



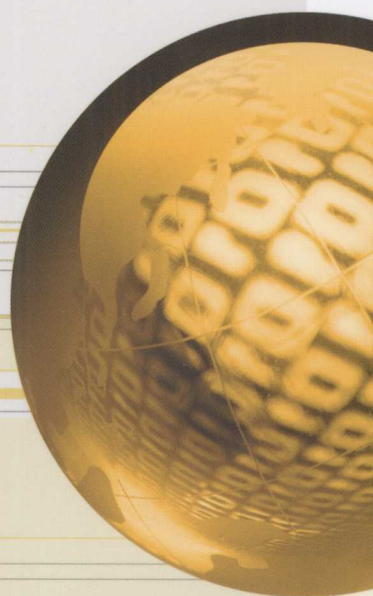
普通高等教育“十一五”国家级规划教材
新编21世纪高等职业教育电子信息类规划教材 · 数控技术应用专业



数控技术 专业英语

(第2版)

汤彩萍 编著



电子工业出版社

PUBLISHING HOUSE OF ELECTRONICS INDUSTRY

<http://www.phei.com.cn>

普通高等教育“十一五”国家级规划教材

新编 21 世纪高等职业教育电子信息类规划教材·数控技术应用专业

数控技术专业英语

(第 2 版)

汤彩萍 编著

電子工業出版社

Publishing House of Electronics Industry

北京·BEIJING

内 容 简 介

本书是一本英文版的数控技术入门教材, 主要介绍数控基础、数控机床、数控操作与编程、金属切削加工与刀具、CAD/CAM 应用、数控机床维护、自动化工厂、数控产品营销等方面的数控技术知识。本书取材基本上源于英美文献原著、美国数控机床制造厂商文件以及网上提供的最新技术信息。文章内容新颖, 文笔流畅, 图文并茂, 采用简单形象的比喻来说明数控机床的工作原理和功能, 具有一定的趣味性。为了训练学习者用英语获得专业信息的能力, 各单元都配有大量的习题。同时, 为了帮助读者顺畅地阅读英文资料, 本书还介绍科技英语翻译的一般技巧。

本书可作为高等职业院校数控技术应用类专业、机电一体化类专业的教材, 也可作为机械制造业及自动化领域有关技术人员或销售人员的参考书。

未经许可, 不得以任何方式复制或抄袭本书之部分或全部内容。
版权所有, 侵权必究。

图书在版编目(CIP)数据

数控技术专业英语/汤彩萍编著. —2版. —北京: 电子工业出版社, 2009.1
新编 21 世纪高等职业教育电子信息类规划教材·数控技术应用专业
ISBN 978-7-121-07906-1

I. 数… II. 汤… III. 数控机床—英语—高等学校: 技术学校—教材 IV. H31

中国版本图书馆 CIP 数据核字 (2008) 第 187125 号

策划编辑: 陈晓明

责任编辑: 陈晓明 特约编辑: 王 芳

印 刷: 北京市李史山胶印厂
装 订:

出版发行: 电子工业出版社

北京市海淀区万寿路 173 信箱 邮编 100036

开 本: 787×1 092 1/16 印张: 14.75 字数: 378 千字

印 次: 2009 年 1 月第 1 次印刷

印 数: 4 000 册 定价: 22.00 元

凡所购买电子工业出版社图书有缺损问题, 请向购买书店调换。若书店售缺, 请与本社发行部联系, 联系及邮购电话: (010) 88254888。

质量投诉请发邮件至 zltz@phei.com.cn, 盗版侵权举报请发邮件至 dbqq@phei.com.cn。

服务热线: (010) 88258888。

前 言

今天,从乡镇企业的小车间到大城市的 500 强企业,数控机床无处不在。这些创新性的机床触及制造业的方方面面,因此从事制造业的每个人都必须很清楚这些复杂的机床的功能。在快速发展的数控技术专业领域,大量的原版英文技术资料 and Internet 提供的最新技术信息与动态,使得英语的掌握对于专业技术的学习和提高有着举足轻重的作用。

