to prolong the life of a lithium-ion battery and explore why they can explode next.

Lithium-ion Battery Life and Death

Lithium-ion battery packs are expensive, so if you want to make yours to last longer, here are some things to keep in mind:

1) Lithium ion chemistry prefers **partial discharge** to **deep discharge**, so it’s best to avoid taking the battery all the way down to zero. Since lithium-ion chemistry does not have a “memory”, you do not harm the battery pack with a partial discharge. If the voltage of a lithium-ion cell drops below a certain level, it’s ruined.

2) Lithium-ion batteries **age**. They only last two to three years, even if they are sitting on a shelf unused. So do not “avoid using” the battery with the thought that the battery pack will last five years. It won’t. Also, if you are buying a new battery pack, you want to make sure it really is new. If it has been sitting on a shelf in the store for a year, it won’t last very long. Manufacturing dates are important.

3) Avoid heat, which degrades the batteries.

Exploding Batteries

Now that we know how to keep lithium-ion batteries working longer, let's look at why they can explode.

If the battery gets hot enough to ignite the electrolyte, you are going to get a fire. There are video clips and photos on the Web that show just how serious these fires can be. The CBC article, "Summer of the Exploding Laptop," rounds up several of these incidents.

When a fire like this happens, it is usually caused by an internal short in the battery. Recall from the previous section that lithium-ion cells contain a separator sheet that keeps the positive and negative electrodes apart. If that sheet gets punctured and the electrodes touch, the battery heats up very quickly. You may have experienced the kind of heat a battery can produce if you have ever put a normal 9-volt battery in your pocket. If a coin shorts across the two terminals, the battery gets quite hot.

In a separator failure, that same kind of short happens inside the lithium-ion battery. Since lithium-ion batteries are so energetic, they get very hot. The heat causes the battery to vent the organic solvent used as an electrolyte, and the heat (or a nearby spark) can light it. Once that happens inside one of the cells, the heat of the fire cascades to the other cells and the whole pack goes up in flames.

It is important to note that fires are very rare. Still, it only takes a couple of fires and a little media coverage to prompt a recall.

Task 5 Render the text

Industrial Engineering and Automation

A major advance in the twentieth century manufacturing was the development of mass production techniques. Mass production refers to manufacturing processes in which an assembly line, usually a conveyer belt, moves the product to stations where each worker performs a limited number of operations until the product is assembled. In the automobile assembly plant such systems have reached a highly-developed form. A complex system of conveyer belts and chain drives moves car parts to workers who perform the thousands of necessary assembling tasks.

Mass production increases efficiency and productivity to a point beyond which the monotony of repeating an operation over and over slows down the workers. Many ways have been tried to increase productivity on assembly lines: some of them are as superficial as piping music into the plant or painting the industrial apparatus in bright colors; others entail giving workers more variety in their tasks and more responsibility for the product.

These human factors are important considerations for industrial engineers who must try the balance an efficient system of manufacturing with the complex needs of workers.

Another factor for the industrial engineer to consider is whether each manufacturing process can be automated in whole or in part. Automation is a word coined in the 1940s to describe processes by which machines do tasks previously performed by people. The word was new but the idea was not. We know of the advance in the development of steam engines that produced automatic valves. Long before that, during the Middle Ages, windmills had been made to turn by taking advantage of changes in the wind by means of devices that worked automatically.

Automation was first applied to industry in continuous-process manufacturing such as refining petroleum, making petrochemicals, and refining steel. A later development was computer-controlled automation of assembly line manufacturing, especially those in which quality control was an important factor.

Task 6 Render the text

Principals of Tuning

Resonant circuits. In the design and operation of electronic systems resonant circuits provide the key to frequency control. When a certain frequency is to be produced, it is necessary to establish a circuit which is resonant at that frequency. Also, when a certain frequency is to be passed through a circuit and others eliminated, it is necessary to have a circuit which is resonant at the frequency to be passed. When a certain frequency is to be blocked, it is necessary to place in the circuit a resonant tank circuit, which will block the frequency for which it is resonant. Resonant circuits are most essential in radio and television receivers and transmitters.

Filters. The characteristics of resonant circuits, as just described, make them very useful for filtering various frequencies in an electronic circuit. Among the types of filters used in electronic circuits are high-pass filters, low-pass filters, and band-pass filters. A high-pass filter tends to pass frequencies in the higher ranges and to attenuate or reduce the current at frequencies in low ranges. The low-pass filter will pass frequencies in the lower ranges and attenuate or reduce the current frequencies of the higher ranges. A band-pass filter will allow a certain band of frequencies to pass and will reduce the current at frequencies below or above the band range. A filter may be made a tuning circuit by making either the inductance or the capacitance variable. A typical tuning circuit consists of a variable capacitor used with a fixed inductance. In some cases, however, the capacitor is fixed and the inductance is tuned by means of a "slug" or movable core. Tuning circuits are usually

designed to have fairly high selectivity, that is, they allow only a very narrow band of frequencies to pass and reject all others.

Task 7 Render the text

The Electron Tube

It may be stated that the modern electronic industry was born with the invention of the electron tube. The first discoveries in electron-tube phenomena were made by Thomas Edison in 1883 during his experiments with the incandescent lamp. Edison discovered that the heated filament of an incandescent lamp gives off electrons which pass to another electrode in the bulb and thus create an actual current flow from the filament to the other electrode, or plate.

The diode tube. An electron tube, also called a vacuum valve, consists of a glass or metal enclosure in which electrodes are placed and sealed in either a gaseous or an evacuated atmosphere. The simplest of electron tubes is the diode, which has two operating electrodes. One of these is the heated cathode, which emits the electrons, and the other is the plate or anode. The cathode may be directly heated or indirectly heated. The tube with the directly heated cathode utilizes the heated filament for the cathode, in this case the filament is coated with a special material which greatly increases the number of electrons emitted. If the tube has an indirectly heated cathode, the cathode consists of a metal tube in the centre of which is a filament or heater. The heater is insulated from the metal tube. The outside of the cathode tube is covered with an electron-emitting material such as barium oxide, strontium oxide or thorium oxide.

The principal advantage of the diode tube is that it permits the flow of current in one direction only, that is, from the heated cathode to the anode. If an alternating current is applied to the cathode, the tube will conduct only during one half of each cycle, that is, while the cathode is negative and the anode or plate is positive. For this reason diode tubes are often used as rectifiers to change alternating current to direct current. Diode tubes are used in the power-supply circuits of such electronic devices as radio and television, which obtain their primary power from a. c. sources.

Another use of the diode tube is as a detector. In this application the tube changes the h. f. a. c. carrier wave into a direct current which displays the modulation of the a. f. signal, separates the audio portion of a radio signal from the r. f. portion which is the carrier wave.

The triode tube. The triode tube was discovered by Dr. Lee De Forest. De Forest found that by adding a third element to the diode tube the electron flow from the cathode to the plate could be effectively controlled by changing the electrical charge on the grid placed between them.

The effect of the grid in a triode makes it possible for the tube to act as an amplifier, that is, small changes in voltage on the grid will cause very substantial changes in the current flow from the cathode to the plate.

Task 8 Render the text

Transistors

Among the most important discoveries in electronics during recent years is the invention of the transistor. The transistor is a very small device which is replacing and is doing the work of a much larger electron tube. One of its principal advantages, however, is that no current is required for a heater circuit, as the transistor works at room temperature. During operation a transistor becomes heated, and so it is necessary to make certain that the transistor circuit is not overloaded beyond its operating limits.

Semiconductors. The operation of a transistor depends upon the nature and characteristics of a crystal substance such as germanium, or silicon. Pure germanium and silicon are good insulators because there are no free electrons to carry current through the material. However, when a very small percentage of an impurity is added, their crystal lattice structure remains the same, but the extra electrons brought in by the impurity remain free in the material to act as current carriers. This makes the material a semiconductor, that is, it will carry current in one direction and block the flow of current in another direction. Germanium with an impurity which leaves an excess of electrons in the material is called *n*-type germanium because of its negative characteristic. When an impurity such as aluminium is added to germanium, *p*-type germanium is formed. This is because aluminium atoms have fewer valence electrons, and when combined with germanium, they leave vacant spots or holes where an electron should be in order to balance the charges between the atoms. A current flow in *p*-type

germanium, electrons move into the holes, leaving other holes at the points from which they came. This is the hole current.

Junction transistor. There are two principal types of transistors: the point-contact transistor and the junction transistor.

A junction transistor consists of three principal sections and may be manufactured as one piece. In a *n-p-n* transistor the crystal consists of a section of *n*-type germanium, and another larger section of *n*-type germanium. One end of this transistor is called the emitter, the small *p*-type section is called the base, and the other end is called the collector. The collector is biased positive with respect to the base; hence there will normally be no current flow across the base-to-collector junction. The positive collector will draw the electrons away from the junction and the negative base will draw the holes away from the junction, and so there can be no transfer of holes or electrons at this point. Since the emitter is negative with respect to the base, the electrons will flow from the emitter to the base and the holes will move from the base to the emitter. This results in a substantial flow of electrons from the emitter to the base, and since the base is very thin, these electrons move across the base and into the positively charged collector.

The result is that a substantial collector current will flow. This collector current will vary in accordance with the changes of the current flow across the emitter-to-base junction. Generally speaking, we may consider the operation of this transistor similar to that of a triode tube with the emitter representing the cathode, the base representing the control grid and the collector representing the plate.

The advantages of a transistor are its very small size and weight, the fact that no power is necessary for heating it, and its comparatively rugged construction.

Task 9 Render the text

Electrical Power and Horsepower

The development of the electromagnet was the beginningйg of the use of electricity for producing power, power to be used by man to run his machines and to do much of his work. ln modern home alone, there are at least a dozens of electric motors in machines to tell the time, to wash and press cloths, to cool the refrigerator, to mix and stir foods, to clean the rugs, to circulate air in a warm room and so on.

Electric motors in the automobile start the car and circulate the warm air from the heater. In the factories, on the farms, and in the mines the electric motor does all types of work and oftenп very heavy work.

What is power? One might ash. Power is measured energy, usually represented as the energy measured by the amount of work a horse can do in a given time. One horsepower is equal to the work done by lifting 550 pounds 1 foot in 1 second. Therefore, power involves three things: weight, time and distance.

Motors are rated in horsepower or fractions of horsepower, for instance, the motor used in a typical washing machine is usually a 1/4 horsepower. Thus, the motor of this kind is known to be termed fractional horsepower motor.

Task 10 Render the text

Types of resistor

Resistors are the most fundamental and commonly used of all the electronic components, to the point where they are almost taken for granted but they play a vital role within a circuit.

There are many different **Types of Resistor** available for the electronics constructor to choose from, from very small surface mount chip resistors up to large wire wound power resistors.The principal job of a resistor within an electrical or electronic circuit is to “resist” (hence the name **Resistor**), regulate or to set the flow of electrons (current) through them by using the type of conductive material from which they are composed.

Resistors can also be connected together in various series and parallel combinations to form resistor networks, which can act as voltage droppers, voltage dividers or current limiters within a circuit.

Resistors are what are called “Passive Devices”, that is they contain no source of power or amplification but only attenuate or reduce the voltage or current signal passing through them. This attenuation results in electrical energy being lost in the form of heat as the resistor resists the flow of electrons through it.

Then a potential difference is required between the two terminals of a resistor for current to flow. This potential difference balances out the energy lost. When used in DC circuits the potential difference, also known as a resistors voltage drop, is measured across the terminals as the circuit current flows through the resistor.

Most types of resistor are linear devices that produce a voltage drop across themselves when an electrical current flows through them because they obey Ohm's Law, and different values of resistance produces different values of current or voltage. This can be very useful in Electronic circuits by controlling or reducing either the current flow or voltage produced across them we can produce a voltage-to-current and current-to-voltage converter.

There are many thousands of different **Types of Resistor** and are produced in a variety of forms because their particular characteristics and accuracy suit certain areas of application, such as High Stability, High Voltage, High Current etc, or are used as general purpose resistors where their characteristics are less of a problem.

Some of the common characteristics associated with the humble resistor are **Temperature Coefficient, Voltage Coefficient, Noise, Frequency Response, Power** as well as a resistors **Temperature Rating, Physical Size** and **Reliability**.

In all Electrical and Electronic circuit diagrams and schematics, the most commonly used symbol for a fixed value resistor is that of a "zig-zag" type line with the value of its resistance given in Ohms, Ω. Resistors have fixed resistance values from less than one ohm, (<1Ω) to well over tens of millions of ohms, (>10MΩ) in value.

Fixed resistors have only one single value of resistance, for example 100Ω, but variable resistors (potentiometers) can provide an infinite number of resistance values between zero and their maximum value.

Task 11 Render the text
Conductors and insulators

Everything is made up of atoms. Each one of them has three particles: protons, neutrons and electrons. Electrons spin around the centre of an atom. They have a negative charge. Protons, which are in the centre of atoms, have a positive charge. Normally, an atom has as many protons as it has electrons. It is stable or balanced. Carbon, for example has six protons and six electrons. Scientists can make electrons travel from one atom to another. An atom that loses electrons is positively charged, an atom that gets more electrons is negatively charged. Electricity is created when electrons move between atoms. Positive atoms look for free negative electrons and attract them, so that they can be balanced.

Electricity can pass through some objects better than through others. Conductors are materials through which electrons can travel more freely. Copper, aluminium, steel and other metals are good conductors. So are some liquids like saltwater.

Insulators are materials in which electrons cannot move around. They stay in place. Glass, rubber, plastic or dry wood are good insulators. They are important for your safety, because without them, you couldn't touch a hot pan or plug in a TV set.

Electric current

When electrons move through a conductor an electric current is created. A current that always flows in one direction is called a direct current (DC). A battery for example, produces a direct current. A current that flows back and forth is called an alternating current (AC).

