

普通高等教育规划教材

计算机辅助设计 与绘图习题集

(二维 / 三维)

窦忠强 张苏华 编

机械工业出版社
China Machine Press

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本习题集是作者在教学实践中, 跟据不同层次、不同专业的人员在学习计算机辅助设计与绘图课程过程中的需求, 精心设计, 不断积累、整理编撰而成。本书可以和任何二维、三维的计算机辅助设计与绘图教材配套使用。

本习题集的内容包括: 计算机辅助设计与绘图的各种二维图形的基本练习题、综合应用题和三维实体的零件和装配模型的习题。

本习题集适于学习计算机辅助设计与绘图的各种层次、不同专业的人员使用, 也可供教师和工程技术人员学习参考。

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前言

使用计算机设计、绘制各类图形已成为现代设计人才所必须掌握的内容。作者总结多年的教学经验,根据不同层次、不同专业的人员在学习计算机辅助设计与绘图课程过程中的需求,精心设计习题题型,旨在加深理解计算机的设计与绘图功能和熟练掌握计算机辅助设计与绘图技巧。

本书在编排顺序上由基本练习到综合应用,由二维绘图到三维绘图,涵盖了计算机辅助设计与绘图软件的大部分功能。

本书的第一章和第二章为二维设计与绘图练习。第三章分为三维设计与绘图练习,包括三维实体的零件和装配模型练习。第三章的基本练习习题数量较少,如果需要,可以利用第一章和第二章的部分二维绘图习题作为补充。第三章中的部分习题有一定难度,使用基于特征的参数化三维造型软件来做会容易些。

为有利于读者练习,本书习题中的实体、图形等作了必要的简化。

本书的习题没有限定使用某一具体的设计绘图软件完成,习题分类和题目要求中的一些文字描述有可能与读者使用的具体软件不一致,敬请读者注意辨别。

本书由窦忠强主编。北京科技大学张苏华编写第一、第二章;窦忠强编写第三章。

本书适用于学习计算机辅助设计与绘图的各种层次、不同专业的人员,也可供教师和工程技术人员学习参考。

编者

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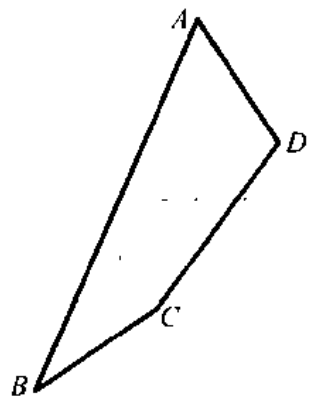
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第一章 基本练习

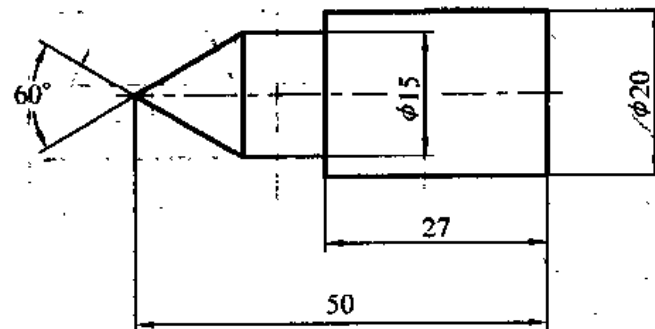
一、直线

1. 按 1:1 的比例绘制平面图形。

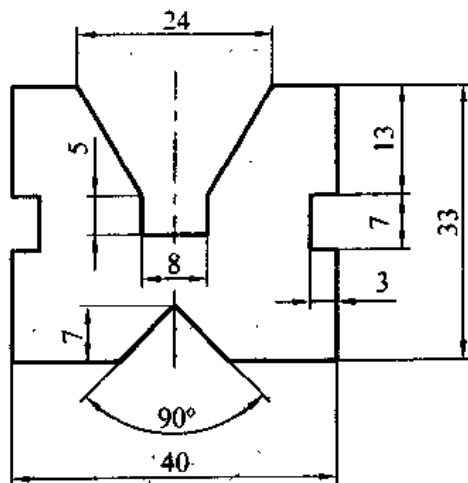
(1) 已知 $A(20, 40)$, $B(-20, -50)$, C 点距 B 点 ($\Delta X = 30, \Delta Y = 20$), D 点距 C 点 ($\Delta X = 30, \Delta Y = 40$), 画出四边形



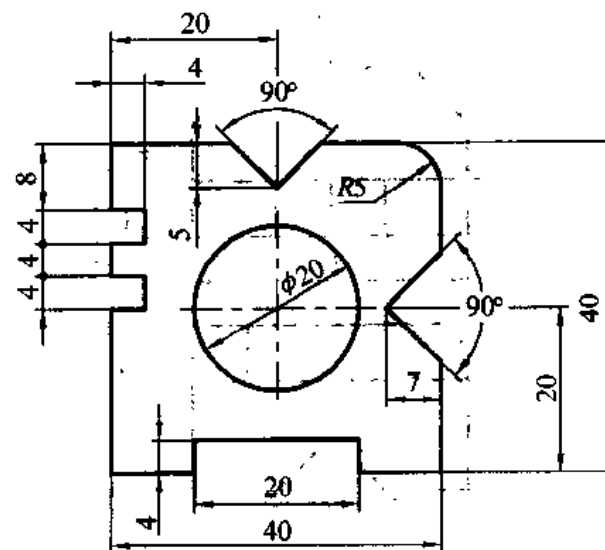
(2)



(3)

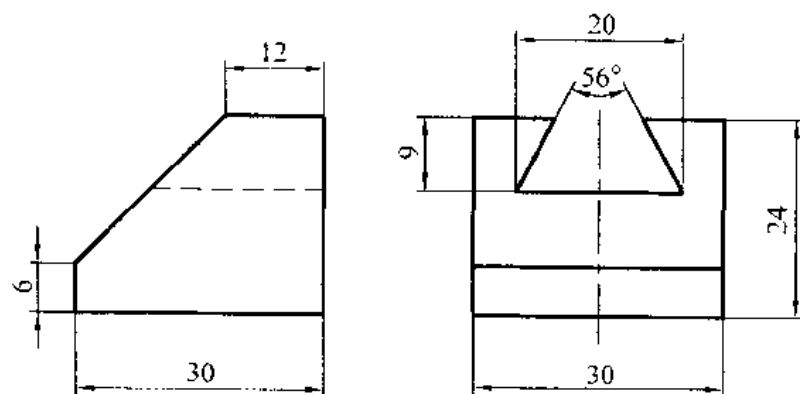


(4)