专业英语课程同高职院校的其他课程一样,注重实践性和应用性,讲究能力的训练。其实践性并不体现在专用的实验实训设备上,而应通过大量的阅读、大量的习题训练来体现。题干为专业知识的任务型习题不仅能够培养学生英语应用能力和解决实际问题的能力,而且体现了用英语学技术的双语教学理念。

本教材采用项目教学思想组织,分数控就业、数控概念、数控基础、数控机床、插补类型、补偿类型、编程结构、CAD/CAM、高速加工、数控操作、数控机床维护、自动化工厂、数控营销等 13 个项目,涵盖数控相关技术及其涉及的语言点和词汇。

在第 2 版的编写过程中,力求体现下列特点:

1. 该书取材源于英美文献原著、美国数控机床制造厂商文件以及网上提供的最新技术信息。编写时对原文只作删节,不作改写。对选取的文章,力求文笔流畅,用简单形象的比喻来说明数控机床的工作原理和功能,具有一定的趣味性,让读者感觉轻松。

2. 该书较第 1 版增加了大容量的习题。采用具体的机床数控产品为例,相关信息在习题中以背景资料的形式出现,图文并茂,使学生克服专业理解的困难。习题形式多样,有判断题、选择题、填空题、翻译题、看图说话题、问答题和综合运用题等题型,重点设计了工作任务式习题,考查学生的专业英语应用能力。

3. 在语境中学习词汇。采取在上下文中找近义词、反义词等方式,或在一定的语境下进行词类形式的变换,或用英语解释英语的方式锻炼学生“think in English”的能力,实用性强。

4. 各个单元配以相关插图,图文并茂,更直观,易于理解。

5. 书的最后列附录,如将常用缩略语、词汇按字母顺序列表,便于读者查询。

6. 结合教学内容,穿插介绍专业英语翻译的基本技巧。

本书的读者群为将来直接从事数控机床工作的人员,学完本书,读者将对 CNC 功能和原理、数控机床的功能有一个良好的理解。本书也适合将来并不直接与数控设备打交道的人员,学完本书,这些读者将对数控技术具备一些实用性的知识,能够在公司里顺畅地与同事交流数控机床方面的知识。

本书还配套有教师授课用电子课件、各单元教学参考、原版录像、部分习题解答等教学资源,教师可发邮件至 tangcaipingtcp@163.com 索取。

本书得到德国专家 Egon Birkenmaier 先生的大力支持,在此表示感谢。

由于编者水平有限,敬请读者批评指正!

编 者

2008 年 9 月

参加“新编 21 世纪高等职业教育电子信息类规划教材”
编写的院校名单（排名不分先后）

桂林工学院南宁分院

江西信息应用职业技术学院

江西蓝天职业技术学院

吉林电子信息职业技术学院

保定职业技术学院

安徽职业技术学院

杭州中策职业学校

黄石高等专科学校

天津职业技术师范学院

福建工程学院

湖北汽车工业学院

广州铁路职业技术学院

台州职业技术学院

重庆工业高等专科学校

济宁职业技术学院

四川工商职业技术学院

吉林交通职业技术学院

连云港职业技术学院

天津滨海职业技术学院

杭州职业技术学院

重庆职业技术学院

重庆工业职业技术学院

广州大学科技贸易技术学院

湖北孝感职业技术学院

江西工业工程职业技术学院

四川工程职业技术学院

广东轻工职业技术学院

西安理工大学

辽宁大学高职学院

天津职业大学

天津大学机械电子学院

九江职业技术学院

包头职业技术学院

北京轻工职业技术学院

黄冈职业技术学院

郑州工业高等专科学校

泉州黎明职业大学

浙江财经学院信息学院

南京理工大学高等职业技术学院

南京金陵科技学院

无锡职业技术学院

西安科技学院

西安电子科技大学

河北化工医药职业技术学院

石家庄信息工程职业学院
三峡大学职业技术学院
桂林电子工业学院高职学院
桂林工学院
南京化工职业技术学院
湛江海洋大学海滨学院
江西工业职业技术学院
江西渝州科技职业学院
柳州职业技术学院
邢台职业技术学院
漯河职业技术学院
太原电力高等专科学校
苏州经贸职业技术学院
金华职业技术学院
河南职业技术师范学院
新乡师范高等专科学校
绵阳职业技术学院
成都电子机械高等专科学校
河北师范大学职业技术学院
常州轻工职业技术学院
常州机电职业技术学院
无锡商业职业技术学院
河北工业职业技术学院
天津中德职业技术学院
安徽电子信息职业技术学院

