



高等职业教育“十一五”精品课程规划教材

DIANZI XINXI ZHUANYE YINGYU

电子信息专业英语

	庄朝蓉	主 编	
余小川	任 敬	赵李春	副主编
		李开柱	主 审



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· 北 京 ·

内 容 简 介

电子信息专业英语作为电子信息类专业的一门专业基础课,很好地突出了高职、高专教学的实用性。本书共 16 个单元,内容包括电子技术、通信技术和计算机技术 3 大板块,涉及电路及电气元件、测量工具、电子器件、集成电路、数字逻辑电路、电源、同步数字系列、密集波分复用系统、环球移动通信系统、码分多址、第三代移动通信技术、非对称数字用户环路、无线网络技术、无线局域网、网络实用技术和计算机网络安全等,基本覆盖了目前电子信息业的技术和业务。在构架上,每个单元包括两篇课文,按难易程度和篇幅分为 Text A 和 Text B,两篇课文后均配以生词、短语及课文注释。在练习的设计上,Text A 注重短语、句子及段落的翻译,Text B 侧重阅读理解。每个单元还包括科技英语翻译技巧及实践。附录包括词汇汇总表、电子信息常用缩略语、课文参考译文和练习参考答案,以方便教师在教学中选用和学生自学。

本书可作为电子信息类大专院校的教材,也可作为英语爱好者从英语角度学习和了解电子信息技术和业务的参考书。

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前 言

随着科技的进步和经济全球化的到来,社会对专业人才的外语能力要求越来越高。电子信息是当今国际、国内发展最迅速、技术更新最活跃的领域之一。

本书为电子信息类高职、高专学生进行专业英语学习而编写,其目的在于使学生通过电子信息专业英语的学习,扩展其在电子信息专业方面的英语词汇量,熟悉该领域的专业术语,了解科技英语的表达特点,掌握专业英语的翻译技巧,从而有利于提高学生的业务素质,并且有利于增强学生在电子信息专业领域的英语应用能力和职业能力,为学生在今后的学习和工作中阅读和翻译电子信息类相关英语专业技术资料作准备。

本书可作为高职、高专电子信息、通信、计算机等专业的教材,也可作为其他电子信息类学生或英语爱好者从英语角度学习和了解电子信息技术和业务的参考书。

本书主要选取国内外优秀教材及专业网站相关英语原文及电子信息新技术、新业务介绍的科普文章,这些文章难度适中,语言流畅,具有较强的专业性和可读性。在选材上,广泛借鉴了传统的相关书籍和教材,并充分考虑到电子信息技术日新月异的发展趋势,选用了与新技术、新业务有关的时文,突出了选材的新颖性。

在编排上基本涵盖了电子信息业的技术和业务领域,包括电气元件、测量工具、电子器件、集成电路、数字逻辑电路、电源、同步数字系列、密集波分复用、环球移动通信系统、码分多址、第三代移动通信技术、非对称数字用户线、无线网络技术、无线局域网、网络实用技术和计算机网络安全等。结合编者多年的专业英语教学实践,本教材练习设计更实用,内容更翔实。考虑到高职、高专学生英语水平差异,各单元课后生词罗列大量词条,加注音标,在给出专业词汇含义的同时,保留部分词条的普通释义,以方便学生温故知新,附录中词汇总表方便学生对单词的记忆和理解。每个单元配以科技英语翻译技巧及实践,突出教学内容的实用性和针对性,满足高职、高专“实用为主,够用为度”的需要。为便于教师教学和读者自学,每篇文章都附有课文注释和参考译文,所有练习配参考答案。

参加本书编写的教师有庄朝蓉、余小川、任敬、赵李春,本书编写的分工如下。

庄朝蓉负责本书的策划和架构设计,并且编写第1~6单元,并对全书进行统稿、校对、修订和排版。余小川编写第7单元、第10~12单元,以及缩略语的整理。任敬编写第13~16单元。赵李春编写第8~9单元。全书的翻译技巧和词汇总表部分由4位老师共同完成。李开柱副教授对全书进行了审阅。

