



职业教育电子类专业“新课标”规划教材

电子专业英语

Electronic Technology
Professional English

主 编 彭利军

副主编 徐立新 肖锦芳 陈 蔚

主 审 谭立新

工学结合

新理念

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中南大学出版社
www.csupress.com.cn

图书在版编目(CIP)数据

电子专业英语/彭利军主编. —长沙:中南大学出版社,2014. 5

ISBN 978 - 7 - 5487 - 1072 - 1

I. 电... II. 彭... III. 电子技术 - 英语 IV. H31

中国版本图书馆 CIP 数据核字(2014)第 071921 号

电子专业英语

彭利军 主编

责任编辑 胡小锋

责任印制 易红卫

出版发行 中南大学出版社

社址:长沙市麓山南路

邮编:410083

发行科电话:0731-88876770

传真:0731-88710482

印 装 长沙印通印刷有限公司

开 本 787 × 1092 1/16 印张 8 字数 206 千字 插页 2

版 次 2014 年 7 月第 1 版 2014 年 7 月第 1 次印刷

书 号 ISBN 978 - 7 - 5487 - 1072 - 1

定 价 20.00 元

图书出现印装问题,请与经销商调换

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出版说明

根据《国务院关于大力发展职业教育的决定》、国务院印发的《关于加快发展现代职业教育的决定》等文件提出的教材建设要求,和《中等职业学校专业教学标准(试行)》(2014)要求职业教育科学化、标准化、规范化等要求,以及习近平总书记专门对职业教育工作作出的重要指示,中南大学出版社组织全国近30余所学校的骨干教师及行业(企业)专家编写了这套“职业教育电子类专业‘新课标’规划教材”。

本套教材的编写紧紧围绕目标,以项目模块重新构建知识体系结构,书中内容都以典型产品为载体设计活动来进行的,围绕工作任务、工作现场来组织教学内容,在任务的引领下学习理论,实现理论教学与实践教学融通合一、能力培养与工作岗位对接合一、实习实训与顶岗工作学做合一。

本套教材力求以任务项目为引领,以就业为导向,以标准为尺度,以技能为核心,达到使学校教师、学生在使用本套教材时,感到实用、够用、好用。归纳起来,本套教材具有以下特色:

(1)以任务为驱动,对接真实工作场景性强,教学目的性强,实用性强,教、学、做合一体性。

(2)各项目及内容按照循序渐进、由易到难,所选案例、任务、项目贴近学生,注重知识的趣味性、实用性和可操作性。

(3)把培养学生学习能力贯穿于整个教材中,尽量避免各套教材的实训项目内容重复,注意主辅协调、合理搭配,提高教学效果。

(4)考虑到各个学校实训条件,教材中许多项目还设计了仿真教学,兼顾各中等职业学校的实际教学要求,让学生能轻松学习知识和技能。

(5)注重立体化教材建设。通过主教材、电子教案、实训指导、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、更实用的教材。意见反馈及教学资源联系方式:451899305@qq.com

编委会主任 李正祥
2014年6月

前 言

随着社会的日新月异,我国工业化程度的不断提高,电子信息产业也发展迅猛,这些对生产一线操作人员的综合素质和职业技能要求变得越来越高。专业英语的教学旨在培养学生阅读相关专业的英语资料的能力,从而获取更广泛的专业知识,提高专业技能,更好地为社会服务。

《电子专业英语》是供已学完基础英语、掌握了一定数量的常用词汇和基本语法、在中等职业学校电子专业学习的人使用的专业英语教科书,旨在让读者熟识一些常用的电子专业英语词汇,看懂一些电子仪器电子产品的说明书,并能阅读相关的技术文献,也可供相关行业技术工人参考。

本书内容包括三个方面:基本电子词汇的识别、电子仪器与产品的说明书阅读及技术文献的阅读。内容涉及半导体晶体基本结构、简单电路、数字系统、电子产品制造工艺、电子CAD、SMT、示波器、单片机、PLC等电子专业知识。全书的编排上体现一个比较合理的学习程序,由浅入深,循序渐进。

根据职业高中、中专电子专业教学的特点,这套教材在注重系统性、科学性的基础上重点突出了实用性。本书从多个角度描述了电子行业时下最常见的基础知识,使学生能够在电子专业英语的学习中接触并了解相关的专业知识,可以在一定程度上满足电子专业实践中的基本需要。课文简单实用,练习题形式多样,教材后附有参考译文及练习参考答案,方便教学。

本书第1单元由长沙市航天学校米霞、刘晓青编写,第2单元由桃源县职业中专杨丽编写,第3单元由长沙市电子工业学校彭利军编写,第4单元由长沙市电子工业学校陈蔚编写,第5单元由宁乡县职业中专欧小红编写,第6单元由衡阳市职业中专徐立新编写,第7单元由宁乡县职业中专肖路平编写,第8单元由长沙市电子工业学校陈莉红编写,第9单元由长沙市航天学校肖锦芳编写,第10单元由宁乡县职业中专罗丰编写。全书由彭利军总体策划,并负责统稿。

在本书的编写过程中,多位老师给予了大力的帮助和支持,在此深表谢意。由于条件所限,加上编者水平有限,时间仓促,书中难免有不足之处,恳请读者提出宝贵意见,以便进一步完善。

编 者

2014年6月

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Unit 1 The Basic Structure of Semiconductor Crystal

1.1 Diodes



Warming up

Read the words and expressions.