浙江工商职业技术学院
河南机电高等专科学校
深圳信息职业技术学院
河北工业职业技术学院
湖南信息职业技术学院
江西交通职业技术学院
沈阳电力高等专科学校
温州职业技术学院
温州大学
广东肇庆学院
湖南铁道职业技术学院
宁波高等专科学校
南京工业职业技术学院
浙江水利水电专科学校
成都航空职业技术学院
吉林工业职业技术学院
上海新侨职业技术学院
天津渤海职业技术学院
驻马店师范专科学校
郑州华信职业技术学院
浙江交通职业技术学院
江门职业技术学院
广西工业职业技术学院
广州市今明科技公司

反侵权盗版声明

电子工业出版社依法对本作品享有专有出版权。任何未经权利人书面许可，复制、销售或通过信息网络传播本作品的行为；歪曲、篡改、剽窃本作品的行为，均违反《中华人民共和国著作权法》，其行为人应承担相应的民事责任和行政责任，构成犯罪的，将被依法追究刑事责任。

为了维护市场秩序，保护权利人的合法权益，我社将依法查处和打击侵权盗版的单位和个人。欢迎社会各界人士积极举报侵权盗版行为，本社将奖励举报有功人员，并保证举报人的信息不被泄露。

举报电话：(010) 88254396; (010) 88258888

传 真：(010) 88254397

E-mail: dbqq@phei.com.cn

通信地址：北京市万寿路 173 信箱

电子工业出版社总编办公室

邮 编：100036

《数控技术专业英语（第2版）》读者意见反馈表

尊敬的读者：

感谢您购买本书。为了能为您提供更优秀的教材，请您抽出宝贵的时间，将您的意见以下表的方式（可从 <http://edu.phei.com.cn> 下载本调查表）及时告知我们，以改进我们的服务。对采用您的意见进行修订的教材，我们将在该书的前言中进行说明并赠送您样书。

姓名：_____ 电话：_____
职业：_____ E-mail：_____
邮编：_____ 通信地址：_____

1. 您对本书的总体看法是：

☐ 很满意 ☐ 比较满意 ☐ 尚可 ☐ 不太满意 ☐ 不满意

2. 您对本书的结构（章节）：☐ 满意 ☐ 不满意 改进意见_____

3. 您对本书的例题 ☐ 满意 ☐ 不满意 改进意见_____

4. 您对本书的习题 ☐ 满意 ☐ 不满意 改进意见_____

5. 您对本书的实训 ☐ 满意 ☐ 不满意 改进意见_____

6. 您对本书其他的改进意见：

7. 您感兴趣或希望增加的教材选题是：

请寄：100036 北京万寿路 173 信箱高等职业教育事业部 刘菊收

电话：010-88254563 E-mail: baiyu@phei.com.cn

Contents

Unit 1 What computer-control programmers and operators do	(1)
Part A Text (数控就业)	(1)
Part B Practice	(5)
Part C Grammar and Translation (科技英语的特点)	(8)
Unit 2 What is CNC	(10)
Part A Text (数控概念)	(10)
Part B Practice	(16)
Part C Grammar and Translation (被动语态的译法)	(17)
Unit 3 Fundamentals of CNC	(19)
Part A Text (数控基础)	(19)
Part B Practice	(24)
Part C Grammar and Translation (定语的译法)	(27)
Part D Supplementary Reading (Programming with codes)	(29)
Unit 4 Know your machine	(30)
Part A Text (数控机床)	(30)
Part B Practice	(36)
Part C Grammar and Translation (as 的用法)	(41)
Unit 5 Understand the motion types	(44)
Part A Text (运动类型)	(44)
Part B Practice	(49)
Part C Grammar and Translation (词义的正确选择)	(51)
Part D Supplementary Reading (Example program showing three types of motion)	(53)
Unit 6 Master the forms of compensation	(55)
Part A Text (补偿形式)	(55)
Part B Practice	(61)
Part C Grammar and Translation (省译)	(63)
Part D Supplementary Reading (How to program cutter radius compensation)	(64)
Unit 7 Format your programs	(66)
Part A Text (程序结构)	(66)
Part B Practice	(70)
Part C Grammar and Translation (增译)	(73)
Part D Supplementary Reading (Program structure)	(74)
Unit 8 Integrate CAD/CAM and CNC	(76)
Part A Text (CAD/CAM 和 CNC 集成)	(76)
Part B Practice	(83)
Part C Grammar and Translation (连词的用法)	(85)

