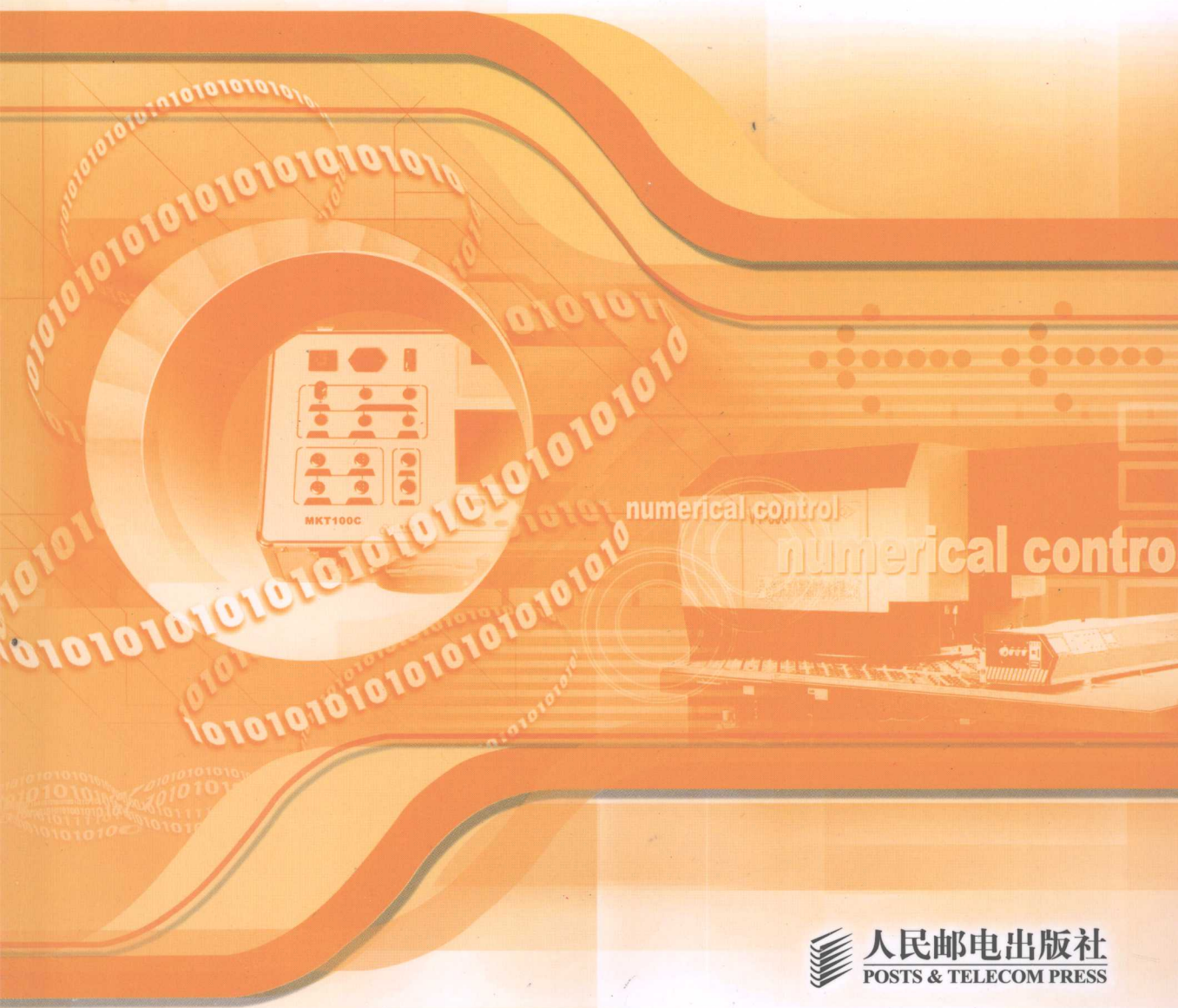


机电一体化及数控专业英语

○ 刘晓莉 苏雪 邓青 主编



世纪英才模块式技能实训
高职机电类专业系列教材

机电一体化及数控专业英语

刘晓莉 苏 雪 邓 青 主编

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内 容 提 要

本书是针对高职院校机电一体化和数控专业而编写的专业英语教材, 内容包括基础模块、机电一体化模块、数控技术模块及应用写作模块。书中的每个教学单元分为课文和阅读材料两个部分, 其中课文部分中 Text 1 侧重于基础知识, Text 2 侧重于实践与实验知识, Text 3 侧重于教学知识的拓展。每个教学单元都配有针对性的练习, 书末配有练习答案与单元课文的参考译文。本书在编写理念上以易于教学为指导, 在材料选取上注重体现教材内容的广泛性、灵活性和实用性。

本书适合高职高专院校机械设计与制造、机电一体化、数控技术与模具技术等专业作为教材使用, 同时也适合成人高校学生以及相关专业人员自学使用。

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丛 书 前 言

对职业院校而言,学生的技能培养才是职业教育真正的主题,理论教学应该围绕着专业技能的需要而展开,这不仅是就业市场的需求,也是高职办学理念上的回归。因此,国家要求高等职业院校构建理论教学体系和实践教学体系的办学格局,指明了高等职业教育改革前进的方向。

职业院校“以就业为导向”的办学方针,意味着职业办学者必须树立向市场靠拢的职教理念,探索全新的职教模式,在具体教学科目、教学内容的选择上必须以市场需求为己任,要“有所为,有所不为”,而不是采取砍课程、减内容或等比例削减课时等简单化行为。