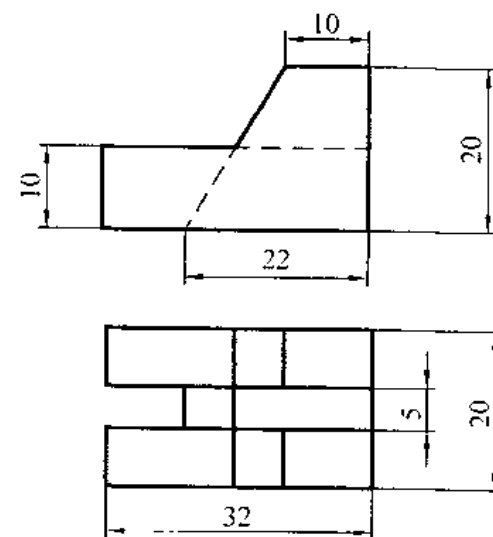


2. 按 1:1 的比例绘制视图。

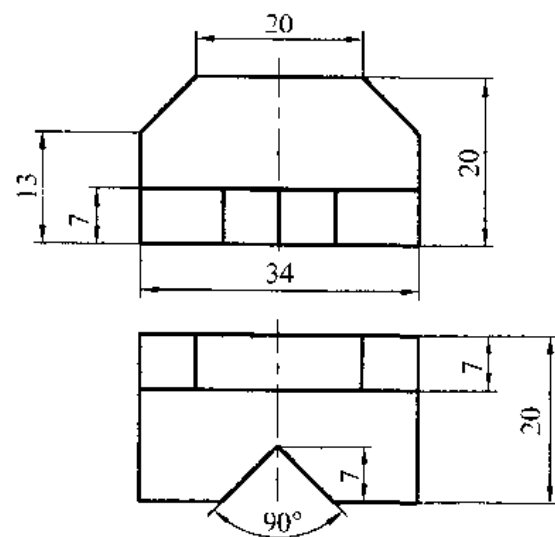
(1)



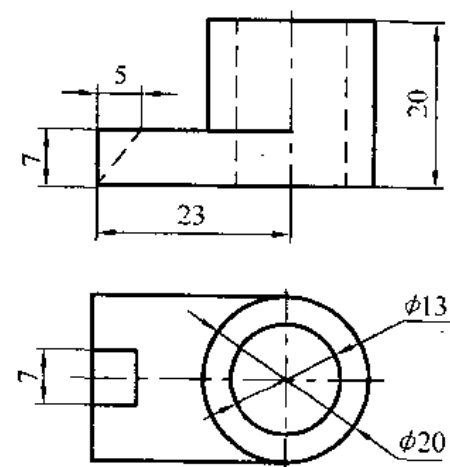
(2)



(3)

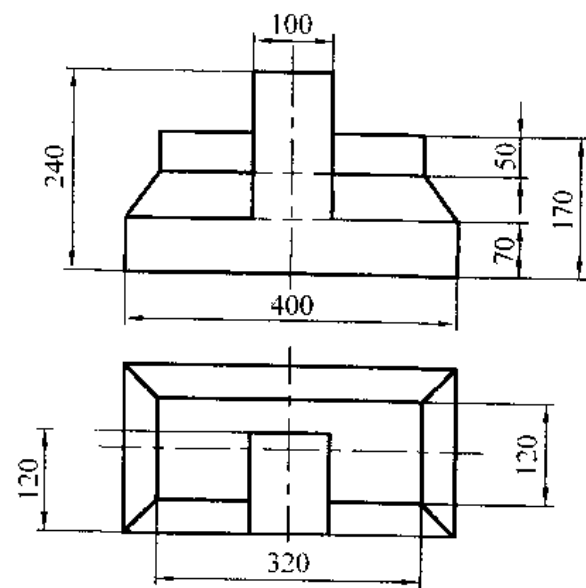


(4)

