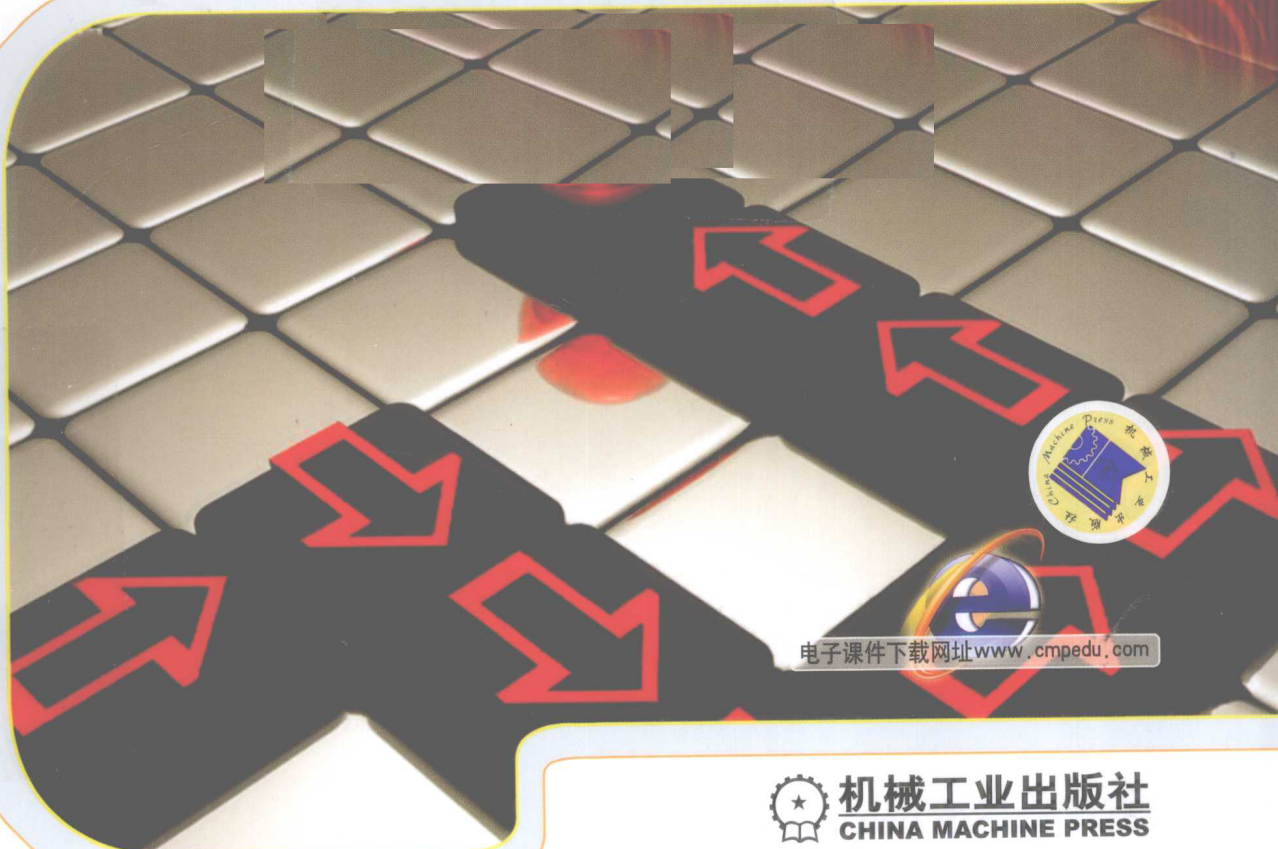




全国高等职业教育规划教材

电子与通信工程 专业英语

徐存善 主编



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全国高等职业教育规划教材

电子与通信工程专业英语

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本书由电子技术基础、通信技术、计算机技术和电子与通信工程四部分组成,共有 26 个单元。每单元包括课文、生词与短语、注释、练习、翻译技巧和阅读材料,内容多取材于原版的专业资料或专业英语教科书,语言真实地道,内容生动新颖,联系职业实际,应用性强,有助于从不同侧面有针对性地培养学生的专业英语实用技能,提高学生阅读和翻译英文技术文献与专业资料的能力,以及在一定场景下用英语进行交流的能力。书后附有部分习题答案和参考译文,便于帮助学生理解和检查自己所掌握的内容,在一定程度上减轻了学习的难度。

