



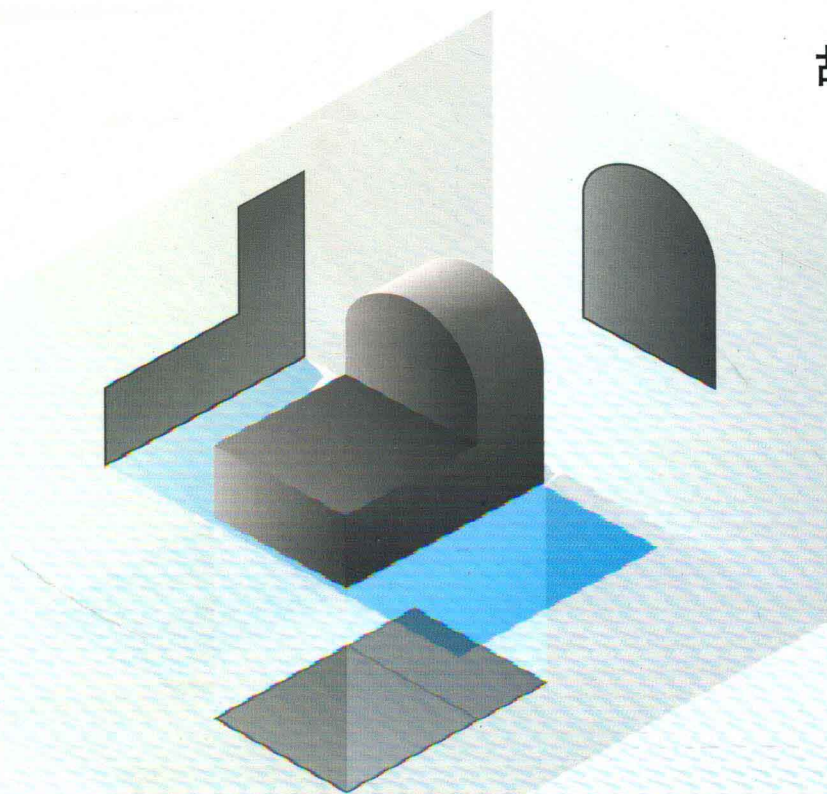
普通高等教育“十一五”国家级规划教材

工程制图习题集(英汉双语对照)

EXERCISE WORKBOOK OF ENGINEERING DRAWING

第2版

胡琳 程蓉 主编



 机械工业出版社
CHINA MACHINE PRESS



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普通高等教育“十一五”国家级规划教材

EXERCISE WORKBOOK OF ENGINEERING DRAWING

(English - Chinese Bilingual Edition)

Second Edition

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(英汉双语对照)

第2版

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Abstract

This book is one of China's National "Eleventh Five-Year-Plan" Textbooks for Regular Higher Education. It is used alongside the textbook "Engineering Drawing" published by China Machine Press at the same time. The layout of this workbook follows the same format as its counterpart textbook, adopting an English-Chinese bilingual layout (the first of its kind), thus providing an opportunity for bilingual teaching in China. The workbook begins with practical engineering applications such as manual drawings. It also implements exercises, which are enhanced to help students in mastering related knowledge and skills. These exercises will play an important role in fostering abilities of comprehensive analyses, design, and innovation.

This workbook contains the basic knowledge of drawing, basic orthographic projection, solids and their intersections, composite solids, axonometric projection, general principles of representation, representation for commonly used parts, detail drawings, assembly drawings, other drawings, computer graphics, etc. All aspects of the workbook have adopted the latest released national standards.

The solutions and standard answers of the exercises are also provided. Teachers using the textbook can download them from the website—<http://www.cmpedu.com>.

This workbook can be used for an Engineering Drawing course (36 to 64 teaching hours) in universities and colleges majoring various subjects, such as science, engineering, economy and management. It can also be used as a textbook on Engineering Drawing for students whose major is closely related to mechanical engineering (72 to 108 teaching hours), and be used as a textbook for students of related subjects in vocational schools, advanced technical schools, broadcast colleges, vocational colleges, correspondence colleges, part-time colleges. It is also a very good reference book for engineering designers, mechanical and manufacturing engineers.

本习题集是普通高等教育“十一五”国家级规划教材“工程制图双语教材”的一部分，与机械工业出版社同时出版的、由胡琳主编的《工程制图》（英汉双语对照）第2版配套使用。本习题集的编排顺序与教材体系一致，采用中英文双语并用的对照编排形式，填补了国内“工程制图双语习题集”的空白，为双语教学创造了良好的条件。在内容编排上，从工程实际出发，以应用型为主导，加强了徒手绘图和工程实际应用有关部分的练习，使学生通过训练，真正掌握与本课程相关的知识与技能，这对培养具有综合分析能力和设计创新能力的应用型现代工程技术人才有着重要的作用。

本习题集的主要内容包括：制图基本知识、正投影基础、立体及其交线、组合体、轴测图、图样画法、常用机件的表达、零件图、装配图、其他工程图、计算机绘图等。全书采用了最新颁布的国家标准。

本习题集配有习题解答和标准答案，请选用该教材的教师从机械工业出版社教材服务网（<http://www.cmpedu.com>）下载。

本习题集可作为高等院校理、工、经、管各专业学生工程制图课程（36~64学时）的教材，可作为近机械类各专业学生工程制图课程（72~108学时）的教材，也可作为高职、高专、电大、职大、函授大学、夜大等继续教育相近专业的教材，还可作为从事工程设计与制造的有关技术人员和企业管理人员的自学参考资料。

Foreword to the Second Edition

Since the first edition of the workbook was published in 2005, it is becoming a piece of unique academic work in the field of engineering drawing teaching with its innovative contents, wide practical use, and featured bilingual education. It received great support and was widely accepted by readers. The workbook was awarded the First Prize of Excellent Textbook of Shenzhen University. In 2008, it was selected as one of the China's National Eleventh Five-Year-Plan Textbooks for Regular Higher Education. As a supporting teaching material, the bilingual electronic teaching plan published together with the book, was also very popular to readers and awarded several provincial and national Prizes of Excellent Multimedia CAI Software for Higher Education.