本系列教材是我们学习教育部“教高[2004]1号”文件,借鉴加拿大CBE(Competency-Based Education)教学思想的一次实践,也是借DACUM方法来开发教学计划的具体探索。新编教材忠实贯彻了“以就业为目标”的指导思想,扭转了“过多强调学科性”及“盲目攀高升格”的倾向,重视知识、技能传授的宏观设计及整体效果,改变了过去高职教材在学科体系基础上加加减减的编写方法。

本系列教材的主要特点如下。

(1)教材结构“模块化”。一个模块一个知识点,重点突出,主题鲜明。模块化课程结构以其良好的弹性和便于综合的特点适应了职业教育市场化的多种需求。

(2)注重“方法论”的教学思想。“授之以鱼,不如授之以渔”。教材是教学之本;故而方法也应是实践教材的主题,决不能简单地、狭义地认为技能实训就是学生的实际操作。技能实训教材以传授经过提炼、加工、升华的专家经验(方法论)为主,这也是与传统实验报告相比的区别所在。

(3)教学内容“本体化”。一套教材由多本内涵不同的单科教材构成,就是教育“本体化”的体现,故而单个科目不向其他学科扩展渗透,追求单科教学内容单纯化,追求系列教材的组合效应是本系列教材的一个基本思想。

(4)中、高职教材的梯度衔接。《世界21世纪高等教育宣言》指出:“教育内部层次的衔接是社会各种工作规范层次的需要,教育与就业的衔接,就是教育本身体现其价值的必然性要求。”编写中、高职教材涉及的问题很多,但中、高职教材有梯度的合理衔接应为首要问题,因为它对学校是一个教学的定位问题,对技术是一个标准问题,对企业是一个用人问题,对社会则是一个公平问题,本系列教材为中职同类教材的生存留下了足够的空间。

(5)合理控制教学成本。若实践教学以教授做事方法为主导,则教学成本不会很高,但若以学生实践为主题,则教学成本会增加许多。如今,不计教学成本的时代即将离去,故而,本系列教材要求作者对每一个技能实训的成本作出估算,以免“曲高和寡”,最终难以得到教学双方的认可。

(6)教材内容更加直观。本系列教材广泛使用图表归纳法,用简洁的图表归纳整理,以解决日益庞大的知识内容与学时偏少之间的矛盾。同时,本系列教材图文并茂、直观清晰、便于自学,文字表达简洁明了、通俗易懂。

