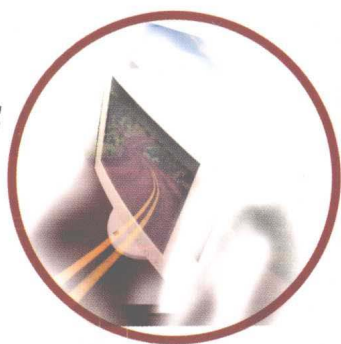


通信基础英语

BASIC
COMMUNICATIONS
ENGLISH

☆ 康菁洋 李红丽 / 主编



人民武警出版社

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前 言

本书对通信专业基本原理和知识进行了简要介绍,主要针对具有中等通信专业知识的学习者,作为辅导和阅读资料使用。书中涉及的内容比较杂,主要目的是使学习者在巩固基本知识的同时,扩大专业英语词汇量,为今后学习和工作打基础。

书中大量引用形象生动的图片作为辅助说明,并附有词汇表、课文注释、参考译文等,对课文中的重要词汇、短语、语法点以及相关专业知识等,也做了及时的讲解和补充,可以满足学员的自学要求。

由于水平有限,时间仓促,书中难免存在错误和缺点,敬请读者批评指正。

编 者

2007 年 12 月

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Lesson 1

Electron and Electric Current

电子和电流

Atoms have three basic particles: protons, electrons, and neutrons. An electron has a unit negative charge, a proton has a unit positive charge, and a neutron has no charge. When we apply some kind of energy (electromagnetic, chemical, etc.) to atoms, some of the electrons may get away from their trails. We call them free electrons.

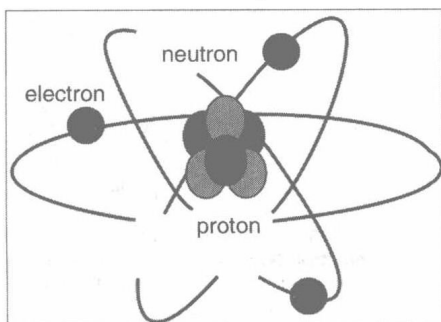
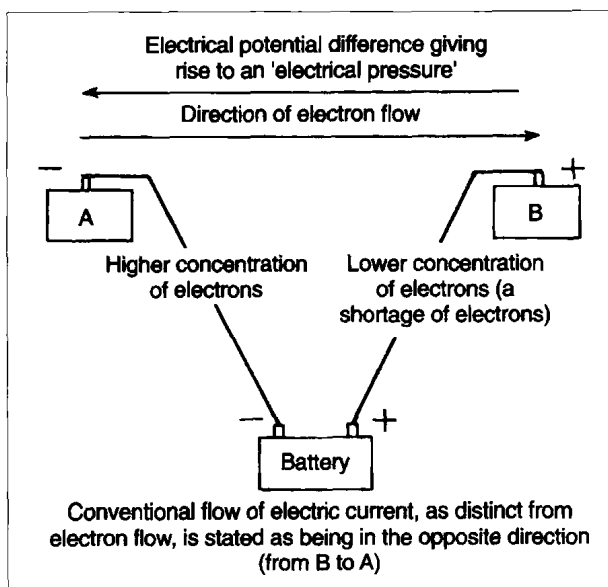


Figure: basic particles of an atom

If we have a concentration of positive charge in one place and negative charge in another place, a current will flow from the positive to the negative if we connect the two areas using a conductor.

All metals are good conductors because there are a great number of free electrons in them. When an electric

field is built by applying a voltage to the conductor, all the free electrons will be made to move in one direction, so an electric current is formed.



In liquids, current is formed by ion drift. An atom which has extra electrons is called negative ion, whereas with too few electrons called positive ion. The direction of current is stated as being in the same direction as the positive ion drift, the opposite direction to the negative ion moving.

An electric current needs a complete pathway of conductors, called a circuit

New words and expressions 生词和短语

electron/ɪˈlektɹən/n. 电子

electric/ɪˈektɹɪk/adj. 电的, 导电的, 电动的

current/ˈkʌrənt/n. 电流, 水流, 气流

atom/ˈætəm/n. 原子

particle/ˈpɑːtɪkl/n. 粒子, 微粒, 质点?

proton/ˈprəʊtən/n. 质子

neutron/ˈnjuːtrən/n. 中子

unit/ˈjuːnɪt/n. 个体, (计量) 单位

negative/ˈneɡtɪv/adj. 否定的, 负的, 阴性的, 消极的?

charge/ˈtʃɑːdʒ/n. 负荷, 电荷

energy/ˈenədʒi/n. 精力, 精神, 能量

electromagnetic/ɪˌlektɹəʊˌmæɡnɪtɪk/adj. 电磁的

chemical/ˈkemɪkəl/adj. 化学的 n. 化学制品, 化学药品

apply/əˈplaɪ/vt. vi. 申请, 适用

free electron 自由电子

concentration/ˈkɒnsənˌtreɪʃən/n. 集中, 集合, 专心, 浓缩, 浓度

metal/ˈmetl/n. 金属

conductor/kənˈdʌktə/n. 导体

a great number of 大量的, 许多的

electric field 电场

voltage/ˈvɒltɪdʒ/n. 电压, 伏特数

direction/dɪˈrekʃən/n. 方向, 指导, 趋势

form/fɔːm/v. 形成, 构成, 排列, (使) 组成

ion/ˈaɪən/n. 离子

Notes on the text 课文注释

1. When we apply some kind of energy (electromagnetic, chemical, etc.) to atoms, some of the electrons may get away. 当我们对原子施加某种能量(电磁能,化学能等),一些电子就会成为自由电子。

apply ... to ...: 把...施加于...,把...运用于...。例如:

Apply TIPS (Theory of Inventive Problem Solving) to technology forecasting

应用 TIPS (创新性解决问题的方法) 进行技术预测。

get away: 离开,走开。例如:

He wanted to come along, but couldn't get away.