In the second edition, the workbook was revised according to the national standards newly formulated or improved in past years and feedbacks and suggestions from readers. The basic structure of the book remains unchanged except that a new chapter on "Other Drawings" was added as the 10th chapter. The contents of the workbook were revised or extended following the new national standards. The 11th chapter on "Computer Graphics", which was the 10th chapter in the first edition, was re-written, in which AutoCAD2008 was used as the demo software.

Primary participants who have contributed to the editing and revision of the second edition are Lin Hu, Rong Cheng.

Support from Shenzhen University through a Teaching Material Development Grant is gratefully acknowledged. Comments, criticisms and submissions from readers are welcome as always.

Authors

第 2 版前言

本习题集是一本内容新颖、富有特色、实用性强的双语教材，自 2005 年首次出版以来，深受广大读者的欢迎和厚爱，并荣获深圳大学优秀教材一等奖，2008 年入选为普通高等教育“十一五”国家级规划教材。与该教材配套的双语电子教案亦极受欢迎，曾多次获得全国及广东省高等教育优秀多媒体教学软件奖。

为了全面贯彻国家颁布的最新标准，同时考虑到一些院校和读者的反馈意见和建议，本习题集第 2 版除增加了“第 10 章 其他工程图”外，基本维持原章节不变，按新国家标准更新修改或补充了相关的内容。原“第 10 章 计算机绘图”顺延为“第 11 章 计算机绘图”，并重新进行了编写，采用 AutoCAD2008 版本的绘图软件。

参加本习题集再版编写和修订的人员有：胡琳、程蓉、彭小波、孙炜，胡琳、程蓉为主编。

本习题集在再版编写和修订过程中得到深圳大学教材建设基金资助，在此表示诚挚的谢意，并衷心希望广大读者继续对本书提出宝贵意见。

编者

Foreword

The higher education in China is now entering a new era of reform which encourages bilingual teaching in foundation courses, technical foundation courses and technical courses. The main objective of the reform is to promote the internationalization of higher education and to produce application-oriented talents with creativity and quality education. The bilingual teaching is thus becoming a trend for our higher education to interface with the world and to face various challenges of the new century. The reform in bilingual teaching is a strategic choice for our higher education in the twenty-first century. This book provides a solid base for bilingual teaching and meets the immediate needs of our higher education reform for interfacing with the world.

This workbook was written following the “*Basic Requirements in Teaching Descriptive Geometry and Engineering Drawing Course*” developed by the Engineering Drawing Advisory Committee for Higher Engineering Education. It was introduced based on the current engineering practices and needs of education reform in teaching engineering drawings. It targets for producing application-oriented talents for the twenty-first century. The development of the book is guided by advanced manufacturing technologies. It is focused on learning activities and aims at quality education. The contents of the book cover carefully selected topics for a wide range of readers. The workbook is suited for an Engineering Drawing course (36 to 64 teaching hours) in universities and colleges majoring in various subjects, such as science, engineering, economy and management. It can also be used as a textbook on Engineering Drawing for students whose major is closely related to mechanical engineering (72 to 108 teaching hours), and for continuing education or other equivalent programs. It is also a very good reference book for engineering designers, mechanical and manufacturing engineers.

This workbook focuses on educational transformation based on years of teaching experience of the editors on such concepts as “knowledge, technology, methodology, capability and quality”. It also emphasizes on fostering modern engineering skills, enhancing diathesis, and encouraging students to be active and enthusiastic in applying “knowledge and skill” while creating engineering drawings in their studies. This workbook adopts the latest releases of national standards and its layout is consistent with its counterpart textbook, providing uniformity of teaching and learning as well as promoting interactive learning and exercises.

The content of this workbook contains the basic knowledge of drawing, basic orthographic projection, solids and their intersections, composite solids, axonometric projection, general principles of representation, representation for commonly used parts, detail drawings, assembly drawings, other drawings, computer graphics, etc.

The solutions and standard answers of the exercises are also provided. Teachers using the textbook can download them from the website—<http://www.cmpedu.com>.

The chief editors of this book are Lin Hu and Rong Cheng. Wenjuan Cheng, an undergraduate from Shenzhen University, was also involved in the production of the drawings.

This workbook is audited by Professor Jinchang Chen from Southern China University of Science and Technology and Professor Weiyin Ma from City University of Hong Kong. Prof. Chen is also a member of the Engineering Drawing Advisory Committee of the Ministry of Education (China) and the Chairman of the Engineering Drawing Society of Guangdong Province. We would like to thank the two auditors for their advices.

This workbook has proudly acquired special financial support from the Teaching Material Development Grant of Shenzhen University. We therefore gratefully announce our special acknowledgement.

Due to various limitations, this workbook may contain mistakes and all criticisms and corrections from all experts and readers are welcome.