(7)练习题体现了理论对实践技能的指导。每一个“技能模块”的练习题都需要学生

开动脑筋、相互讨论，到图书馆、互联网去查阅资料，到实验室去做实验才能解答；同时，练习题更加贴近实际，体现应用，而不再只是巩固所学知识。它摒弃了传统应试教育的问答方式，力求体现理论对实践技能的指导，引导学生去探索、去实践、去领悟、去创新。

综上所述，本系列实训教材是对符合当今高等职业教育发展方向的一个有潜在价值的教学模式的探索。本系列教材的作者都是长期担任相关课程教学工作的有工程背景的教师，不仅具备扎实的理论功底，还在职业技能方面积累了丰富的经验。正是由于本系列教材的作者具备了这些条件，才保证了本系列教材的高质量。

总之，本系列教材的出版价值不仅在于它贯彻了国家教育部“教高[2004]1号”文件中高等职业教育的改革思想，而且与当前就业单位“招聘的人能立即上岗”的要求合拍，并为学生毕业后在机电类各专业间转岗奠定了最基本的知识和技能基础。同时其新（新思想、新技术、新面貌）、实（贴近实际、体现应用）、简（文字简洁、风格明快）的编写风格令人耳目一新。

如果您对这个系列的教材有什么意见和建议，或者您也愿意参与这个系列教材中其他专业课教材的编写，可以发邮件至 wuhan@ptpress.com.cn 与我们联系，也可以进入本系列教材的服务网站 www.ycbook.com.cn 留言。

编委会

前 言

当前职业院校专业英语教学所面临的最大问题之一,就是所用的教材不太符合教学实际的需要。考虑到目前高职高专学生英语的实际水平和现代社会对机电一体化与数控技术专业英语的实际要求,以及机电一体化技术与数控技术两个专业的内在联系,我们“合二为一”地编写了这本《机电一体化及数控专业英语》教材。本书每个教学单元分为课文和阅读材料两个部分,在课文部分采用了灵活的版面设计,对课文内容加以旁注,以便于理解;课文内容的选取则以短小精干的文章为主,以便于教学;在编写风格上体现了时代性和实用性。每个教学单元都配有针对性的练习,书末配有练习答案与教学单元课文的参考译文。另外,本书还提供配套电子课件,可在出版社网站下载。

本书以模块式结构进行素材的组织,总体分为基础模块、机电一体化模块、数控技术模块及应用写作模块。这些模块既彼此独立又相互联系、相辅相成。本教材在内容的安排与处理上充分体现了现代社会对专业英语教材广泛性、灵活性与实用性的客观要求。这种灵活而实用的编写方式使本教材适合机电工程类多个方向专业英语的教学需要。本书适合高职高专院校机械设计与制造、机电一体化、数控技术与模具技术等专业作为教材使用,同时也适合成人高校学生以及相关专业技术人员自学使用。目前本书已列入“世纪英才 NEW IDEA INSIDE”教材出版工程(详情请见 www.ycbook.com.cn)。

本书由武汉市一轻工业学校的刘晓莉、武汉铁路职业技术学院的苏雪、武汉工业职业技术学院的邓青担任主编,由江华圣审校。其他参编和提供资料的人员有王璟、王英、阳夏冰、黄超、颜昌彪、周慎、杨宏等。另外,一些厂家和相关人员也为本书的编写提供了部分资料。本书在编写过程中还得到了杨承毅老师的大力支持与帮助。在此一并表示感谢!