本书适合高职高专(含成人教育学院)电子技术、电子通信类专业和计算机控制等专业的学生使用,也可供相关专业的工程技术人员参考学习,或作为中等职业学校相关专业的学生用书。

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出版说明

根据“教育部关于以就业为导向深化高等职业教育改革的若干意见”中提出的高等职业院校必须把培养学生动手能力、实践能力和可持续发展能力放在突出的地位，促进学生技能的培养，以及教材内容要紧密结合生产实际，并注意及时跟踪先进技术的发展等指导精神，机械工业出版社组织全国近 60 所高等职业院校的骨干教师对在 2001 年出版的“面向 21 世纪高职高专系列教材”进行了全面的修订和增补，并更名为“全国高等职业教育规划教材”。

本系列教材是由高职高专计算机类专业、电子类专业和机电类专业教材编委会分别会同各高职高专院校的一线骨干教师，针对相关专业的课程设置，融合教学中的实践经验，同时吸收高等职业教育改革的成果而编写完成的，具有“定位准确、注重能力、内容创新、结构合理和叙述通俗”的编写特色。在几年的教学实践中，本系列教材获得了较高的评价，并有多个品种被评为普通高等教育“十一五”国家级规划教材。在修订和增补过程中，除了保持原有特色外，针对课程的不同性质采取了不同的优化措施。其中，核心基础课程的教材在保持扎实的理论基础的同时，增加实训和习题；实践性较强的课程强调理论与实训紧密结合；涉及实用技术的课程则在教材中引入了最新的知识、技术、工艺和方法。同时，根据实际教学的需要对部分课程进行了整合。

归纳起来，本系列教材具有以下特点：

- 1) 围绕培养学生的职业技能这条主线来设计教材的结构、内容和形式。
- 2) 合理安排基础知识和实践知识的比例。基础知识以“必需、够用”为度，强调专业技术应用能力的训练，适当增加实训环节。
- 3) 符合高职高专学生的学习特点和认知规律。对基本理论和方法的论述容易理解、清晰简洁，多用图表来表达信息；增加相关技术在生产中的应用实例，引导学生主动学习。
- 4) 教材内容紧随技术和经济的发展而更新，及时将新知识、新技术、新工艺和新案例等引入教材。同时注重吸收最新的教学理念，并积极支持新专业的教材建设。
- 5) 注重立体化教材建设。通过主教材、电子教案、配套素材光盘、实训指导和习题及解答等教学资源的有机结合，提高教学服务水平，为高素质技能型人才的培养创造良好的条件。

由于我国高等职业教育改革和发展的速度很快，加之我们的水平和经验有限，因此在教材的编写和出版过程中难免出现问题和错误。我们恳请使用这套教材的师生及时向我们反馈质量信息，以利于我们今后不断提高教材的出版质量，为广大师生提供更多、更适用的教材。

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前 言

随着科技进步和社会的发展,我国对专业人才英语能力的要求越来越高。电子与通信工程是当今世界发展最迅速、技术更新最活跃的领域之一。我国在该领域注重引进世界先进技术和设备,同时要发展和创造外向型经济,因此该领域对具有专业英语能力人才的需求比以往任何时候都更加迫切。为了更好地培养学生的专业外语能力,促进具有国际竞争力的人才培养,我们在追求通俗易懂、简明扼要、便于教学和自学的指导思想下编写了这本《电子与通信工程专业英语》。