第 1 版前言

当前,我国的高等教育进入了新一轮的改革阶段:大力开展基础课、专业基础课和专业课的双语教学,加速推进我国高等教育的国际化和培养高素质创造性应用型人才。因此,双语教学是我国高等教育与国际接轨,迎接新世纪挑战和教育改革发展的必然趋势,也是中国高等教育在 21 世纪必须作出的战略选择。本套教材的编写为双语教学创造了一个良好的条件,及时地满足了高等教育与国际接轨这一教育改革形势发展的需要。

本习题集是依照高等学校工科制图课程教学指导委员会制订的“画法几何及工程制图课程教学基本要求”,结合近年来工程图学课程教学改革的特点,立足培养面向 21 世纪的高级工程应用型人才,面向现代制造技术,并紧紧围绕以“学”为中心、以“素质提高”为目的的指导思想,力求简明扼要、精选内容编写而成的。本习题集适合于高等院校为理、工、经、管各专业学生开设的工程制图课程(36~64 学时)使用,也可用于为近机械类及机械类各专业学生开设的工程制图课程(72~108 学时),还可作为继续教育同类专业的教材,亦可供企业的设计人员和工程技术人员作为自学参考资料。

本习题集针对基础课程的特点,继承传统内容的精华,融入多年积累的教学经验,着眼于新时期对人才培养的要求,以加强对学生综合素质及创新能力的培养为出发点,力求最大限度地调动学生的学习主动性和积极性,从而使“工程图学”教育从以“知识、技能”为主的教育,向以“知识、技能、方法、能力、素质”综合培养的教育转化。本习题集采用了最新颁布的国家标准,为了方便使用,本习题集的编排顺序与教材体系保持一致,并相互配合,使教与学相统一,学与练相促进。

本习题集的主要内容包括:制图基本知识、正投影基础、立体及其交线、组合体、轴测图、图样画法、常用机件的表达、零件图、装配图、其他工程图、计算机绘图等。

本习题集配有习题解答和标准答案,请选用该教材的教师从机械工业出版社教材服务网(<http://www.cmpedu.com>)下载。

本习题集由胡琳、程蓉担任主编,彭小波、孙炜参加修订,深圳大学本科生陈稳娟参加了习题集的有关绘图工作。

本习题集由中国工程图学教学指导委员会副主任委员、广东省工程图学学会理事长、华南理工大学的陈锦昌教授和香港城市大学的马维银教授担任主审,两位主审对习题集进行了仔细的审阅,提出了许多宝贵意见和非常好的建议,在此表示衷心的感谢!

本习题集参考了国内外一些著述和教材,在此向有关作者深表谢意!并感谢所有关心和帮助本书出版的人员。

由于编者水平有限,习题集中难免有错误和疏漏,敬请读者批评指正。

编 者

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1-1 Lettering exercises. 字体练习。

机	校	核	审	定	比	例	姓	名	材	料	班	级	技	术	要	求	序	号	其	余	旋	转	铸	钢	螺	母	配	合	栓	钉	垫	圈	零	部	件	钻	孔	深	设	计	泵	体	阀	壳
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1 2 3 4 5 6 7 8 9 0

I II III IV V VI VII VIII IX X

Handwriting practice lines for numbers 1-0.

Handwriting practice lines for numbers 1-0.

Handwriting practice lines for letters A-Z.

Handwriting practice lines for letters A-Z.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Handwriting practice lines for letters A-Z.

Handwriting practice lines for letters A-Z.

a b c d e f g h i j k l m n o p q r s t u v w x y z

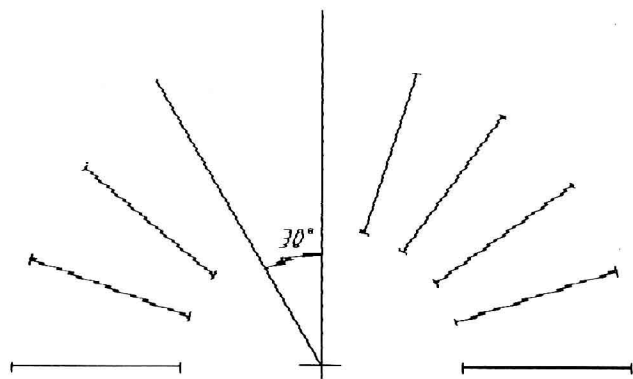
Handwriting practice lines for lowercase letters a-z.

Handwriting practice lines for lowercase letters a-z.

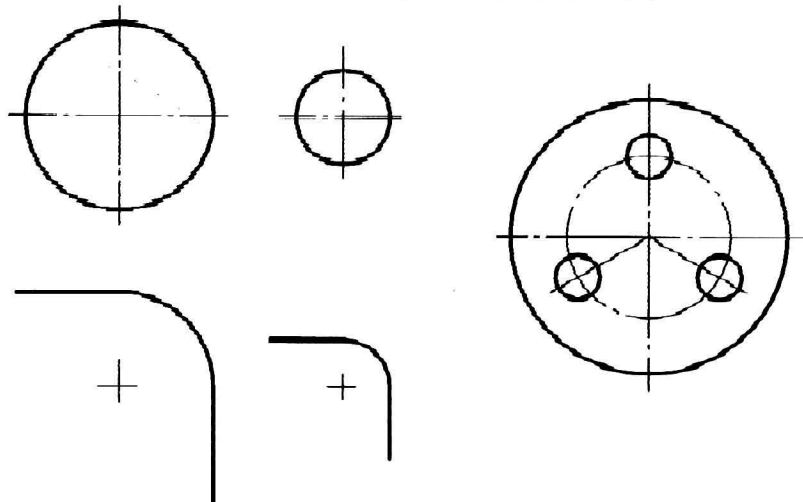
Class: _____ No: _____ Name: _____

1-2 Dimensioning exercises (obtain sizes by measuring the drawings and retain the integers). 填注下列图形中的尺寸 (尺寸数值从图中测量, 取整数)。