本书是集体智慧的结晶。选材上参照并借鉴了笔者主持的2006年四川省省级精品课程《通信英语》的相关资料和选材思路,为了确保本书内容的翔实、丰富和相关技术、知识的时效性,笔者在编写过程中参考了大量的国内外书籍和专业网站内容,在此对“精品课程”课题组的相关老师和国内外相关资料及网站的文献作者表示由衷的感谢。

北京邮电大学出版社周堃老师对本书的出版给予了鼎力支持和具体指导,在成书过程中得到四川邮电职业技术学院相关领导的支持和李媛等专业课老师无私的帮助,张天科老师和朱鸥老师付出了辛勤的劳动,在此一并表示衷心的感谢。

由于编者的水平与实践经验有限,书中疏漏和错误之处敬请专家和读者批评指正。

编 者

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Unit 1 Circuits and Electrical Components

This unit introduces you to electronic circuits and explains what is meant by current, voltage, and resistance. You can also find out about the important types of components used in building electronic circuits.^[1]

本单元我们要介绍电路并解释什么是电流、电压和电阻。你也可以了解用于构成电子电路的重要电气元件类型。

Text A

Circuits

Current

An electric current is a flow of charged particles. Inside a copper wire, current is carried by small negatively-charged particles, called electrons. The electrons drift in random directions until a current starts to flow. When this happens, electrons start to move in the same direction.^[2] The size of the current depends on the number of electrons passing per second.

Current is represented by the symbol I , and is measured in amperes, or ‘amps’, A . One ampere is a flow of 6.24×10^{18} electrons per second past any point in a wire. That’s more than six million million million electrons passing per second.

In electronic circuits, currents are most often measured in milliamps, mA , that is, thousandths of an amp.

Voltage

In the torch circuit, what causes the current to flow? The answer is that the cells provide a ‘push’ which makes the current flow round the circuit.^[3]

Each cell provides a push, called its potential difference, or voltage. This is represented by the symbol U , and is measured in volts, V .

Typically, each cell provides 1.5 V . Two cells connected one after another, in series, provide 3 V , while three cells would provide 4.5 V :

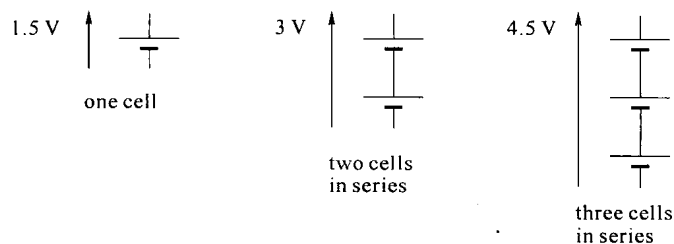


Fig. 1-1 Cells in Series

Cells connected in series

Which arrangement would make the lamp glow most brightly? Lamps are designed to work with a particular voltage, but, other things being equal, the bigger the voltage, the brighter the lamp. [4]

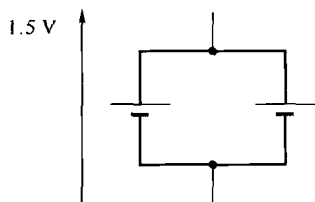


Fig. 1-2 Cells in Parallel

Strictly speaking, a battery consists of two or more cells. These can be connected in series, as is usual in a torch circuit, but it is also possible to connect the cells in parallel, like this:

Cells connected in parallel

A single cell can provide a little current for a long time, or a big current for a short time. Connecting the cells in series increases the voltage, but does not affect the useful life of the cells. On the other hand, if the cells are connected in parallel, the voltage stays at 1.5 V, but the life of the battery is doubled.

A torch lamp which uses 300 mA from C-size alkaline cells should operate for more than 20 hours before the cells are exhausted.