全书由四部分组成,即电子技术基础、通信技术、计算机技术和电子与通信工程。内容多取材于原版的专业资料或专业英语教科书,基本涵盖了电子技术基础、仪器仪表使用与维护、计算机技术应用、网络与多媒体技术、通信技术等领域,同时还收录了一些电子信息技术发展前沿的文章,如遥感技术、数字信号处理、电路仿真、数字电视、3G 技术、GPS 等。课文内容丰富、题材广泛,语言通俗地道,能满足大多数学生对专业英语的学习需求。

本书共 26 个单元,每单元包括课文、生词、专业术语、课文注释、翻译技巧和阅读材料。在最后 6 个单元中,用相当篇幅分别介绍了英语网站注册申请、中外著名电子信息公司、英语招聘广告的阅读、个人简历和求职信的书写、面试技巧等,目的是使毕业生在外资或合资企业的就业竞争中能胜人一筹。附录部分汇编了 8 个单元职业现场的交际对话、各单元的参考译文与部分习题答案(为了培养学生的独立阅读能力,部分阅读材料的参考译文和习题答案只在电子教案中给出)、生词表、常用专业术语缩略语等内容。

本书可作为高职高专应用电子技术、计算机控制与应用、网络与多媒体技术以及通信技术等专业的英语教材。每单元参考学时为 2~3 学时。建议教师根据学生的接受能力和本校学时情况选用本书 15~20 个单元的内容,同时配合生动活泼、灵活多样的互动式教学与课后练习讨论,多方位培养学生的专业英语兴趣与应用能力。对于教师在授课中没有选入的单元,学生可根据自己的学习兴趣自学,以拓宽专业英语的知识面。

本书由河南工业职业技术学院徐存善副教授主编。编写分工为:徐存善编写第 1~4 单元和附录 C;王美娥编写第 5~8 单元;薛红勤编写第 9 单元和附录 A;王存才编写第 10 单元;乔竞宇编写第 11 单元;赵莹编写第 12 单元;郭静编写第 13 单元;高玲编写第 14~16 单元;杨文铂编写第 17 单元和附录 D;席东河编写第 18、19 两个单元;赵转莉编写第 20~22 单元;谭胡心编写第 23 单元;唐红莲编写第 24~26 单元;附录 B 中各单元参考译文和习题答案分别由相应作者提供。

本书的编审工作得到了编者所在院校领导的高度重视与大力支持。齐智英教授、刘明黎主任为本教材的编写提出了宝贵意见,在此一并表示衷心的感谢。

由于时间仓促,加上编者水平有限,书中难免有不足之处,恳请广大读者批评指正。

编 者

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Chapter I Fundamentals of Electronics Technology

Unit 1 Current, Voltage and Resistance

Text

The primary purpose of an electric circuit is to move or transfer charges along specified paths.^[1] This motion of charges constitutes an electric current. Current flow is represented by the letter symbol I , and it is the time rate of change of charge, given by $I = dq / dt$. The basic unit in which current is measured is ampere (A). An ampere of current is defined as the movement of one coulomb (6.28×10^{18} electrons) past any point of a conductor during one second of time.^[2] The milliampere (mA) and the microampere (μ A) units are also used to express a magnitude of current much smaller than the ampere. One milliampere is equivalent to one-thousandth of an ampere, and one microampere is equivalent to one-millionth of an ampere.

We shall define voltage “across” an element as the work done in moving a unit charge (+1 C) through the element from one terminal to the other. The term voltage (represented by the letter symbol U) is commonly used to indicate both a potential difference and an electromotive force. The unit in which voltage is measured is volt (V).^[3] One volt is defined as that magnitude of electromotive force required cause a current of one ampere to pass through a conductor having a resistance of one ohm.^[4] Besides the volt, smaller or larger magnitude of voltage are expressed in millivolts (mV), microvolts (μ V) or kilovolts (kV).

