新世纪

高等职业教育
机电类课程规划教材

电专业英语阅读教程

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新世纪高等职业教育教材编委会教材建设指导委员会

总　序

我们已经进入了一个新的充满机遇与挑战的时代，我们已经跨入了21世纪的门槛。

20世纪与21世纪之交的中国，高等教育体制正经历着一场缓慢而深刻的革命，我们正在对传统的普通高等教育的培养目标与社会发展的现实需要不相适应的现状作历史性的反思与变革的尝试。

20世纪最后的几年里，高等职业教育的迅速崛起，是影响高等教育体制变革的一件大事。在短短的几年时间里，普通中专教育、普通高专教育全面转轨，以高等职业教育为主导的各种形式的培养应用型人才的教育发展到与普通高等教育等量齐观的地步，其来势之迅猛，发人深思。

无论是正在缓慢变革着的普通高等教育，还是迅速推进着的培养应用型人才的高等职业教育，都向我们提出了一个同样的严肃问题：中国的高等教育为谁服务，是为教育发展自身，还是为包括教育在内的大千社会？答案肯定而且惟一，那就是教育也置身其中的现实社会。

由此又引发出高等教育的目的问题。既然教育必须服务于社会，它就必须按照不同领域的社会需要来完成自己的教育过程。换言之，教育资源必须按照社会划分的各个专业（行业）领域（岗位群）的需要实施配置，这就是我们长期以来明乎其理而疏于力行的学以致用问题，这就是我们长期以来未能给予足够关注的教育目的问题。

如所周知，整个社会由其发展所需要的不同部门构成，包括公共管理部门如国家机构、基础建设部门如教育研究机构和各种实业部门如工业部门、商业部门，等等。每一个部门又可作更为具体的划分，直至同它所需要的各种专门人才相对应。教育如果不能按照实际需要完成各种专门人才培养的目标，就不能很好地完成社会分工所赋予它的使命，而教育作为社会分工的一种独立存在就应受到质疑（在市场经济条件下尤其如此）。可以断言，按照社会的各种不同需要培养各种直接有用人才，是教育体制变革的终极目的。

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随着教育体制变革的进一步深入,高等院校的设置是否会同社会对人才类型的不同需要一一对应,我们姑且不论。但高等教育走应用型人才培养的道路和走理论型(也是一种特殊应用)人才培养的道路,学生们根据自己的偏好各取所需,始终是一个理性运行的社会状态下高等教育正常发展的途径。

高等职业教育的崛起,既是高等教育体制变革的结果,也是高等教育体制变革的一个阶段性表征。它的进一步发展,必将极大地推进中国教育体制变革的进程。作为一种应用型人才培养的教育,高等职业教育从专科层次起步,进而高职本科教育、高职硕士教育、高职博士教育……当应用型人才培养的渠道贯通之时,也许就是我们迎接中国教育体制变革的成功之日。从这一意义上说,高等职业教育的崛起,正是在为必然会取得最后成功的教育体制变革奠基。

高职教育还刚刚开始自己发展道路的探索过程,它要全面达到应用型人才培养的正常理性发展状态,直至可以和现存的(同时也正处在变革分化过程中的)理论型人才培养的教育并驾齐驱,还需假以时日;还需要政府教育主管部门的大力推进,需要人才需求市场的进一步完善发育,尤其需要高职教学单位及其直接相关部门肯于做长期的坚忍不拔的努力。新世纪高等职业教育教材编审委员会就是由全国100余所高职院校和出版单位组成的旨在以推动高职教材建设来推进高等职业教育这一变革过程的联盟共同体。

在宏观层面上,这个联盟始终会以推动高职教材的特色建设为己任,始终会从高职教学单位实际教学需要出发,以其对高职教育发展的前瞻性的总体把握,以其纵览全国高职教材市场需求的广阔视野,以其创新的理念与创新的组织形式,通过不断深化的教材建设过程,总结高职教学成果,探索高职教材建设规律。

在微观层面上,我们将充分依托众多高职院校联盟的互补优势和丰裕的人才资源优势,从每一个专业领域、每一种教材入手,突破传统的片面追求理论体系严整性的意识限制,努力凸现高职教育职业能力培养的本质特征,在不断构建特色教材建设体系的过程中,逐步形成自己的品牌优势。