Electric circuits

Electrons cannot jump freely through the air to a positively charged atom. They need a circuit to move. When a source of energy, like a battery, is connected to a light bulb the electrons can move from the battery to the light bulb and back again. We call this an electric circuit.

Sometimes there are many circuits in an electrical device that make it work. A TV set or a computer may have millions of parts that are connected to each other in different ways.

You can stop the current from flowing by putting a switch into the circuit. You can open the circuit and stop electrons from moving.

A piece of metal or wire can also be used to produce heat. When an electrical current passes through such metal it can be slowed down by resistance. This causes friction and makes the wires hot. That's why you can toast your bread in a toaster or dry your hair with warm air from a hairdryer.

In some cases wires can become too hot if too many electrons flow through them. Special switches, called fuses, protect the wiring in many buildings.

Kinds of electricity

Static electricity

• happens when there is a build-up of electrons
• it stays in one place and then jumps to an object
• it does not need a closed circuit to flow
• it is the kind of electricity you feel when you rub your pullover against an object or when you drag your feet over a carpet
• lightning is a form of static electricity

Current electricity

• happens when electrons flow freely between objects
• it needs a conductor—something in which it can flow, like a wire
• current electricity needs a closed circuit
• it is in many electrical appliances in our homes - toasters, TV sets, computers
• a battery is a form of current electricity

How batteries work

A battery has liquid or paste in it that helps it produce electric charges. The flat end of the battery has a negative charge and the end with the bump has a positive charge.

When you link a wire between both ends a current flows. When the current passes through a light bulb electric energy is converted into light.

The chemicals in the battery keep the ends charged and the battery going. As times passes, the chemical becomes weaker and weaker and the battery cannot produce any more energy.

How electricity is produced

Generators are used to transform mechanical energy into electrical energy. A magnet rotates inside a coil of wire. When the magnet moves, an electric current is produced in the wire.

Most power stations use turbines to make the generator rotate. Water is heated to make steam, which pushes the blades of the turbine. Gas, oil or coal can be used to heat the water. Some countries build power stations on rivers, where the moving water pushes the turbine blades.

How electricity is measured

Electricity is measured in watts, named after James Watt who invented the steam engine. It would take about 750 watts to equal one horsepower.

A kilowatt-hour is the energy of 1,000 watts that work for one hour. If, for example, you use a 100-watt light bulb for 10 hours you have used 1 kilowatt of electricity.

How electricity is transported

The electricity produced by a generator travels along cables to a transformer that changes the voltage of electricity. Power lines carry the high-voltage electricity over very long distances. When it reaches your home town another transformer lowers the voltage and smaller power lines bring it to homes, offices and factories.

Electrical safety

It is important to understand why and how you can protect yourself from electrical injuries.

Electric shock occurs when an electric current passes through your body. It can lead to heart failure and can damage other parts of your body. It can also burn your skin and other body tissues.

A very weak electrical object, like a battery, cannot do any harm to you, but inside the house you have devices and machines that use 220 volts.

Most machines in your house have safety features to protect you. If something goes wrong, a special wire leads the electricity to the ground where nothing can happen.

There are also electrical dangers outside your house. Trees that touch power lines can be dangerous. Lightning has more than enough electricity to kill a person. If you get caught in a thunderstorm stay away from open fields and high places. One of the safest places is your car, because lightning will only hit the outside metal of the car.

Task 12 Render the text

Solar light by night

Most people living in towns consider it a usual thing that streets are lit at night. But street lights need a power supply (источник энергии) therefore distant areas with no source of electricity remain in darkness until the sun comes up again. With new appliances now offered by several British firms, many distant places could be lit with solar-powered street lights. It may seem strange that the lamps can use the power of the sun which shines by day when the lamps are needed at night, but they work by using energy accumulated during the day from a solar panel. The solar panel produces electricity which charges (заряжать) a battery. When the sun goes down, the battery power is then used for lighting. Each lamp has its own panel so the system can be used for one individual light or a number of them. In the south of Saudi Arabia a motorway tunnel miles from any power supply is lit day and night by solar-powered devices. The solar panels provide power during the day and charge batteries which accumulate enough power to light the tunnel at night. The generation of electricity by batteries is still expensive but the advantage of sun-powered lamps is that they can bring light to areas distant from any other power supply. There is one more advantage of solar power: not only it is unlimited, but also its use does not pollute the environment. That is why it is very important to develop devices which make it possible to transform solar power into mechanical or electric forms of power.

Task 13 Render the text

Energy

In the language of science energy is the ability to do work. There are various forms of energy, such as heat, mechanical, electrical, chemical, atomic and so on. One might also mention the two kinds of mechanical energy– potential and kinetic, potential energy being the energy of position while kinetic energy is the energy of motion. It is well known that one form of energy can be changed into another. A waterfall may serve as an example. Water falling from its raised position, energy changes from potential to kinetic energy. The energy of falling water is generally used to turn the turbines of hydroelectric stations. The turbines in their turn drive the electric generators, the latter producing electric energy. Thus, the mechanical energy of falling water is turned into electric energy. The electric energy, in its turn, may be transformed into any other necessary form. When an object loses its potential energy, that energy is turned into kinetic energy. Thus, in the above-mentioned example when water is falling from its raised position, it certainly loses its potential energy, that energy changing into kinetic energy. We have already seen that energy of some kind must be employed to generate the electric current. Generally speaking, the "sources of energy usually employed to produce current are either chemical as in the battery, or mechanical, as in the electromagnetic generator. Chemical sources of current having a limited application, the great quantities of electric energy generated today come from various forms of mechanical energy. The rising standards of modern civilization and growing industrial application of the electric current result in an increasing need of energy. Every year we need more and more energy. We need it to do a lot of useful things that are done by electricity. However, the energy sources of the world are decreasing while the energy needs of the world are increasing. These needs will continue to grow as more motors and melted metals are used in industry and more electric current is employed in everyday life. As a result, it is necessary to find new sources of energy. The sun is an unlimited source of energy. However, at present, only a little part of solar energy is being used j directly. How can we employ solar energy directly to produce useful energy? This is a question which has interested scientists and inventors for a long time. Lavoisier and other great scientists of the past melted metals with the help of solar furnaces. Today, solar furnaces illustrate just one of the numerous ways to harness the sun. Using semiconductors, scientists, for example, have transformed solar energy into electric energy.

Task 14 Render the text

Atomic energy

A man trying to see a single atom is like a man trying to see a single drop of water in the sea while he is flying high above it. He will see the sea made up of a great many drops of water but he certainly will not be able to see a single drop. By the way, there are so many atoms in the drop of water that if one could count one atom a second, day and night, it would take one hundred milliard years. But that is certainly impossible. Man has, however, learned the secret of the atom. He has learned to split atoms in order to get great quantities of energy. At present, coal is one of the most important fuel and our basic source of energy. It is quite possible that some day coal and other fuel may be replaced by atomic energy. Atomic energy replacing the present sources of en-

ergy, the latter will find various new applications. The nuclear reactor is one of the most reliable "furnaces" producing atomic energy. Being used to produce energy, the reactor produces it in the form of heat. In other words, atoms splitting in the reactor, heat is developed. Gas, water, melted metals, and some other liquids circulating through the reactor carry that heat away. The heat may be carried to pipes of the steam generator containing water. The resulting steam drives a turbine, the turbine in its turn driving an electric generator. So we see that a nuclear power-station is like any other power-station but the familiar coal-burning furnace is replaced by a nuclear one, that is the reactor supplies energy to the turbines. By the way, a ton of uranium (nuclear fuel) can give us as much energy as 2.5 to 3 million tons of coal. The first industrial nuclear power-station in the world was constructed in Obninsk not far from Moscow in 1954. It is of high capacity and has already been working for many years. One may mention here that the station in question was put into operation two years earlier than the British one and three and a half years earlier than the American nuclear power-stations. A number of nuclear power-stations have been put into operation since 1954. The Beloyarskaya nuclear power-station named after academician Kurchatov may serve as an example of the peaceful use of atomic energy in the USSR. Soviet scientists and engineers achieved a nuclear superheating of steam directly in the reactor itself before steam is carried into the turbine. It is certainly an important contribution to nuclear engineering achieved for the first time in the world. We might mention here another important achievement, that is, the first nuclear installation where thermal energy generated in the reactor is transformed directly into electrical energy. Speaking of the peaceful use of atomic energy it is also necessary to mention our nuclear ice-breakers. "Lenin" is the world's first ice-breaker with a nuclear installation. Its machine installation is of a steam turbine type, the steam being produced by three reactors and six steam generators. This ice-breaker was followed by many others. The importance of atomic energy will grow still more when fast neutron reactors are used on a large scale. These reactors can produce much more secondary nuclear fuel than the fuel they consume.

Task 15 Render the text

Early history of electricity

Let us now turn our attention to the early facts, that is to say, let us see how it all started. History shows us that at least 2,500 years ago, or so, the Greeks were already familiar with the strange force (as it seemed to them) which is known today as electricity. Generally speaking, three phenomena made up all of man's knowledge of electrical effects. The first phenomenon under consideration was the familiar lightning flash –a dangerous power, as it seemed to him, which could both kill people and burn or destroy their houses. The second manifestation of electricity he was more or less familiar with was the following: he sometimes found in the earth a strange yellow stone which looked like glass. On being rubbed, that strange yellow stone, that is to say amber, obtained the ability of attracting light objects of a small size. The third phenomenon was connected with the so-called electric fish which possessed the property of giving more or less strong electric shocks which could be obtained by a person coming into contact with the electric fish. Nobody knew that the above phenomena were due to electricity. People could neither understand their observations nor find any practical applications for them. As a matter of fact, all of man's knowledge in the field of electricity has been obtained during the last 370 years, or so. Needless to say, it took a long time before scientists learned how to make use of electricity. In effect, most of the electrically operated devices, such as the electric lamp, the refrigerator, the tram, the lift, the radio, and so on, are less than one hundred years old. In spite of their having been employed for such a short period of time, they play a most important part in man's everyday life all over the world. In fact, we cannot do without them at present. So far, we have not named the scientists who contributed to the scientific research on electricity as centuries passed. However, famous names are connected with its history and among them we find that of Phales, the Greek philosopher. As early as about 600 B. C. (that Is, before our era) he discovered that when amber was rubbed, it attracted and held minute light objects. However, he could not know that amber was charged with electricity owing to the process of rubbing. Then Gilbert, the English physicist, began the first systematic scientific research on electrical phenomena. Rediscovered that various other substances possessed the property similar to that of amber or, in other words, they generated electricity when they were rubbed. He gave the name "electricity" to the phenomenon he was studying. He got this word from the Greek "electrum" meaning "amber". Many learned men of Europe began to use the new word "electricity" in their conversation as they were engaged in research of their own. Scientists of Russia, France and Italy made their contribution as well as the Englishmen and the Germans.

Task 16 Render the text

Electricity

It is impossible to imagine our civilization without electricity: economic and social progress will be turned to the past and our daily lives completely transformed. Electrical power has become universal. Thousands of applications of electricity such as lighting, electrochemistry and electrometallurgy are longstanding and unquestionable. With the appearance of the electrical motor, power cables replaced transmission shafts, gear wheels, belts and pulleys1 in the 19-th century workshops. And in the home a whole range of various time and labour saving appliances have become a part of our everyday lives. Other devices are based on specific properties of electricity: electrostatics in the case of photocopying machine and electromagnetism in the case of radar and television. These applications have made electricity most widely used. The first industrial application was in the silver workshops in Paris. The generator – a new compact source of electricity – was also developed there. The generator replaced the batteries and other devices that had been used before. Electric lighting came into wide use at the end of the last century with the development of the electric lamp by Thomas Edison. Then the transformer was invented, the first electric lines and networks were set up, dynamos and induction motors were designed. Since the beginning of the 20th century the successful development of electricity has begun throughout the industrial world. The consumption of electricity has doubled every ten years. Today consumption of electricity per capita is an indicator of the state of development and economic health of a nation. Electricity has replaced other sources of energy as it has been realized that it offers improved service and reduced cost. One of the greatest advantages of electricity is that it is clean, easily-regulated and generates no by-products. Applications of electricity now cover all fields of human activity from house washing machines to the latest laser devices. Electricity is

6. Примеры оценочных средств для проведения промежуточной аттестации

6.1 Примеры тестовых заданий

Вариант 1

Выберите правильный вариант:

1. She ….a secretary.
a) is b)are c)have d)were
2. …..swine is big.
a)these b)those c)this d)its
3. He….taking his dog for a walk.
a)were b)is c)have d)shall be
4. We know their names, but they don’t know ..... .
a)us b)our c)ours d) we
5. Are these ..... coats?
a)yours b)your c)you d) us
6. Gina gave ..... the wrong phone number just for fun.
a)he b)him c)his d) he’s
7. We have a large garden. Do you know where ..... garden is?
a)us b)our c)ours d) our’s
8. I like that camera. I am going to buy ..... .
a)she b)it c)its d) he
9. This is not my pencil; ..... is blue.
a)my b)mine c)me d)mines
10. My room is bigger than hers, but ..... is nicer.
a)she b)her c)hers d)her’s
11. Will you give me his telephone number? I don’t know .....
a)him b)its c)it d)hers
12. I gave her my address and she gave ..... hers.
a)my b)mine c)me d)I
13. I don’t like dogs. I am afraid of ..... .

a)they b)them c)their d)theirs

Преобразуйте предложения, употребляя оборот there is / are:

a) 1. This city has many monuments. 2. Our town has no theatres. 3. This family has two children. 4. Our group has many good pupils. 5. Every week has seven days and every year has twelve months. 6. She has a lot of English books in her library.

b) 1. The dog is in the room. 2. The children are in the yard. 3. The students are in the laboratory. 4. The car is near the house. 5. The bench was under the tree. 6. A lot of people will be at the stadium tomorrow.