Resistors restrict the flow of electric current, for example, a resistor is placed in series with a light-emitting diode (LED) to limit the current passing through the LED.^[5] The value of resistor is called resistance and is represented by the letter symbol R . Resistance is measured in ohms; the symbol of ohm is omega (Ω). One ohm is defined as that amount of resistance that will limit the current in a conductor is one ampere when the voltage applied to the conductor is one volt.^[6] 1Ω is quite small, so resistor values are often given in kilohm ($k\Omega$) or megohm ($M\Omega$)

“Ohm’s Law” is one of the fundamental laws of electronics, and pertains to the relationship between current, voltage and resistance in an electrical conductor. This relationship states that “Current=Voltage / Resistance”. Ohm’s Law states that the ratio of the voltage between the ends of a wire and the current flowing in it is equal to the resistance of the wire. The usual way of expressing this in mathematical terms is “ $I = U / R$ ”, and “ $U = IR$ ” or “ $R = U / I$ ” are also used.

New words and phrases

- current ['kʌrənt] *adj.* 现在的; 通用的 *n.* 趋势; (水、气、电) 流
constitute ['kɒnstɪtju:t] *vt.* 组成, 构成; 任命; 建立
represent [ˌreprɪˈzent] *vt.* 表现; 代表; 表示 *vi.* 提出异议; 代表
voltage ['vɒltɪdʒ] *n.* 电压
diode ['daɪəʊd] *n.* 二极管
circuit ['sə:kɪt] *n.* 电路
transfer [trænsˈfɜ:] *vt.* 转移, 移动
charge [tʃɑ:dʒ] *n.* 费用; 负载; 电荷 *vt.* 使充电 *vi.* 索价; 充电
specify ['spesɪfaɪ] *vt.* 指定; 列举; 详细说明; 把……列入说明书
symbol ['sɪmbəl] *n.* 符号; 象征
ampere ['æmpɪə] *n.* 安[培]
milliampere [ˌmɪliˈæmpɪə] *n.* 毫安
microampere ['maɪkrəʊˈæmpɪə] *n.* 微安
coulomb ['ku:lɒm] *n.* 库[仑]
magnitude ['mægnɪtju:d] *n.* 数量, 大小
element ['elɪmənt] *n.* 元素, 元件
terminal ['tɜ:mɪnəl] *n.* 终端; 接线端
ohm [əʊm] *n.* 欧[姆]
megohm ['megəʊm] *n.* 兆欧[姆]
millivolt ['mɪlɪvɒlt] *n.* 毫伏[特]
microvolt ['maɪkrəʊvɒlt] *n.* 微伏
kilovolt ['kɪləʊvɒlt] *n.* 千伏[特]
pertain [pəˈteɪn, pə-] *vi.* 适合; 属于; 关于
resistor [rɪˈzɪstə] *n.* 电阻器
ratio ['reɪʃiəʊ, -ʃəʊ] *n.* 比, 比率
be represented by 用……表示
be equivalent to 等于
in series with 和……串联
pertain to 适合于

Technical Terms

- electric circuit 电子线路
electric current 电流
potential difference 电位差
electromotive force 电动势
light-emitting diode (LED) 发光二极管
Ohm's Law 欧姆定律

Notes

[1] The primary purpose of an electric circuit is to move or transfer charges along specified paths.

译文：电路的主要作用是沿着特定路径移动或传送电荷。

说明：句中两个表示选择关系的不定式短语作表语。

transfer 除用作动词外，还可以用作名词。作名词的相关词组如下：

data transfer 数据传送；数据转换；数据传输；资料传输

bulk transfer 大额股票转名；散装转运；块传输；批量传输

file transfer 文件传输；档案传输；文件传送；文件转移

Translation is not simply a transfer of language pattern but that of culture pattern and the process of culture exchange. 翻译的过程不仅是语言模式的转换，还是文化模式及文化交流的转换。

[2] An ampere of current is defined as the movement of one coulomb (6.28×10^{18} electrons) past any point of a conductor during one second of time.