新世纪高等职业教育教材编审委员会在推进高职教材建设事业的过程中,始终得到了各级教育主管部门以及各相关院校相关部门的热忱支持和积极参与,对此我们谨致深深谢意;也希望一切关注、参与高职教育发展的同道朋友,在共同推动高职教育发展、进而推动高等教育体制变革的进程中,和我们携手并肩,共同担负起这一具有开拓性挑战意义的历史重任。

新世纪高等职业教育教材编审委员会

2001年8月18日

前　言

《电专业英语阅读教程》是新世纪高等职业教育教材编审委员会推出的机电类课程规划教材之一。作为专业英语阅读教程，其目的不仅要提高学生专业文章的阅读能力，还要通过阅读训练使学生掌握正确的阅读方法。也通过学习这门课程，扩大学生的专业词汇量，同时使学生获得更多的本学科、本专业的知识和新的发展动态。

我们针对高职教育的特点，为适应高职教育对象的教学活动，并结合已出版的规划教材《计算机专业英语》，编写了这本具有特色的《电专业英语阅读教程》。

本教材具有如下特点：

1. 每个单元都是训练阅读能力的一个完整的过程，训练目的明确，配备相应练习。通过周期性反复训练使学生掌握阅读专业文章的正确方法。

2. 教材内容安排上，按机电类学科细化成八个单元，每个单元突出一个学科领域的知识，这是该教材编写上的一大特色。

3. 选材新颖，点面结合。不仅能体现专业知识性还能体现趣味性，同时选取了大量的最新知识和最新的应用实例。

4. 每课都提供了各种练习题，既实用又具有针对性，有利于检验学生学习掌握的程度。便于更好进行教学活动。

5. 课文中生词的注释标在正文的一侧，利于学生阅读。

6. 为了便于扩大学生的专业词汇量，专业词汇将按各单元所涉及的学科内容分别列在各单元结束的地方，这也是该教材的一大特色。

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本教材共分八个单元，内容包括电的基本知识与应用、数电与模电、高频技术、电气工程、电器、检测与传感、微处理器技术和自动控制系统。

本教材由沈阳师范大学职业技术学院温丹丽和辽宁机电职业机电技术学院隋传国任主编；辽阳职业技术学院李丹、辽宁石油化工大学职业技术学院张树江任副主编。具体编写分工如下：温丹丽编写第4、5、6单元，并编写了构词法部分；隋传国编写1、8单元；李丹编写2、3、7单元；张树江参加部分内容的编写。东北财经大学宋继红老师对本教材提出了许多宝贵的意见和建议。

尽管我们在教材建设的特色方面做了许多努力，但也难免有不足之处，望各教学单位和读者在使用本教材时给予关注，并提出一些宝贵的意见和建议，以便下次修订时改进。

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编　者

2004年8月

目　录

Unit One

The Basis of Electricity and its Applications

Passage One Conception of Electricity

Training target: *In this part, our target is to train your reading comprehension. We have made the flexible sentences strong black and marked the subject, predicate and object of them. Try to grasp the main idea of these sentences.*

.Text.

Ⅰ. Resistance

Resistance is the **opposition** of the flow of electrons. **The greater the resistance of a wire is, the less electric current will pass through it under the same voltage.** The resistance of a wire mainly depends on the length, the **cross-section**, the material and the temperature of the wire.

opposition 反抗

cross-section 横截面积

Copper is one of the best conductors that are used in electrical engineering. A long copper wire has a greater resistance than a short copper wire with the same cross-section. If two copper wires are equal in length, the one with the larger cross-section will show smaller resistance.