Употребите глаголы to be или to have в нужной форме:

1. There is no school in this village and the children go to the school which … two miles away.
2. How old … you? I … 17.
3. … you English lessons twice a week? – Yes, we …
4. I … no time to help you yesterday. I … very sorry about it.
5. We … a conference tomorrow. So I … busy with my report today.
6. My sister … a second-year student of the Law Faculty.
7. What ... you fond of? My hobby … drawing.
8. Will you … any lectures tomorrow?
9. Physics … my favorite subject at school.
10. He … a lot of trouble with his car yesterday.
11. My grandfather … short grey hair but my grandmother's hair … long and thick.

Your glasses … on the table.

Вариант 2

Выберите правильный вариант:

1. The ….. comes everyday.
a)postman b)postmen c) postmans d)postmens
2. There are a lot of …. in the forest .
a) deer b)deers c)a deer d)the deers
3. …..play in the yard.
a)the child b)a child c)children d)childrens
4. The Browns are my ….
a)neighbors b)neighbor c)a neighbor d)the neighbor
5. My ….works at school.
a)sisters b)the sisters c)the sister d)sister
6. ……speak English well.
a)student b)students c)he d)she
7. We work five … a week.
a)day b)a day c)the day d)days
8. My …….lives not far from her.
a)mothers' friend b)mother friend's c)mother friends' d)mother's friend
9. Our ….is light.
a)friend's rooms b)friends' room c)friend's room
10. ….is not elected every four years.
a) Britain's Queen b)Britains' Queen c)Britain Queen's d) Britain Queens'
11. Prime Minister is the….
a)Parliament's the head b)head's Parliament c)Parliament's head d)Parliament head
12. ……was moved to Moscow.
a) Russias' capital b)Russia's capital c)Russia capital's d)Russia capitals'
13. The …..will arrive tomorrow.
a)country's delegations b)country's delegation c)delegation's country d)delegations' country
14. My …… are at home.
a)children's brother b)brother's childrens c)brother's child d)brother's children
15. He received his …..

a)friends' letter b)friend's letter's c)letter's friend d) friend letters
16. Our….is brown.
a)teachers' tables b)table's teacher c)teacher's table d) table's teachers
17. My….. is new.
a)mothers' umbrellas b)mother's umbrella c)umbrella's mother d)umbrellas' mother
18. The interesting thing about ..... is all the roads that they built in Britain.
a) Romans b) a Romans c) the Romans d) Romen

Употребите глаголы, данные в скобках, в Present Indefinite:

1. We (read) the newspaper in class every day.
2. He always (prepare) his homework carefully.
3. We always (play) tennis on Saturdays.
4. She (speak) several foreign languages.
5. The children (play) in the park every afternoon.
6. Helen (work) very hard.
7. They (take) a lot of trips together.
8. We always (travel) by car.
9. I (eat) lunch in the cafeteria every day.

Вариант 3

Choose the right variant.

1. Have you ever visited other countries? - Yes, I... to Italy and France.
a) was c) had been
b) have been d) would be
2. I feel really tired. We ... to the party last night and have just returned home.
a) went c) had seen
b) has gone d) was going
3. At the beginning of the film I realized that I ... it before.
a) see c) had seen
b) saw d) have seen
4. When the bus stopped in the small square, Helen ... her magazine and didn't realized at first that she had arrived at her destination.
a) read c) was reading
b) reads d) had read
5. My sister's son ... in tomorrow's race, because he is too young. They do not allow riders under sixteen.
a) won't ride c) wouldn't ride
b) shan't ride d) doesn't ride
6. A beautiful bridge ... in our city. It will be finished next year.
a) builds c) is being built
b) is built d) has been built
7. It has been raining for two hours. I hope it ... raining soon.
a) stops c) would stop
b) shall stop d) stop
8. Television has many advantages. It keeps us informed about the latest news, and also ... entertainment at home.
a) provide c) is provided
b) provides d) provided
9. On the other hand television ... for the violent behavior of some young people, and for encouraging children to sit indoors, instead of doing sports.
a) blames c) is blamed
b) blamed d) would blame
10. Some millionaires have lots of money and ... what to do with it.
a) don't know c) won't know
b) didn't d) knows

11. How ... at college? You didn't say much about it in your last letter.
a) do you get on c) will you get on
b) are you get on d) are you getting on
12. When you ... in this city again? - In a month.
a) arrive c) have you arrived
b) arrived d) will you arrive
13. Every time that I miss the bus, it means that I ... walk to work.
a) has to c) had to
b) have to d) could
14. Every time when I missed the bus, I ... to return home late.
a) must c) can
b) had d) may
15. That was great! It was ... meal you have ever cooked.
a) good c) best
b) better d) the best
16. This exhibition is ... interesting than the previous one.
a) little c) least
b) less d) the least
17. We saw ... good film last night. The film was about the love of a girl to her cat and dog.
a) a c) -
b)the d) an
18. Everybody agrees that ... happiness is very important in the life of people.
a) - c) a
b) the d) many
19. In the past people lived in ... harmony with the environment.
a) a c) the
b) an d) -
20. When they arrived ... the station, they rushed to the platform not to miss the train.
a)to c)in
b) at d) for

Вариант 4
Choose the right variant.
1. When you ... older, you'll change your mind about this.
a) will grow c) have grown
b) grow d) grew
2. By the time the police get there, the burglars ... .
a) vanish c) will have vanished
b) will vanish d) vanished
3. As soon as the taxi arrives, I ... you know.
a) let c) had let
b) have let d) will let
4. My friend has been writing to me for years already, but he never ... a photo.
a) sends c) will send
b) has sent d) sent
5. Why are you busy packing? - My train ... in two hours, so we'll leave the house in an hour.
a) is leaving c) leaves
b) will be leaving d) left
6. When was this building finished? - They say it ... by the end of last year.
a) had been finished c) will be finished
b) was finished d) finishes
7. I thought that I ... my key and was very glad when I found it.
a) lose c) had lost

b) lost d) was losing
8. What's the matter? You look upset. Last week I lost my scarf and now I just ... my gloves.
a) lost c) had lost
b) have lost d) lose
9.1 ... for this bank for five years already but I have decided to change my job.
a) am working c) have been working
b) has worked d) worked
10. Martin said that he ... the tickets the next day.
a) bought c) will buy
b) had bought d) would buy
11. The house opposite our college .,., that's why we are using the back entrance at present.
a) pulls down c) is being pulled down
b) is pulled down d) pulled down
12. You ... an umbrella when you left the house, didn't you?
a) have c) had had
b) was having d) had
13. By the time we got to the cinema the film ... .
a) will begin c) had begun
b) would begin d) began
14. Is there anything I ... do to help you?
a) can c) am to
b) may d) as to
15. The last film I saw was ... frightening than this one.
a) little c) least
b) less d) the least
16. Someone is calling you. Will you answer ... phone?
a) a c) -
b) the d) these
17. To tell the truth I don't like ... pair of trousers that I bought last month.
a) those c) that
b) this d) a
18. Whose house is it? - It's ... .
a) my c) her
b) mine d) our
19. Today is ... cold than yesterday. So, I'm wearing my
shorts.
a) little c) least
b) less d) the least
20. "Come home ... Christmas Day, we'll be waiting for you", my mother always says to me.
a)in c) -
b) on d) at

Вариант 5

Choose the right variant.

1. Excuse me, do you speak English? I ... for a hotel.
a) look c) was looking
b) am looking d) have been looking
2. Last summer we wanted a relaxing holiday, so we ... to stay on a small island.
a) choose c) had chosen
b) have chosen d) chose
3. Mathematics ... hard. I don't understand it.
a) are c) was
b) is d) were
4. While we ... for the train, it started to rain.

a) waited c) was waiting
b) are waiting d) were waiting
5. The police officer said that every house in that street ... already by the police.
a) search c) had been searched
b) were searched d) searched
6. There is going to be a big art exhibition. It... a lot of visitors.
a) attracts c) has attracted
b) will attract d) attracted
7. The result of his investigation ... in the newspaper soon.
a) publish c) will be published
b) be published d) is published
8. When they arrived home, their children ... outside the door waiting for them.
a) sit c) was sitting
b) are sitting d) were sitting
9. We ... a new computer not long ago. Now the job will be done much more quickly.
a) had bought c) bought
b) was bought d) have bought
10. He was sorry that he ... to me for so long.
a) didn't write c) hadn't been writing
b) haven't been writing d) hasn't been writing
11. The ring you found ... be returned to an old lady who had lost it.
a) can c) have to
b) must d) are to
12. Everybody in our team played ... except the captain.
a) bad c) worst
b) badly d) the worst
13. You know much, but you know ... than your teacher.
a) little c) least
b) less d) much
14. Small shops are not as ... as supermarkets.
a) more convenient c) most convenient
b) convenient d) the most convenient
15. Sarah is a very good pianist. She plays ... piano very well.
a) a c) the
b)an d)-
16. We had five phone calls, but there were ... for you.
a) no c) either
b) none d) neither
17. I didn't have much time, but I ... visit a lot of places of interest in London.
a) can c) must
b) was able to d) had to
18. That's an easy question! ... knows the answer!
a) All c) Each
b) Everybody d) Every
19. The comic told silly jokes, but nobody laughed ... him.
a) on c) at
b) under d)about
20. We feel sorry ... Sam because he hasn't got any friends.
a) for c) with
b)about d) by

Вариант 6 Choose the right variant.

1. If I ... some fish, will you cook it for me?
a) will catch c) caught
b) catch d) am catching

2. She said that she ... her present flat. She tried to find another one.
a) doesn't like c) didn't like
b) won't like d) likes

3.1 saw you yesterday from the bus. Where ... you ... at that time?
a) was hurrying c) had hurried
b) were hurrying d) did hurry

4.1 found that everything I said on the phone ... to the police.
a) report c) was reported
b) is reported d) had been reported

5. When I speak Italian, all the others in the class ... at me as I don't know the language well.
a) laughed c) will laugh
b) was laughing d) laugh

6. He ... in the Army for eighteen months. This is his last month.
a) serves c) has been serving
b) is serving d) have served

7. Don't make noise: the children ... to sleep.
a) try c) will try
b) is trying d) are trying

8. A new museum ... in the city. What a beautiful building it will be!
a) was being built c) is built
b) is being built d) builds

9. Two terrorists ... in New York some days ago.
a) are arrested c) were arrested
b) have been arrested d) will be arrested

10.1 ... understand this letter. Will you translate it for me?
a) mustn't c) may not
b) can't d) shouldn't

11. Diana's parents don't let her go to late-night disco. She ... be at home at 9 o'clock in the evening.
a) must c) may
b) can d) have to

12. Henry ... apologize for his bad behaviour yesterday.
a) have to c) had to
b) may d) is to

13. The children studied hard, and as a result they passed the exams ... of all.
a) good c) best
b) better d) the best

14. This is ... film I've ever seen.
a) more interesting c) most interesting
b) the most interesting d) not interesting

15. ... old, ... sick, ... unemployed need our special care.
a) - c) the
b) an d)everybody

16. Someone who saw ... robbery called the-police.
a) - c)the
b) a d)those

17. According to this song ... we need is love.
a) all c) each

b) every d) some
18. We wished the bride and groom happiness in ... new life together.
a) there c) theirs
b) their d) these
19. Excuse me, but does this umbrella belong ... you?
a) to c) at
b) for d) with
20. I listened to the radio every day to know the weather forecast but I can never rely ... it.
a) at c) in
b) to d) on

Вариант 7

Choose the right variant.

1. I knew that I ... her somewhere before.
a) saw c) would see
b) had seen d) has seen
2. When I finally found the house, I knocked at the door but ... the answer.
a) don't hear c) didn't hear
b) hasn't heard d) heard
3. I went out into the garden to fetch my bike, but found that someone ... it.
a) stole it c) has stolen
b) would steal d) had stolen
4. When I... for the keys, I remembered that I had left them at home.
a) looked c) had been looking
b) was looking d) look
5. I have been working for the bank for a year already, but I ... to change my job.
a) decided c) has decided
b) have decided d) decide
6. They spoke so quickly that I ... what they were speaking about.
a) not understand c) didn't understand
b) don't understand d) hadn't understood
7. Yesterday our flight ... because of the fog.
a) cancelled c) had been cancelled
b) was cancelled d) has been cancelled
8. I couldn't open the office door because someone ... it.
a) lock c) had locked
b)locked d)would lock
9. As soon as you ... me, I will contact you.
a) calls c) called
b) will call d) call
10.1 ... him since he started working here.
a) have never trusted c) trusted
b) had never trusted d) trust
11. Mary will be ready soon. She ... coffee at the moment.
a) has c) was having
b) have d) is having
12. If we ... late for the class, our teacher will be angry with us.
a) is c) will be
b) were d) are
13. We ... in the sunshine for about half an hour when I suddenly felt sick.
a) have been sitting c) sat
b) were sitting d) had been sitting
14. We were disappointed as the film was ... than we expected.
a) entertaining c) most entertaining

b) less entertaining d) entertaining
15. We usually ask our teacher to explain ... difficult problems to us.
a) the c) a
b) - d) this
16. Playing ... guitar is an interesting hobby.
a) - c) the
b) a d) mine
17. Our city is famous for ... beautiful ancient buildings.
a) its c) it's
b) it d) his
18. Her hair is long and fair. Everybody admires ... .
a) them c) they
b) it d) its
19. You are very good ... dealing with people.
a) in c) on
b) at d) about
20. Last summer our neighbours decided to drive to Scotland ... a short holiday.
a) at c) on
b) to d) for