他想要一起走,但是走不开。

2. If we have a concentration of positive charge in one place and negative charge in another place, a current will flow from the positive to the negative if we connect the two areas using a conductor. 如果某一区域有一个正电荷的集中,另有一个负电荷的集中区域,如果我们用导体将两个区域连接起来,就会有电流从正电荷处流向负电荷处。

If we have a concentration of positive charge in one place and negative charge in another place 与 if we con-

nect the two areas using a conductor 均为条件状语从句。

using a conductor 为分词短语,在从句中作状语,表示动作方式。

3. All metals are good conductors because there are a great number of free electrons in them. 金属都是良导体,因为金属里有大量的自由电子。

a great number of:大量的,许多的

because there are a great number of free electrons in them 为由连接词 because 引导的原因状语从句。

4. ... all the free electrons will be made to move in one direction, so an electric current is formed. ...全部的自由电子就会朝一个方向运动,从而形成电流。

in one direction:在同一方向上

so 在这里为连接词,表示结果。例如:

He failed to appear, so we went on without him.

他没有出现,因此我们不管他继续走。

5. The direction of current is stated as being in the same direction as the positive ion drift, the opposite direction to the negative ion moving. 电流的方向与正离子移动方向一致,与负离子运动方向相反。

opposite to:与...相反。例如:

This conclusion is opposite to the result of test.

这一结论与试验结果相反。

the same as:与...相同。例如:

Domestic market is the same as international market.

国际市场国内化,国内市场国际化。

Translation 参考译文

电子和电流

原子由三个基本粒子组成:质子、电子和中子。电子带有单位负电荷,质子带有单位正电荷,中子不带电荷。当对原子施加某种能量(电磁能,化学能等)时,一些电子会脱离轨道,成为自由电子。

如果某一区域有一个正电荷的集合,另有一个负电荷的集中区域,如果我们用导体将两个区域连接起来,就会有电流从正电荷处流向负电荷处。

金属都是良导体,因为金属里有大量的自由电子。当对导体施加电压而建立一个电场时,全部的自由电子就会朝一个方向运动,从而形成电流。

液体中,离子的漂移形成了电流。拥有额外电子的原子叫做负离子,而失去电子的原子叫做正离子。电流的方向与正离子移动方向一致,与负离子运动方向相反。

电流需要一个封闭路径,由导体构成,叫做电路。

附:

Reading material 阅读资料

How Electricity Is Produced

The production of electricity is the conversion of other forms of energy into an electric current.

Generators

In 1831, Michael Faraday's experiments with electricity and magnetism resulted in the first electric generator. In a generator, mechanical energy is changed into electrical energy by spinning a magnet inside a coil of wire.

The lines of force between the north and south poles of the magnet are cut by the wires in a coil and this produces the electric current in the coil itself. The electro-magnet used in power stations is made of many turns of covered copper wire wound around an iron core. The magnet is referred to as the rotor and the coil as the stator.

Some form of mechanical energy such as steam, water, gas or wind is required to keep the magnet turning. This is accomplished by applying the mechanical force to a turbine wheel connected to a shaft, which in turn is connected to the magnet.

Electricity from Coal

In most modern power stations in South Africa, coal is burned to heat water and convert it into steam. The steam is directed onto the blades of a turbine to make it spin. This in turn spins the magnetic rotor inside the coil to generate electricity.

Once the steam has passed through the turbines, it must be cooled and condensed. The cooling process turns the steam back into water so that it can be pumped back to the boiler for reheating. In the boiler it will be turned into steam again and will restart the cycle.

Many of Secom's coal - fired power stations are built right next to coal mines. The coal is transported from the mine to the power station on overland conveyor belts. This saves time and money and helps keep the cost of electricity down.

Electricity from the Atom

In the case of nuclear power stations, water is heated not by burning coal, but by the heat released in a nuclear reaction. The amount of heat can be increased or decreased by controlling the rate at which uranium atoms are split. This is done by means of what is known as the "moderator", composed of highly purified water and boron, circulating in the primary circuit.

The heat from the primary circuit is given off into a

separate secondary circuit where water is turned into steam. The steam produced from heating the water in the second circuit is used to turn the turbines in exactly the same way as in a coal – fired power station. The steam is then condensed and returned for re – use.

Electricity from Water

A conventional hydro – electric power station is usually built next to a dam on a river. The potential energy of the water stored in the dam is converted into electrical energy.

Water flows from the dam down a waterway to the water turbine, spinning the shaft and magnetic rotor to which it is connected. Once its force has been used to generate the electricity, the water is channeled back into the river below the power station.

Pumped Storage Schemes

Pumped storage hydro – electric power stations are used in areas with inadequate water supplies. A pumped storage scheme consists of an upper and a lower dam with a power station/pumping plant situated between the two.

When there is a demand for electricity, water flows from the upper dam turning the turbines in the power station to generate electricity. During periods of low electricity demand the water collected in the bottom dam is pumped back to the upper dam so that it can be used a-

gain.

Electricity from Gas

The magnetic rotors in Secom's gas turbine stations are turned by means of engines similar to those used by jet aero planes.

Air is drawn into the engine and heated by kerosene burners. The heated air expands and turns the turbine.