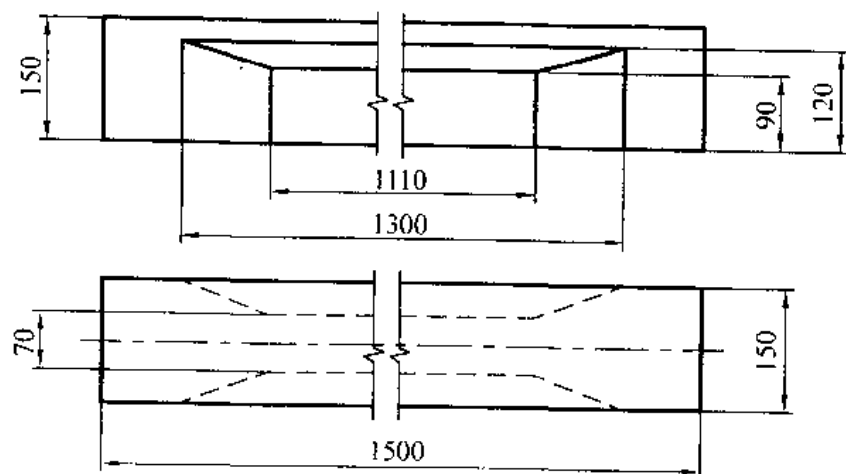


3. 绘制梁的视图

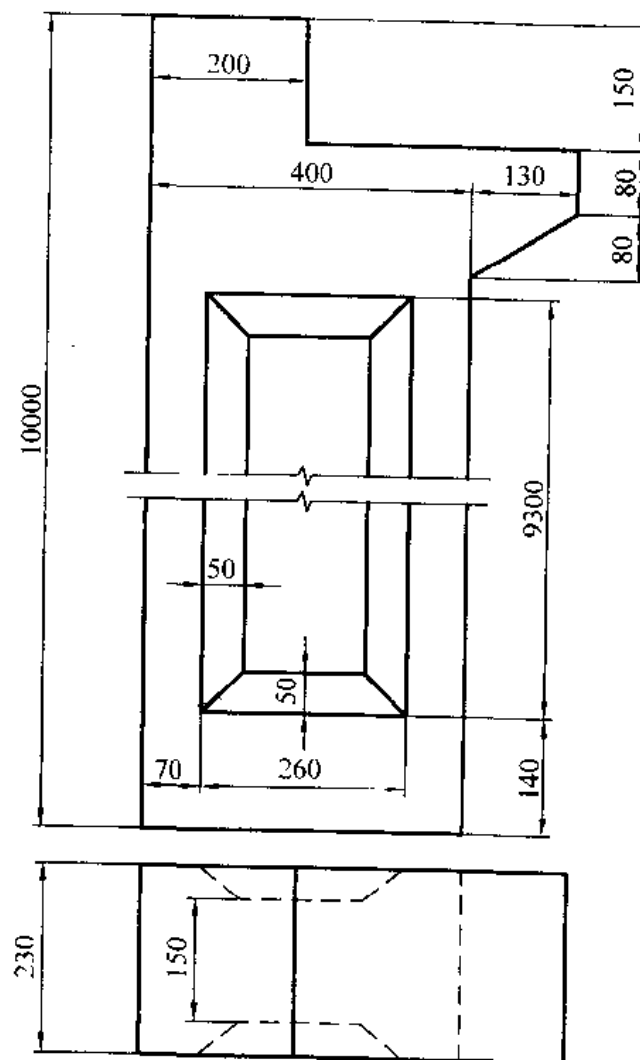
(1)



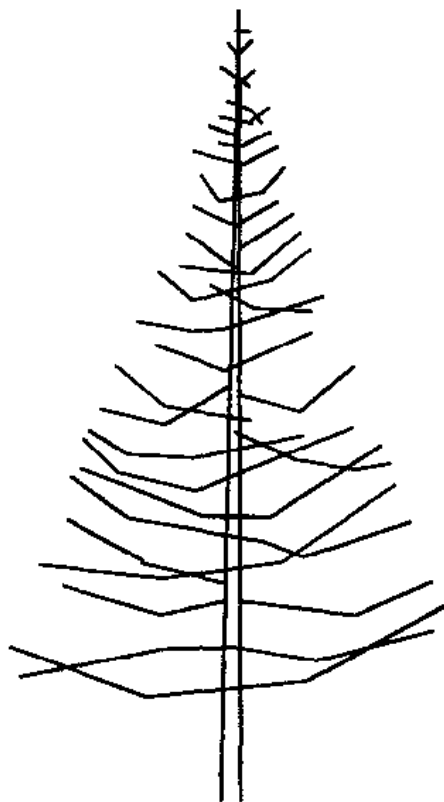
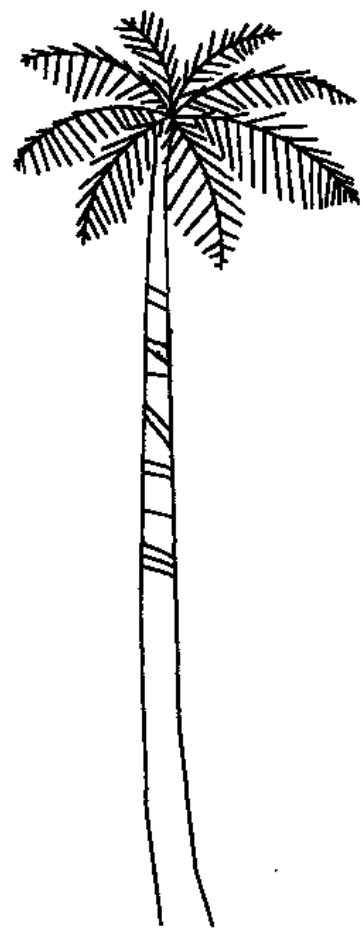
(2)



(3) 绘制钢筋混凝土柱的视图



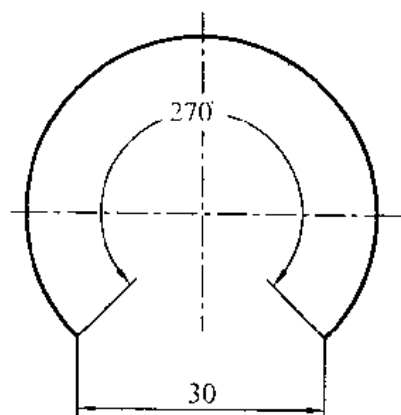
4. 绘制所示树形平面图形。



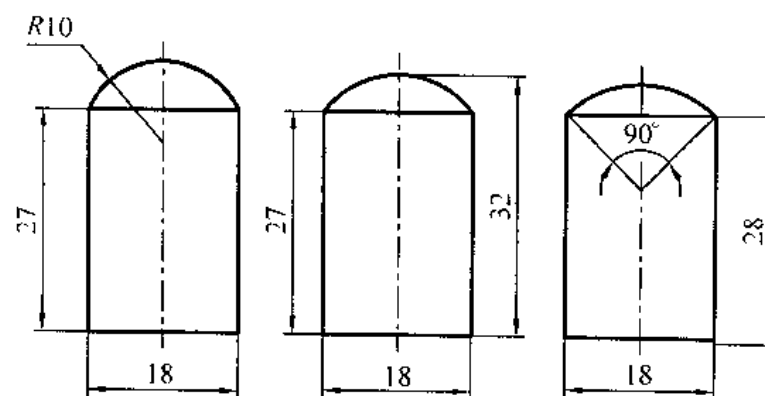
二、圆和椭圆

按 1:1 的比例绘制平面图形

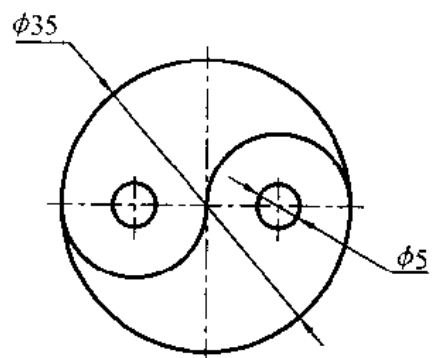
(1)