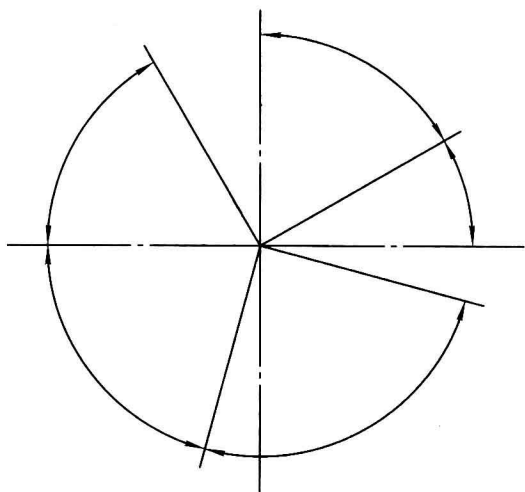
(1) Mark the linear dimensions and arrows. 注出线性尺寸和箭头。



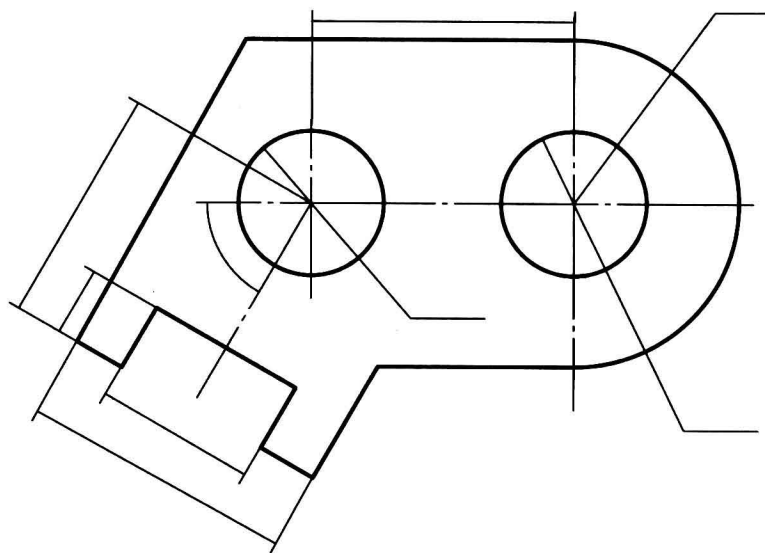
(2) Dimension diameters and radius. 注出圆的直径和半径。



(3) Dimension angles. 注出角度。

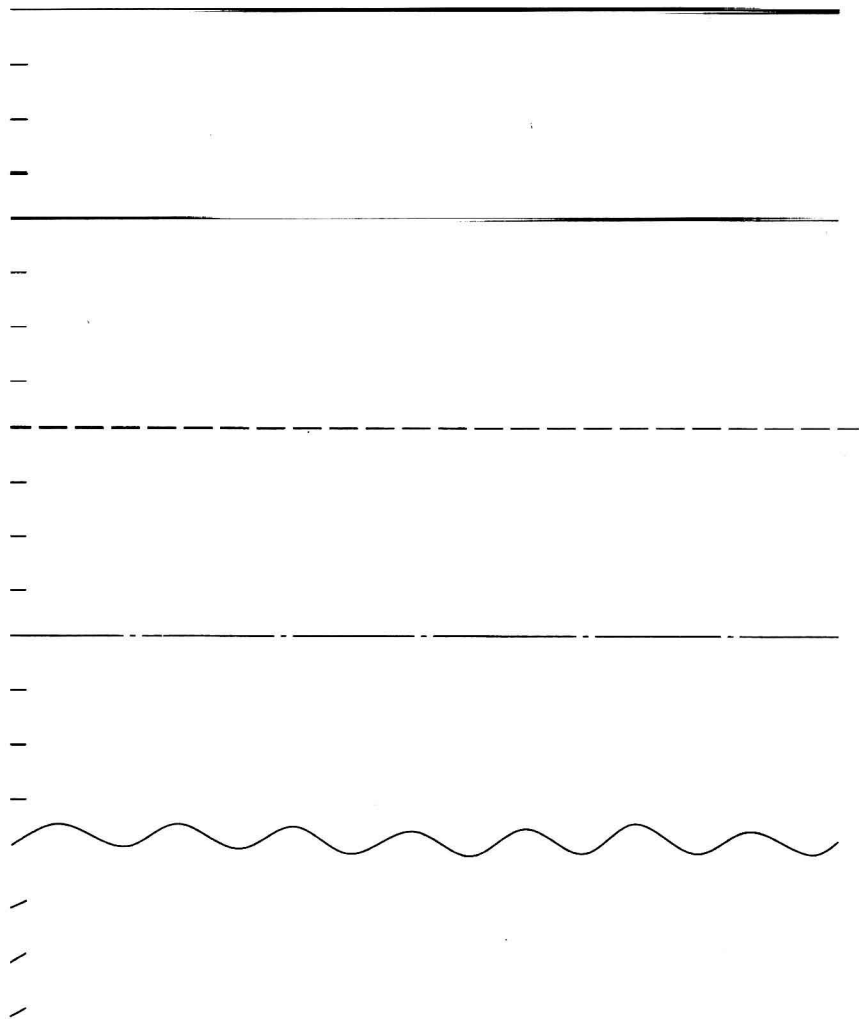


(4) Make the dimensions and arrows. 注出尺寸和箭头。

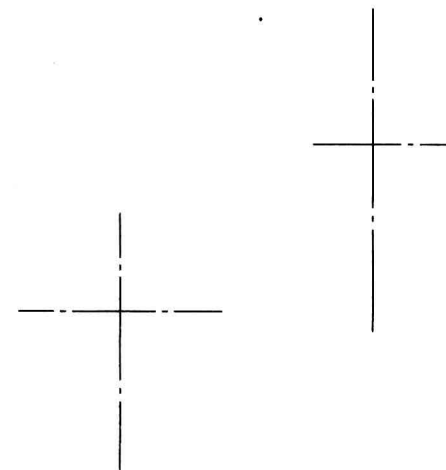
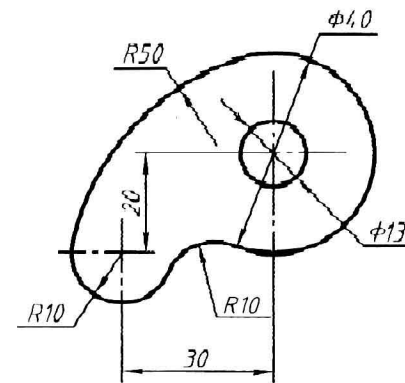