译文：1A 电流的定义是：在 1s 内 1C(6.28×10^{18} 个电子)电量通过导体的任何一点时的电流。

[3] The unit in which voltage is measured is volt (V).

译文：度量电压的单位是伏[特](V)。

说明：句中 in which voltage is measured 是介词+关系代词引导的定语从句，修饰 unit。

[4] One volt is defined as that magnitude of electromotive force required cause a current of one ampere to pass through a conductor having a resistance of one ohm.

译文：使 1A 电流流过电阻为 1Ω 的导体所需的电动势定义为 1V。

说明：句中 required 充当后置定语，修饰 electromotive force；having a resistance of one ohm 是现在分词短语作后置定语，修饰 conductor。

magnitude 意思是“量，量值”，如：DC magnitude 直流幅度。

We actually do use the duration of shaking to estimate the magnitude for some small earthquakes. 我们的确会使用震动持续时间来估计一些小型地震的震级。

[5] For example, a resistor is placed in series with a light-emitting diode (LED) to limit the current passing through the LED.

译文：比如，与发光二极管(LED)串联的电阻器限制了流过 LED 的电流。

说明：句中，in series 是介词短语作方式状语。

[6] One ohm is defined as that amount of resistance that will limit the current in a conductor is one ampere when the voltage applied to the conductor is one volt.

译文： 1Ω 的定义是：1V 的电压施加在导体上产生 1A 的电流所对应的导体的电阻值。

说明：句中，第二个 that 引导定语从句，修饰 amount of resistance，when 引导时间状语从句。

be defined as 表示“被定义为”，如：

Inventory can be defined as “stocks used to support production, support activities and customer service”. 库存定义为支持生产、经营以及客户服务的存储。

Exercises

I. Answer the following questions according to the text.

1. What forms an electric current?
2. Which symbol is used to indicate both a potential difference and an electromotive force?
3. Besides the volt, what are expressed in millivolts (mV), microvolts (μV) or kilovolts (kV) ?
4. How is a resistor placed with a light-emitting diode (LED) to restrict the current passing through the LED?
5. Can you describe the Ohm's Law? What is it?

II. Decide whether the following statements are true (T) or false (F) according to the text.

1. The flow of electrons through a conductor is called an electric current.
2. The term voltage is usually used to show a potential difference but not electromotive force.
3. One millivolt is equivalent to one-thousandth (0.001) of a volt, and one microvolt is equivalent to one-billionth (0.000000001) of a volt.
4. $1\ \Omega$ is quite small so resistor values are often given in kilohm ($\text{k}\Omega$) or microohm ($\mu\Omega$).
5. Ohm's Law expresses that the ratio of the voltage between the ends of a wire and the current flowing in it equals the resistance of the wire.
6. The unit in which resistance is measured is ohm (Ω).

III. Choose the best answer for the following sentences.

1. Electrons, as one knows, are minute (微小的) _____ charges of electricity.
A. reverse B. positive C. negative
2. The unit of voltage, or potential difference, as _____ is sometimes called, is the volt.
A. who B. they C. it
3. The switch, resistor(电阻器) and wire _____ a circuit.
A. made of B. are composed of C. constitute
4. Matter is made up of atoms, which _____ a number of fundamental particles.
A. are composed of B. comprised C. compose of
5. The flow of electrons _____ electric current.
A. is made up of B. makes up C. consist of
6. A resistor is an electrical component that _____ the flow of electrical current.
A. increases B. resists C. changes
7. The electromotive force or EMF is measured _____ Volts.
A. in B. on C. at
8. "Ohm's Law" _____ the relationship between current, voltage and resistance in an electrical conductor.
A. pertains to B. state C. described

IV. Translate the following sentences into English.

1. 电压这个术语常用来表示电位差和电动势。
2. 电阻器的大小叫电阻。
3. 沿指定路径移动或传送电荷就形成电流。
4. 欧姆定律是电子学中最基本的定律之一。

Translating Skills

科技英语翻译的标准与方法

翻译是一种再创造，即译者根据原作者的思想，用另一种语言表达出原作者的意思。这就是要求译者必须确切理解和掌握原作的内容与含意，在确切理解的基础上，很好地运用译文语言把原文的内涵通顺流畅地再现给读者。