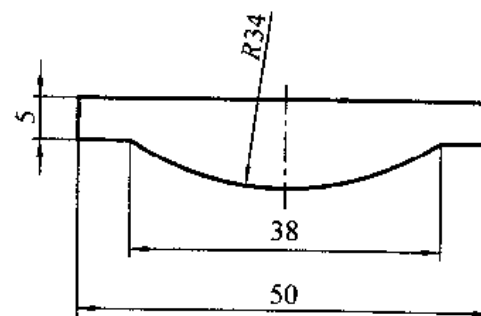
(2)



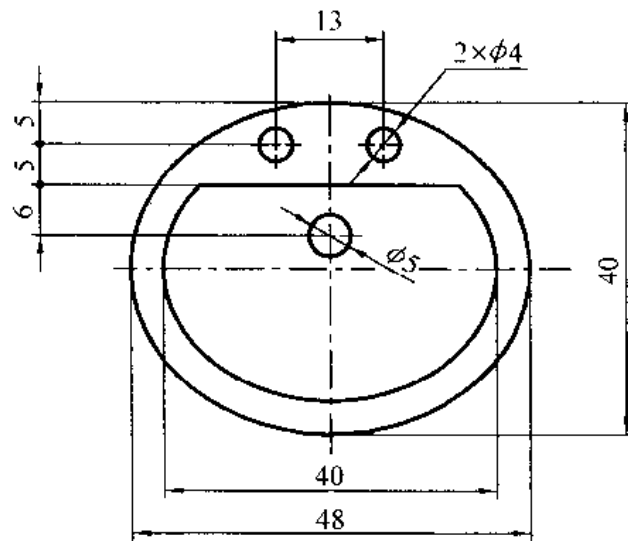
(3)



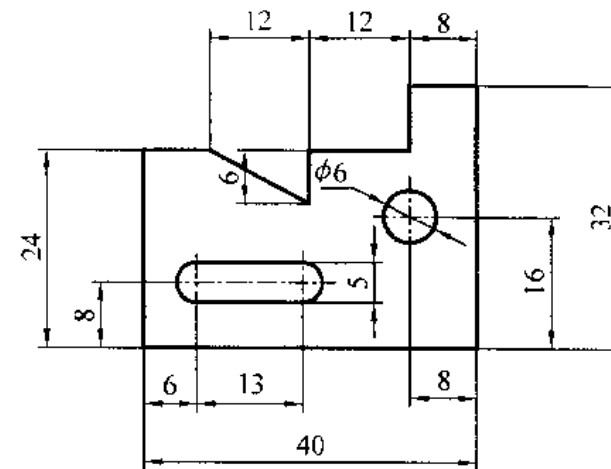
(4)



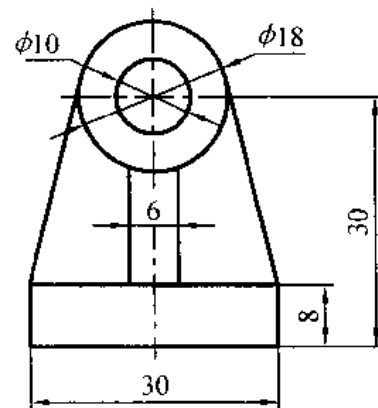
(5)



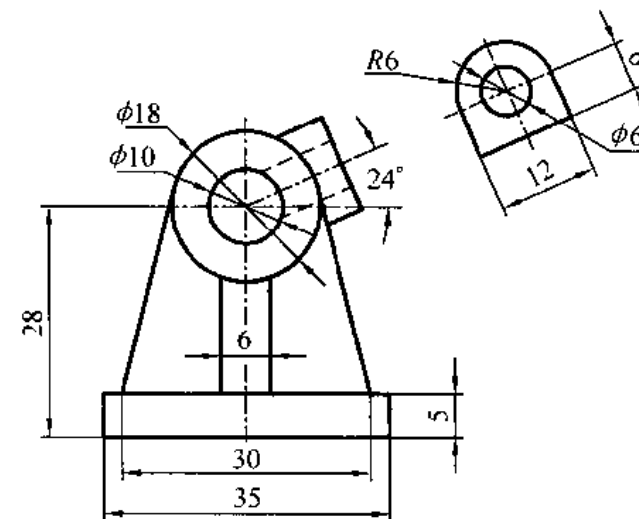
(6)



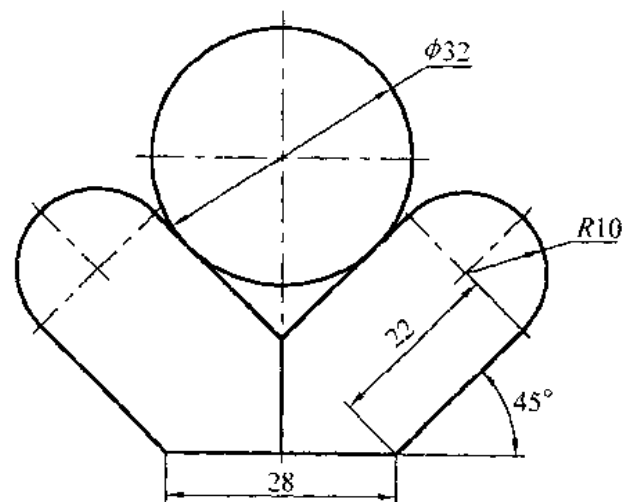
(7)