由于编者水平有限,书中难免有不妥之处,恳请读者批评指正。

编 者

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Unit 1 Basic Knowledge (I)

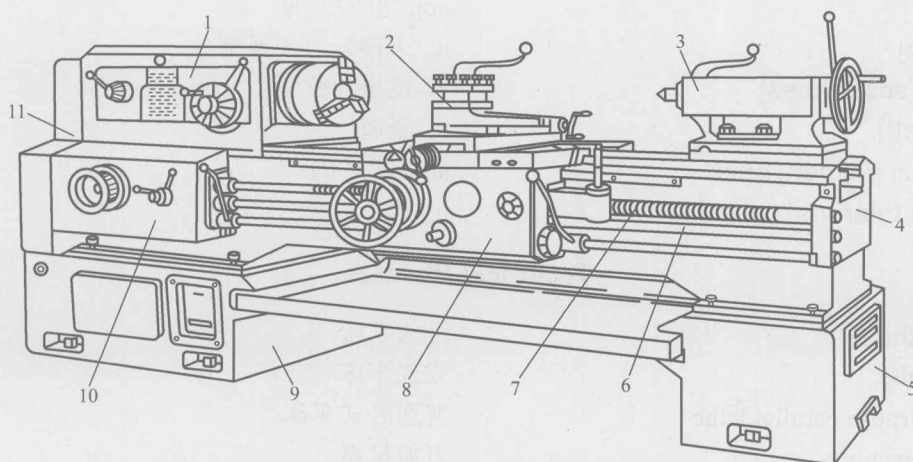
Text 1 Lathe and Turning

In general⁽¹⁾, lathes can be classified as⁽²⁾ parallel lathes, or vertical lathes. The general purpose parallel lathe is a versatile machine in the workshop, and is capable of carrying out⁽³⁾ a wide variety of machining operations.

The main components of the general purpose parallel lathe (see Fig.1T.1.1) are the headstock, the tool-rest, the tailstock, the bed, the lead screw, the feed rod, the apron, etc. The headstock and tailstock are at⁽⁴⁾ opposite ends of a bed, and a tool-rest is between them which holds the cutting tool.¹

Turning means that the part is rotating while it is being machined. The starting material is usually a workpiece that has been made by other processes, such as casting, forging, extrusion, or drawing. Turning operations can be classified as rough turning, or as finish turning operations. The objective of the rough turning operation is to remove the bulk of⁽⁵⁾ the excess metal as rapidly and as efficiently as possible. Enough metal

- (1) in general
一般[大体]说来
- (2) be classified as ...
被分为……
- (3) carry out ...
实现, 执行
- (4) be at ...
在, 位于, 处于
- (5) the bulk of sth.
大部分, 主要部分
- (6) so (that) ...
为了, 以便 [表示目的]



1-Headstock; 2-Tool post; 3-Tailstock; 4-Bed; 5-Headstock pedestal; 6-Feed rod;
7-Lead screw; 8-Apron; 9-Tailstock pedestal; 10-Feeding box; 11-Change gear box

Fig.1T.1.1 A Parallel Lathe

must be left on the workpiece so⁽⁶⁾ a finish turning operation can be performed. The objective of the finish turning operation is to attain the required dimensional tolerances and the required surface finish on all surfaces of the workpiece. Parts are sometimes semi-finish turned in a lathe, and the final dimensions and surface finish are obtained on a grinding machine.²

New Words

lathe [leið]	n. 车床
turning ['tə:niŋ]	n. 车削, 车工工作
parallel ['pærəlel]	adj. 平行的, 卧式的
vertical ['və:tikəl]	adj. 垂直的, 立式的
versatile ['və:sətail]	adj. 有多种用途的, 万用的
workshop ['wə:kʃɒp]	n. 车间, 工厂
headstock ['hedstɒk]	n. 床头箱, 主轴箱, 头架
tool-rest	n. 刀架
tailstock ['teilstɒk]	n. 尾座, 尾架, 顶尖座
bed [bed]	n. 车床床身
pedestal ['pedistl]	n. (支承) 腿, 柱脚, 台座
apron ['eiprən]	n. 溜板箱
workpiece ['wə:kpi:s]	n. 工件
process [prə'ses]	n. 过程, 加工, 工艺
casting ['kɑ:stiŋ]	n. 铸件 (法)
forging ['fɔ:dʒiŋ]	n. 锻件, 模锻
extrusion [eks'tru:ʒən]	n. 挤压件, 挤压
drawing ['dru:ɪŋ]	n. 拉延[削、制、深、丝], 拉制件
objective [əb'dʒektiv]	n. 目标
rough [rʌf]	adj. 粗加工的
bulk [bʌlk]	n. 大部分, 主要部分
excess [ik'ses, 'ekses]	n. 过量, 余量
metal ['metl]	n. 金属
dimensional [di'menʃənəl]	adj. 尺寸的
tolerance ['tɒlərəns]	n. 公差