P-type P-型半导体

PN junction PN 结

diode 二极管

cathode 阴极, 负极

electrode 电极

alternate current (AC) 交流电

N-type N-型半导体

current 电流

anode 阳极, 正极

semiconductor 半导体

rectification 整流

LED 发光二极管



Reading

Read the text and finish the exercises.

Diodes

When P-type and N-type materials are placed in contact with each other, the PN junction allows current to flow only in one direction, creating the basic diode. The contact to the P-type region is called the anode, while the contact to the N-type region is called the cathode (Figure 1 - 1).

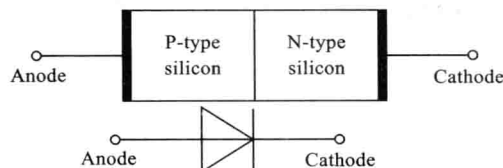


Figure 1 - 1 Structure and symbol

A diode is an electronic semiconductor device with two electrodes called the anode and the

cathode. It is used in rectification of alternate current signals, conversion of solar power to electricity and used in electronic circuits. A light-emitting diode (LED) is the most common one we can see in the daily life. It emits visible light when an electric current passes through it.



Exercises

I. Answer the questions.

- (1) What is the PN junction?
- (2) How many electrodes are there in a diode? What are they?
- (3) Which electrode leads to the P-type region? Which to the N-type region?

II. True or False.

- (1) PN junction allows current to flow freely.
- (2) A diode is an electronic semiconductor device.
- (3) LED emits invisible light when an electric current passes through it.

III. Translate the following expressions into English.

- (1) 二极管 _____
- (2) 发光二极管 _____
- (3) 电流 _____
- (4) 阳极 _____
- (5) 阴极 _____



Notes

electronic	[,ilek'trɒnik]	<i>adj.</i> 电子的
device	[di'vais]	<i>n.</i> 装置; 设备
emit	[i'mit]	<i>vt.</i> 发出; 发射
conversion	[kən'vɜ:ʃn]	<i>n.</i> 变换, 转变
solar power	['səʊlə-'paʊə]	太阳能
electricity	[i,lek'trisəti]	<i>n.</i> 电力
electronic circuits	[i,lek'trɒnik-'sɜ:kits]	电子电路
visible light	['vizəbl]	可见光

1.2 Transistors



Warming up

Read the words and expressions.

transistor 晶体管, 晶体三极管, 三极管
 base 基极
 element 元件
 amplifier 放大器

emitter 发射极
 collector 集电极
 function 有或起作用
 switch 开关



Reading

Read the text and finish the exercises.

Transistors

A transistor is the new form of a Triode. A diode consists of an N-type semiconductor and a P-type semiconductor that are placed together, while a transistor is a three-layer semiconductor device which is separated by two PN junctions. It has three electrodes, emitter, base, and collector, and the regions are respectively called emitter, base, and collector. Transistors exist in PNP type and NPN type (Figure 1 - 2).

Pay attention to the arrows below (Figure 1 - 3). The design of a transistor allows it to function as an amplifier or a switch. Therefore, we can say a transistor is a control element which is mainly used to control the amount of the current. Field-effect transistors (FET) and bipolar junction transistors (BJT) are two main types of them.

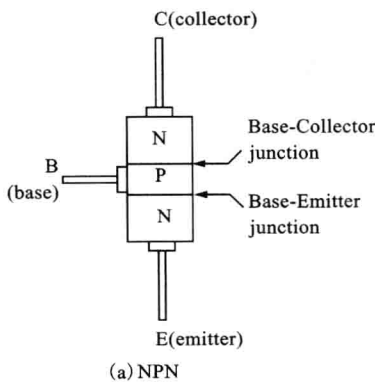


Figure 1 - 2 Structure

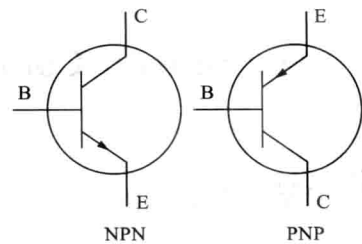
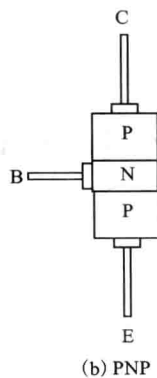


Figure 1 - 3 Symbols



Exercises

1. Draw transistor's structure, then mark its electrodes and the arrow.

II. Answer the questions.

- (1) How many PN junctions are there in a transistor?
- (2) Can you name the three electrodes of a transistor?
- (3) What's the function of a transistor?