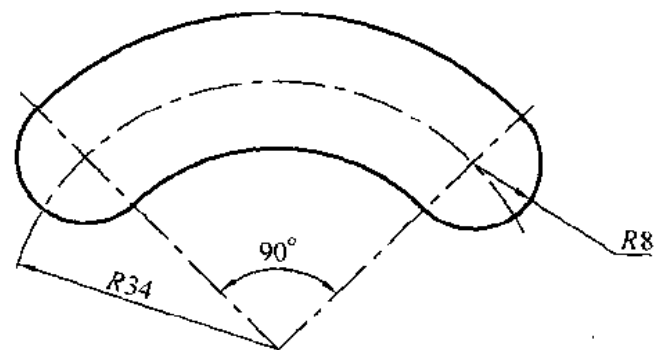
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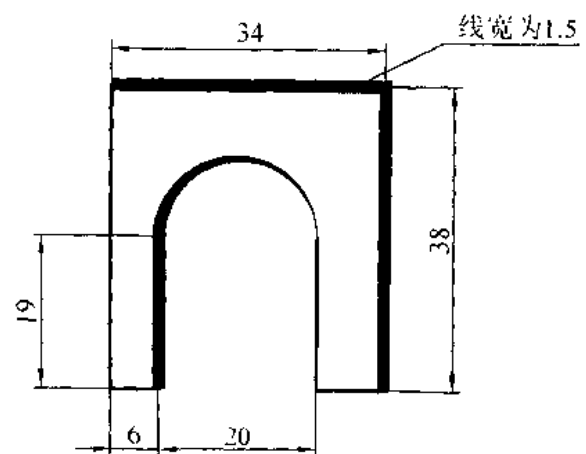
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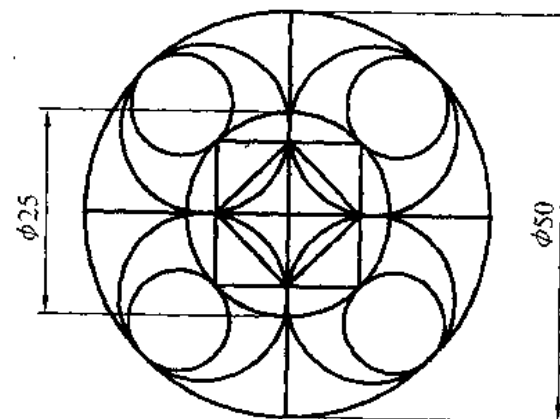
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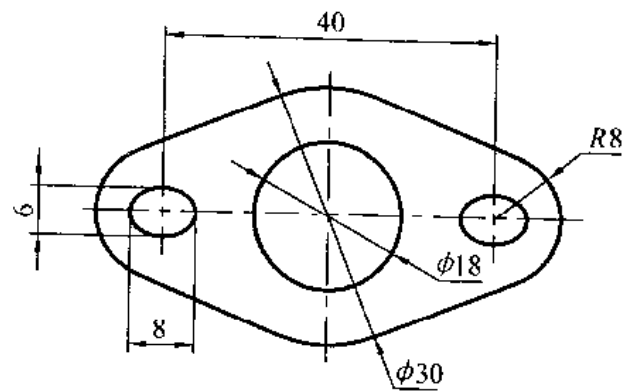
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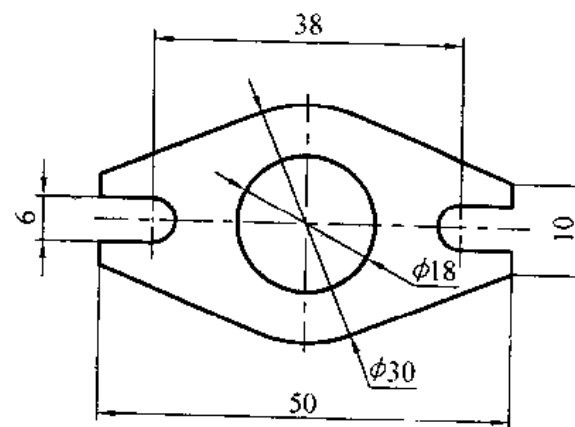
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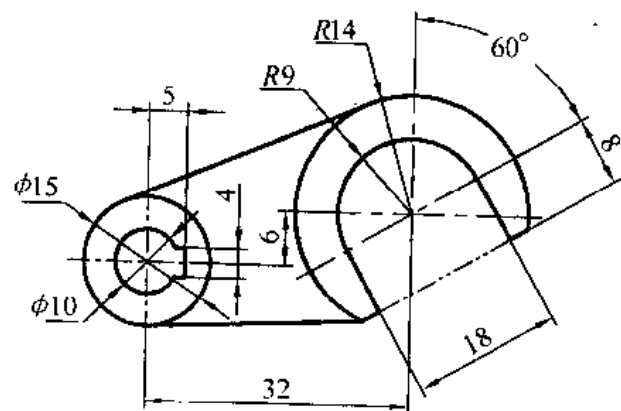
(13)



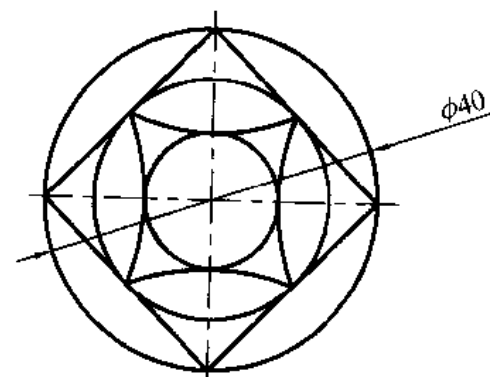
(14)



(15)



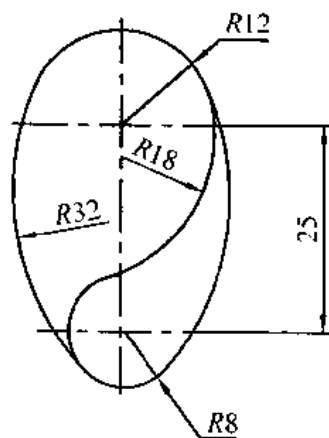
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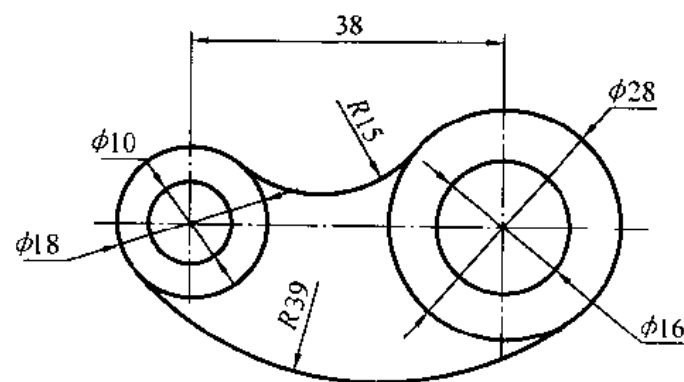
三、圆弧连接