Technical Phrases

parallel lathe	卧式车床
vertical lathe	立式车床
general purpose parallel lathe	普通卧式车床
versatile machine	万能机器
lead screw	丝杠
feed rod	光杠
cutting tool	切削刀具

finish turning operation

精车加工

grinding machine

磨床, 砂轮机, 研磨机

feeding box

进给箱

change gear box

交换齿轮箱

Notes

1. The headstock and tailstock are at opposite ends of a bed, and a tool-rest is between them which holds the cutting tool.
主轴箱和尾座位于床身两头, 而刀架位于它们之间, 用来夹持刀具。
句中: them 指 headstock 和 tailstock。
which (holds the cutting tool) 引导定语从句修饰先行词 a tool-rest.
2. Parts are sometimes semi-finish turned in a lathe, and the final dimensions and surface finish are obtained on a grinding machine.
在车床上有时零件进行的是半精车, 而所需的最终的尺寸和精整的表面是在磨床上获得的。

Text 2 Vitrified Bond & Vitrified Grinding Wheel

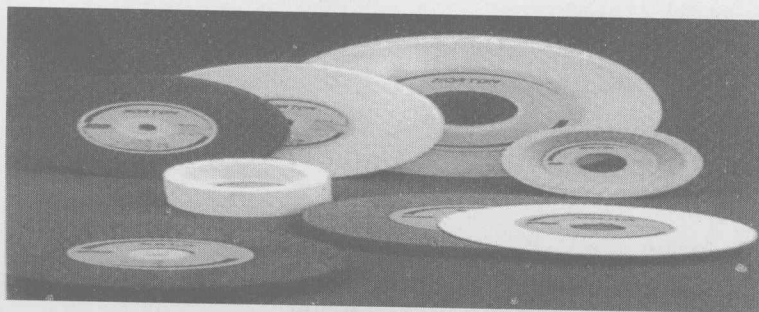


Fig.1T.2.1 Vitrified Grinding Wheels

Vitrified Bonded Grinding Wheel is the most popular abrasive tool used in metal condition area.¹

Bond is a very important composition of a grinding wheel. Its function is to hold abrasive grains together to form a wheel to accomplish the grinding task. Vitrified bond normally is a blend of minerals in vitreous state. The selection of bond is based on⁽¹⁾ the requirements of wheel speed, grinding application and surface finish required.

To achieve the best result, grinding wheels should be chosen carefully and correctly.² Compared with⁽²⁾ other bonded grinding wheels, vitrified bonded grinding wheel has following characters, such as⁽³⁾ rigid, friable, durable, high sintering temperature, high temperature resistance, stable physical and chemical properties,

- (1) based on
以……为基础, 根据
- (2) Compared with
和……相比
- (3) such as
例如……像这种的
- (4) fitting for
适于

which make vitrified bonded grinding wheel fitting for⁽⁴⁾ various cooling systems and low operating speed. So it is the preferred choice for precision grinding application, requiring high accuracy and tight tolerance, such as surface grinding, cylindrical grinding, gear grinding, thread grinding, internal grinding, centerless grinding, etc.