Unit 9 High speed machining	(88)
Part A Text (高速加工)	(88)
Part B Practice	(93)
Part C Grammar and Translation (转译)	(94)
Part D Supplementary Reading (Characteristics of high speed cutting)	(96)
Unit 10 Learn the HAAS control panel	(97)
Part A Text (机床控制面板的操作)	(97)
Part B Practice	(112)
Part C Grammar and Translation (用户说明书的阅读)	(116)
Unit 11 Maintenance and troubleshooting	(117)
Part A Text (机床维护和故障诊断)	(117)
Part B Practice	(122)
Part C Grammar and Translation (长句的译法)	(122)
Part D Supplementary Reading (Vibration)	(124)
Unit 12 Elements of the computer-controlled factory	(125)
Part A Text (自动化工厂的要素)	(125)
Part B Practice	(132)
Part C Grammar and Translation (科技英语翻译小技巧)	(133)
Unit 13 At CIMT	(135)
Part A Text (机床展览会)	(135)
Part B Practice	(138)
Part C Writing (如何写英文求职书)	(138)
Part D Supplementary Reading (At a dinner party)	(141)
Assessment 1 (测试 1)	(145)
Assessment 2 (测试 2)	(150)
Assessment 3 (测试 3)	(154)
Assessment 4 (测试 4)	(160)
Assessment 5 (测试 5)	(165)
Appendix A Suggested translations (参考译文)	(170)
Appendix B List of G code and M code (G 代码和 M 代码表)	(198)
Appendix C Technical vocabulary (专业词汇表)	(201)
Appendix D Abbreviations (缩略语)	(221)
References (参考文献)	(225)

Unit

Part A Text

Warm-up questions

1. In your sense, what do computer-control programmers and operators do?
2. How much do you know about the employment opportunities related to CNC?

What computer-control programmers and operators do

Computer-control programmers and operators use computerized numerical control (CNC) machines to cut and shape precision products, such as automobile parts, machine parts, and compressors. CNC machines include machining tools such as lathes, multi-axis spindles, milling machines, and electrical discharge machines (EDM), but the functions formerly performed by human operators are performed by a computer-control module¹. CNC machines cut away material from a solid block of metal, plastic, or glass - known as a workpiece - to form a finished part². Computer-control programmers and operators normally produce large quantities of one part, although they may produce small batches or one-of-a-kind items. They use their knowledge of the working properties of metals and their skill with CNC programming to design and carry out the operations needed to make machined products that meet precise specifications³.

Before CNC programmers machine a part, they must carefully plan and prepare the operation⁴. First, these workers review three-dimensional computer aided design (CAD) blueprints of the part. Next, they calculate where to cut or bore into the workpiece, how fast to feed the metal into the machine, and how much metal to remove. They then select tools and materials for the job and plan the sequence of cutting and finishing operations⁵.

Next, CNC programmers turn the planned machining operations into a set of instructions. These instructions are translated into a computer aided manufacturing (CAM) program containing a set of commands for the machine to follow. These commands normally are a series of numbers that describes where cuts should occur, what type of cut should be used, and the speed of the cut. CNC programmers and operators check new programs to ensure that the machinery will function properly and that the output will meet specifications. Because a problem with the program could damage costly machinery and cutting tools, computer simulations may be used to check the program instead of a trial run⁶. If errors are found, the program must be changed and retested until the problem is resolved. In addition, growing connectivity between CAD/CAM software and CNC machine tools is raising productivity by automatically translating designs into instructions for the

computer controller on the machine tool⁷. These new CAM technologies enable programs to be easily modified for use on other jobs with similar specifications.