Resistance

Part of the torch circuit limits, or resists, the flow of current. Most of the circuit consists of thick metal conductors which allow current to flow easily. These parts, including the spring, switch plates and lamp connections, have a low resistance. The lamp filament, on the other hand, is made up of very thin wire. It conducts much less easily than the rest of the circuit and has a higher resistance. [5]

The resistance, R , of the filament is measured in ohms, Ω . If the battery voltage is 3 V (2 C-size cells in series) and the lamp current is 300 mA, 0.3 A, what is the resistance of the filament? This is calculated from:

$$R = \frac{U}{I} = \frac{3}{0.3} = 10 \Omega$$

where R is resistance, U is the voltage across the lamp, and I is current. In this case, 10Ω is the resistance of the lamp filament once it has heated up.

Resistance values in electronic circuits vary from a few ohms, Ω , to values in kilohms, $k\Omega$, (thousands of ohms) and megohms, $M\Omega$, (millions of ohms). Electronic components designed to have particular resistance values are called resistors.

Words and Expressions

component [kəm'pəʊnənt] *n.* 零件, 元件, 成分

circuit [ˈsɜ:kɪt] *n.* 电路, 巡回, 一圈

current [ˈkʌrənt] *n.* 流动, 气流, 水流; 电流

voltage [ˈvɒltɪdʒ] *n.* 电压

resistance [rɪˈzɪstəns] *n.* 电阻

- electric [i'lektɹɪk] *n.* 导电的, 电动的, 电的
- charge [tʃɑ:dʒ] *n.* 费用; 电荷 *v.* 收费; 充电, 使带电
- particle ['pɑ:tɪkl] *n.* 粒子, 极小量, 点
- negative ['negətɪv] *adj.* 否定的, 负的, 消极的
- drift [drɪft] *n.* 漂流; 漂移 *v.* 漂, 漂流; 漂移
- random ['rændəm] *adj.* 任意的, 随便的
- symbol ['sɪmbl] *n.* 符号, 象征, 记号
- ampere ['æmpeə] *n.* 安培
- tiny ['taɪni] *adj.* 很少的, 微小的
- switch [swɪtʃ] *n.* 开关, 转换; 电闸 *v.* 转换, 转变, 变换
- terminal ['tɜ:mɪnəl] *n.* 终端, 末端 *adj.* 终端的, 末端的
- negative ['negətɪv] *n.* 否定, 负数 *adj.* 否定的, 负的
- flow [fləu] *n.* 水流, 电流, 气流, 流动 *v.* 流动
- filament ['fɪləmənt] *n.* 细丝, 灯丝
- blow [bləu] *n.* 吹动, 吹气 *v.* 吹, 刮; 随风飘动
- potential [pəʊtenʃl] *n.* 潜在性, 可能性 *adj.* 有潜力的, 潜在的, 可能的
- difference ['dɪfrəns] *n.* 差异; 分歧; 差别
- double [dʌbl] *n.* 两倍 *v.* 使加倍 加倍 *adj.* 两倍的; 双重的 *adv.* 双倍地; 双重地
- exhaust [ɪg'zɔ:st] *v.* 用尽; 抽完; 耗尽
- positive ['pɒzətɪv] *n.* 正面; 正数 *adj.* 肯定的, 积极的, 正极的
- resist [rɪ'zɪst] *v.* 抵抗, 抗拒, 反抗
- design [dɪ'zain] *n.* 设计 *v.* 设计; 计划
- glow [gləu] *v.* 发红光, 发热, 发亮
- vary ['veri/'veər-] *v.* 改变, 变更; 变化
- find out *v.* 找出, 发现, 揭示, 了解
- make up *v.* 弥补, 形成
- in series 串联
- in parallel 平行, 并联
- strictly speaking 严格地说
- consist of 由……组成
- be made up of 由……组成
- depends on 取决于

Notes

[1] You can also find out about the important types of components used in building electronic circuits.

此句可译为: 你也可以了解用于构成电子电路的重要电气元件类型。

此句是简单句, “used in building electronic circuits” 为过去分词做后置定语修饰 components。在科技英语中, 此类分词短语用做后置定语的情况频繁使用。

[2] When this happens, electrons start to move in the same direction.