Class: _____ No: _____ Name: _____

1-3 Draw the lines with respective line style following the examples. 在指定位置处，照样画出各种图线。

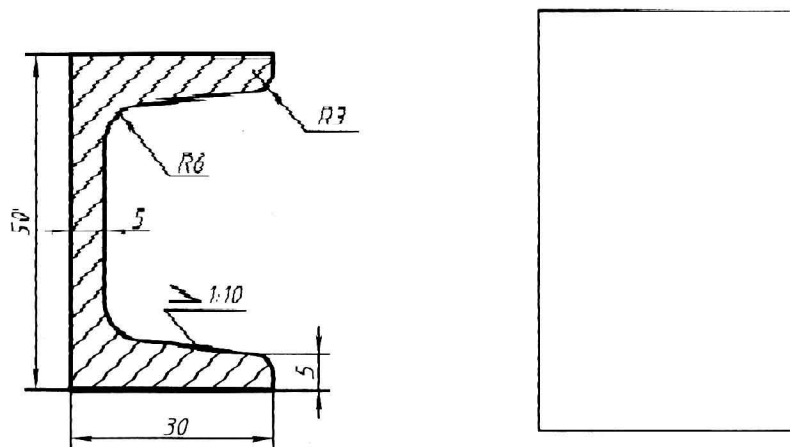


1-4 Redraw the arcs and dimensions following the example (scale 1:1). 按图所示尺寸，用 1:1 的比例在指定位置处照样画出平面图形，并标注尺寸。

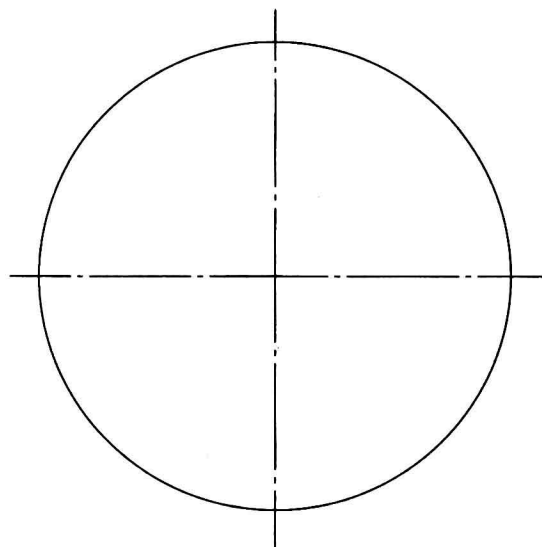


Class: _____ No: _____ Name: _____

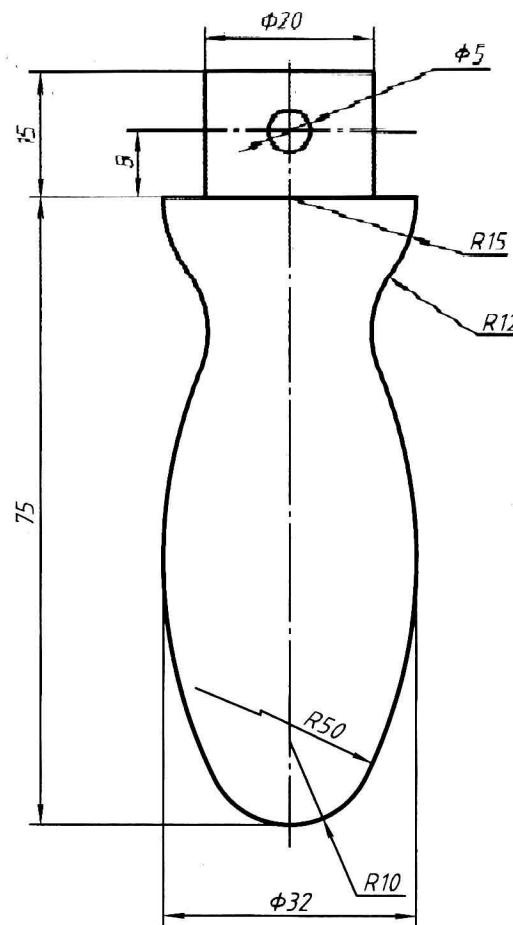
1-5 Add the lines at given slope (scale 1:1) and dimensions. 按规定的斜度补画下面图形中的图线, 并标注尺寸, 比例为1:1。



1-6 Draw a regular heptagon. 作圆的内切正七边形。



1-7 Mark the following drawing on an A4 sheet (scale 2:1; continuous thick line 0.8mm; dimension size 3.5). 在A4图纸上, 按2:1的比例画出下面图形。粗实线宽度为0.8mm, 尺寸数字为3.5号。

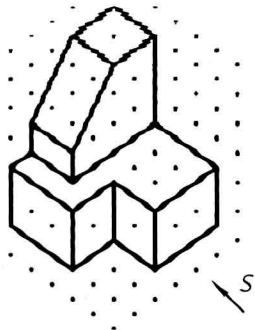


Design 设计		(Date 日期)	(MATL 材料)	(School name 学校名)
Checked 校核			Scale 比例	Handle 手柄
Approved 审核			Total 共张 No. 第张	(DRG No. 图号)
Class name 班级	Stu No. 学号			