After the programming work is completed, CNC operators perform the necessary machining operations. The CNC operators transfer the commands from the server to the CNC control module using a computer network link or floppy disk. Many advanced control modules are conversational, meaning that they ask the operator a series of questions about the nature of the task. CNC operators position the metal stock on the CNC machine tool - lathe, milling machine, or other - set the controls, and let the computer make the cuts. During the machining process, computer-control operators constantly monitor the readouts from the CNC control module, checking to see if any problems exist. During a machining operation, the operator modifies the cutting program to account for any problems encountered. Unique, modified CNC programs are saved for every different machine that performs a task.

CNC operators detect some problems by listening for specific sounds, for example, a dull cutting tool or excessive vibration. Dull cutting tools are removed and replaced. Machine tools rotate at high speeds, which can create problems with harmonic vibrations in the workpiece. Vibrations cause the machine tools to make minor cutting errors, hurting the quality of the product. Operators listen for vibrations and then adjust the cutting speed to compensate. In older, slower machine tools, the cutting speed would be reduced to eliminate the vibrations, but the amount of time needed to finish the product would increase as a result. In newer, high speed CNC machines, increasing the cutting speed normally eliminates the vibrations and reduces production time. CNC operators also ensure that the workpiece is being properly lubricated and cooled, because the machining of metal products generates a significant amount of heat.

Computer-control programmers and operators can advance in several ways. Experienced CNC operators may become CNC programmers, and some are promoted to supervisory or administrative positions in their firms. A few open their own shops.

Computer-control programmers and operators should have excellent job opportunities. Due to the limited number of people entering training programs, employers are expected to continue to have difficulty finding workers with the necessary skills and knowledge. Job growth in both occupations will be driven by the increasing use of CNC machine tools. Advances in CNC machine tools and manufacturing technology will further automate production, boosting CNC operator productivity and limiting employment growth. The demand for computer-control programmers will be negatively affected by the increasing use of software that automatically translates part and product designs into CNC machine tool instructions.

I can make a good wage and develop a rewarding career working with CNC machines.



TECHNICAL WORDS

machine	[mə'ʃi:n]	<i>n.&v.</i>	机器, 机械; 机加工
position	[pə'ziʃən]	<i>n.&v.</i>	位置, 岗位; 定位
compressor	[kəm'presə]	<i>n.</i>	压缩机
programmer	['prəugræmə]	<i>n.</i>	程序员
operator	['ɒpəreɪtə]	<i>n.</i>	操作员
precision	[pri'siʒən]	<i>n.</i>	精密, 精度
autoloader	['ɔ:təu,ləudə]	<i>n.</i>	自动装卸装置
automobile	['ɔ:təməubi:l]	<i>n.</i>	汽车
module	['mɒdju:l]	<i>n.</i>	模块, 组件
spindle	['spɪndl]	<i>n.</i>	主轴
solid	['sɒlɪd]	<i>n.</i>	固体, 实体
property	['prɒpəti]	<i>n.</i>	属性, 特性
blueprint	['blu:,prɪnt]	<i>n.</i>	蓝图
workpiece	['wɜ:kpi:s]	<i>a.</i>	工件, 加工件
bore	[bɔ:]	<i>v.</i>	镗孔; 钻孔
mill	[mil]	<i>v.&n.</i>	铣; 铣床; 铣刀
specification	[,spesɪfɪ'keɪʃən]	<i>n.</i>	规格
feed	[fi:d]	<i>n.&v.</i>	进给, 切入
job	[dʒɒb]	<i>n.</i>	工作任务, 作业, 零件活
modify	['mɒdɪfaɪ]	<i>v.</i>	修改
instruction	[ɪn'strʌkʃən]	<i>n.</i>	指令; 指导
simulation	[,sɪmjʊ'leɪʃən]	<i>n.</i>	模拟, 仿真
function	['fʌŋkʃən]	<i>n.&v.</i>	作用, 功能; 起作用, 运行
productivity	[,prɒdʌk'tɪvɪti]	<i>n.</i>	生产率
connectivity	[kənek'tɪvɪti]	<i>n.</i>	连通性, 兼容性
technology	[tek'nɒlədʒi]	<i>n.</i>	技术
stock	[stɒk]	<i>n.</i>	毛坯, 余量; 库存
readout	['ri:daut]	<i>n.</i>	读数, 显示值
vibration	[vaɪ'breɪʃən]	<i>n.</i>	振动
compensate	['kɒmpənsɪt]	<i>v.</i>	补偿
lubricate	['lu:brikeɪt]	<i>v.</i>	润滑
cool	[ku:l]	<i>v.</i>	冷却