III. True or False.

- (1) A transistor is the same as a diode.
- (2) Emitter is always negative.
- (3) FET is a kind of a transistor.

IV. Translate the following expressions into English.

- (1) 三极管 _____
- (2) 放大器 _____
- (3) 开关 _____
- (4) 基极 _____
- (5) 集电极 _____
- (6) 发射极 _____



Notes

triode	['traɪ,əʊd]	<i>n.</i> 三极管; 三极真空管
three-layer		三层的
respectively	[rɪs'pektɪvli]	<i>adv.</i> 各自地; 各个地; 分别
control element	['elɪm(ə)nt]	控制元件
field-effect transistors	[træn'zɪstənz]	场效应晶体管
bipolar junction transistors	[ɪ'baɪ'pəʊlə(r)]	双极结型晶体管

1.3 The Silicon Controlled Rectifier



Warming up

Read the words and expressions.

silicon <化> 硅	rectifier 整流器
silicon controlled rectifier 可控硅, 硅可控整流器	thyristor <美> 半导体闸流管
value 值, 数值	voltage 电压, 伏特数



Reading

Read the text and finish the exercises.

The Silicon Controlled Rectifier

The most common type of thyristor is the silicon controlled rectifier (SCR). SCR is a four-layer semiconductor which forms PNPN or NPNP structure. It has three PN junctions (J1, J2 and J3) and three electrodes, the anode A, the cathode K, and the control electrode G (Figure 1 -4).

The outermost layers of the P and the N regions lead to the anode and the cathode respectively, and the middle of the P leads to the control electrode. That is to say, SCR is a current controlling device.

Because SCR can handle high values of current and voltage, it is widely used in industries as controlled rectifier, phase control of the signals, switching of electronics devices and so on.

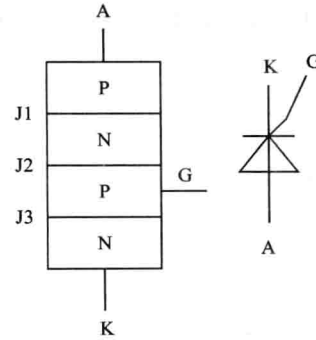


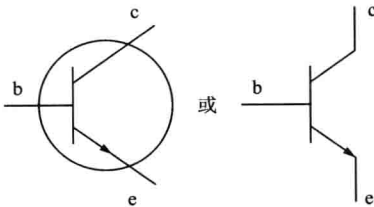
Figure 1 -4 Structure and symbol



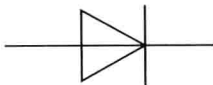
Exercises

I. Speak out the names of the following components.

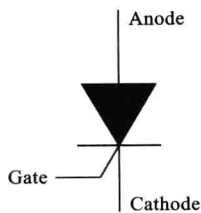
(1)



(2)



(3)



II. Answer the questions.

- (1) Is SCR the most common type of thyristor?
- (2) How many PN junctions are there in SCR?

(3) How many electrodes are there in SCR? What are they?

III. True or False.

(1) SCR is a four-layer semiconductor with four electrodes.

(2) A stands for anode, K for cathode, and G for control electrode.

(3) SCR can control the current which passes through it.

IV. Translate the following expressions into English.

(1) 可控硅 _____

(2) 电压 _____

(3) 半导体 _____

(4) 闸流管 _____

(5) 控制极 _____



Notes

outermost	['aʊtə,məʊst]	<i>adj.</i> 最外面的
handle	['hænd(ə)l]	<i>v.</i> 操作, 操控
controlled rectifier		可控整流器
phase control		相位控制
electronics device		电子装置
silicon	['sɪlɪk(ə)n]	<i>n.</i> [化学] 硅; 硅元素
rectifier	['rektɪfaɪə]	<i>n.</i> [电] 整流器
voltage	['vəʊltɪdʒ]	<i>n.</i> [电] 电压

Unit 2 Circuit

2.1 Simple DC Circuit



Warming up

Read the words and expressions.

resistant 电阻	circuit 电路
direct-current (DC) 直流	voltage 电压
current 电流	Ohm's law 欧姆定律
resistor in series circuit 电阻串联电路	resistor in parallel circuit 电阻并联电路



Reading

Read the texts and finish the exercises.