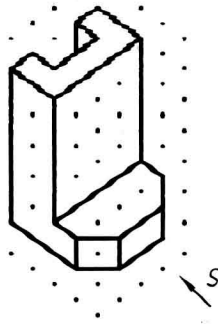
Class: _____ No: _____ Name: _____

2-1 Draw the three views of the components on the square grids. 由物体的立体图在给出的网点格内画三面投影图。

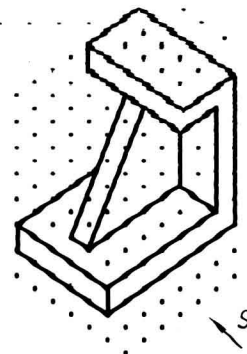
(1)



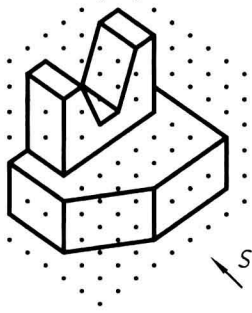
(2)



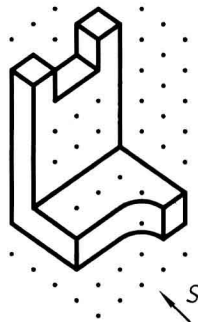
(3)



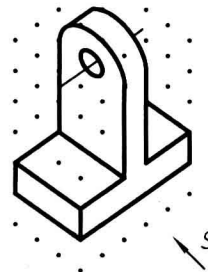
(4)



(5)

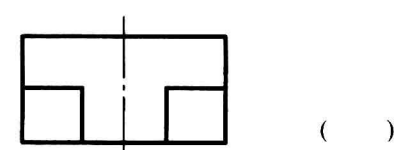
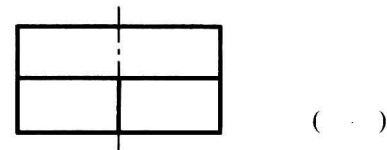
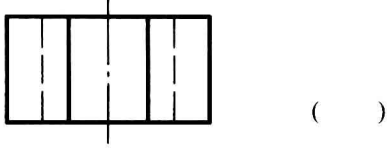
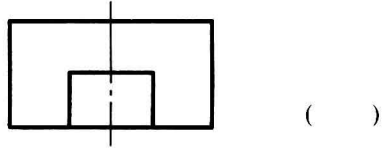
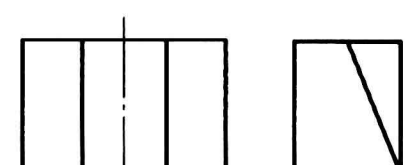
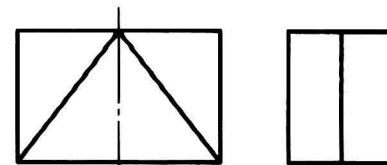
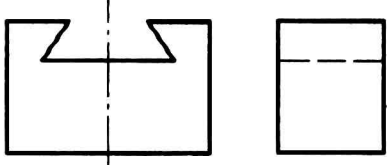
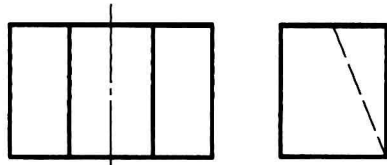
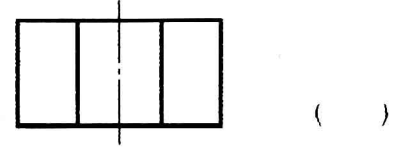
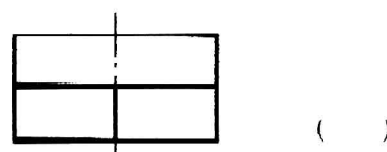
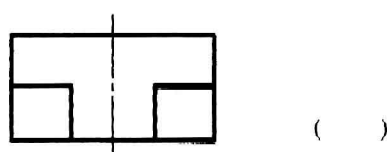
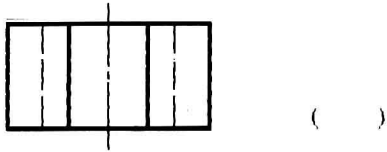
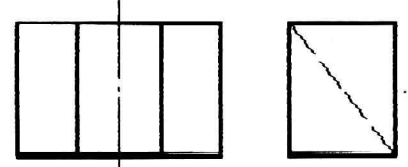
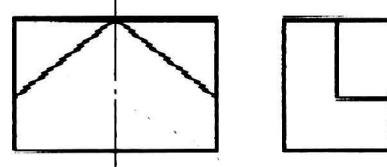
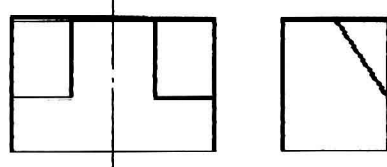
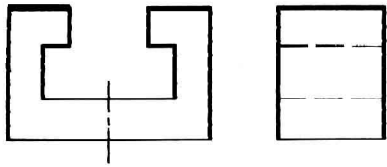


(6)



Class: _____ No: _____ Name: _____

2-2 Place the number of the appropriate component in the bracket beside each three views. 在括号内填写对应立体的图号。



1

2

3

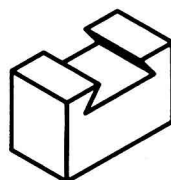
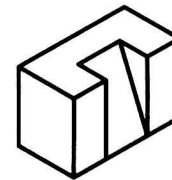
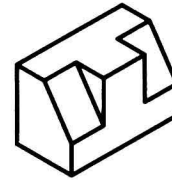
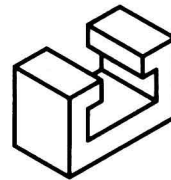
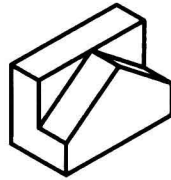
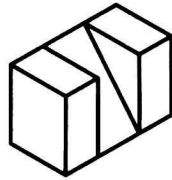
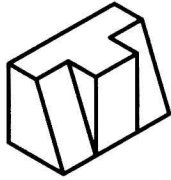
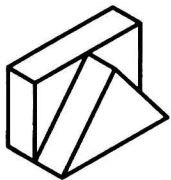
4