New Words

vitrify ['vitrifai]	v. 使成玻璃状
bond [bɒnd]	n. 结合剂
blend [blend]	n. 混合物, 混合品
mineral ['minərəl]	n. 无机材料
vitreous ['vitriəs]	adj. 呈玻璃态的
rigid ['ridʒid]	adj. 坚硬
friable ['fraiəbl]	adj. 脆性
durable ['djuərəbl]	adj. 耐用
sintering ['sintəriŋ]	adj. 抗(高温)
stable ['steibl]	adj. 稳定的

Technical Phrases

vitrified bond	陶瓷结合剂
Vitrified Bonded Grinding Wheel	陶瓷结合剂砂轮
abrasive tool	磨具
tight tolerance	高的尺寸公差精度
surface grinding	平面磨
cylindrical grinding	外圆磨
gear grinding	齿条修磨
thread grinding	螺纹磨
internal grinding	内圆磨
centerless grinding	无心磨

Notes

1. Vitrified Bonded Grinding Wheel is the most popular abrasive tool used in metal condition area.
陶瓷结合剂砂轮是金属加工领域最常见的一种磨具。
句中 used in metal condition area 为过去分词短语作后置定语。
2. To achieve the best result, grinding wheels should be chosen carefully and correctly.
为了达到最佳的磨削效果, 必须仔细地、合理地选择砂轮。
句中 To achieve the best result 为不定式短语状语, 表示目的。

Text 3 Integrated Circuit

An integrated circuit(also called a chip)is a piece of⁽¹⁾ silicon on which multiple gates have

been embedded. These silicon pieces are mounted on a plastic or ceramic package with pins along the edges that can be soldered onto circuit boards or inserted into⁽²⁾ appropriate sockets.¹ Each pin connects to the input or output of a gate, or to power or ground.

Integrated Circuits(IC)⁽³⁾ are classified by the number of gates contained in them. These classifications also reflect the historical development of IC technology(see Table 1T.3.1).

- (1) a piece of 一块
- (2) inserted into 插入, 加进
- (3) Integrated Circuits(IC) 集成电路
- (4) more than 大于
- (5) small-scale 小规模
- (6) only a few 仅仅少数, 一点点

Abbreviation	Name	Number of Gates
SSI	Small-Scale Integration	1 to 10
MSI	Medium-Scale Integration	10 to 100
LSI	Large-Scale Integration	100 to 100, 000
VLSI	Very-Large-Scale Integration	more than 100, 000

An SSI chip has a few independent gates, such as the one shown in Fig.1T.3.1. This chip has 14 pins: eight for input to gates, four for output of the gates, one for ground, and one for power. Similar chips can be made with different gates.

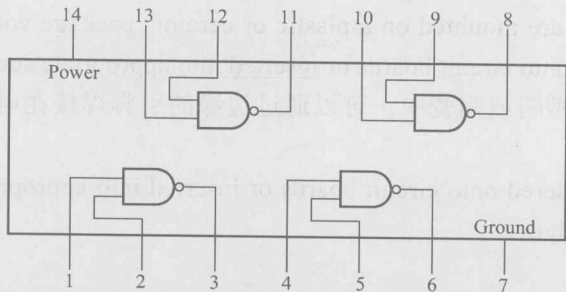


Fig.1T.3.1 An SSI Chip Containing Independent NAND Gates

How can a chip have more than⁽⁴⁾ 100,000 gates on it? That would imply the need for 300, 000 pins! The key is that the gates on a VLSI chip are not independent as they are in small-scale⁽⁵⁾ integration. VLSI chips embed circuits with a high gate-to-pin ratio. That is, many gates are combined to create complex circuits that require only a few⁽⁶⁾ input and output values. Multiplexers are an example of this type of circuit.

New Words

- integrated ['ɪntɪɡreɪtɪd]
- adj. 集成的
- silicon ['sɪlɪkən]
- n. 硅片
- multiple ['mʌltɪpl]
- adj. 多重的, 许多的, 反(重)复的
- gate [geɪt]
- n. 门
- power ['paʊə]
- n. 电源
- ground [ɡraʊnd]
- n. 接地

embed [im'bed]
 mount [maunt]
 plastic ['plæstik, plə:'stik]
 ceramic [si'ræmik]
 solder ['sɒldə, 'sɒ(:)-]
 socket ['sɒkit]
 pin [pin]
 combine [kəm'bain]
 multiplexer ['mʌlti,pleksə]

v. 封装, 放入, 包埋
 v. 安装
 adj. 塑料的
 adj. 陶瓷(材料)的, 陶器(土, 质)的
 v. (低温)焊(接, 固)
 n. 插座(槽), 孔, 穴
 n. 针, 引脚
 v. 组合, 结合
 n. 多路复用器

