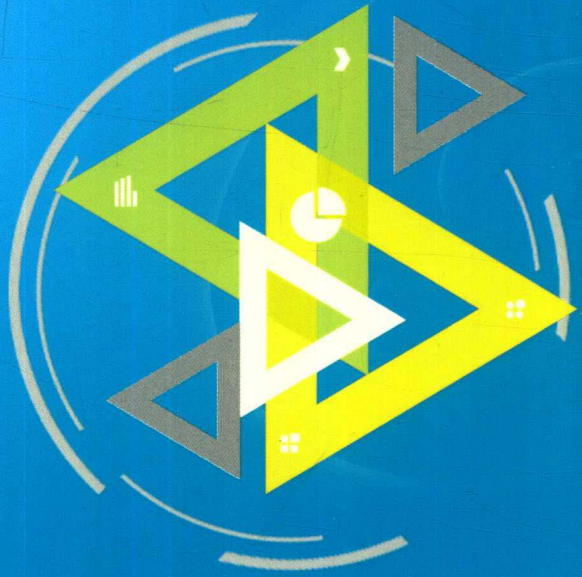
普通高等教育“十三五”规划教材

Fundamentals of Manufacturing Technology Problems Set

英汉对照

机械制造技术基础习题集

任小中 任乃飞 ◎ 等编著



机械工业出版社
CHINA MACHINE PRESS

普通高等教育“十三五”规划教材

Fundamentals of Manufacturing Technology

Problems Set

机械制造技术基础习题集

（英汉对照）

任小中　任乃飞　薛进学　杨建军　编著

机械工业出版社

本习题集条理清晰，重点突出，题型齐全，编写形式新颖，除附录外，共汇编了近800道习题，主要内容包括金属切削原理、机床与刀具、机械加工工艺的制订、机床夹具设计原理、机械加工质量分析与控制、机械装配技术基础和先进制造技术简介。每章习题均分为六部分：名词英汉对照、填空题、选择题、判断题、简答题、分析与计算题。学生可根据教学需要选做中文或英文习题。附录中备有自测练习和中、英文样卷，并附有参考答案，以供学生检验自己对所学知识的理解和掌握程度。

本习题集是以英汉双语的形式编著的与“机械制造技术基础”和“机械制造工艺学”课程配套的习题集，与机械工业出版社出版的《机械制造技术基础》（英汉双语对照）和《机械制造工艺学》（英汉双语对照）教材配套使用，可作为高等院校本、专科生同类课程双语教学的配套教材，或继续教育同类课程的辅助教材，也可供从事机械制造的有关技术人员作为参考资料。

图书在版编目（CIP）数据

机械制造技术基础习题集 = Fundamentals of Manufacturing Technology Problems Set：英汉对照/任小中等编著. —北京：机械工业出版社，2017.9

普通高等教育“十三五”规划教材

ISBN 978-7-111-59030-9

Ⅰ.①机… Ⅱ.①任… Ⅲ.①机械制造工艺-高等学校-习题集-英、汉 Ⅳ.①TH16-44

中国版本图书馆CIP数据核字（2018）第080962号

机械工业出版社（北京市百万庄大街22号 邮政编码100037）

策划编辑：舒 恬 责任编辑：舒 恬 李 超

责任校对：李芸霞 封面设计：张 静

责任印制：张 博

三河市国英印务有限公司印刷

2018年7月第1版第1次印刷

184mm×260mm · 10.75印张 · 259千字

标准书号：ISBN 978-7-111-59030-9

定价：26.00元

凡购本书，如有缺页、倒页、脱页，由本社发行部调换

电话服务

服务咨询热线：010-88379833

读者购书热线：010-88379649

网络服务

机工官网：www.cmpbook.com

机工官博：weibo.com/cmp1952

教育服务网：www.cmpedu.com

金书网：www.golden-book.com

封面无防伪标均为盗版

Preface

With the economic globalization and the increase of international communication activities, requirements of society for the talents in foreign language proficiency and international competitive power are getting higher and higher. To carry out bilingual teaching is an important measure to make the domestic higher education connect to international education.