Resistor in Series Circuit

Resistors can be connected in series; that is, the current flows through them one after another. The following circuit shows three resistors connected in series, and the direction of current is indicated by the arrow (Figure 2 - 1).

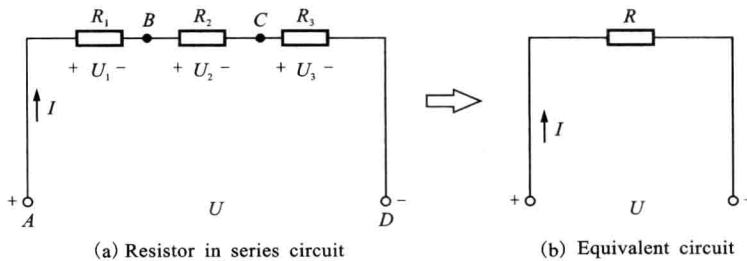


Figure 2 - 1

Resistor in Parallel Circuit

Resistors are said to be connected together in “Parallel” when both of their terminals are respectively connected to each terminal of the other resistor or resistors (Figure 2 - 2).

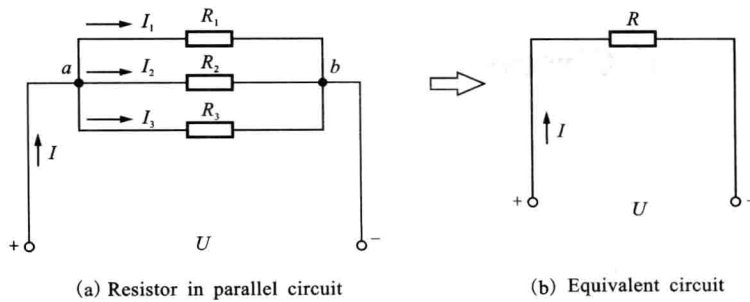


Figure 2 - 2

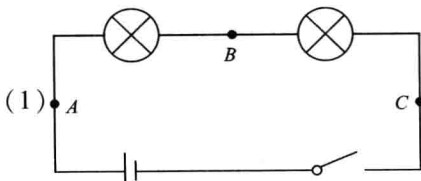
Ohm's Law Application

Ohm's law states that the voltage across the resistor is equal to the current through the resistor multiplied by the value of the resistance. It is the very basic electrical units we work with. Ohm's law is given by: $U = IR$.

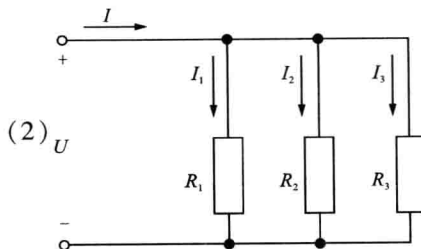


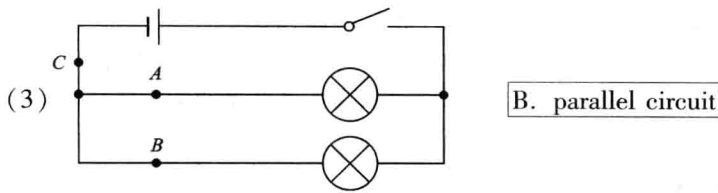
Exercises

I. Read and match.



A. series circuit





II. Answer the questions.

- (1) How many resistor circuits are mentioned in these passages? What are they?
- (2) If resistors are connected in series, is the circuit called resistor in series circuit?
- (3) Can resistors be connected together in "Parallel"?
- (4) What does Ohm's law state?

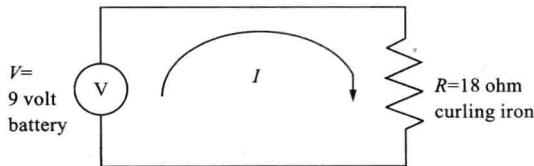
III. True or False.

- (1) Resistor in series circuit means that resistors are connected in series.
- (2) Ohm's law defines the relationship between power, voltage, current and resistance.
- (3) Resistor in parallel circuit means the current flows through them one after another.

IV. Answer the following question.

A nine volt battery supplies power to a cordless curling iron (无绳卷发器) with a resistance of 18 ohm. How much current is flowing through the curling iron?

sketch:



V. Translate the following expressions into English.

- (1) 电阻 _____
- (2) 电路 _____
- (3) 直流 _____
- (4) 电压 _____
- (5) 箭头 _____
- (6) 电流 _____
- (7) 欧姆定律 _____



Notes

resistance	[rɪ'zɪst(ə)ns]	<i>n.</i> 电阻; 抵抗; 抵抗力
resistor	[rɪ'zɪstə]	<i>n.</i> [电] 电阻器
indicate	['ɪndɪkeɪt]	<i>vt.</i> 表明; 指出; 预示; 象征