Technical Phrases

Integrated Circuits(IC)	集成电路(又称芯片), 缩写: IC
Small-Scale Integration	小规模集成, 缩写: SSI
Medium-Scale Integration	中规模集成, 缩写: MSI
Large-Scale Integration	大规模集成, 缩写: LSI
Very-Large-Scale Integration	超大规模集成, 缩写: VLSI

Notes

1. These silicon pieces are mounted on a plastic or ceramic package with pins along the edges that can be soldered onto circuit boards or inserted into appropriate sockets.
 这些硅片被封装在塑料或陶瓷中, 可以通过边缘的引脚焊接在电路板上或插入适合的插座中。
 句中 that can be soldered onto circuit boards or inserted into appropriate sockets. 为定语从句, 先行词为 the edges.

Exercises to the text

I. True or false.

1. The general purpose parallel lathe is a versatile machine in the workshop, and is capable of carrying out a narrow variety of machining operations. ()
2. The headstock and tailstock are at opposite ends of a bed, and a tool-rest is between them which holds the cutting tool. ()
3. Turning means that the part is rotating while it is being machined. ()
4. The objective of the finish turning operation is to remove the bulk of the excess metal as rapidly and as efficiently as possible. ()
5. The objective of the rough turning operation is to attain the required dimensional tolerances and the required surface finish on all surfaces of the workpiece. ()
6. Parts are always semi-finish turned in a lathe, and the final dimensions and surface finish are obtained on a grinding machine. ()

7. Vitrified Bonded Grinding Wheel is the most popular abrasive tool used in metal condition area. ()
8. Vitrified bond generally is a blend of minerals in vitreous state. ()
9. An integrated circuit(also called a chip)is a piece of silicon on which multiple gates have been embedded. ()
10. The gates on a VLSI chip are not independent as they are in small-scale integration. ()

II. Answer the question according to text.

1. In general, how many types can the lathes be divided into?
2. Please write out the principal components of the general purpose parallel lathe.
3. How many types can the turning operations be divided into?
4. Please give out the objective of the rough turning operation.
5. Please give a brief description of the objective of the finish turning operation.
6. What is the bond?
7. What was the main reasons to the selection of bond ?
8. Compared with other bonded grinding wheels, Vitrified Bonded Grinding Wheel has its superiority ,please make a list of them.
9. Vitrified Bonded Grinding Wheel was used in a variety of grinding application, please make a list of them.
10. Please give a brief definition of integrated circuit.

III. Choose from Column B an appropriate object for each of the words in Column A.

- | A | B |
|-----------------|-----------------------------|
| () 1. 车床 | A. headstock |
| () 2. 车削 | B. lathe |
| () 3. 主轴箱 | C. cutting tool |
| () 4. 刀架 | D. tailstock |
| () 5. 床身 | E. apron |
| () 6. 尾架 | F. lead screw |
| () 7. 切削刀具 | G. forging |
| () 8. 丝杠 | H. vitrified bonded |
| () 9. 齿条修磨 | I. grinding wheel |
| () 10. 溜板箱 | J. finish turning operation |
| () 11. 锻件 | K. change gear box |
| () 12. 精车加工 | L. drawing |
| () 13. 拉拔件 | M. feeding box |
| () 14. 进给箱 | N. integrated circuit |
| () 15. 交换齿轮箱 | O. tailstock pedestal |
| () 16. 陶瓷结合剂 | P. internal grinding |
| () 17. 砂轮 | Q. tool post |
| () 18. 内圆磨 | R. bed |
| () 19. 尾座支承腿 | S. pin |