Bilingual textbook is the basis of bilingual teaching. Appropriate bilingual textbook is the key to ensure high teaching quality. Two bilingual textbooks published by China Machine Press, i. e. *Fundamentals of Manufacturing Technology* written by Ren Xiaozhong, Ren Naifei and Wang Hongjun and *Machine Manufacturing Technology* written by Ren Xiaozhong and Zhou Jinmin, have provided high quality resources for the bilingual teaching of similar courses, and have got favourable comment from teachers and students. In order to fulfill the promise in the preface of these two books and to detect the understanding of the students on the contents of the textbook, combining with the published bilingual textbooks, we compiled this bilingual problems set written in both English and Chinese. This bilingual problems set written in both English and Chinese on the "Fundamentals of Manufacturing Technology" and the "Machine Manufacturing Technology". The purposes are to provide excellent teaching resource for the teaching of similar courses, especially for bilingual teaching and to improve teaching quality.

Taking "focused on 'learning activities', 'enhancing diathesis' as the goal" as guiding ideology, with an eye to enhancing students' comprehensive quality, this book integrated the teaching experiences accumulated by authors and inherited the essence of traditional teaching contents so as to encourage students to be active and enthusiastic in learning. For the convenience in use, the layout of this book is consistent with the bilingual textbook *Fundamentals of Manufacturing Technology* written by Ren Xiaozhong, Ren Naifei and Wang Hongjun, providing uniformity of teaching and learning as well as promoting interactive learning and exercises. This book can also be taken as the supplementary material of the bilingual textbook *Machine Manufacturing Technology* written by Ren Xiaozhong and Zhou Jinmin.

The book consists of seven chapters. Main contents include principles of metal cutting, machine tools and cutting tools, machining process planning, design principles of machine tool fixture, analysis and control of machining quality, fundamentals of machine assembly technalogy, and brief introduction to advanced manufacturing technology. The exercises in each chapter are divided into six parts: English-Chinese terms, filling in the blanks, making choice, true or false, short-answer questions, analysis and calculation. In the appendix, there are evaluation exercises and several test papers accompanied with answers, which are provided for students to test their understanding of what they have learned.

The book is written jointly by Prof. Ren Xiaozhong (Henan University of Science & Technolo-

gy), Prof. Ren Naifei (Jiangsu University), Xue Jinxue and Yang Jianjun (Henan University of Science & Technology). The specific division of the writing tasks is as follows: Ren Xiaozhong wrote Chapter 1, Chapter 4, Chapter 6, Chapter 7 and Appendix; Ren Naifei wrote Chapter 2, Chapter 5; Xue Jinxue wrote Section 3.1 to Section 3.3 of Chapter 3; Yang Jianjun wrote Section 3.4 to Section 3.6 of Chapter 3.

Ren Xiaozhong is in charge of overall compiling and editing the entire bilingual textbook.

The book has referenced some textbooks published at home and abroad. Hereon, we express a most cordially thank to the authors. At the same time, we also announce our sincerely acknowledgement to all who have provided their helps and kindness for the publication of the book.

Due to various limitations, there may be some improper contents or even mistakes in the first edition. We respectfully invite criticisms and corrections from all experts and readers for further improvement of the book so that the flaws and errors can be corrected in future versions.

Authors

前　言

随着经济全球化和国际交流活动的日益频繁，社会对人才外语水平和国际竞争能力的要求越来越高。双语教学是我国高等教育与国际教育接轨的一项重要举措。

双语教材是开展双语教学的基础，合适的双语教材是保证双语教学质量的关键。由机械工业出版社出版，任小中、任乃飞、王红军编著的《机械制造技术基础》（英汉双语对照）和由任小中、周近民编著的《机械制造工艺学》（英汉双语对照），为同类课程双语教学提供了优质资源，深受任课教师和学生的好评。为了兑现在这两部教材“前言”中的承诺，更是为了便于检测学生对教材内容的理解和掌握程度，作者结合已出版的双语教材内容编写了这本英汉双语习题集。这部以中、英文形式编著的“机械制造技术基础”和“机械制造工艺学”方面的双语习题集，旨在为同类课程教学，尤其是双语教学提供优质的教学资源，保证教学质量。

本习题集以“学”为中心，以“提高素质”为目标，继承传统内容的精华，融入作者多年积累的教学经验，着眼于培养学生的综合素质，力求最大限度地调动学生学习的积极性和主动性。为方便使用，本习题集的编排顺序与由任小中、任乃飞、王红军编著的《机械制造技术基础》（英汉双语对照）教材体系一致，并相互配合，使教与学相统一、学与练相促进。本习题集也可作为由任小中、周近民编著的《机械制造工艺学》（英汉双语对照）教材的辅助教材。