PHRASES

be known as	称为
be referred to as	称为
small batches or one-of-a-kind items	单件小批量
account for (problems)	解决 (问题)
prior to	在前, 居先
carry out	(perform) 进行, 完成
three-dimensional	三维的
cut away	(remove) 切除
machine tool	机床
computerized numerical control	(CNC) 计算机数控
electrical discharge machine	(EDM) 电火花加工机
turning machine	(lathe) 车床
milling machine	(mill) 铣床
computer aided design	(CAD) 计算机辅助设计
computer aided manufacturing	(CAM) 计算机辅助制造
trial run	试运行
floppy disk	软磁盘
cutting tool	刀具
cutting speed	切削速度
finished part	成品件

NOTES

1. CNC machines include **machining tools** such as lathes, multi-axis spindles, milling machines, and electrical discharge machines (EDM), but the functions formerly performed by human operators are performed by a computer-control module. 数控(CNC)机床包括车床、多轴机床、铣床和电火花机床(EDM), 只不过以前由人工完成的功能现在由计算机控制模块完成。这里 **machining tools** 中的 *machine* 作为动词用, 是机加工的意思, 机床是制造各种机器的工具, 被称为工作母机, 因此英语里“机床”往往用“*machine tool*”来表达。

2. CNC machines cut away material from a solid block of metal, plastic, or glass - known as a workpiece - to form a finished part. 数控机床从整块的金属、塑料或玻璃实体(称为工件)上切除材料, 形成成品件。

3. They use their knowledge of the working properties of metals and their skill with CNC programming to design and carry out the **operations needed** to make machined products **that meet precise specifications**. 他们运用其金属材料特性方面的知识和数控编程方面的技能进行设计和加工, 制造满足精度要求的机加工产品。*needed* 为过去分词, 作后置定语, 修饰 *operations*;

that meet precise specifications 是定语从句, 修饰 *products*。

4. Before CNC programmers machine a part, they must carefully plan and prepare the operation. 在数控程序员加工零件之前, 他们必须对整个加工过程进行仔细的规划和准备。

5. First, these workers review three-dimensional computer aided design (CAD) blueprints of the part. Next, they calculate where to cut or bore into the workpiece, how fast to feed the metal into the machine, and how much metal to remove. They then select tools and materials for the job and plan the sequence of cutting and finishing operations. 首先, 这些工人查看零件的三维计算机辅助设计(CAD)图纸; 接下来, 他们计算切入或钻入工件的位置、工件的进给速度、金属的去除量; 然后, 他们选择适合工件的刀具和材料, 制定粗加工和精加工操作的顺序。

6. Because a problem with the program could damage costly machinery and cutting tools, computer simulations may be used to check the program instead of a trial run. 因为程序有问题会对机床和刀具造成极大的损坏, 因此可用计算机仿真的方法检查程序的正确性, 而不用试运行的方法。

7. In addition, growing connectivity between CAD/CAM software and CNC machine tools is raising productivity by automatically translating designs into instructions for the computer controller on the machine tool. 另外, CAD/CAM 软件与数控机床之间的联系日益紧密, CAD/CAM 软件能自动将设计结果转换成机床的计算机控制器能接受的指令, 这大大提高了生产率。