此句可译为:当电流流动时,电子开始朝一个相同的方向移动。

句中 When this happens 意指上句中的 a current starts to flow,即“当电流流动时”。

[3] The answer is that the cells provide a ‘push’ which makes the current flow round the circuit.

此句可译为:答案是电池单元提供一个“推力”让电流在电路中环形。

句中 that 引导表语从句, which makes the current flow round the circuit 为定语从句,修饰先行词 push。

[4] Lamps are designed to work with a particular voltage, but, other things being equal, the bigger the voltage, the brighter the lamp.

此句可译为:灯泡是设计成工作在特定电压下的,但是当其他条件相同时,电压越高,灯泡就越亮。

句中“other things being equal”为分词的独立主格结构做状语,“the bigger the voltage, the brighter the lamp.”可译为“电压越高,灯泡越亮。”英语中“the more..., the more...”结构用于表示随着前事物的变化,后事物呈相应的变化,翻译为“越……,越……”。

[5] It conducts much less easily than the rest of the circuit and has a higher resistance.

此句可译为:它(灯泡的灯丝)比电路的其他部分更不容易传导电流,也具有更高的电阻。

句中 it 指代上句中提到的 the lamp filament。

Exercises

1. Put the following phrases into English

- (1) 电气元件
- (2) 电子电路
- (3) 随机漂移
- (4) 度量单位为安培
- (5) 带电荷的粒子流
- (6) 电势差
- (7) 金属导体
- (8) C-型碱性电池
- (9) 串联
- (10) 并联

2. Put the following phrases into Chinese

- (1) components used in building electronic circuits
- (2) small negatively-charged particles
- (3) represented by the symbol I
- (4) move in the same direction
- (5) the number of electrons passing per second
- (6) make the current flow round the circuit

- (7) work with a particular voltage
- (8) strictly speaking
- (9) connecting the cells in series
- (10) switch plates

3. Translate the following sentences into Chinese

- (1) You can also find out about the important types of components used in building electronic circuits.
- (2) An electric current is a flow of charged particles.
- (3) The electrons drift in random directions until a current starts to flow.
- (4) The size of the current depends on the number of electrons passing per second.
- (5) Other things being equal, the bigger the voltage, the brighter the lamp.
- (6) Strictly speaking, a battery consists of two or more cells.
- (7) Connecting the cells in series increases the voltage, but does not affect the useful life of the cells.
- (8) Most of the circuit consists of thick metal conductors which allow current to flow easily.
- (9) Electronic components designed to have particular resistance values are called resistors.
- (10) It conducts much less easily than the rest of the circuit and has a higher resistance.

4. Translate the following paragraphs into Chinese

(1) Series and Parallel Connections

There are two ways of connecting components;

In series, each component has the same current. The battery voltage is divided between the two lamps. Each lamp will have half the battery voltage if the lamps are identical.

In parallel, each component has the same voltage. Both lamps have the full battery voltage across them. The battery current is divided between the two lamps.

(2) Resistance values in electronic circuits vary from a few ohms, Ω , to values in kilohms, $k\Omega$, (thousands of ohms) and megohms, $M\Omega$, (millions of ohms). Electronic components designed to have particular resistance values are called resistors.

Text B

Electrical Components

Resistors

A resistor is an electrical component that resists the flow of electrical current. The amount of current (I) flowing in a circuit is directly proportional to the voltage across it and inversely proportional to the resistance of the circuit^[1]. This is Ohm law and can be expressed as

a formula: $I = \frac{U_R}{R}$. The resistor is generally a linear device and its characteristics form a straight line when plotted on a graph.

Resistors are used to limit current flowing to a device, thereby preventing it from burning out, as voltage dividers to reduce voltage for other circuits, as transistor biasing circuits, and to serve as circuit loads^[2].

Capacitors

Electrical energy can be stored in an electric field. The device capable of doing this is called a capacitor or a condenser.

A simple condenser consists of two metallic plates separated by a dielectric. If a condenser is connected to a battery, the electrons will flow out of the negative terminal of the battery and accumulate on the condenser plate connected to that side. At the same time the electrons will leave the plate connected to the positive terminal and flow into the battery to make the potential difference just the same as that of the battery^[3]. Thus the condenser is said to be charged.