Вариант 8
Choose the right variant.
1. When the light ... I was sitting in the armchair reading a book.
a) goes out c) go out
b) had gone out d) went out
2. I thought I ... this film before, but I hadn't.
a) saw c) had seen
b) seen d) have seen
3. Why haven't you brought me the letters for signature? ... them yet?
a) Don't you type c) Haven't you typed
b) Didn't you type d) Will you type
4. She wasn't sure whether she ... the door of her flat.
a) locked c) had locked
b) has locked d) didn't lock
5. I... my homework all morning and haven't finished it yet.
a) am doing c) have been doing
b) do d) did
6. The inspector suspected that the thief ... a special key for opening this door.
a) uses c) had used
b) has used d) will use
7. I was very tired. When I ... to bed, I fell asleep immediately.
a) got c) had got
b) has got d) will get
8. The Vikings ... to North America a thousand years ago.
a) sail c) had sailed
b) sailed d) have sailed
9. Thank you for your offer, but I ... not to accept it.
a) decide c) have decided
b) has decided d) decided
10. You ... through your old photograph album for half an hour already.
a) look c) have looked
b) are looking d) have been looking
11. Nobody knows where his picture is. Perhaps, it ... .

a) was stolen c) has been stolen
b) will be stolen d) stolen
12. I agree. You ... apologize for not inviting him to your birthday party.
a) can't c) shouldn't
b) mustn't d) may not
13. Actually, today I feel ... than I did yesterday.
a) bad c) worst
b) worse d) the worst
14. ... people who are unemployed often feel depressed.
a) The c) A
b) - d) That
15. Who was the first astronaut who landed on ... Moon?
a) the c) a
b) - d) those
16. What happened at the end of the film? - I'm sorry to say, but I haven't seen ... film.
a) a c) -
b) the d) those
17. This is ... interesting exhibition I've ever visited.
a) more c) less
b) most d) the most
18. Would you mind waiting ... minutes?
a) few c) little
b) a few d) a little
19. I'm ... interested in languages than in mathematics,
a) much c) little
b) many d) less
20. The students often translate English texts ... Russian.
a) to c) into
b) in d) on

Вариант 9
Choose the right variant.
1. My mother ... strawberries for years but she has never had such a good crop before.
a) grow c) has been growing
b) grew d) had grown
2. Helen got off the bus and walked into the bank when she realized that she ... her handbag on the bus.
a) left c) has left
b) had left d) leaves
3. You are a great cook! This cake ... wonderful as usual.
a) taste c) will taste
b) tasted d) tastes
4. I cut my finger when I ... the potatoes.
a) am peeling c) was peeling
b) have peeled d) will peel
5. The students ... not to be late for their classes.
a) ask c) are asked
b) asked d) are asking
6. Yesterday, while Jane ... she broke two cups.
a) wash up c) was washing up
b) washes up d) has washed up
7. Be attentive and more serious. You always ... something!
a) lose c) have lost
b) are losing d) have been loosing

8. What ... you ... when I phoned you last night?
a) did do c) had done
b) were doing d) had been doing
9. Our flat ... at the moment, so it doesn't look its best.
a) paints c) is being painted
b) is painted d) has been painted
10. My brother will be absent. He ... for his exam at this time tomorrow.
a) will prepare c) will have prepared
b) will be preparing d) will have been preparing
11. ... you give me some advice about the language courses?
a) Have c) Should
b) May d) Could
12. Why didn't you give me a call yesterday? We ... discuss everything together.
a) can c) may
b) must d) could
13. At college the work is harder than the work we did at school, but it is much ... interesting.
a) more c) many
b) most d) a few
14. A person with a good education usually gets ... better job.
a) - c) the
b) a d) an
15. ... poor people need help from the government.
a)- c)A
b) The d) This
16. The government should help ... poor.
a) - c) a
b) the d)that
17. You can do ... you want, but don't bother me now.
a) anything c) some
b) something d) any
18. The government is going to provide ... houses for homeless people.
a) much c) most
b) more d) least
19.1 think of coming to Moscow ... a few days to visit my sister.
a) of c) for
b)on d)over
20. I think we should ask ... some information about this case.
a) about c) for
b) - d) on

Вариант 10
Choose the right variant.1
1.The train stopped at all the stations, and long before we got to London every seat ... and people were standing in the corridors.
a) has been taken c) had been taken
b) was taken d) is taken
2. Most of the young people left this village a long time ago and nobody ... yet.
a) returned c) had returned
b) has returned d) was returned
3. The police suspected that Bill himself had broken the window at his house because he wanted to make them think that a burglar ... his valuable stamp collection.
a) stole c) was stealing
b) had stolen d) has stolen

4. The police thought that he ... it because he needed money.
a) did c) was doing
b) had done d) has done
5. If you work a bit harder, I'm sure you ... the exam.
a) pass c) have passed
b) will pass d) would pass
6. Where are you going? I ... speaking with you yet.
a) not finished c) haven't finished
b) didn't finish d) don't finish
7.I didn't see where the bus stop was, so I... the bus yesterday.
a) miss c) has missed
b) missed d) had missed
8. Last week a burglar broke into the house while we ... television.
a) watch c) watched
b) have watched d) were watching
9. When are you going to finish this translation? - I... this translation today.
a) finish c) have finished
b) finished d) had finished
10. I felt really tired. We ... for two hours before we reached the nearest hotel.
a) walked c) have been walking
b) were walking d) had been walking
11. My father is sure that most people ... bicycles to work in twenty years' time.
a) shall ride c) ride
b) will be riding d) are riding
12. The plane ... take off after the fog had lifted.
a) must c) can
b) was able to d) may
13. Finally we ... stop: we were tired and it was dark.
a) can c) must
b) may d) had to
14. In the past most of the population lived in ... country.
a) the c) -
b) a d) this
15. The judge sent our neighbor to ... prison for a month.
a) the c) -
b) a d) an
16. ... English are proud of their country and that the English language is spoken all over the world.
a) the c) an
b) - d) few
17. Why have you done it? Oh, there are ... reasons for it.
a) much c) a little
b) little d) many
18. Sorry, but I can't hear ... of you properly.
a) neither c) nobody
b) either d) none
19. We were looking forward ... a quiet rest near the forest.
a) for c) on
b) to d) at
20. Our city is famous ... its beautiful ancient buildings.
a) of c) by
b) for d) with

Вариант 11

Choose the right variant.

1. My passport ... last month, and nobody has found it yet .
a) lost c) has been lost
b) was lost d) had been lost
2. There's going to be an interesting art exhibition. It ... a lot of visitors.
a) attracts c) will attract
b) attract d) would attract
3. Have you head the news? He ... all his exams this week.
a) passed c) had passed
b) has passed d) pass
4. By the time we get to the cinema the film ... .
a) will begin c) will have begun
b)begins d)began
5. He says his train ... at 8 a.m. He's packing his things at the moment.
a) leave c) has left
b) leaves d) would leave
6.1 was quite ... to see Ben behaving like that.
a)shocked c) being shocked
b)shocking d)shock
7. I ... on the phone when the postman knocked on the door and entered the room.
a) speak c) was speaking
b) am speaking d) have spoken
8. We first came to this town more than twenty years ago. Everything ... in the town since that time.
a)change c) has changed
b)changed d)is changed
9. We didn't know that Bill ... to Brazil the week before, and he was abroad when the burglary took place.
a) flew c) has flown
b) had flown d) would flow
10. I arrived in Prague in September last year. So I ... here for six months.
a) live c) have lived
b) lived d) will live
11. While I was wondering whether to buy the shoes or not, they ... by someone else.
a) buy c) were bought
b) bought d) had been bought
12. He was happy. He ... pass his driving test at the first attempt.
a) should c) had to
b) must d) was able to
13. At present I ... afford to go to the cinema twice a week.
a) can't c) must not
b) couldn't d) might not
14. We didn't think you were ... in ancient history.
a) interested c) not interesting
b) interesting d) less interesting
15. Every morning I listen to ... radio, but I don't like to watch TV so early.
a) the c) -
b) a d) these
16. ... English is the world language and the English language spoken in the USA or Australia differs from the English language spoken in Britain.
a)the c) an
b) - d)a
17. You are always quarreling! Stop it, ... of you!
a)everybody c) both

b) some d) every
18. Mr. Smith was accused of spying and put ... prison.
a) in c) at
b) of d) to
19. Our city succeeded ... collecting a large sum of money for charity.
a) on c) with
b) in d) at
20. I'm sorry ... your difficulties. Can I help?
a)for c) about
b) at d)on

Вариант 12
Choose the right variant.
1. It's 11 o'clock so I ... to bed now.
a) go c) will go
b) am going d) have gone
2. The tickets to the football match usually ... and checked at the entrance.
a) sell c) are sold
b) was sold d) won't be sold
3. We ... to the party today.
a) have been invited c) have invited
b) are invited d) had been invited
4. The baby ... because it is hungry now.
a) crying c) cries
b) is crying d) cried
5. There ... a lot of people waiting in the station yesterday evening.
a) is c) was
b) are d) were
6. Some people ... on the benches waiting for their trains.
a) was sleeping c) have slept
b) were sleeping d) had slept
7. By the time the train arrived, Susan ... to push her way to the front of the crowd.
a) managed c) had managed
b) has managed d) would manage
8. ... you ... my English book anywhere? I can find it nowhere.
a) Did ... see c) Will ... see
b) Have ... seen d) Had ... seen
9. He ... the text before I decided to help him.
a) translated c) has translated
b) had translated d) will translate
10. It ... in London this morning that the British Oil Corporation had discovered oil under the sea near the Welsh coast.
a) announced c) had been announced
b) would be announced d) was announced
11. If he ... when I come, I won't wake him up.
a) sleep c) will sleep
b) will be sleeping d) is sleeping
12. ... they leave before supper or have they time to stay until my friends come?
a) must c) might
b) may d) should
13. My ... brother studies at college.
a) old c) older
b) elder d) the eldest

14. This is ...film I have ever seen.
a) good c) worse
b) the best d) better
15. ... Hyde Park is a very large park in central London.
a) - c) a
b) the d) an
16. My friends tell me that professors are people who think a lot, but say ... .
a) little c) a few
b) few d) some
17. These books cost ... than my friend wants to pay.
a) more c) most
b) much d) the most
18. He has earned so ... money that he has decided to help the poor.
a) much c) little
b) many d) few
19. They go to work by car and come home ... foot.
a) by c) with
b) on d) in
20. The bus from Glasgow arrives ... the Central bus station.
a) at c) in
b) to d) for

Вариант 13

Refer to the texts in this unit if necessary. A good score is at least 8 correct answersout of these 10 questions. The answers are listed in the back of this book.

1. The atomic number of an element is determined by
(a) the number of neutrons.
(b) the number of protons.
(c) the number of neutrons plus the number of protons.
(d) the number of electrons.

2. The atomic weight of an element is approximately determined by
(a) the number of neutrons.
(b) the number of protons.
(c) the number of neutrons plus the number of protons.
(d) the number of electrons.

3. Suppose there is an atom of oxygen, containing eight protons and eight neutrons in the nucleus, and two neutrons are added to the nucleus. What is the resulting atomicweight?
(a) 8
(b) 10
(c) 16
(d) 18

4. An isotope
(a) is electrically neutral.
(b) has positive electric charge.
(c) has negative electric charge.
(d) can have either a positive or negative charge.

5. A molecule
(a) can consist of a single atom of an element.
(b) always contains two or more elements.
(c) always has two or more atoms.
(d) is always electrically charged.

6. In a compound,

(a) there can be a single atom of an element.
(b) there must always be two or more elements.
(c) the atoms are mixed in with each other but not joined.
(d) there is always a shortage of electrons.

7. A coulomb

(a) represents a current of 1 ampere.
(b) flows through a 100-watt light bulb.
(c) is equivalent to 1 ampere per second.
(d) is an extremely large number of charge carriers.

8. The attraction or repulsion between two electrically charged objects is called

(a) electromagnetic deflection.
(b) electrostatic force.
(c) magnetic force.
(d) electroscopic force.

9. A stroke of lightning

(a) is caused by a movement of holes in an insulator.
(b) has a very low current.
(c) is a discharge of static electricity.
(d) builds up between clouds.

10. Visible light is converted into electricity

(a) in a dry cell.
(b) in a wet cell.
(c) in an incandescent bulb.
(d) in a photovoltaic cell.

Вариант 14

1. **Read the text**

THE NATURE OF ELECTRICITY

Practical electricity is produced by small atomic particles known as electrons. It is the movement of these particles which produce the effects of heat and light.

The pressure that forces these atomic particles to move, the effects they encounter opposition and how these forces are controlled are some of the principles of electricity.

Accepted atomic theory states that all matter is electrical in structure. Any object is largely composed of a combination of positive and negative particles of electricity. Electric current will pass through a wire, a body, or along a stream of water. It can be established in some substances more readily than in others, that all matter is composed of electric particles despite some basic differences in materials. The science of electricity then must begin with a study of the structure of matter.

Matter is defined as any substance which has mass (or weight) and occupies space. This definition should be broad enough to cover all physical objects in the universe. Wood, water, iron, and paper are some examples of matter. Energy is closely related to, but not to be confused with, matter. Energy does not have mass, and it does not occupy space. Heat and light are examples of energy.

The smallest particle of matter which can be recognized as an original substance was thought to be a unit called the atom. Recently scientists have found particles even smaller than atoms, but our theories are still based on the atom. The atom consists of a nucleus and a cloud of electrons. It is generally agreed that the electrons are small particles of electricity, which are negative in nature. These particles orbit the nucleus in much the same fashion that planets orbit a sun.