Part B Practice

I. Translate the following words into English.

- | | |
|-------------|--------------|
| 1. 精密产品 | 2. 加工(n.) |
| 3. 工艺准备(v.) | 4. 切入点 |
| 5. 进给速度 | 6. 工件、作业 |
| 7. 指令(n.) | 8. 符合规格 |
| 9. 修改程序 | 10. 解决问题 |
| 11. 数控机床 | 12. 电火花加工机 |
| 13. 车床 | 14. 铣床 |
| 15. 强烈的振动 | 16. 润滑(n.) |
| 17. 冷却(n.) | 18. 完成功能(v.) |
| 19. 数控编程(员) | 20. 数控操作(员) |

II. Fill in the blanks with the following words, changing their forms if necessary.

CAD, CAM, CNC, EDM, calculate, select, review, translate

- _____ uses all the advanced technologies to automate the operations in manufacturing and handle the data that drive the process.
- _____ is a televisionlike system that produces a picture on the CRT screen.
- First, these workers _____ three-dimensional computer aided design (CAD) blueprints of the part. Next, they _____ where to cut or bore into the workpiece, how fast to

feed the metal into the machine, and how much metal to remove. They then _____ tools and materials for the job and plan the sequence of cutting and finishing operations.

4. _____ is the process of removing metal through the use of electrical sparks which burn away the metal.

5. To eliminate the vibrations, the cutting speed would be _____, as a result, the amount of time needed to finish the product would increase.

III. Choose the best answer.

1. The first thing for a CNC programmer is:

A. To review three-dimensional computer aided design (CAD) blueprints of the part

B. To calculate where to cut or bore into the workpiece, how fast to feed the metal into the machine, and how much metal to remove

C. To select tools and materials for the job and plan the sequence of cutting and finishing operations

Your answer: _____

2. Because a problem with the program could damage costly machinery and cutting tools, what may be firstly used to check the program?

A. A trial run

B. The single-block run

C. Computer simulations

Your answer: _____

3. The proper sequence of performing the necessary machining operations for a CNC operator is as the following:

①transfers the commands from the server to the CNC control module using a computer network link or floppy disk.

②sets the controls

③positions the metal stock on the CNC machine tool

④monitors the machining process

⑤lets the computer make the cuts

A. ①→③→②→⑤→④

B. ①→②→④→③→⑤

C. ①→②→③→④→⑤

Your answer: _____

4. Sounds in the CNC machine is probably caused by:

A. a dull cutting tool

B. high speeds

C. both of the above

Your answer: _____

IV. Fill in the brackets with words that have the similar meaning with the underlined words, changing their forms if necessary.

1. () During a machining operation, the operator modifies the cutting program to account for any problems encountered.
2. () Because a problem with the program could damage costly machinery and cutting tools, computer simulations may be used to check the program instead of a trial run.
3. () If errors are found, the program must be changed and retested until the problem is resolved.
4. () Conversational programming means that the control asks the operator a series of questions about the nature of the task.
5. () These new CAM technologies enable programs to be easily modified for use on other jobs with similar specifications.
6. () CNC programmers turn the planned machining operations into a set of instructions.
7. () Machine tools rotate at high speeds, which can create problems with harmonic vibrations in the workpiece.
8. () CNC operators also ensure that the workpiece is being properly lubricated and cooled, because the machining of metal products generates a significant amount of heat.

V. Answer the following questions according to the text.

1. After reading the text, can you tell what computer-control programmers and operators do? Use your own words to conclude the working procedures.
2. In order to program and operate a CNC machine, what knowledge do you think is necessary?

VI. Translate the following passage into Chinese.

Job opportunities related to CNC

There is quite a shortage of skilled people to utilize (利用) CNC machines. And the shortage is growing. Everywhere I go I hear manufacturing people claiming that they cannot find skilled people. Unfortunately, it has also been my experience that pay scales have not yet reflected this shortage. Even so, you can make a good wage and develop a rewarding career working with CNC machines. Here are some of the job titles of people working with CNC machine tools.

Working for manufacturing companies:

CNC helpers; CNC tool setters; CNC operators; CNC setup people; CNC programmers; CAM system programmers; CNC maintenance (维护) personnel

Working for companies that sell CNC machines

CNC service (维修服务) technicians (技师); CNC applications engineers; CNC instructors

Working for schools

CNC instructors