本习题集共有七章，主要内容包括金属切削原理、机床与刀具、机械加工工艺的制订、机床夹具设计原理、机械加工质量分析与控制、机械装配技术基础、先进制造技术简介。每章习题均分为六个部分：名词英汉对照、填空题、选择题、判断题、简答题、分析与计算题。学生可根据教学需要选做中文或英文习题。附录中备有自测练习和样卷，并附有参考答案，以供学生检验自己对所学知识的理解和掌握程度。

本习题集由任小中教授（河南科技大学）、任乃飞教授（江苏大学）、薛进学和杨建军（河南科技大学）共同编著。具体编写分工为：任小中编写第 1 章、第 4 章、第 6 章、第 7 章和附录，任乃飞编写第 2 章和第 5 章，薛进学编写第 3 章的 3.1~3.3 节，杨建军编写第 3 章的 3.4 ~3.6 节。全书由任小中负责统稿。

本习题集参考了国内外出版的一些教材和习题集，谨此向有关作者表示诚挚的谢意！同时，向所有关心和帮助本书出版的人员表示感谢！

由于编者水平有限，书中难免有错漏和不当之处，敬请各位专家和广大读者批评指正。

作　者

CONTENTS 目录

Chapter 1

Principles of Metal Cutting

第1章

金属切削原理

1.1 English-Chinese Terms 名词英汉对照

1. machining 机械加工
2. rake angle 前角
3. clearance angle 后角
4. leading cutting edge angle 主偏角
5. trailing cutting edge angle 副偏角
6. cutting edge inclination angle 刃倾角
7. primary motion 主运动
8. feed motion 进给运动
9. build-up edge 积屑瘤
10. tool life 刀具寿命
11. machining variables 切削用量

1.2 Filling in the blanks 填空题

1. In machining, the movement of _____ is named as cutting motion. According to the function, the cutting motion can be divided into _____ and _____, where _____ consumes the largest power.

在加工中，_____运动称为切削运动。按其功用，切削运动可分为_____和_____。其中_____运动消耗功率最大。

2. The three elements of machining variables mean _____, _____ and _____.

切削用量三要素是指_____、_____和_____。

3. The assumptions for the reference system of static tool angle are _____ and _____.

刀具静止角度参考系的假定条件是_____和_____。

4. Common used section planes of cutting edge are _____, _____, _____ and _____, each of them and the reference plane and the cutting plane constitute the corresponding reference system.

常用的切削刃剖切平面有_____、_____、_____和_____，它们可分别与基面和切削平面组成相应的参考系。

5. The angle included between rake face and reference plane in orthogonal plane is called _____, and the angle included between the flank and cutting plane is called _____.

在正交平面内，前刀面与基面之间的夹角称为_____，后刀面与切削平面之间的夹角称为_____。

6. The condition to coincide the orthogonal plane and the normal plane is _____.

正交平面与法平面重合的条件是_____。

7. After the reference plane is determined, the rake face is determined by _____ and _____; the flank is determined by _____ and _____. The rake face and flank determines

a cutting edge, therefore, a cutting edge is determined by four angles, i. e. _____, _____, _____ and _____.

当基面确定后，前刀面由_____和_____两个角度确定；后刀面由_____和_____两个角度确定。前、后刀面确定了一条切削刃，所以一条切削刃由_____、_____、_____、_____四个角度确定。

8. Two types of reference systems to determine tool angles are _____ and _____.

用以确定刀具几何角度的两类参考坐标系为_____和_____。

9. Undeformed chip dimensions are _____, _____ and _____.

切削层参数有_____、_____和_____。

10. The sequence to select machining variables is: the first is to select _____, then is _____, the last is to select _____.

切削用量选择的顺序是：先选_____，再选_____，最后选_____。

11. Common physical phenomena in the metal cutting process are _____, _____, _____ and _____.

金属切削过程中常见的物理现象有_____、_____、_____和_____。

12. In the chip form, the chip can be classified as ribbon chip, _____, _____ and splintering chip.

从形态上看，切屑可以分为带状切屑、_____、_____和崩碎切屑四种类型。

13. The deformation zone Ⅱ occurs at _____, its deformation feature is _____.

第Ⅱ变形区发生在_____，其变形特点是_____。

14. Sources of cutting force are mainly from _____ and _____.

切削力的来源主要是_____和_____两方面。

15. With the increase of leading cutting edge angle, the back force F_p _____, the feed force F_f _____.

刀具主偏角增加，背向力 F_p _____，进给力 F_f _____。

16. The primary forms of the normal tool wear are _____, _____ and _____.

刀具正常磨损的主要形式有_____、_____和_____。

17. The main causes of tool wear are _____, _____, _____ and oxidizing wear.

刀具磨损的原因主要有_____、_____、_____和氧化磨损。

18. The functions of cutting fluids are _____, _____, _____ and _____. Common used types are _____, _____ and _____.

切削液的作用是_____、_____、_____和_____。常用种类有_____、_____和_____。

19. The geometrical shapes of cutting tool mean _____, _____ and the shape of cutting edge.

刀具的几何形状指的是_____、_____和切削刃的形状。

20. In roughing, the main factor to restrict the feed is _____; in finishing, the main factor to restrict the feed is _____.