1. 翻译的标准

科技英语的翻译标准可概括为“忠实、通顺”四个字。

忠实，首先指忠实于原文内容，译者必须把原作的内容完整而准确地表达出来，不得任意发挥或增删；忠实还指保持原作风格，尽量表现其本来面目。

通顺，即指译文语言必须通俗易懂，符合规范。

忠实与通顺是相辅相成的，缺一不可。忠实而不通顺，读者会看不懂；通顺而不忠实，脱离原作的内容与风格，通顺就失去了意义。例如：

The electric resistance is measured in ohms.

误译：电的反抗是用欧姆测量的。

正译：电阻的测量单位是欧姆。

All metals do not conduct electricity equally well.

误译：全部金属不导电得相等好。

正译：并非所有的金属都同样好地导电。

The moment the circuit is completed, a current will start flowing the coil.

正译：电路一旦接通，电流开始流向线圈。

Some special alloy steels should be used for such parts because the alloying elements make them tougher, stronger, or harder than carbon steels.

正译：对这类零件可采用某些特殊的合金钢，因为合金元素能提高钢的韧性、强度、硬度。

从以上例句可以清楚地看到，不能任意删改，并不是逐词死译；汉语译文规范化，并非是离开原文随意发挥。此外，还应注意通用术语的译法。比如，例 1 中的“电阻”已成为固定词组，不能用别的译法。

2. 翻译的方法

翻译的方法一般来说有直译 (literal translation) 和意译 (free translation)。直译，即指“既忠实于原文内容，又忠实于原文的形式”的翻译；意译，就是指忠实于原文的内容，但不拘泥于原文的形式。

翻译时应灵活运用上述两种方法，能直译的就直译，需要意译的就意译。对同一个句子来说，有时并非只能用一种方法，可以交替使用或同时并用以上两种方法。

请看下面的例子。

Milky Way 应译为“银河”(意译),不可直译为“牛奶路”。

bull's eye 应译为“靶心”(意译),不可直译为“牛眼睛”。

New uses have been found for old metals, and new alloys have been made to satisfy new demands. 老的金属有了新用途,新的金属被冶炼出来,以满足新的需要(本句前半部分用了意译法,后半部分用了直译法)。

The ability to program these devices will make a student an invaluable asset to the growing electronic industry. 编程这些器件的能力将使学生成为日益增长的电子工业领域中的无价人才(这里 asset 原意为“资产”,根据上下文意译成“人才”)。

3. 翻译中的专业性特点

科学技术本身的性质要求科技英语与专业内容相互配合,相互一致,这就决定了专业英语与普通英语有很大的差异。专业英语以其独特的语体,明确表达作者在其专业方面的见解,其表达方式直截了当,用词简练。即使同一个词,在不同学科的专业英语中,其涵义也是不同的。例如:

The computer took over an immense range of tasks from workers muscles and brains.

误译:计算机代替了工人大量的肌肉和大脑。

正译:计算机取代了工人大量的体力和脑力劳动。

(这里 muscles and brains 引申为“体力和脑力劳动”。)

Vibration has worked some connection lose.

误译:振动影响了一些连接的松弛。

正译:振动使一些接线松了。

(connection 可以意译为“接线”或“连接线”。)

In any case work doesn't include time, but power does.

正译:在任何情况下,功不包括时间,但功率包括时间。

(这里 work、power 在物理专业分别译为“功”、“功率”。)

Like charges repel each other while opposite charges attracted.