按 1:1 的比例绘制平面图形。

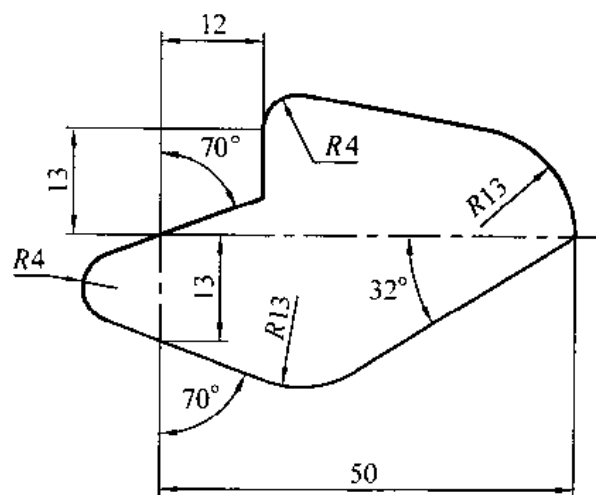
(1)



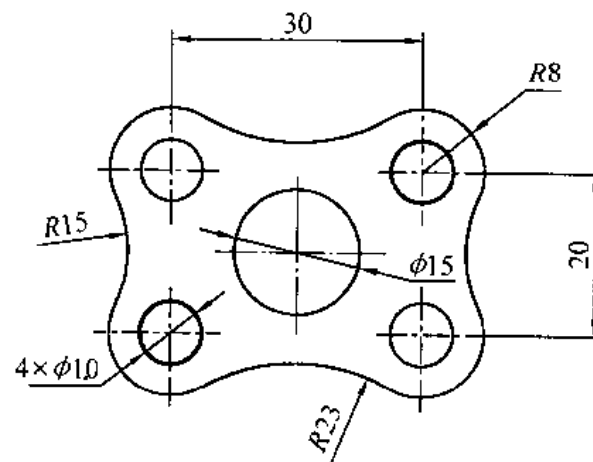
(2)



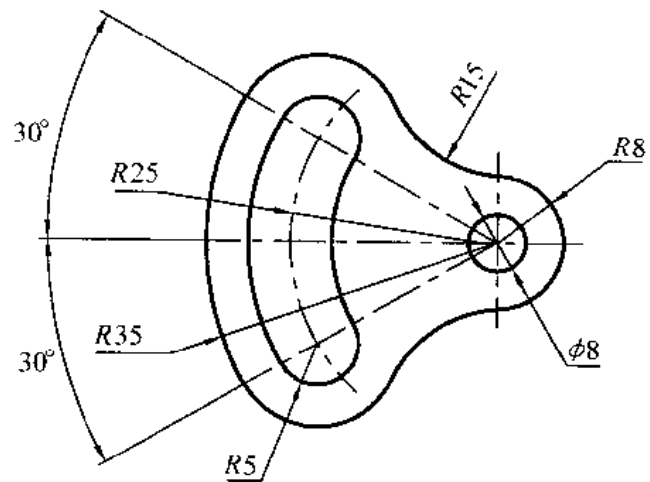
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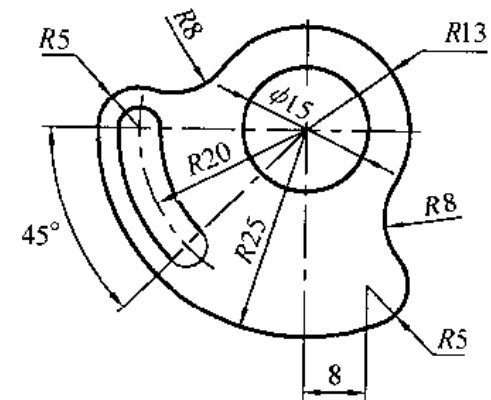
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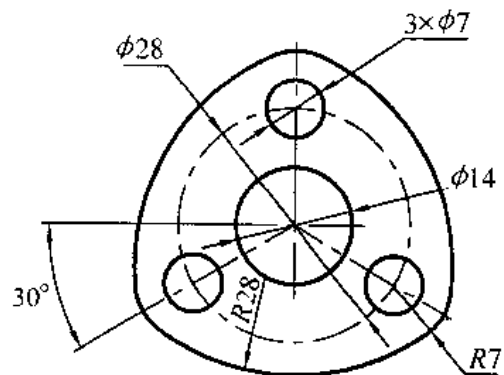
(5)