Now let's study the effect of temperature on resistance. Measure the resistance of a conductor when a small current is passing through it, and then measure its resistance when a large current causes it to become **red-hot. You will find the electrons meet more resistance when the conductor is hot than when it is cold. Accordingly a conductor which has a resistance of 100 ohms at 0℃ will have a resistance of about 150 ohms at 100℃.** The higher its temperature is, the more resistance it shows.

measure 测量

red-hot 赤热的

Ⅱ. Electric Current

All metals are good conductors because there are a great number of free electrons in them. These free electrons usually do not

move in a regular way so that there is no current. However, when an electric field is set up, all the free electrons will be made to move in one direction and an electric current is formed. Or to say, in order that an electric current can be produced in a conductor, an electric field must be built in it. An electric field is usually set up by applying a voltage between the two terminals of the conductor. Thus, the free electrons form an electric current in the conductor.

in order that 为……起见

There are two kinds of electric currents: direct current (D.C.) and alternating current (A.C.). Direct current is an electric current, the charges of which move in one direction only. It is constant in value, unless the circuit conditions, such as the applied voltage or the circuit resistance, are changed. The charges of an alternating current change their direction regularly. First they flow one way, then the other. The difference between A.C. and D.C. depends upon the voltage applied. If the electric field applied is unchanged, the current produced is D.C.. If the electric field applied is alternating, the current produced is A.C.. Both A.C. and D.C. have their advantages and disadvantages and they are respectively used in different applications.

value 数值

respectively 各自地

Ⅲ. Direct and Alternating Currents

A direct current is, of course, useful. The electric system in a car uses direct current. Besides, direct current is also used to meet some of the industrial requirements.

requirement 需要

However, at present, most cities are making use of another kind of electric current for lighting, heating and industrial and other purposes. This current goes first in one direction and then in another, we give it the name of an alternating current.

make use of 利用

In spite of its being very useful, a direct current system has one great disadvantage. Namely, there is no easy, economical way in which one can increase or decrease its voltage. The alternating current does not have this disadvantage, and its voltage may be increased or decreased with little energy loss by the use of a transformer. Using a transformer, it is possible to transform power at low voltage into power at high voltage, and vice versa.

in spite of 尽管

transformer 变压器

vice versa 反之亦然

In that manner, current can be generated at a voltage which is suitable for any given machine. In large power stations, the most common voltage is often 6,300V or 10,500V. Power being transmitted

over long distance with less loss at high voltage than at low voltage, it is more economical to increase the voltage to 35,000V or 110,000V or even 220,000 V for **transmission**. **Wherever** the power is to be used, it is **lowered** to the voltage which **satisfies** that particular purpose, such as 220V in homes, or 380 V in factories, etc..

transmission 传输
wherever 无论何处
lower 把……降低
satisfy 满足

.End.

Speciality Vocabulary

alternating current 交流电
cross-section 横截面积
direct current 直流电
electric field 电场
length 长度
material 材料
resistance 电阻
temperature 温度

.Exercise.

[Ex 1] *Choose the right statements according to the passage.*

1. The flow of electrons is not concerned with the material of the conductors.
2. The lower its temperature is, the more resistance it shows.
3. All metals are good conductors.
4. An electric field is usually set up by applying a voltage between the two terminals of the conductor.
5. The electric system in a car usually uses direct current.
6. The voltage in a direct current system may be increased or decreased by the use of a transformer.

[Ex 2] *Answer the following questions.*

1. What will a resistance be about at 100℃ when it has a resistance of 100 ohms at 0℃?
2. How many kinds of electric currents are there? What are they?
3. What is the voltage in homes?
4. Which one is more economical for transmission, 35,000V or 110,000V?

[Ex 3] *Match the items listed in the following two columns.*

1. opposition	a. 反抗
2. voltage	b. 发热
3. cross-section	c. 赤热的
4. red-hot	d. 横截面积
5. charge	e. 传输
6. transmission	f. 电荷
7. transformer	g. 电压
8. generate heat	h. 变压器

[Ex 4] *Complete the following sentences by translating the Chinese in the brackets into*

English.

1. The resistance of a wire _____(主要取决于)the length, the cross-section, the material and the temperature of the wire.

2. _____(如果所加的电场不变), the current produced is D.C..