2. Guess the meaning of the following international words:

Electricity, electron, effect, structure, combination, material, mass, energy, atom, orbit

3. Give the English equivalents for the words below:

1) производить; 2) частица; 3) тепло и свет; 4) напряжение; 5) сила; 6) вещество; 7) положительный; 8) отрицательный; 9) электрический ток; 10) вес; 11) ядро

4. Translate into Russian the words and expressions from the text:
1) atomic particle; 2) effects of heat and light; 3) encounter opposition; 4) principles of electricity; 5) composed (of); 6) pass through a wire; 7) structure of matter; 8) occupy space; 9) physical objects; 10) a cloud of electrons; 11) in the same fashion.
5. Complete the sentences using the text:
1. Electricity is produced by …
2. The effects of heat and light are produced by …
3. According to the accepted atomic theory all matter is …
4. Any object is composed of …
5. Matter is defined as …
6. Energy must not be confused with …
7. The atom consists of …
8. The smallest particle of matter is …
9. Most theories are based on …
10. Electrons are …

Вариант 15
№ 1 Read the text

ELECTRIC CURRENT

The electric current is a quantity of electrons flowing in a circuit per second of time. The unit of measure for current is ampere. If one coulomb passes a point in a circuit per second then the current strength is 1 ampere. The symbol for current is I.
The current which flows along wires consists of moving electrons. The electrons move along the circuit because the e .m. f. drives them. The current is directly proportional to the e. m. f.
In addition to traveling through solids, however, the electric current can flow through liquids as well and even through gases. In both cases it produces some most important effects to meet industrial requirements.
Some liquids, such as melted metals for example, conduct current without any change to themselves. Others, called electrolytes, are found to change greatly when the current passes through them.
When the electrons flow in one direction only, the current is known to be d. c., that is, direct current. The simplest source of power for the direct current is a battery, for a battery pushes the electrons in the same direction all the time (i.e., from the negatively charged terminal to the positively charged terminal).
The letters a. c. stand for alternating current. The current under consideration flows first in one direction and then in the opposite one. The a. c. used for power and lighting purposes is assumed to go through 50 cycles in one second. One of the great advantages of a. c. is the ease with which power at low voltage can be changed into an almost similar amount of power at high voltage and vice versa. Hence, on the one hand alternating voltage is increased when it is necessary for long-distance transmission and, on the other hand, one can decrease it to meet industrial requirements as well as to operate various devices at home.
Although there are numerous cases when d. c. is required, at least 90 per cent of electrical energy to be generated at present is a. c. In fact, it finds wide application for lighting, heating, industrial, and some other purposes.
2. Guess the meaning of the following international words:
electric, ampere, symbol, proportional, industrial, metal, electrolyte, battery, generate.
3. Give the English equivalents for the words and word combinations below:
1) течь, протекать; 2) цепь, схема; 3) единица измерения; 4) провод; 5) электродвижущая сила; 6) твердое тело; 7) жидкость; 8) проводить (ток); 9) источник энергии; 10) постоянный ток; 11) переменный ток; 12) напряжение.
4. Give Russian equivalents for the following:
1) to meet industrial requirements; 2) melted metals; 3) to push in the same direction; 4) negatively (positively) charged terminal; 5) power and lightning purposes; 6) long-distance transmission; 7) to operate devices; 8) to find wide application.
5. Say whether these sentences are true or false:
1. The symbol for current is I.
2. The electric current can flow only through liquids.
3. The current can be of two types: direct current and alternating current.

4. The alternating current flows in one direction.
5. A battery is the simplest source of power for the direct current.
6. Direct current finds wider application than alternating current.
7. Electrolytes don't change greatly when current passes through them.
8. One of the great advantages of alternating current is the ease with which voltage can be changed.

Вариант 16

Refer to the texts in this unit if necessary. A good score is at least 13 correct answers out of these 15 questions.

1. A positive electric pole

(a) has a deficiency of electrons.
(b) has fewer electrons than the negative pole.
(c) has an excess of electrons.
(d) has more electrons than the negative pole.

2. An EMF of 1 V

(a) cannot drive much current through a circuit.
(b) represents a low resistance.
(c) can sometimes produce a large current.
(d) drops to zero in a short time.

3. The volt is the standard unit of

(a) current.
(b) charge.
(c) electromotive force.
(d) resistance.

4. If an EMF of 1 volt is placed across a resistance of 2 ohms, then the current is

(a) half an ampere.
(b) 1 ampere.
(c) 2 amperes.
(d) impossible to determine.

5. A potentially lethal electric current is on the order of

(a) 0.01 mA.
(b) 0.1 mA.
(c) 1 mA.
(d) 0.1 A.

6. A current of 25 A is most likely drawn by

(a) a flashlight bulb.
(b) a typical household.
(c) a utility power plant.
(d) a small radio set.

7. A piece of wire has a conductance of 20 S. Its resistance is

(a) 20 Ω.
(b) 0.5 Ω.
(c) 0.05 Ω.
(d) 0.02 Ω.

8. A resistor has a value of 300 Ω. Its conductance is

(a) 3.33 mS.
(b) 33.3 mS.
(c) 333 μS.

(d) 0.333 S.

9. A span of wire 1 km long has a conductance of 0.6 S. What is the conductance ofa span of this same wire that is 3 km long?

(a) 1.8 S
(b) 0.6 S
(c) 0.2 S
(d) More information is necessary to determine this.

10. In a battery, chemical energy can sometimes be replenished by

(a) connecting it to a light bulb.
(b) charging it.
(c) discharging it.
(d) no means known; when a battery is dead, you must throw it away.

11. Of the following energy units, the one most often used to define electricalenergy is

(a) the Btu.
(b) the erg.
(c) the foot-pound.
(d) the kilowatt-hour.

12. A low voltage, such as 12 V,

(a) is never dangerous.
(b) is always dangerous.
(c) is dangerous if it is ac, but not if it is dc.
(d) can be dangerous under certain conditions.

13. A fluctuating magnetic field

(a) produces an electric current in an insulator.
(b) magnetizes the earth.
(c) produces a fluctuating electric field.
(d) results from a steady electric current.

14. Which of the following units can represent magnetic flux density?

(a) The volt-turn
(b) The ampere-turn
(c) The gauss
(d) The gauss-turn

15. A ferromagnetic material

(a) concentrates magnetic flux lines within itself.
(b) increases the total magnetomotive force around a current-carrying wire.
(c) causes an increase in the current in a wire.
(d) increases the number of ampere-turns in a wire.

Вариант 17

Refer to the texts in this unit if necessary. A good score is at least 8 correct answersout of these 10 questions.

1. One important advantage of an electrostatic meter is the fact that

(a) it measures very small currents.
(b) it can handle large currents.
(c) it can detect and indicate ac voltages as well as dc voltages.
(d) it draws a large current from a power supply.

2. An important advantage of an electromagnet-type meter over a permanent-magnetmeter is the

fact that

(a) the electromagnet meter costs much less.
(b) the electromagnet meter need not be aligned with the earth's magnetic field.
(c) the permanent-magnet meter has a more sluggish coil.
(d) the electromagnet meter is more rugged.

3. Ammeter shunts are useful because

(a) they increase meter sensitivity.
(b) they make a meter more physically rugged.
(c) they allow for measurement of large currents.
(d) they prevent overheating of the meter movement.

4. Voltmeters should generally have

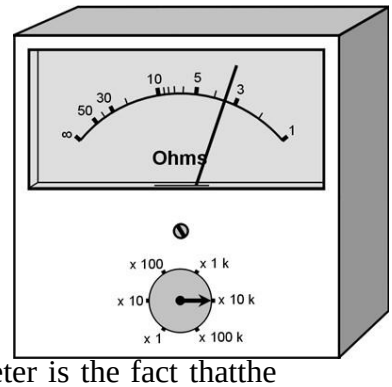
(a) high internal resistance.
(b) low internal resistance.
(c) the greatest possible sensitivity.
(d) the ability to withstand large currents.

5. In order to measure the power-supply voltage that is applied to an electricalcircuit, a voltmeter should be placed

(a) in series with the circuit that works from the supply.
(b) between the negative pole of the supply and the circuit working from the supply.
(c) between the positive pole of the supply and the circuit working from the supply.
(d) in parallel with the circuit that works from the supply.

6. Which of the following will not normally cause a large error in an ohmmeterreading?

(a) A small voltage between points under test
(b) A slight change in switchable internal resistance
(c) A small change in the resistance to be measured
(d) A slight error in the range switch position



7. The ohmmeter in Figure 40 shows a reading ofapproximately

(a) 34,000 Ω.
(b) 3.4 kΩ.
(c) 340 Ω.
(d) 34 Ω.

8. The main advantage of a FETVM over a conventional voltmeter is the fact thatthe FETVM

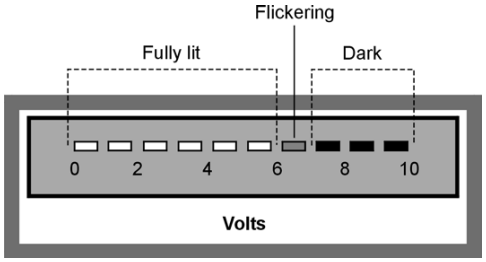
(a) can measure lower voltages.
(b) draws less current from the circuit under test.
(c) can withstand higher voltages safely.
(d) is sensitive to ac voltage as well as to dc voltage.

9. Which of the following is not a function of a fuse?

(a) To ensure there is enough current available for an appliance to work right
(b) To make it impossible to use appliances that are too large for a given circuit
(c) To limit the amount of power that a device can draw from the electrical circuit
(d) To make sure the current drawn by an appliance cannot exceed a certain limit

10. What voltage would be expected to produce the reading on the bar-graph meter shown in Figure?

(a) 6.0 V
(b) 6.5 V
(c) 7.0 V
(d) There is no way to tell because the meter, as shown, is malfunctioning.



Вариант 18

Do not refer to the texts when taking this test. A good score is at least 23 correct.

1. An application in which an analog meter would almost always be preferred over adigital meter is
(a) the signal-strength indicator in a radio receiver.
(b) a meter that shows power-supply voltage.
(c) a utility watt-hour meter.
(d) a clock.
(e) a device in which a direct numeric display is wanted.

2. The ohm is a unit of
(a) electrical charge quantity.
(b) the rate at which charge carriers flow.
(c) opposition to electrical current.
(d) electrical conductance.
(e) potential difference.

3. The number of protons in the nucleus of an element is known as the
(a) electron number.
(b) atomic number.
(c) valence number.
(d) charge number.
(e) proton number.

4. A hot-wire ammeter
(a) can measure ac as well as dc.
(b) registers current changes very fast.
(c) can indicate very low voltages.
(d) measures electrical energy.
(e) works only when current flows in one direction.

5. Which of the following units indicates the rate at which energy is expended?
(a) The volt
(b) The ampere
(c) The coulomb
(d) The ampere-hour
(e) The watt

6. A loudness meter in a hi-fi system is generally calibrated in
(a) volts.
(b) amperes.
(c) decibels.
(d) watt-hours.
(e) ohms.

7. An electrically charged atom (either positive or negative) is known as
(a) a molecule.
(b) an isotope.
(c) an ion.
(d) an electron.
(e) a fundamental particle.

8. Suppose a battery delivers 12.0 V to a bulb, and current flowing through the bulbis 3.00 A. The resistance of the bulb is which of the following?
(a) 36.0 Ω
(b) 4.00 Ω
(c) 0.250 Ω
(d) 108 Ω

(e) 0.750 Ω

9. A primitive device for indicating the presence of an electric current is
(a) an electrometer.
(b) a galvanometer.
(c) a voltmeter.
(d) a coulometer.
(e) a wattmeter.

10. Suppose a battery supplies 6.0 V to a bulb rated at 12 W. The bulb draws howmuch current?
(a) 2.0 A
(b) 0.5 A
(c) 72 A
(d) 40 mA
(e) 72 mA

11. When an electrical charge exists but there is no flow of current, the charge issaid to be
(a) ionizing.
(b) atomic.
(c) molecular.
(d) electronic.
(e) static.

12. A watt-hour meter measures
(a) voltage.
(b) current.
(c) power.
(d) energy.
(e) charge.

13. Every chemical element has its own unique type of particle, which is known as its
(a) neutron.
(b) electron.
(c) proton.
(d) atom.
(e) isotope.

14. A unit of electrical charge quantity is the
(a) volt.
(b) ampere.
(c) watt.
(d) tesla.
(e) coulomb.

15. A unit of conductance is the
(a) volt per meter.
(b) ampere per meter.
(c) anti-ohm.
(d) siemens.
(e) ohm per meter.

16. A voltmeter should have
(a) low internal resistance.
(b) electrostatic plates.
(c) a sensitive amplifier.
(d) high internal resistance.
(e) the highest possible full-scale value.

17. The rate at which charge carriers flow is measured in
(a) amperes.
(b) coulombs.

(c) volts.
(d) watts.
(e) watt-hours.

18. A chemical compound
(a) consists of two or more atoms.
(b) contains an unusual number of neutrons.
(c) is technically the same as an ion.
(d) has a shortage of electrons.
(e) has an excess of electrons.

19. Power is defined as
(a) the rate at which current flows in a circuit.
(b) the product of voltage and resistance in a circuit.
(c) the rate at which energy is radiated or dissipated.
(d) the accumulation of energy over time.
(e) the amount of heat generated in a circuit.

20. The charged particles in the nucleus of an atom are
(a) electrons.
(b) protons.
(c) positrons.
(d) neutrons.
(e) negatrons.

21. The internal conductance (expressed in siemens) of an ammeter is generally
(a) low.
(b) directly proportional to the current.
(c) inversely proportional to the current.
(d) high.
(e) any value; it doesn't matter.

22. A steady magnetic field can be produced by
(a) a straight wire carrying a constant direct current.
(b) a loop of wire carrying a constant direct current.
(c) a coil of wire carrying a constant direct current.
(d) a constant-intensity stream of protons in free space, moving in a straight line.
(e) any of the above.