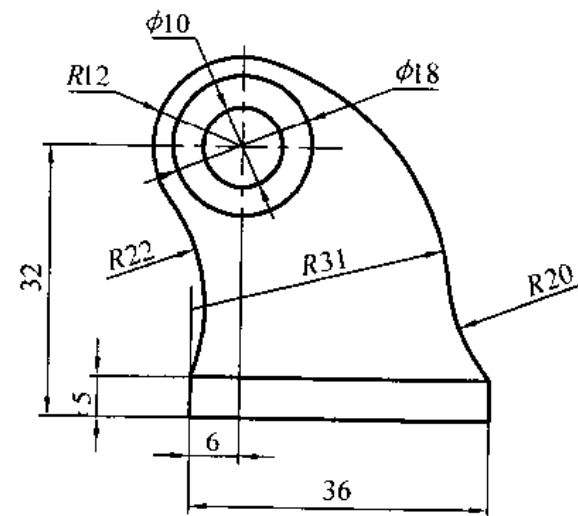
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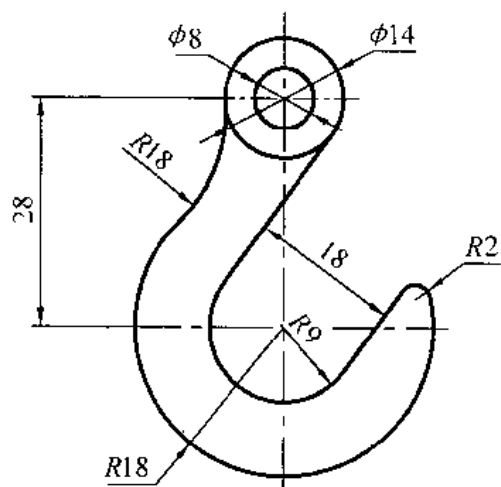
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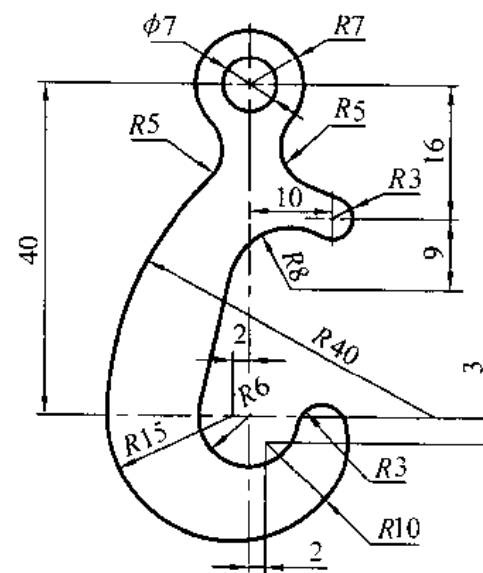
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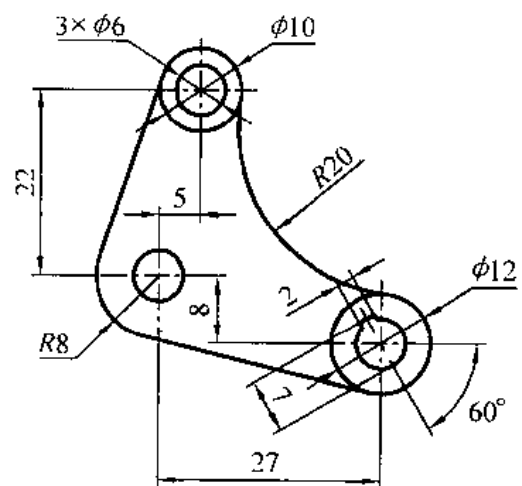
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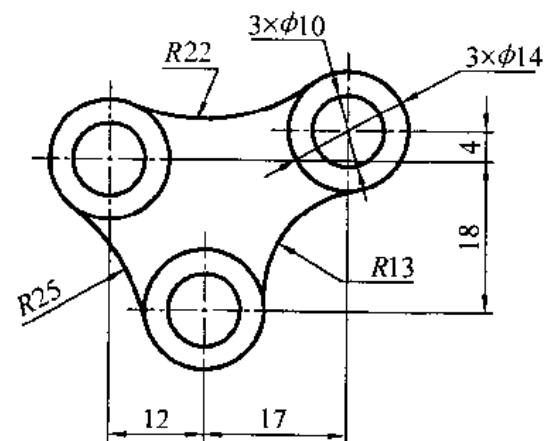
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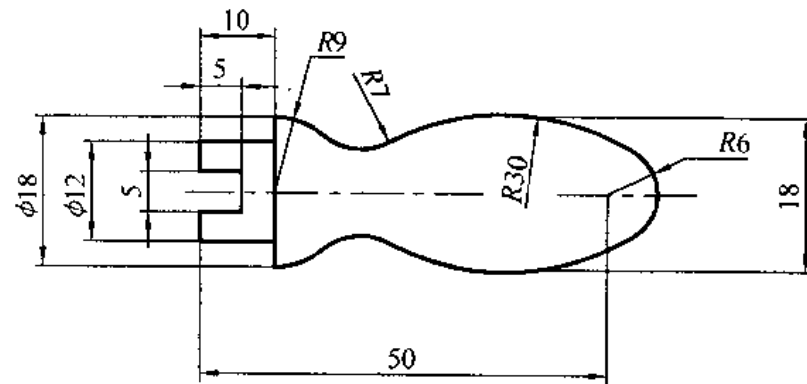
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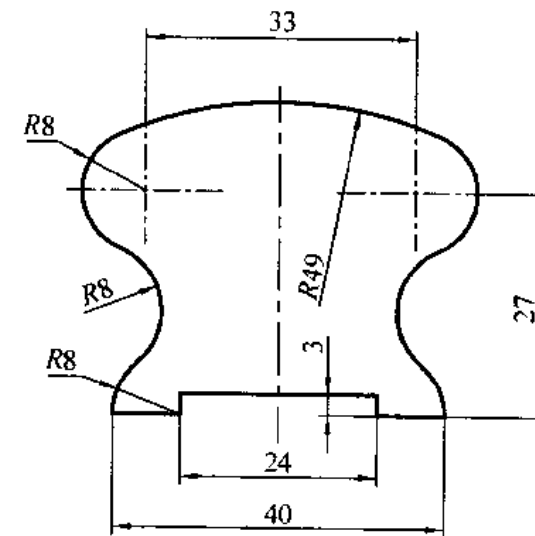
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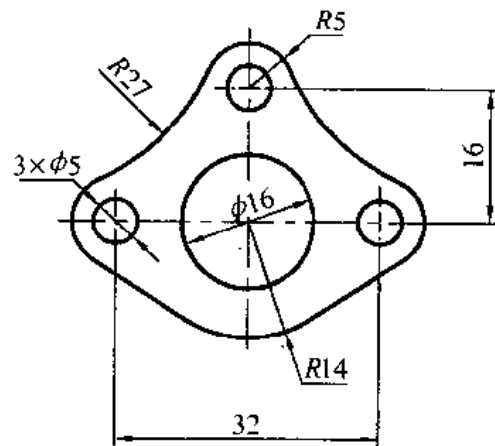
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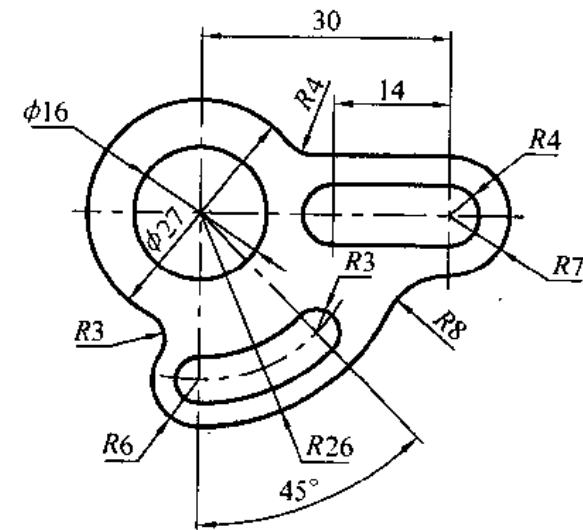
(14)