3. _____(由于电力在高压下进行长距离输送比在低压下输送损耗小), it is more economical to increase the voltage to 35,000V or 110,000V or even 220,000V for transmission. (Power being transmitted)

4. _____(利用变压器), it is possible to transform power at low voltage into power at high voltage, and vice versa. (Using)

参考译文

有关电的概念

一、电阻

电阻是对电子流动的阻碍作用。一根导线的电阻越大,在电压相同的情况下通过该导线的电流就越小。导线电阻的大小主要取决于该导线的长度、横截面积、材料以及温度。

铜是电气工程上所使用的最好的导体之一。在横截面相同的情况下,一根长的铜导线的电阻要比一根短的铜导线的电阻大。如果两根铜线长度相等,那么横截面较大的那根铜线的电阻较小。

现在让我们来研究一下温度对电阻的影响。在弱电流通过导体时测量一下电阻,再在强电流使导体变得赤热时测量一下电阻,你就会发现,电子在导体热的时候所遇到的阻力要比在导体冷的时候大。因此在摄氏 0 度时电阻为 100 欧姆的导体,在摄氏 100 度时其阻值约为 150 欧姆。导体的温度越高,它的电阻就越大。

二、电流

金属里存在大量的自由电子,所以一切金属都是良导体。这些自由电子通常做不规则的运动,所以导体中没有电流。但是当建立起一个电场时,所有自由电子就会朝一个方向运动,从而形成电流。或者说为了使导体里能产生电流,必须在该导体里建立起一个电场。而电场通常可用在导体两端施加电压的方法来建立。这样,自由电子就在导体里形成了电流。

电流有两种:直流电(D.C.)和交流电(A.C.)。直流电是电荷只朝一个方向流动的电流。在外加的电压和电阻等电路条件不变时,直流电是定值。交流电的电荷流向作规则的变化。它们先朝一个方向流动,然后再朝另一方向流动。交流电与直流电的差别取决于所施加的电压。如果所加的电场不变,产生的就是直流电;如果所加的电场是交变的,产生的就是交流电。交流电和直流电两者都各有其优缺点,各有其不同的用途。

三、直流电和交流电

当然,直流电是非常有用的。汽车里的电气系统使用的是直流电。此外直流电也用来满足一些工业上的需要。

但是,目前大多数城市使用另一种电流来照明、加热以及进行工业生产等。这种电流先是朝某一方向流动,然后再朝另一方向流动,我们称之为交流电。

尽管直流电非常有用,但它有一个缺点,即没有一种简易而又经济的方法来提高或降低电压。交流电就没有这一缺点。使用变压器可以使交流电以很少的能量损耗来升高或降低电压。利用变压器,就能使低压电转变为高压电,反之亦然。

以这种方式,就可以得到其电压适于任何指定机器的电流。在大型发电站,最适用的电压通常是6,300伏或10,500伏。由于电力在高压下进行长距离输送比在低压下输送损耗小,所以将电压升高到35,000伏或110,000伏,甚至高达220,000伏来输送就更为经济。无论什么地方使用电,都需要把电压降低以适应其特定的用途,例如家庭用电是220伏,而工厂用电是380伏等。

练习答案

[Ex 1]

1. T 2. F 3. T 4. T 5. T 6. F

[Ex 2]

1. A conductor which has a resistance of 100 ohms at 0℃ will have a resistance of about 150 ohms at 100℃.

2. There are two kinds of electric currents: direct current (D.C.) and alternating current (A.C.).

3. 220V.

4. 110,000V is more economical for transmission.

[Ex 3]

1-a 2-g 3-d 4-c 5-f 6-e 7-h 8-b

[Ex 4]

1. mainly depends on

2. If the electric field applied is unchanged

3. Power being transmitted over long distance with less loss at high voltage than at low voltage

4. Using a transformer

Passage Two Introduction of Transistors

Training target: *In this part, our target is to train your reading speed. You should pay more attention to "word group". Treating a group of words as a whole unit is a short cut to save your time. We have underlined the word groups in some sentences, and the rest can be practiced by yourself. If there are some new words, you may cover the note area with a piece of paper and try to guess their meanings without using the dictionary.*

.Text.