5

6

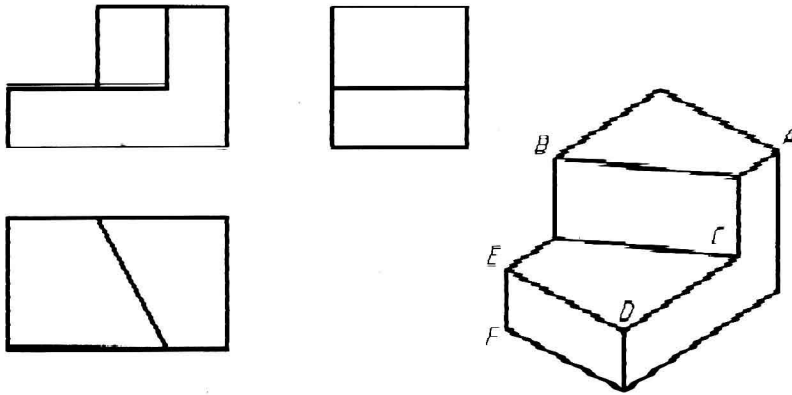
7

8

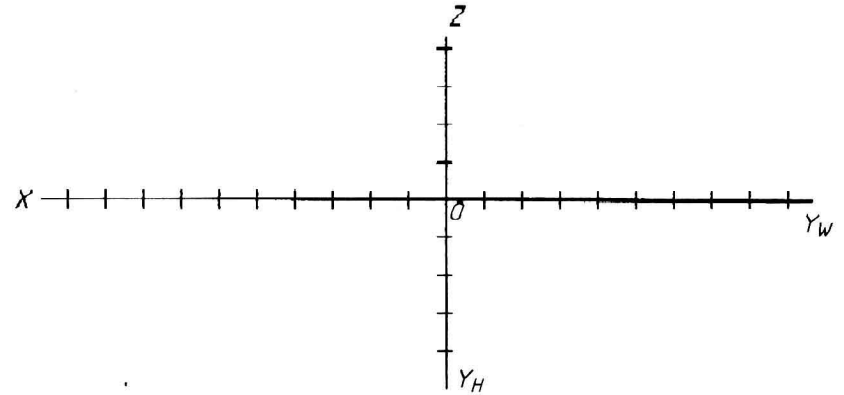


Class: _____ No: _____ Name: _____

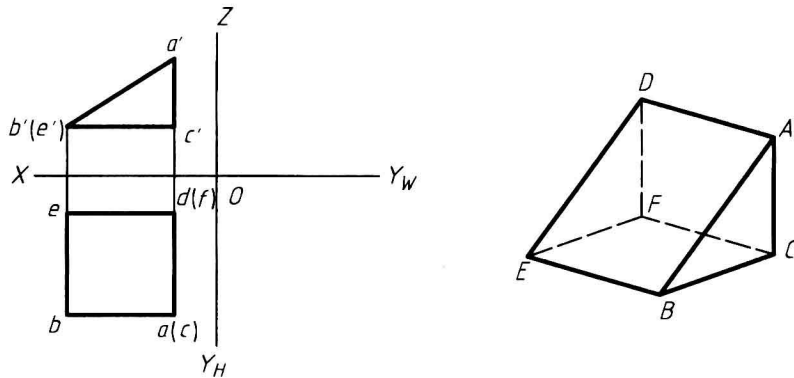
2-3 (1) Point out the positions of the points A, B, C, D, E, F in the three views of the component. 在物体的三视图中标出点 A, B, C, D, E, F 的三面投影。



2-3 (2) Draw the three projection positions of points A, B and C given that the coordinates of point A are $(40, 15, 0)$; point B is located 20mm on the right side of A , 5mm in front of A and 20mm above A ; and point C is located 10mm on the left side of A , 5mm behind A and 15mm above A . 已知 A 点坐标为 $(40, 15, 0)$, 按要求画出 A, B 和 C 点的三投影。要求: B 点在 A 点右面 20mm, 在 A 点前面 5mm, 在 A 点上面 20mm, C 点在 A 点左面 10mm, 在 A 点后面 5mm, 在 A 点上面 15mm。

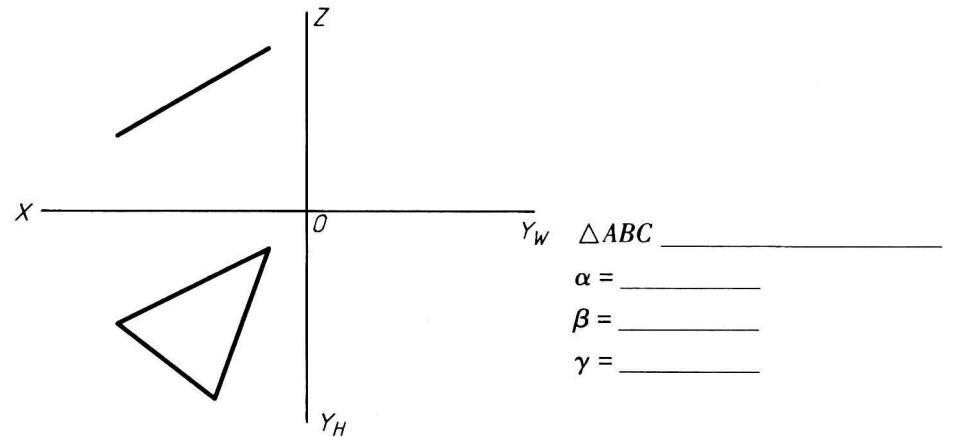


2-3 (3) Draw the third view and decide the projection position of each line. 判断三棱柱上各直线对投影面的相对位置, 并画出第三投影。