23. An atom with 7 protons and 5 electrons is an example of
(a) a positive isotope.
(b) a negative isotope.
(c) a positive ion.
(d) a negative ion.
(e) a neutral ion.

24. Some substances cause magnetic lines of flux to bunch closer together than theywould be if the magnetic field existed in a vacuum. This property is known as
(a) electromagnetism.
(b) diamagnetism.
(c) flux magnification.
(d) flux constriction.
(e) ferromagnetism.

25. Fill in the blank to make the following sentence true: "Electrical current can beexpressed in terms of the number of passing a given point per unit time."
(a) neutrons
(b) webers or gauss

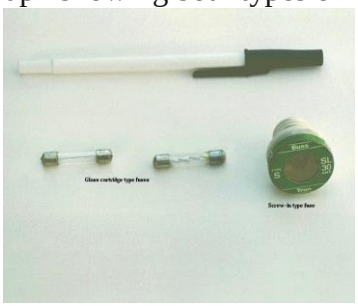
(c) charge carriers
(d) wave cycles
(e) isotopes

Вариант 19

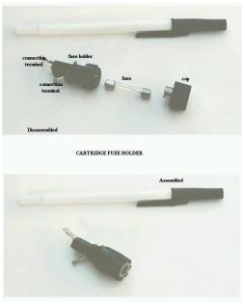
Read and translate the text.

A ***fuse*** is nothing more than a short length of wire designed to melt and separate inthe event of excessive current. Fuses are always connected in series with the component(s) to be protected from overcurrent, so that when the fuse blows (opens) it will open the entire circuit and stop current through the component(s). A fuse connected in one branch of a parallel circuit, of course, would not affect current through any of the other branches.

Normally, the thin piece of fuse wire is contained within a safety sheath to minimize hazards of arc blast if the wire burns open with violent force, as can happen in the case of severe overcurrents. In the case of small automotive fuses, the sheath is transparent so that the fusible element can be visually inspected. Residential wiring used to commonly employ screw-in fuses with glass bodies and a thin, narrow metal foil strip in the middle. A photograph showing both types of fuses are shown here.



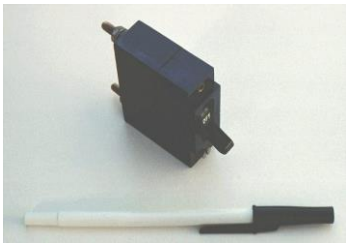
Cartridge type fuses are popular in automotive applications, and in industrial applications when constructed with sheath materials other than glass. Because fuses are designed to ~~fa~~ail‖ open when their current rating is exceeded, they are typically designed to be replaced easily in a circuit. This means they will be inserted in to some type of holder rather than being directly soldered or bolted to the circuit conductors. The following is aFigure photograph showing a couple of glass cartridge fuses in a multi-fuse holder .



The fuses are held by spring metal clips, the clips themselves being permanently connected to the circuitconductors.
The base material of the fuse holder (or fuseblock as they are sometimes called) is chosen to be a good insulator.

Another type of fuse holder for cartridge-type fuses is commonly used for installation in equipment control panels, where it is desirable to conceal all elecrical contact points from human contact. Unlike the fuse block just shown, where all the metal clips are openly exposed, this type ofholder completely encloses the fuse in an insulating housing.

The most common device in use for overcurrent protection in high-current circuitstoday is the circuit breaker. Circuit breakers are specially designed switches that automatically open to stop current in the event of an overcurrent condition. Small circuit breakers, such as those used in residential, commercial and light industrial service are thermally operated. They contain a bimetallic strip (a thin strip of two metals bonded back-to-back) carrying circuit current, which bends when heated. When enough force is generated by the bimetallic strip (due to overcurrent heating of the strip),
the trip mechanism is actuated and the breaker will open.



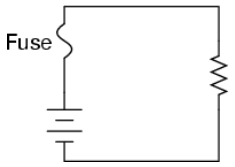
Larger circuit breakers are automatically actuated by the strength of the magnetic field produced by current-carrying conductors within the breaker, or can be triggered to trip by external devices monitoring the circuitcurrent (those devices being called protective relays).

Because circuit breakers don‘t fail when subjected to overcurrent conditions— rather, they merely open and can be re-closed by moving a lever—they are more likelyto be found connected to a circuit in a more permanent manner than fuses. A photographof a small circuit breaker is shown here (figure 52).

From outside appearances, it looks like nothing more than a switch. Indeed, it could be used as such. However, its true function is to operate as an overcurrentprotection device.

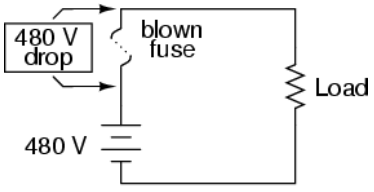
It should be noted that some automobiles use inexpensive devices known as fusible links for overcurrent protection in the battery charging circuit, due to the expenseof a properly-rated fuse and holder. A fusible link is a primitive fuse, being nothingmore than a short piece of rubber-insulated wire designed to melt open in the event of overcurrent, with no hard sheathing of any kind. Such crude and potentially dangerous devices are never used in industry or even residential power use, mainly due to the greater voltage and current levels encountered. As far as this author is concerned, their application even in automotive circuits is questionable.

The electrical schematic drawing symbol for a fuse is an S-shaped curve:

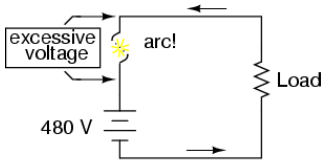


Fuses are primarily rated, as one might expect, in the unit for current: amps. Although their operation depends on the self-generation of heat under conditions of excessive current by means of the fuse‘s own electrical resistance, they are engineered to contribute a negligible amount of extra resistance to the circuits they protect. This is largely accomplished by making the fuse wire as short as is practically possible. Just as anormal wire‘s ampacity is not related to its length (10-gauge solid copper wire will handle 40 amps of current in free air, regardless of how long or short of a piece it is), a fuse wire of certain material and gauge will blow at a certain current no matter how long it is. Since length is not a factor in current rating, the shorter it can be made, the less resistance it will have end-to-end.

However, the fuse designer also has to consider what happens after a fuse blows: the melted ends of the once-continuous wire will be separated by an air gap, with full supply voltage between the ends. If the fuse isn‘t made long enough on a high-voltage circuit, a spark may be able to jump from one of the melted wire ends to the other, completing the circuit again:



When the fuse "blows," full supply voltage will be dropped across it and there will be no current in the circuit.



If the voltage across the blown fuse is high enough, a spark may jump the gap, allowing some current in the circuit. THIS WOULD NOT BE GOOD!!!

Consequently, fuses are rated in terms of their voltage capacity as well as the current level at which they will blow.

Some large industrial fuses have replaceable wire elements, to reduce the expense.The body of the fuse is an opaque, reusable cartridge, shielding the fuse wire from exposure and shielding surrounding objects from the fuse wire.

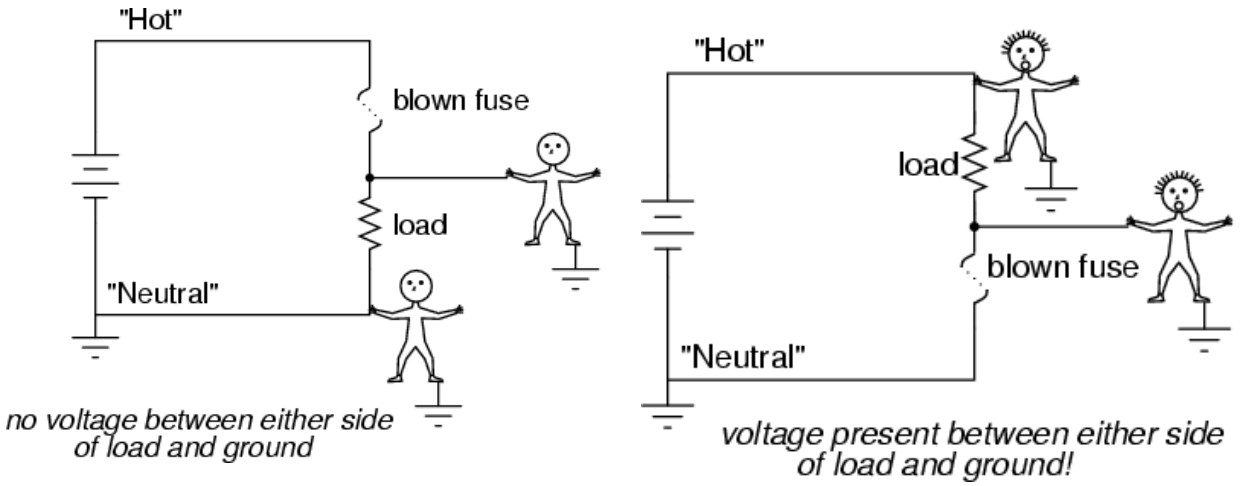
There‘s more to the current rating of a fuse than a single number. If a current of 35 amps is sent through a 30 amp fuse, it may blow suddenly or delay before blowing, depending on other aspects of its design. Some fuses are intended to blow very fast, while others are designed for more modest ―opening‖

times, or even for a delayed action depending on the application. The latter fuses are sometimes called slow-blow fuses due to their intentional time-delay characteristics.

A classic example of a slow-blow fuse application is in electric motor protection, where inrush currents of up to ten times normal operating current are commonly experienced every time the motor is started from a dead stop. If fast-blowing fuses were to be used in an application like this, the motor could never get started because the normal inrush current levels would blow the fuse(s) immediately! The design of a slow- blow fuse is such that the fuse element has more mass (but no more ampacity) than an equivalent fast-blow fuse, meaning that it will heat up slower (but to the same ultimate temperature) for any given amount of current.

On the other end of the fuse action spectrum, there are so-called semiconductor fuses designed to open very quickly in the event of an overcurrent condition. Semiconductor devices such as transistors tend to be especially intolerant of overcurrent conditions, and as such require fast-acting protection against overcurrents in high-power applications.

Fuses are always supposed to be placed on the ―hot‖ side of the load in systems that are grounded. The intent of this is for the load to be completely de-energized in all respects after the fuse opens. To see the difference between fusing the ―hot‖ side versus the ―neutral‖ side of a load, compare these two circuits:



In either case, the fuse successfully interrupted current to the load, but the lower circuit fails to interrupt potentially dangerous voltage from either side of the load to ground, where a person might be standing. The first circuit design is much safer.

As it was said before, fuses are not the only type of overcurrent protection device in use. Switch-like devices called circuit breakers are often (and more commonly) used to open circuits with excessive current, their popularity due to the fact that they don‘t destroy themselves in the process of breaking the circuit as fuses do. In any case, though, placement of the overcurrent protection device in a circuit will follow the same general guidelines listed above: namely, to ―fuse‖ the side of the power supply not connected to ground.

Although overcurrent protection placement in a circuit may determine the relative shock hazard of that circuit under various conditions, it must be understood that such devices were never intended to guard against electric shock. Neither fuses nor circuit breakers were designed to open in the event of a person getting shocked; rather, they are intended to open only under conditions of potential conductor overheating. Overcurrent devices primarily protect the conductors of a circuit from overtemperature damage (and the fire hazards associated with overly hot conductors), and secondarily protect specific pieces of equipment such as loads and generators (some fast-acting fuses are designed to protect electronic devices particularly susceptible to current surges).

Since the current levels necessary for electric shock or electrocution are much lower than the normal current levels of common power loads, a condition of overcurrent is not indicative of shock occurring. There are other devices designed to detect certain shock conditions (ground-fault detectors being the most popular), but these devices strictly serve that one purpose and are uninvolved with protection of the conductors against overheating.

Insert the missing words into the sentences below.

1. A fuse is a small, thin ……….. designed to melt and separate into two pieces for the purpose of breaking a circuit in the event of excessive current.
2. A circuit breaker is a specially designed …… that automatically opens to interrupt circuit current in the event of an overcurrent condition. They can be ‗tripped‖ (opened) thermally, by magnetic fields, or by external devices called ‗protective relays,‖ depending on the design of , its size, and the application.
3. Fuses are primarily rated in terms of maximum ……., but are also rated in terms of how much voltage drop they will safely withstand after interrupting a …….
4. ……… can be designed to blow fast, slow, or anywhere in between for the same maximum level of current.
5. The best place to install a fuse in a grounded power system is on the ungrounded conductor path to the …….. That way, when the fuse blows there will only be the grounded (safe) conductor still connected to the load, making it safer for ……. to be around.

Вариант 20

Transcribe the following words:

Correlation
Passage
Explanation
Mechanical
Characteristics
Chemical
Quantum
Impurity

Malleability
Distinction
Appreciable
Ascertain
Measurable
Exhibit
Configuration

Give the definitions of the following words and expressions.

Excessive
Sheath
Foil
Strip
Expose
Spark
Opaque
Reusable

Bimetallic
Relay
Crude
Negligible
Gauge
Inrush
Ground-fault

Discuss the following points with your partner. Compose a short report using your answers.

- What types of electrical fuses do you know?
- What is the point called in a fuse when the metal strip melts?
- What is a short blow fuse and what is it used in?

- How are fuses connected in an electrical device?
- What usually happens when a strong overcurrent occurs?
- Can the fuse voltage exceed the application voltage?
- What is the difference between interrupting rating and the fuse's ampere rating?
- Is it necessary to derate a fuse to account for the operating temperature?
- Are fuse reducers required for downsizing ampere ratings of Class L fuses?
- Do fuseholders require derating?
- What is the purpose of fuseblock's rejection feature?
- Why are both fuse and earthing are needed?
- How can we use 250v fuse in a 9v circuit?

Вариант 21

Explain the following questions. Discuss them with your partner,choose one of the points and compose a dialogue.