To discharge the condenser the external circuit of these two plates is completed by joining terminals together with a wire. The electrons start moving from one plate to the other through the wire to restore electrical neutrality.

Inductors

An inductor is an electrical device, which can temporarily store electromagnetic energy in the field about it as long as current is flowing through it^[4]. Also, inductors are wound with various sizes of wire and in varying numbers of turns which affect the dc resistance of the coil. Later, you will study how the resistance affects inductor operation in certain ac circuit applications.

Excellent information is available about the details of winding coils to desired specifications in The Radio Amateur's Handbook published by the American Radio Relay League (ARRL)^[5]. Also there are numerous inexpensive special slide rules that allow you to establish required parameters and to read the number of turns, coil length, coil diameter, and so on, needed for the desired results.

Words and Expressions

resistor [ri'zistə(r)] *n.* 电阻器

electrical [i'lektrikl] *adj.* 与电有关的, 电气科学的; 电的

proportional [prə'pɔ:ʃnəl] *adj.* 比例的, 成比例的

directly proportional [数] 成正比(的)

inversely proportional [数] 成反比(的)

formula ['fɔ:mjulə] *n.* 公式; 规则

linear ['liniə(r)] *adj.* 线的, 线性的, 直线的

- device [dɪ'vaɪs] *n.* 装置;图案;设计
- characteristics [数] 特征,特征线
- form [fɔ:m] *n.* 形状,形式,表格 *v.* 形成;构成
- plot [plɒt] *n.* 图,地区图 *v.* 划分,绘图
- graph [grɑ:f] *n.* 图;图表 *v.* 用图表表示
- limit ['lɪmɪt] *n.* 界限;限制;限度 *v.* 限制;限定
- thereby *adv.* 因此,从而
- load [ləʊd] *n.* 负荷;装载量 *v.* 装载;负载
- capacitor [kə'pæsɪtə] *n.* 电容器
- condenser [kən'densə] *n.* 缩写者;电容器;冷凝器
- metallic [mɪ'tælk] *adj.* 金属的,含金属的
- plate [pleɪt] *n.* 图版,金属板
- dielectric [dai'lektrɪk] *n.* 电介质;绝缘体 *adj.* 非传导性的
- negative terminal [计] 负端
- accumulate [ə'kjʊ:mjuːleɪt] *v.* 积聚,累积;积攒
- positive terminal [电] 正端
- discharge [dɪs'tʃɑ:dʒ] *n.* 卸货;放电 *v.* 卸下,卸货;放电
- external [eks'tɜ:nl] *n.* 外部;外面 *adj.* 外部的,表面的
- restore [rɪ'stɔ:ɪ] *v.* 恢复;使复原;修复
- neutrality [nu:'træləti/nju:-] *n.* 中立,中间状态
- inductor [ɪn'dʌktə(r)] *n.* 电感器,感应器
- temporarily *adv.* 暂时地,临时地
- field [fi:ld] *n.* 领域,范围 *adj.* 田间的;野外的
- wound [waʊnd,wu:nd] *wind* 的过去分词,上发条,缠绕
- coil [kɔɪl] *n.* 卷,圈;线圈 *v.* 卷,盘绕;把……卷成圈
- application [æpli'keɪʃn] *n.* 申请;要求;运用;适用
- available [ə'veɪləbl] *adj.* 有空的,有用的
- specification [spesɪfɪ'keɪʃn] *n.* 规格,详细说明书,详述
- slide [slɑɪd] *n.* 滑,滑道 *v.* 滑,滑落;使滑动,使滑行
- parameter [pə'ræmɪtə(r)] *n.* 参数,参量;界限;因素

Notes

[1] The amount of current (I) flowing in a circuit is directly proportional to the voltage across it and inversely proportional to the resistance of the circuit.