AB _____ AC _____
 AD _____ BC _____

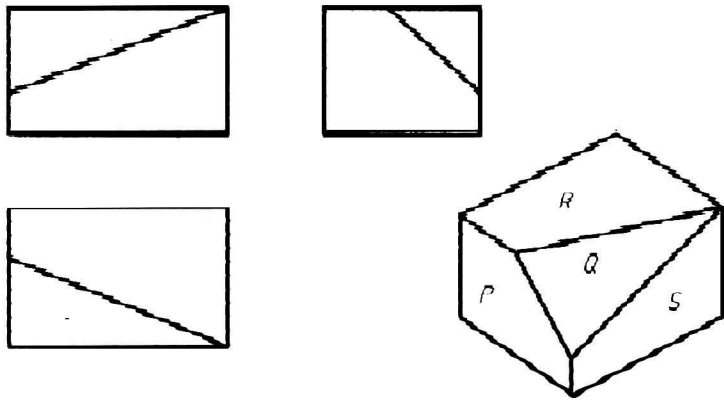
2-3 (4) Draw the third view and decide the projection position of $\triangle ABC$. 判断三角形 $\triangle ABC$ 对投影面的相对位置, 并画出第三投影。



$\triangle ABC$ _____
 $\alpha =$ _____
 $\beta =$ _____
 $\gamma =$ _____

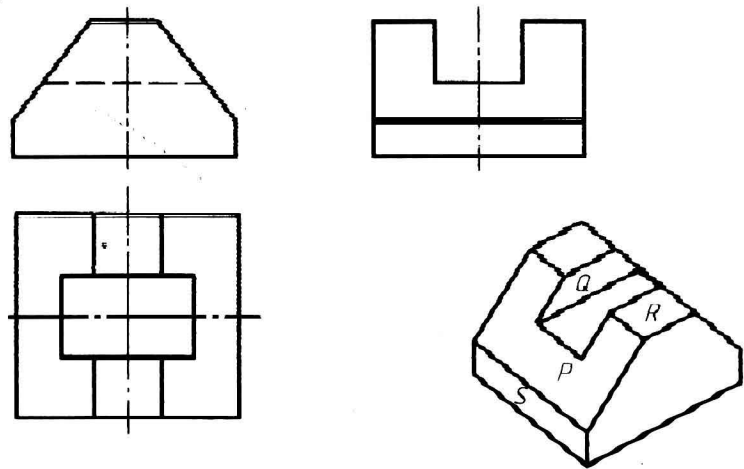
2-4 Point out the projection type and position of each plane in the three views. 标全物体上指定平面的三面投影, 并指出它们为何种位置平面。

(1)



P _____ Q _____ R _____ S _____

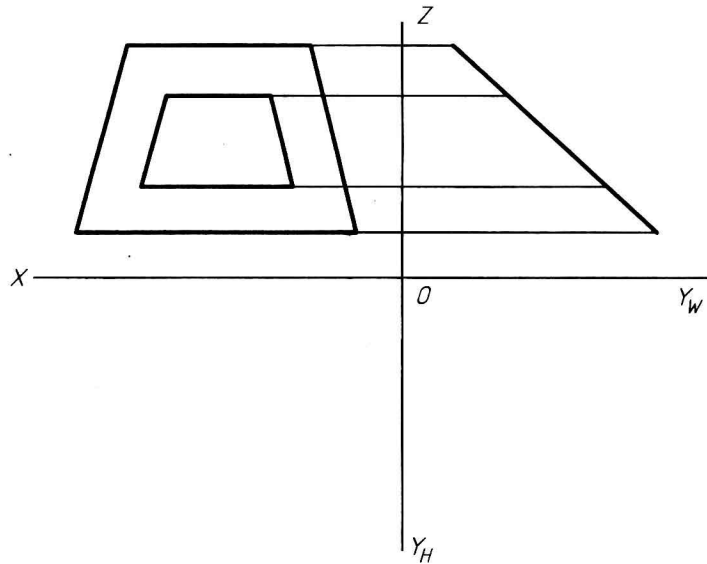
(2)



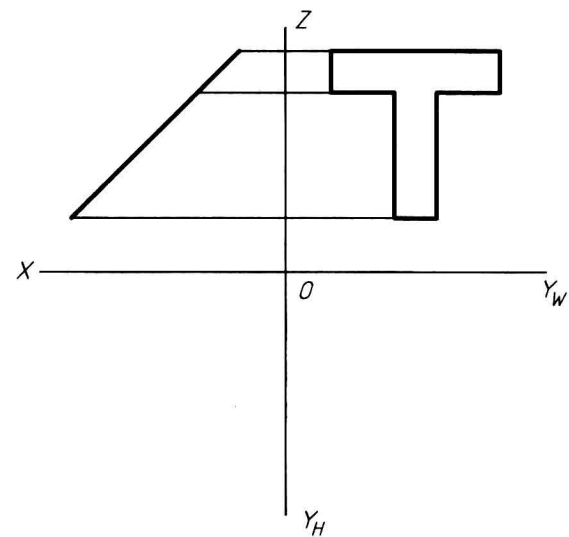
P _____ Q _____ R _____ S _____

2-5 Complete the third view according to the two given views of the plane. 已知平面的两投影, 求第三投影。

(1)



(2)



Class: _____ No: _____ Name: _____