粗加工时，限制进给量的主要因素是_____；精加工时，限制进给量的主要因素

是_____。

21. The methods to measure cutting deformation are _____, _____.

衡量切削变形的方法有_____、_____两种。

22. When finish turning cast irons, (YG3、YT10、YG8)㊀ should be selected; when rough turning steels, (YT5、YG6、YT30) should be selected.

精车铸铁时，应选用（YG3、YT10、YG8）；粗车钢时，应选用（YT5、YG6、YT30）。

23. When the feed rate increases, the cutting force (increases, decreases), and the cutting temperature (increases, decreases).

当进给量增加时，切削力（增加、减少），切削温度（增加、减少）。

24. (Water-based fluids, cutting oils) should be selected in finishing; the high carbon steels should be treated by (annealing, quenching㊁) in order to improve machinability.

精加工时应选择（水溶液，切削油）；为改善切削加工性，对高碳钢材料应进行（退火，淬火）处理。

1.3 Making choice 选择题

1. In longitudinal turning, the cutting force which does not consume power but has an effect on the machining accuracy is _____.

A. feed force　　B. back force

C. major cutting force　　D. resultant cutting force

纵车外圆时，不消耗功率但影响工件精度的切削分力是_____。

A. 进给力　　B. 背向力　　C. 主切削力　　D. 总切削力

2. As for the influence of machining variables on cutting temperature, the influencing degree from large to small is _____.

A. $v_c \rightarrow a_p \rightarrow f$　　B. $v_c \rightarrow f \rightarrow a_p$　　C. $f \rightarrow a_p \rightarrow v_c$　　D. $a_p \rightarrow f \rightarrow v_c$

切削用量对切削温度的影响程度由大到小的顺序是_____。

A. $v_c \rightarrow a_p \rightarrow f$　　B. $v_c \rightarrow f \rightarrow a_p$　　C. $f \rightarrow a_p \rightarrow v_c$　　D. $a_p \rightarrow f \rightarrow v_c$

3. One of the functions of the cutting edge inclination angle is to control the chip flowing direction. If the inclination angle is negative, the chip flows to _____.