正译:同性电荷相排斥,异性电荷相吸引。

(charge 含义有“负载、充电、充气、电荷”,按专业知识理解为“电荷”。)

从以上例句可知,专业英语专业性强,逻辑性强,翻译要力求准确、精练、正式。这不仅要求我们能熟练地运用汉语表达方式,还要求具有较高的专业水平。

Reading

Conductors, Insulators and Semiconductors

Any substance, which allows electrons to flow freely through its structure, is called a conductor. In general, metals are good conductors. A definite relationship exists between good conductors and their atomic structures. In good conductors, the outer-ring electrons, which are also called valence electrons, may be released from their orbits with relative ease. Atom with 1, 2 and 3 outer ring electrons, and therefore most metals are good conductors.

Substances which prevent the passage of electrons through their structures are called insulators. Insulators have very few easily removed electrons in their outer rings. There are no

perfect insulators: first, because of the presence of impurities (foreign materials) which can never be entirely removed; and second, because even a small amount of heat will cause a certain number of valence electrons to be freed from their atoms.

Insulators generally have very stable atomic structures, of which the 4-electron outer-ring structure is typical. In such a structure, there is an absence of easily removed electrons. Examples of good insulators are certain compounds of carbon and diamond, which has a similar atomic structure.

Semiconductors are a group of materials, which conduct electrons poorly and therefore cannot properly be classified either as conductors or insulators. Generally, semiconductors differ from insulators in that their outer-ring electrons can detach themselves from their orbits more easily than in insulators. Typical semiconductor materials are germanium and silicon.

Impurities may be added to pure semiconductors. This results in semiconductor materials, which may either have an excess of free electrons or a deficiency of orbital electrons. When an excess of electrons is present we call the material N-type; when lack of orbital electrons occurs, we call the material P-type. Both N-type and P-type semiconductors are made by treated materials. The addition of impurities to semiconductors is called doping.

New Words and Phrases

- insulator [ˈɪnsjuleɪtə] *n.* 绝缘体; 从事绝缘工作的工人
atomic [əˈtɒmɪk] *adj.* 原子的, 原子能的; 微粒子的
valence [ˈveɪləns] *n.* 价; 原子价; 化合价; 效价
impurity [ɪmˈpjʊərəti] *n.* 杂质; 不纯; 不洁
diamond [ˈdaɪəmənd] *n.* 钻石, 金刚石; 菱形; *adj.* 金刚钻的
conduct [ˈkɒndʌkt, kənˈdʌkt] *vi.* 带领; 导电 *vt.* 管理 *n.* 行为; 实施
compound [ˈkɒmpaʊnd, kəmˈpaʊnd] *vt.* 混合; 合成 *n.* 化合物; 混合物
detach [dɪˈtætʃ] *vt.* 分离; 派遣; 使超然
classify [ˈklæsɪfaɪ] *vt.* 分类; 分等
germanium [dʒɜːˈmeɪniəm] *n.* 锗; 锗元素 (32 号元素, 符号 Ge)
silicon [ˈsɪlɪkən] *n.* 硅; 硅元素 (14 号元素, 符号 Si)
deficiency [dɪˈfɪʃənsi] *n.* 缺乏; 不足的数额; 缺陷, 缺点
orbital [ˈɔːbɪtəl] *adj.* 轨道的; 眼窝的
excess [ɪkˈses, ˈeksɪs] *a.* 过量的; 附加的 *n.* 超过, 超越, 过度, 过量
doping [ˈdəʊpɪŋ] *n.* (半导体) 掺杂质, 加添加剂; 涂上航空涂料
outer-ring 外环, 外层, 外圈, 外包围圈
N-type N 型

Exercises

I. Answer the following questions according to the text.

1. What is called a conductor or an insulator?
2. Why are metals generally good conductors?

3. Why are there no perfect insulators?
4. What are typical semiconductor materials?
5. How to make both N-type and P-type semiconductors? What is called doping?

II. Translate the following phrases and expressions.

1. a number of valence electrons
2. be released from their orbits with relative ease
3. the 4-electron outer-ring structure
4. not be classified either as conductors or insulators
5. either have an excess of free electrons or a deficiency of orbital electrons