1. Why should you never fly your kite near overhead power lines?
2. What can happen if you plug in too many appliances at one power point or power board?
3. Why shouldn‘t you dig near underground power lines?
4. What should you do with faulty appliances or appliances that have a damaged cord?
5. Think of a dangerous electrical situation. Draw and label it in the box below.

Make a brief report about:

- the reasons of electrical shock;
- electrical fire precautions;
- why safety is important;
- the rules that can keep people safe.

Вариант 22

1. Расположите части письма в правильном порядке:

1) 7 Maple Estate, Hlarbour Road, Melbourn, Australia. (Sender’s address)
Ref. JK/RS
Telephone 041-336-3692
7 May 2007

2) Dear Sirs,

3) We await your instructions, which shall have our careful attention

Yours faithfully
Richard Smith
Sales Manager

4) We recently had the honour of sending you a catalogue of our goods, and trust that you duly received the same.

As we have not yet been favoured with your order, we venture to enquire if you have reached a decision, and whether you require further information about our product.

5) Purchasing Department
Sunrise Boulevard
Riverton, MI 44444 (Addressee’s address)

2. Расположите части делового письма в правильном порядке:

1. John L. Davis, President
Autocomp. Inc.
8100 South Jackson Street

Detroit, MI 48220

2. We recently purchased $ 250,000 worth of automated material-handling equipment from your company. This equipment was purchased from you because of the fine reputation you have for quality and service to your customers.

3. We look forward to doing business with your company in the future.
Sincerely,
Victor Boyd,
Plant Manager

4. Dear Mr. Davis:

5. Rusk Seed, Inc.
400 National Highway
Decatur, Illinois 62525
April 15, 2007

3. Ответьте на вопросы, пользуясь информацией на конверте:

New Jersey Power Company
5695South 23 Road
(1) Ridgefield, (2) NJ 08887

Mr. Frederick Wolf
Director of Marketing
(3) Smith Printing Company
590 (4) Sixth Avenue
Milwaukee, (5) WI 53216

1. What is the ZIP code in the return address?
2. What is the ZIP code in the mailing address?
3. What town does the letter come from?
4. What is addressee's company name?
5. What is the street name in the mailing address?

4. Определите, к какому виду делового документа относится представленный ниже отрывок:

Mr. Fred North,
Purchasing Manager,
Broadway Autos,
London, Great Britain
7th July, 2007

Dear Mr. Sign,
I am writing to apologize for the late delivery of this order.
Our revised delivery date is now Friday November 22.
We hope that this revised date is suitable and we greatly regret by inconvenience that may have been caused.

Best regards,
Fred North

Ответ:

1. Contract
2.Letter of apology
3. Memo
4. CV

5. Выберите слова или сочетания слов для заполнения пропусков так, чтобы они

отражали особенности оформления служебной записки:

To :Secretarial Supervisor

(1) ___: John Davis

(2) ___: automated equipment

The (3) ___: of Smart Equipment will visit us on 28 April to demonstrate their new material handing equipment which you are sure to be interested in.

Please arrange the time to meet him so that all your staff could be present.

(4) ___

1. Subject
2. From
3. Sales Manager
4. J.D.

6. Перед вами конверт:

Amtorg Trading Corporation
5695 South 23 Madison Avenue
(1) New York, (2) NJ 08887

(3) Mr. R. Calvert
Director of Marketing
(4) Smith Printing Company
590 (5) Lincoln Street
Chicago, WI 53216

Соотнесите информацию под определенным номером на конверте с тем, что она обозначает:

1) the addressee's company name
2) the town the letter comes from
3) the addressee
4) the ZIP Code in the return address
5) the street name in the mailing address

7. Ответьте на вопросы, пользуясь информацией на конверте.

New York Power Company
3638 North 25 Road
(1) Summerfield, (2) NK 09346

(3) Mr. Paul Brown
Director of Purchasing Department
Smith Electronic Company
360 (5) Fifth Avenue
Roanoke, (4) VA 24040

1. What is the ZIP Code in the return address?
2. What is the ZIP Code in the mailing address?
3. Who is the addressee?
4. What town does the letter come from?
5. What is the street name in the mailing address?

8. Определите, к какому виду делового документа относится представленный ниже отрывок:

19 Elm Street
Elmont,
New York
The Jameson Constructions Co.
Harbour Road
June 24 2007_
Melbourn 6
Australia

Dear Sirs

We were very interested in your display at the latest Exhibition held in Moscow.

We would be very much obliged if you would send us your illustrated catalogue of your products together with the pricelist, with special reference to all sizes and quantities. We would also like to know what discounts you grant for large quantities.

If you can guarantee prompt delivery we would be prepared to place a large order.

We can supply the names of several firms as references.

Yours faithfully

Donald Vance

Manager

Ответ:

1. Letter of enquiry (request)
2. Invitation
3. Memo

9. Определите, к какому виду письменного сообщения относится следующее.

DYNATEAM Innovations

7 October 2007

Mr. Rigley
Rainbow Homecenter
1212 Westlake Ave,
Seattle, Wash. 98404

Dear Mr. Rigley,

We thank you for your inquiry of 5 July in which you asked about sports swimming suits we advertised in June's edition of 'Sports News'. These sports swimming suits are made of new generation of micro fibers ideally suitable for sensitive skin. They are MicFib™ products, which is a brand name you are familiar with. Their unique hygienic properties have proved the main selling point of this product. All dealers who have displayed our brightly colored, jazzy products have reported a tremendous increase in sales. You can choose from more than twenty-five designs in all sizes. We would be pleased to add you to our list of customers and could promise you excellent products and prompt supply. As we execute all orders in strict rotation, we strongly advise you to order early.

Thank you for your interest. Our services are at your disposal.

M. Kerr
Sales Manager
Enc. 2007 Catalog

Ответ:

1. order
2. offer
3. invitation

10. Определите, к какому виду письменного сообщения относится следующее:

22 May 2001

The Chairman
South California District
Export Council
11777 San Vicente Blvd.
Los Angeles, Calif. 90049

Dear Sir,

We are a large store in the Center of Montreal and we are interested in importing wine from California, Please send us a list of California wine exporters.

I would appreciate a prompt reply.

Yours sincerely,
M. Pino
Chief Buyer

Ответ:

1. memo
2. order
3. inquiry

11. Определите, к какому виду письменного сообщения относится следующее

Bronson Machines Inc.
2244 Lincoln Ave., Bonneyvihe, S. D.

Date: 17 September2007
Subject: Incorporation
To:
All employees in all departments
From:
Jim Gerry, CEO
You all know that Bronson Machines has incorporated and is now called Bronson Machines Inc.
Details concerning restructuring will be sent to the heads of the departments in question. However, this memorandum is being circulated to reassure you of the following:
1. There will be no firing as a result of this change.
2. Restructuring will finish at the tail end of this year.
3. Salaries and wages will not be cut.
4. Management positions will not be affected. Managers will be offered special training.
Jim Gerry
CEO

Ответ:

1. invitation
2. minutes
3. memo

12. Определите, к какому виду письменного сообщения относится следующее:

Walter and Rose Inc.
173 Lombard St., Toronto, Ont.

Date: 10 November 2000
To: All staff
From: Head Office

Selection of Mr.Caldwell The CEO of the Year for 2000.

We are pleased to inform you that 2000 CEO of the Year Advisory Board has selected Mr. Caldwell, the CEO of our company, the CEO of the Year. Mr. Caldwell was selected on criteria including sense of vision, leadership, innovation, and social responsibility.

Marc Geisler
Chairman of the Board of Director

Ответ:

1. minutes
2. invitation
3. memo

13. Определите, к какому виду письменного сообщения относится следующее:

HOWAKD & PRATT
Ladies' Clothing

306, 3d Avenue
Chicago, Ill. 60602
JACKSON & MILES
118 Regent Street
London WIC 37D
UK

Gentlemen: 21 Oct, 2000

We saw your women's dresses and suits in your October catalogue. The lines you showed would be most suitable for our market.

Would you kindly send us your quotation for spring and summer clothing that you could supply to us by the end of January next.

We would require 2,000 dresses and suits in each of the sizes 10-14, and 500 in sizes 8 and 16. Please quote c.i.f. Chicago prices.

Payment is normally made by letter of credit.

Thank you for an early reply.

Very truly yours,

P.Pratt
P.PRATT. Jr
Buyer

Ответ:

1. inquiry
2. order
3. memo

14. Определите, к какому виду делового документа относится представленный ниже отрывок:

Mr. Fred North,
Purchasing Manager,
Broadway Autos,
London, Great Britain
7th July, 2007

Dear Mr. Sign,

I am writing to apologize for the late delivery of this order.

Our revised delivery date is now Friday November 22.

We hope that this revised date is suitable and we greatly regret by inconvenience that may have been caused.

Best regards,

Fred North

Ответ:

1. Contract
2. Letter of apology
3. Memo
4. CV

15. Определите, к какому виду делового документа относится представленный ниже отрывок:

19 Elm Street
Elmont,
New York

The Jameson Constructions Co.
Harbour Road
Melbourn 6
Australia

June 24 2007_

Dear Sirs
We were very interested in your display at the latest Exhibition held in Moscow.
We would be very much obliged if you would send us your illustrated catalogue of your products together with the pricelist, with special reference to all sizes and quantities. We would also like to know what discounts you grant for large quantities.
If you can guarantee prompt delivery we would be prepared to place a large order.
We can supply the names of several firms as references.
Yours faithfully
Donald Vance
Manager
Ответ:

1. Letter of enquiry (request)
2. Invitation
3. Memo

16. Ответьте на вопросы, пользуясь информацией на конверте.

New York Power Company
3638 North 25 Road
(1) Summerfield, (2) NK 09346

(3) Mr. Paul Brown
Director of Purchasing Department
Smith Electronic Company
360 (5) Fifth Avenue
Roanoke, (4) VA 24040

1. What is the ZIP Code in the return address?
2. What is the ZIP Code in the mailing address?
3. Who is the addressee?
4. What town does the letter come from?
5. What is the street name in the mailing address?

17. Выберите слова или сочетания слов для заполнения пропусков так, чтобы они отражали особенности оформления служебной записки:

To :Secretarial Supervisor
(1) ___: John Davis
(2) ___: automated equipment
The (3) ___: of Smart Equipment will visit us on 28 April to demonstrate their new material handing equipment which you are sure to be interested in.
Please arrange the time to meet him so that all your staff could be present.
(4) ___

1. Subject
2. From
3. Sales Manager
4. J.D.

6.2 Комплексные тесты для промежуточной аттестации
COMPLEX GRAMMAR TEST 1
1. We go home ... bus.
a. in b. by c. to
2. They are going to leave ... Moscow tonight.
a. to b. for c. in
3. The hall is full ... people.

a. of b. by c. for
4. Let’s listen ... the new tapes.
a. to b. for c. over
5. How do you get ... your office?
a. by b. in c. to
6. How much time do you spend ... your English a day?
a. at b. on c. for
7. We are very busy ... weekdays.
a. out of b. in c. on
8. Classes end ... 3 o’clock.
a. at b. in c. to
9. You must translate this text ... Russian.
a. in b. into c. for
10. My friend ... on the ship for fifteen years by next year.
a. will have been serving b. have served c. was serving
11. By two o’clock the students will ... the test translation for two hours.
a. be doing b. have been doing c. do
12. When Jim came out of army he ... what to do.
a. is wondering b. has wondered c. was wondering
13. His parents were sick, they didn’t have much money, so they ... pretty desperate.
a. were getting b. are getting c. have got
14. ... you speak English?
a. do b. does c. is d. are
15. Where ... your son learn?
a. do b. does c. is d. are
16. I can’t translate this text because I ... not know these words.
a. do b. does c. is d. are
17. Peter ... not go in for sports this winter because he is unwell.
a. do b. does c. is d. are
18. When ... first spring flowers appear on the ground?
a. do b. does c. is d. are
19. ... it snowing now?
a. do b. does c. is d. are
20. ... it often rain in autumn?
a. do b. does c. is d. are
21. ... it still dark?
a. do b. does c. is d. are
22. When ... it get light in January?
a. do b. does c. is d. are
23. What hobby group ... you going to join?
a. do b. does c. is d. are
24. My father ... too old to do this work.
a. do b. does c. is d. are
25. How long ... it take you to get to the Institute?
a. do b. does c. is d. are
26. I am sorry. I am late. ... I come in?
a. must b. can c. may d. need
27. – ... I read or translate the text? – Read it, please.
a. must b. can c. may d. need
28. My sister studies French. She ... already read and speak French a little.
a. must b. can c. may d. need
29. It is late. I ... go home.
a. must b. can c. may d. need
30. Must I describe the picture? No, you ... not.

a. must b. can c. may d. need
31. May I take these magazines home? No, you ... not.
a. must b. can c. may d. need
32. There are no people in the hall, we ... have a talk there.
a. must b. can c. may d. need
33. The weather is getting worse. It ... rain.
a. must b. can c. may d. need
34. – ... your little daughter walk? – No, she can't. She is only eight months old.
a. must b. can c. may d. need
35. My brother ... home late as a rule.
a. come b. comes c. is coming
36. Look, your brother ... home.
a. go b. goes c. is going
37. What are you doing? I ... a book.
a. read b. reads c. am reading
38. When do you ... ?
a. get up b. gets up c. getting up
39. Are you ... to smoke?
a. go b. to go c. going
40. It does not ... me long to wash and dress in the morning.
a. take b. takes c. taking
41. Does it sometimes ... in summer?
a. snow b. snows c. snowing
42. Go on ... , please.
a. read b. to read c. reading
43. My sister is fond of ... .
a. skate b. skates c. skating
Какой вспомогательный глагол будет употребляться для образования вопросительной формы?
44. I usually have dinner at home.
a. is b. do c. does
45. He gets older.
a. is b. do c. does
46. It is raining.
a. is b. do c. does
47. He has (больше) free time than I have.
a. more b. most c. better
48. (Лучше) late than never.
a. better b. best c. worse
49. This is the (самый удобный) chair.
a. more comfortable b. most comfortable c. less comfortable
50. He plays tennis (хуже) than I do.
a. better b. worse c. worst
51. We have (меньше) flowers than they have.
a. less b. least c. fewer
52. They have (меньше) white paper than we have.
a. less b. least c. fewer
53. Winter is the (самое холодное) season in a year.
a. cold b. colder c. coldest
54. Take some other book because these stories are (слишком) easy for you.
a. much b. too c. more
55. He (собирается) to paint a picture.
a. is fond of b. wants c. is going
56. This book is (такая же трудная) as that magazine.