A. machined surface　　B. surface to be machined

C. along the normal direction to the cutting edge　　D. uncertain

刃倾角的功用之一是控制切屑流向。若刃倾角为负，则切屑流向_____。

A. 已加工表面　　B. 待加工表面

C. 沿切削刃的法线方向　　D. 不确定

4. The carbides often used to cut brittle materials belong to _____.

A. YT type (P)　　B. YG type (K)　　C. YW type (M)　　D. diamond

㊀ 从括号中勾选出正确的一项即可，后同。

㊁ 淬火有时翻译为“hardening”，本书统一使用“quenching”。

常用于切削脆性材料的硬质合金属于____。

A. YT 类（P 类） B. YG 类（K 类） C. YW 类（M 类） D. 金刚石

5. The element which has the largest effect on cutting force is ____.

A. cutting thickness B. cutting depth C. feed D. cutting speed

对切削力影响最大的因素是____。

A. 切削厚度 B. 切削深度 C. 进给量 D. 切削速度

6. In surface grinding, the grade and structure of grinding wheel should be ____.

A. soft and dense B. soft and open C. hard and dense D. hard and open

在磨削平面时，砂轮的硬度和组织应该是____。

A. 软、紧密 B. 软、疏松 C. 硬、紧密 D. 硬、疏松

7. The number of primary motion may be ____.

A. only one B. two C. three D. four

主运动的数量可能是____。

A. 只有 1 个 B. 2 个 C. 3 个 D. 4 个

8. The carbides used to cut both steels and cast irons belong to ____.

A. YT type (P) B. YG type (K) C. YW type (M) D. diamond

既可以用于切削钢材也可以用来切削铸铁的硬质合金属于____。

A. YT 类（P 类） B. YG 类（K 类） C. YW 类（M 类） D. 金刚石

9. The element which has the largest effect on cutting temperature is ____.

A. cutting thickness B. cutting depth C. feed D. cutting speed

对切削温度影响最大的因素是____。

A. 切削厚度 B. 切削深度 C. 进给量 D. 切削速度

10. In finish grinding, the grade and structure of grinding wheel should be ____.

A. soft and dense B. soft and open C. hard and dense D. hard and open

在精磨时，砂轮的硬度和组织应该是____。

A. 软、紧密 B. 软、疏松 C. 硬、紧密 D. 硬、疏松

11. Of the three components of cutting force, ____ consumes the largest power.

A. feed force F_x B. radial cutting force F_y C. main cutting force F_z D. uncertain

在车削的三个切削分力中，____消耗的功率最大。

A. 进给抗力 F_x B. 径向切削力 F_y C. 主切削力 F_z D. 不确定

12. In turning, the surface, which is on the cutting tool, facing to the machined surface is ____.

A. rake face B. flank C. minor flank D. reference plane

切削时刀具上与工件已加工表面相对的表面是指车刀的____。

A. 前面 B. 主后刀面 C. 副后刀面 D. 基面

13. The angle included between the major cutting edge and reference plane in cutting plane is ____.

A. γ_o B. α_o C. κ_r D. λ_s

在切削平面中测量的主切削刃与基面之间的夹角是 ____。

A. 前角 γ_o　　B. 后角 α_o　　C. 主偏角 κ_r　　D. 刃倾角 λ_s

14. YT type carbides are mainly used to cut ____.

A. steels　　B. cast irons　　C. ceramics　　D. diamonds

YT 类硬质合金刀具主要用于加工____。

A. 钢　　B. 铸铁　　C. 陶瓷　　D. 金刚石

15. The plane which passes through a designated point on the cutting edge and is perpendicular to the direction of primary motion is called ____.

A. cutting edge plane　B. feed plane　　C. reference plane　　D. orthogonal plane

通过切削刃选定点，垂直于主运动方向的平面称为____。

A. 切削平面　　B. 进给平面　　C. 基面　　D. 主剖面

16. The angle included between the rake face and reference plane in orthogonal plane is ____.

A. rake angle　　B. clearance angle

C. cutting edge angle　　D. cutting edge inclination angle

在正交平面内度量的基面与前刀面的夹角为____。

A. 前角　　B. 后角　　C. 主偏角　　D. 刃倾角

17. Cutting edge inclination angle is the angle included between major cutting edge and ____.

A. cutting edge plane　　B. reference plane

C. major motion direction　　D. feed direction

刃倾角是主切削刃与____之间的夹角。

A. 切削平面　　B. 基面　　C. 主运动方向　　D. 进给方向

18. In turning, the working rake angle of the lathe cutter ____ the designated rake angle of the lathe cutter.

A. is larger than　　B. equals

C. is smaller than　　D. is at times larger or smaller than

车削加工时，车刀的工作前角____车刀标注前角。

A. 大于　　B. 等于　　C. 小于　　D. 有时大于，有时小于

19. When using the carbides cutter for finish cutting the workpiece made of carbon steel, the cutting tool material should be ____.

A. YT30　　B. YT5　　C. YG3　　D. YG8

用硬质合金刀具对碳素钢工件进行精加工时，应选择刀具材料的牌号为____。

A. YT30　　B. YT5　　C. YG3　　D. YG8

1.4 True or false 判断题

1. The phenomena such as BUE, wear on the rake face etc. occurred in cutting are caused by the deformation produced in the deformation zone Ⅲ. (　　)

切削时出现的积屑瘤、前刀面磨损等现象，都是第Ⅲ变形区的变形所造成的。(　　)

2. The deformation produced in the deformation zone Ⅲ is the leading cause of machined sur-

face hardening and residual stress. ( )

第Ⅲ变形区的变形是造成已加工表面硬化和残余应力的主要原因。( )

3. Under the condition of forming cracked chip, the splintering chip may be occurred by decreasing the rake angle and cutting speed, and increasing the cutting thickness. ( )

在形成挤裂切屑的条件下，若减小刀具前角，降低切削速度，加大切削厚度，就可能得到崩碎切屑。( )

4. Under the condition of forming cracked chip, the ribbon chip may be occurred by increasing the rake angle and cutting speed, and decreasing the cutting thickness. ( )

在形成挤裂切屑的条件下，若加大刀具前角，提高切削速度，降小切削厚度，就可能得到带状切屑。( )

5. Major cutting force F_c is the main basis for calculating the machine tool power and designing the fixture and cutting tool. ( )