此句可译为:在电阻器中流过的电流与加在电阻两端的电压成正比,与电阻的阻值成反比。

此句是简单句,“flowing in a circuit”为现在分词做后置定语修饰 current。

directly proportional to 成正比(的);inversely proportional to 成反比(的)。

[2] Resistors are used to limit current flowing to a device, thereby preventing it from burning out, as voltage dividers to reduce voltage for other circuits, as transistor biasing circuits, and to serve as circuit loads.

此句可译为:电阻器常用做限流器,限制流过器件的电流以防止器件因流过的电流过大而烧坏。电阻器也可用做分压器,以减小其他电路的电压,如晶体管偏置电路。电阻器还可用作电路的负载。

此句是简单句,谓语部分采用了动词的被动语态。科技英语中大量使用被动语态。

are used to 在此处指“被用于做什么”; as 表示“用于,作为”。

[3] At the same time the electrons will leave the plate connected to the positive terminal and flow into the battery to make the potential difference just the same as that of the battery.

此句可译为:同时与电源正极相接的极板上的电子将离开极板流入电池正极,这样两极板上就产生了与电池上相等的电位差。

句中“connected to the positive terminal”为过去分词短语用做后置定语,修饰 plate, “just the same as that of the battery”中的“that”在此处替代的是“potential difference”。

[4] An inductor is an electrical device, which can temporarily store electromagnetic energy in the field about it as long as current is flowing through it.

此句可译为:当电流流过电感器时,电感器周围就有电磁场,电感器是以电磁场的形式暂时储存电磁能量的电子器件。

此句为复合句。句中 which 引导了一个非限制性定语从句,对前面内容进行解释说明; “as long as”意思是“只要”,引导条件状语从句。

[5] Excellent information is available about the details of winding coils to desired specifications in The Radio Amateur's Handbook published by the American Radio Relay League (ARRL).

此句可译为:在业余无线电手册中有满足所需的技术条件绕制线圈的详尽资料。

句中“of winding coils to desired specifications”为介词后跟动名词短语,在句中修饰 details。

The Radio Amateur's Handbook published by the American Radio Relay League (ARRL): 业余无线电手册。

Exercises

Mark the following statements with T(true) or F(false) according to the text

- (1) The amount of current flowing in a circuit is inversely proportional to the voltage across it and directly proportional to the resistance of the circuit. ()
- (2) Resistors are used to limit current flowing to a device. ()
- (3) Electrical energy cannot be stored in an electric field. ()
- (4) A simple condenser consists of two metallic plates separated by a dielectric. ()

(5) If a condenser is connected to a battery, the electrons will flow out of the positive terminal of the battery and accumulate on the condenser plate connected to that side. ()

(6) To discharge the condenser the external circuit of these two plates is completed by joining terminals together with a wire. ()

(7) The electrons start moving from one plate to the other through the wire to restore electrical neutrality. ()

(8) An inductor is an electrical device, which can permanently store electromagnetic energy in the field about it as long as current is flowing through it. ()

(9) Excellent information is available about the details of winding coils to desired specifications in The Radio Amateur's Handbook published by the American Radio Relay League (ARRL). ()

(10) A resistor is an electrical component that enhances the flow of electrical current. ()

Translating Skill 1

派生词的翻译(一)

电子信息专业英语词汇有相当一部分以派生词法构成。所谓派生词法这里指词根加上前缀和后缀形成的词。大部分词缀都源于拉丁语和希腊语。掌握词缀及其派生词的翻译要点,对准确迅速地译出电子信息类专业原文有很大帮助。

本单元和下单元的翻译技巧将分别介绍电子信息工作人员必须掌握的主要词缀和汉译:

1. 形容词词缀

词 缀	译 义	词 例	译 义
in-	不,非	insufficient	不足的
im-	不,非	incompatible	不兼容的
un-	不,非	unstable	不稳定的
super-	上,超,过	supersonic	超音速的
-ive	……的,有……作用的	reactive	电抗性的
-ar	……状的,……特性的	linear	线性的
-ic	具有……性质的	electronic	电子的
-ous	有……特性的,像……的	synchronous	同步的
-proof	防……的	fireproof	防火的