a. more difficult than b. as difficult c. not so difficult
57. It is not (так тепло) in autumn as in summer.
a. warmer than b. as warm as c. so warm
58. My daughter is (гораздо моложе) than you are.
a. less younger b. much younger c. youngest
59. Let's listen to the (последние) news.
a. next b. latest c. last
60. (Необходимо) for you to help your friends.
a. it is possible b. necessary c. it is necessary

Найдите синонимы или определения к указанным словам:

61. to tell
a. to describe b. to speak c. to ask
62. before
a. over b. around c. in front of
63. over
a. between b. above c. at
64. also
a. seldom b. very c. too
65. in the country
a. out of town b. on the ground c. in town
66. to watch
a. to describe b. to look attentively c. to repeat
67. as a rule
a. seldom b. never c. usually
68. tidy
a. clean b. fresh c. clear
69. to attend
a. to get b. to smoke c. to come regularly

Выберите антонимы для следующих слов:

70. short
a. long b. black c. fine
71. early
a. never b. late c. long
72. far
a. good b. often c. near
73. to get dark
a. to get light b. to get older c. to get worse
74. warm
a. dark b. cool c. bad
75. well
a. bad b. badly c. good
76. to learn
a. to rewrite b. to forget c. to describe
77. after
a. before b. over c. around
78. more
a. fewer b. larger c. smaller
79. best
a. least b. most c. worst
80. to come back
a. to leave b. to attend c. to forget
81. always
a. never b. seldom c. often
82. often

a. seldom b. never c. sometimes
Определите, какой частью речи является выделенное слово:
83. The girl sitting at the window is the best **skier** of our group.
a. существительное b. наречие c. прилагательное
84. The girl **sitting** at the window is the best skier of our group.
a. причастие b. герундий c. прилагательное
85. **Reading** books helps us to master English.
a. причастие b. герундий c. существительное
86. **The reading** boy is Comrade Petrov's son.
a. причастие b. герундий c. прилагательное
87. Nobody likes **rainy** weather.
a. прилагательное b. герундий c. причастие
88. It is a good **beginning**.
a. существительное b. причастие c. герундий
89. The sun shines **brightly**.
a. наречие b. прилагательное c. причастие
90. You may **rewrite** your test if you like.
a. прилагательное b. глагол c. существительное
Укажите правильное место в предложении данных наречий:
91. often
He (a) is (b) late (c).
92. seldom
She (a) goes (b) skiing (c).
93. badly
You (a) speak (b) French (c).
94. usually
She (a) is (b) at home in the evenings (c).
95. always
We (a) take (b) books home (c).
96. well
You (a) must learn (b) to speak English (c).
97. Куда ты идешь?
a. Where are you going? b. Where do you go? c. Where can you go now?
98. Куда ты ходишь каждый день?
a. Where are you going now? b. Where do you go every day? c. Where must you go every day?
99. Летом рано светает.
a. It is already getting light. b. It gets light early in summer. c. It is early summer.
100. Идет снег?
a. Does it snow? b. Is it snowing? c. Is it going to rain?

Keys: COMPLEX GRAMMAR TEST 1

1b	11b	21c	31b	41a	51c	61b	71b	81a	91b
2b	12c	22b	32b	42c	52a	62c	72c	82c	92a
3a	13a	23d	33c	43c	53c	63b	73a	83a	93c
4a	14a	24c	34b	44b	54b	64c	74b	84a	94b
5c	15b	25b	35b	45c	55c	65a	75b	85b	95a
6b	16a	26c	36c	46a	56b	66b	76b	86a	96c
7c	17b	27a	37c	47a	57c	67c	77a	87a	97a
8a	18a	28b	38a	48a	58b	68a	78a	88a/c	98b
9b	19c	29a	39c	49b	59b	69c	79c	89a	99b
10a	20b	30d	40a	50b	60c	70a	80a	90b	100b

COMPLEX GRAMMAR TEST 2

1. Let's translate this article ... Russian.
a. in b. into c. on
2. Let's listen ... the latest news.
a. for b. into c. to
3. He gets ... the Institute by bus.
a. to b. into c. in
4. He is free ... Mondays.
a. on b. in c. at
5. Classes are over ... 3 o'clock.
a. at b. in c. on
6. I haven't finished my drawing ... .
a. yet b. just c. already
7. I have ... been to London.
a. never b. since c. now
8. We had sent the letter ... we learnt the news.
a. before b. after c. till
9. She has ... painted the picture.
a. yet b. already c. an hour ago
10. ... he meet us at the station tomorrow?
a. will b. does c. is
11. ... you finished to write your article yet?
a. were b. did c. have
12. What magazine ... you looking through when we came into the hall?
a. did b. were c. are
13. I knew you ... pass the exams successfully.
a. will b. would c. have
14. This problem ... discussed at our last meeting.
a. will be b. was c. had
15. When ... they come back?
a. did b. have c. were
16. – ... it still raining? – Yes, it is.
a. is b. does c. will
17. ... your sister want to buy a new radio-set?
a. has b. is c. does
18. We were watching TV while the children ... in the garden.
a. will be playing b. played c. were playing
19. Oh, I'm sorry. I haven't ... you at first.
a. understanding b. understood c. understand
20. He was so tired that he couldn't ... us.
a. to join b. joined c. join
21. We shall ... the results when we finish our experiments.
a. to be discussing b. to discuss c. discuss
22. We ... to the theatre this month.
a. are not b. have not been c. were not
23. – Have you written the letter yet? – No, I haven't. I ... still ... it.
a. have ... written b. am ... writing c. was ... writing
24. When we ... our work we shall go home.
a. shall finish b. will be finished c. finish
25. I ... to the engineer before I read the article about him in the newspaper.
a. had spoken b. have spoken c. spoke
26. Did she ... her plan last month?
a. fulfils b. fulfill c. fulfilled

27. Does your son ... to watch TV?
a. likes b. liked c. like
28. We shall be glad if we ... to take our exams in advance.
a. are allowed b. shall be allowed c. shall have
29. My father ... home at 5 o'clock yesterday.
a. was coming b. has come c. came
30. At 5 o'clock yesterday I ... to the news on the radio.
a. was listening b. listened c. have listened

Какой вспомогательный глагол следует употребить для образования вопросительной формы?

31. It rained hard yesterday.
a. do b. did c. does d. had
32. They had to stay at home.
a. do b. did c. does d. had
33. These students combine work and studies.
a. do b. did c. does d. had
34. He goes on business to St. Petersburg.
a. do b. did c. does d. had
35. I (не был) to my native town since I entered the Institute.
a. was not b. have not been c. had not been
36. He said that a lot of interesting subjects (изучаются) by the students.
a. are studied b. were studied c. are studying
37. He thought that you (занимаетесь) in for swimming.
a. went b. go c. are going
38. Foreign languages (изучаются) by the students.
a. have learnt b. are learnt c. are learning
39. (Умеете) you play tennis?
a. must b. can c. may
40. I (не смогу) to help you.
a. shan't be allowed b. shan't be able c. shan't have
41. They (пришлось, должны были) to take part in the competition.
a. must be b. had c. had to be
42. He (сможет) go skiing.
a. will have to b. will allow c. will be able to
43. We (пришлось) to stay at home because it was raining.
a. were able to b. had to c. could
44. As soon as the classes (окончатся) we shall hurry to the station.
a. will be over b. are over c. will finish
45. We were sure that you (разрешили) the problem.
a. solved b. had solved c. were solved
46. Do you speak (какой-нибудь) foreign language?
a. some b. any c. something
47. (Все) knows him.
a. everything b. somebody c. everybody
48. Did (кто-нибудь) ring me up?
a. somebody b. anybody c. anything
49. This project is the (самый лучший) in our group.
a. better b. best c. worst
50. This flat is (менее) comfortable than yours.
a. worse b. least c. less
51. The 21st of June is the (самый длинный) day in a year.
a. warmest b. longer c. longest
52. Do you hear (что-нибудь)?
a. everything b. something c. anything

53. He did not tell me (ничего).
a. nothing b. something c. anything
54. He rang (никому) up.
a. anybody b. nobody c. somebody
55. (Их) work is not interesting.
a. them b. theirs c. their
56. I can't see (их).
a. them b. they c. their
57. I live in this house. There is a bus stop in front of (ним).
a. him b. it c. its
58. I have not met (его) sister.
a. his b. him c. its
59. (Ее) project is the best in our group.
a. her b. its c. hers
60. I don't hear (его).
a. him b. his c. he

Найдите синонимы или определения к указанным словам:

61. usually
a. as a rule b. seldom c. often
62. to continue
a. to make pleasant b. to go on c. to enjoy
63. to arrive
a. to come b. to visit c. to introduce
64. a number of
a. near b. a few, some c. pleasant
65. to be held
a. to take place b. to go on c. to devote
66. favourable
a. convenient b. extensive c. straight
67. extensive
a. great, wide, large b. improved c. far, further
68. actual
a. active b. recent c. real
69. plenty of
a. a top mark b. an opinion c. a great deal of
70. opinion
a. to put into production b. to pay attention to c. an idea of something or somebody
71. to receive
a. to get b. to divide c. to depend
72. recently
a. a year ago b. not long ago c. sometime later
73. to watch
a. to get interested b. to look attentively c. to devote
74. to leave
a. to attend b. to come in c. to go away

Выберите пары слов - антонимов:

75. a. famous – unknown b. outstanding – good c. thick – white
76. a. to make progress – to forget b. to get light – to get dark c. to be born – to live
77. a. far – near b. eventful – expressive c. happy – favourable
78. a. to be well – to be untidy b. to ask – to answer c. to be glad – to be free
79. a. to read – to agree b. to miss classes – to attend classes c. to translate – to repeat
80. a. to make – to do b. a lot of – few, little c. to combine – to miss
81. a. to learn – to forget b. to do – to finish c. to ask – to discuss

Укажите, с каким словом (или сочетанием слов) могут сочетаться данные ниже.

82. to be interested in
a. something b. somewhere c. some
83. to make
a. development b. an impression c. exercises
84. straight
a. tickets b. streets c. examinations
85. to accept
a. an event b. an invitation c. suburbs
86. to enter
a. an institute b. a journey c. a trip
87. to book
a. a ticket b. reading c. historical events
88. to graduate from
a. a school b. an institute c. a palace
89. conference
a. takes part b. takes place c. busy
90. Выберите вопрос, для образования которого следует употребить вспомогательный глагол do:
a. ... their children study any foreign language?
b. ... the conditions greatly improved by them?
c. ... the plant equipped with up-to-date machinery?
d. ... you meet Mary at the station last night?
91. Why do you have to do this work?
a. Почему вы делаете эту работу? b. Почему вы должны делать эту работу? c. Кто должен делать эту работу?
92. He is often seen in the library.
a. Он часто ходит в библиотеку. b. Его часто видят в библиотеке. c. Он часто видит его в библиотеке.
93. This competition is much spoken about.
a. Поговорим об этом соревновании.
b. Об этом соревновании много говорят. c. Надо много говорить об этом соревновании.
94. There are some fruit trees in our park.
a. В нашем парке есть несколько фруктовых деревьев.
b. Несколько фруктовых деревьев растет в нашем парке.
c. В нашем парке можно увидеть
несколько фруктовых деревьев.
95. Our garden is as large as your park.
a. Наш сад больше вашего парка. b. Наш сад не такой большой, как
ваш парк.
c. Наш сад такой же большой, как ваш парк.
96. We thought that you were going to enter an institute.
a. Мы думали, что вы собираетесь поступать в институт.
b. Мы думали, что вы собирались поступать в институт.
c. Мы думали, что вы пойдете в институт.
97. It is our district that he lives in.
a. Он живет в нашем районе. b. Это наш район, и мы в нем живем. c. Он живет как раз в нашем районе.
98. Выберите правильный вопрос к следующему предложению: The conditions of work were greatly improved.
a. Did they improve the conditions of work?
b. Will the conditions of work be greatly improved?
c. What was greatly improved?

Какое из следующих предложений при переводе на русский язык будет включать относительное местоимение
“который”, вводящее придаточное определительное предложение?
99. a. Which of them deals with this problem?
b. The palace that they visited during their stay in the town made a great impression on them.
c. What questions were you asked?
100. a. The conference we are planning to hold next month will be attended by many foreign scientists.
b. We did not know which of them was the dean.
c. He was going to express his opinion but he was interrupted.

Keys: COMPLEX GRAMMAR TEST 2

1b	11c	21c	31b	41b	51c	61a	71a	81a	91b
2c	12b	22b	32b	42c	52c	62b	72b	82a	92b
3a	13b	23b	33a	43b	53c	63a	73b	83b	93b
4a	14b	24c	34c	44b	54b	64b	74c	84b	94a
5a	15a	25a	35b	45b	55c	65a	75a	85b	95c
6a	16a	26b	36b	46b	56a	66a	76b	86a	96a
7a	17c	27c	37a	47c	57b	67a	77a	87a	97c
8a	18c	28a	38b	48b	58a	68c	78b	88b	98c
9b	19b	29c	39b	49b	59a	69c	79b	89b	99b
10a	20c	30a	40b	50c	60a	70c	80b	90a	100a