主切削力 F_c 是计算机床功率及设计夹具、刀具的主要依据。( )

6. Feed force F_f is the important basis for designing and checking the strength of machine tool's feed mechanism. ( )

进给抗力 F_f 是设计和校验机床进给机构强度的重要依据。( )

7. Cutting power is the power consumed mainly by primary motion and major cutting force. ( )

切削功率主要是主运动和主切削力所消耗的功率。( )

8. There are many factors influencing on the cutting force. Tool material, tool wear and cutting fluid are the uppermost factors. ( )

影响切削力的因素很多，其中最主要的是刀具材料、刀具磨损、切削液。( )

9. The magnitude of cutting temperature depends on not only the amount of heat generated in the heat source, but also the heat dissipation condition. ( )

切削温度的高低不仅取决于热源区产生热量的多少，而且还取决于散热条件的好坏。( )

10. In finish machining, the BUE is beneficial for the cutting process. ( )

在精加工时，积屑瘤对切削过程是有利的。( )

11. In machining variables, the feed has the least effect on the tool life. ( )

切削用量中进给量对刀具寿命的影响最小。( )

12. There is only one feed motion in machining process. ( )

在切削加工中，进给运动只能有一个。( )

13. Other parameters are constant, if the cutting edge angle decreases, the cutting layer thickness increases. ( )

其他参数不变，主偏角减少，切削层厚度增加。( )

14. Other parameters are constant, if the cutting depth increases, the cutting width increases. ( )

其他参数不变，切削深度增加，切削层宽度增加。( )

15. The angle included between the leading cutting edge and feed direction is called leading

cutting edge angle. (　　)

主切削刃与进给运动方向间的夹角为主偏角 κ_r。(　　)

16. In cylindrical turning, if the tool nose is higher than the center of workpiece, the practical rake angle increases. (　　)

车削外圆时，若刀尖高于工件中心，则实际前角增大。(　　)

17. When cutting cast irons and other brittle materials, the K series (YG type) carbides should be selected. (　　)

切削铸铁类等脆性材料时，应选择 K 类（YG 类）硬质合金。(　　)

18. In rough machining, the carbides with lower cobalt content should be selected. (　　)

粗加工时，应选择含钴量较低的硬质合金。(　　)

19. Of the three cutting variables, the feed has the largest influence on the surface roughness. (　　)

切削用量三要素中，进给量对表面粗糙度的影响最大。(　　)

20. The cutters made of diamond can be used to cut ferrous metals like iron and steels. (　　)

用金刚石制造的刀具可以切削像钢铁之类的黑色金属。(　　)

21. Of the three cutting variables, the cutting depth has the largest influence on the tool life. (　　)

切削用量三要素中，切削深度对刀具寿命影响最大。(　　)

22. The cutters made of high speed steel can be used to cut steel at higher speed than that of carbide cutters. (　　)

高速钢刀具加工钢的切削速度可以比硬质合金刀具的还要高。(　　)

23. "−" γ_o should be selected in finish turning. (　　)

在精车时应选择负前角。(　　)

24. The larger the tool life, the higher the cutting speed the cutter permits. (　　)

刀具寿命越长，其允许的切削速度越高。(　　)

1.5 Short-answer questions　简答题

1. How to distinguish primary motion from feed motion?

如何区别主运动和进给运动？

2. What are the reference planes in the orthogonal plane reference system?

在正交平面参考系中都有哪些参考平面？

3. What properties should the cutting tool materials have?

刀具材料应具备哪些性能？

4. What are the common used cutting tool materials?
常用的刀具材料有哪些？

5. What are the common used carbides? How about their usages? How to select them?
常用的硬质合金刀具材料有哪些？它们各自的用途如何？应如何选择？

6. How is the influence of build-up edge on cutting process? List the measures to prevent it.
积屑瘤对切削过程有何影响？列出防治积屑瘤产生的措施。

7. What are the factors which affect the cutting force?
影响切削力的因素是什么？

8. What are the factors which affect the cutting temperature?
影响切削温度的因素有哪些？

9. What is the tool wear limit? What does the tool life mean?
何谓刀具磨钝限度？刀具寿命指的是什么？

10. What are the factors affecting the tool life?
影响刀具寿命的因素有哪些？

11. What functions does the cutting fluid have? How many kinds of cutting fluids are there?
切削液都有哪些功用？切削液有哪些种类？

12. What do the undeformed chip dimensions mean? What are the relations of cutting depth ,