In the 1870's Thomas Alva Edison created the electric-light bulb, from which the electron tube was developed **later**. Such tubes are often called "vacuum tubes", since the air is removed from them so that there is a vacuum inside them.

later 后来

A three-element electron tube (or triode), created by the American Lee De Forest, consists of three **fundamental** parts: the filament, the **grid** and the plate. The electron tube can be used to amplify incoming electric impulses or signals to make them strong enough to cause the diaphragm of a telephone receiver or a loudspeaker to vibrate.

fundamental 基本的

grid 栅极

Electron tubes are wonderful devices, but they have a few **drawbacks**. **For one thing**, they waste a good deal of electricity. One of the elements (the filament) in a vacuum tube must be heated so that it **gives off** electrons. This heating requires electricity and produces unwanted heat. You probably know from experience that the inside of a working radio gets quite warm. Imagine how much heat is produced by the hundreds of vacuum tubes in the electronic controls of a supersonic jet airplane. Such planes have to use special cooling equipment to help **get rid of** the heat.

drawback 缺点

for one thing 举个例子

give off 放出

get rid of 排出

Scientists, realizing this and other drawbacks of electron tubes, searched for other ways of doing the jobs that electron tubes did. Then in 1948, **to be exact**, a new device, the transistor, was announced by Bell Telephone Laboratories. After years of work two Bell scientists, Brattain and Bardeen, were able to show to the world, in 1948, the first one of these remarkable devices.

to be exact 精确地说

It does not look very impressive. In fact, it is so small that you have to look carefully to see it, for many transistors are smaller than the eraser on the end of a lead pencil. Yet some transistors can replace electron tubes hundreds of times of their size! Transistors need **far less** current, and produce far less heat than comparable electron tubes.

far less 少得多

But what are transistors? And how do they work?

Transistors are made of small **slices** of germanium crystals. Germanium is an element, **just as** copper, oxygen and hydrogen are elements. It is crystalline in form. The slice of germanium crystal used in a typical transistor may be less than 1/8 square inch and less than 1/32 inch thick. Look at a ruler to see how small this is.

slice 薄片

just as 正像

In one kind of transistor, three wires are fastened to the crystal of

germanium. Let us imagine that we are using this transistor to amplify a telephone signal. The **hookup** is shown in Fig.1.1.

hookup 连接

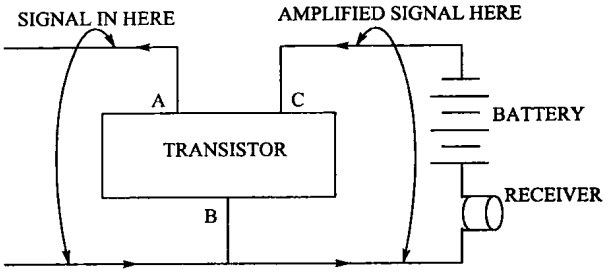

Fig.1.1 transistor

As the transistor hookup shown, the signal comes in through wires A and B. The receiver is hooked up through a battery to wires B and C. With no signal, no current will flow from the battery through the receiver. But when a signal comes in, the transistor amplifies it in the following way. The signal consists of **surge** of electrons, or electric current. The electrons enter into through wire B and leave out of through wire A. As electrons move out of the germanium, they leave behind germanium atoms with positive charges, that is, some of the atoms lose electrons. Some of these positive charges are then satisfied by electrons flowing in from wire B. But other positive charges are satisfied by electrons coming in through wire C.

surge 脉冲

Here is the way to think of the actions taking place in the germanium. Positive charges are produced in the crystals around wire A. These positive charges can be thought of as holes, since they are an **absence** of electrons. When a signal comes in through wires A and B, many "holes" are produced in the germanium. Electrons then flow in from wire C to fill these "holes", that is, current flows between wires C and B. This current causes the receiver to operate.

absence 缺席

The amazing thing about all this is that a very small current, or signal, coming in through wires A and B produces many "holes", and thus a large current in the germanium, between wires C and B, is generated. In other words, the signal is greatly **magnified**. This is the same job the electron tube does.

magnify 放大

There are other types of transistors in use, and still more are being developed in laboratories. Now you can buy tiny radios that use transistors instead of electron tubes. Television sets and many other types of electronic equipment are using, or will soon use, transistors instead of electron tubes. With transistors all this equipment can be made much smaller.