(15)



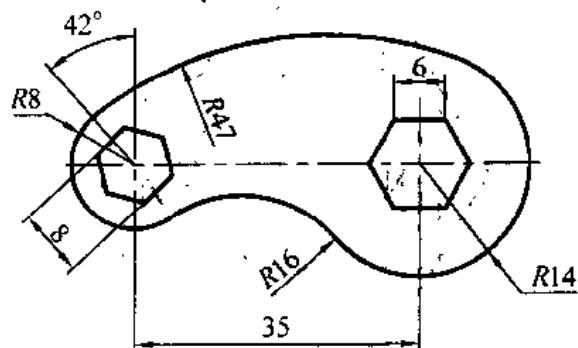
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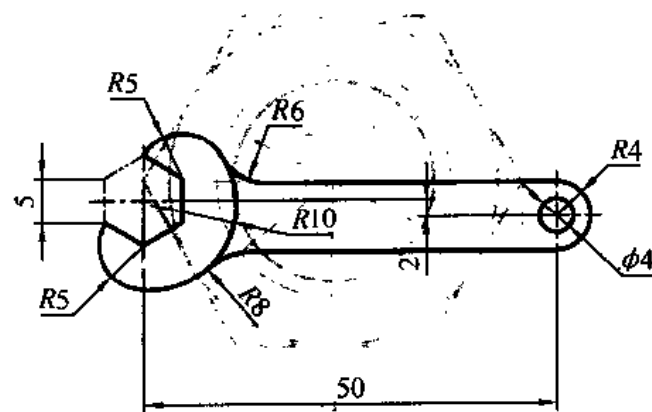
四、矩形和多边形

按 1:1 的比例绘制平面图形。

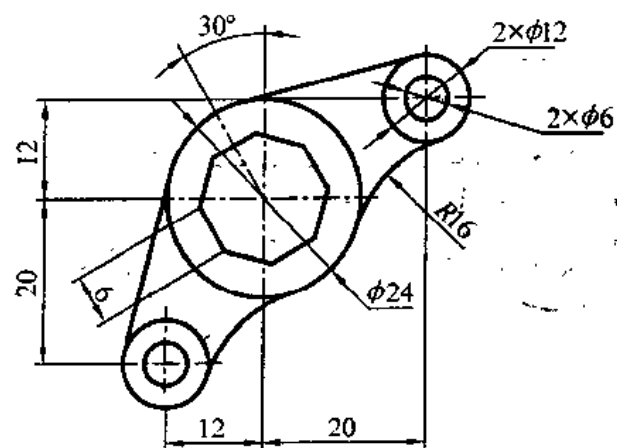
(1)



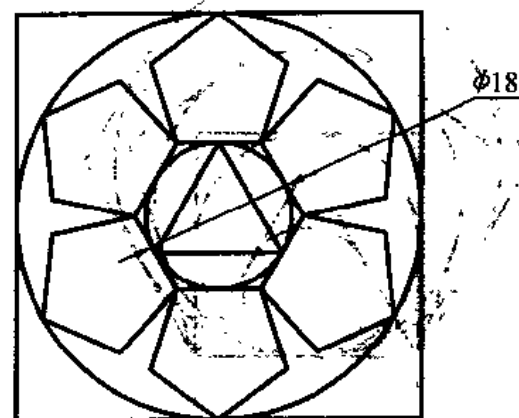
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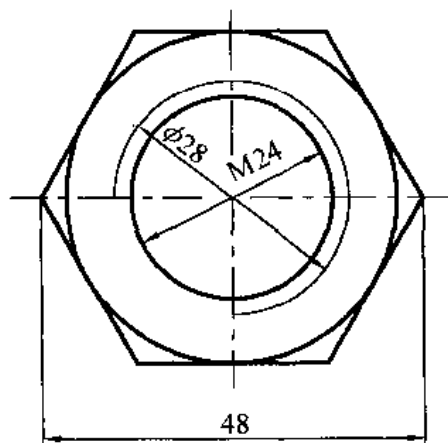
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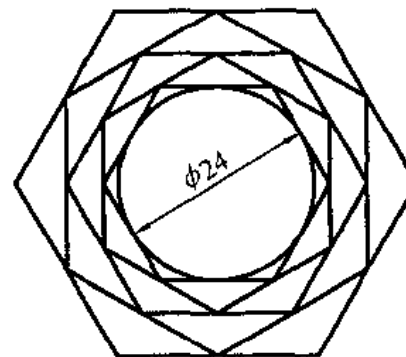
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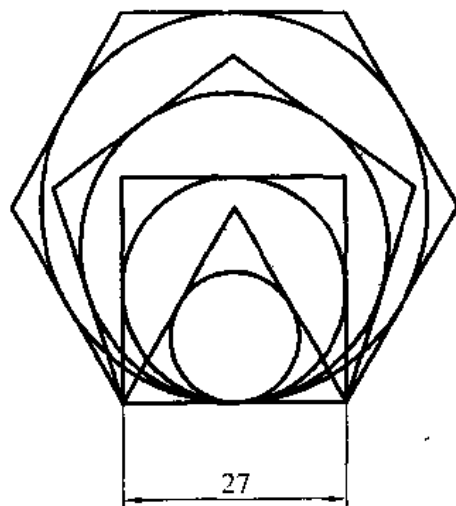
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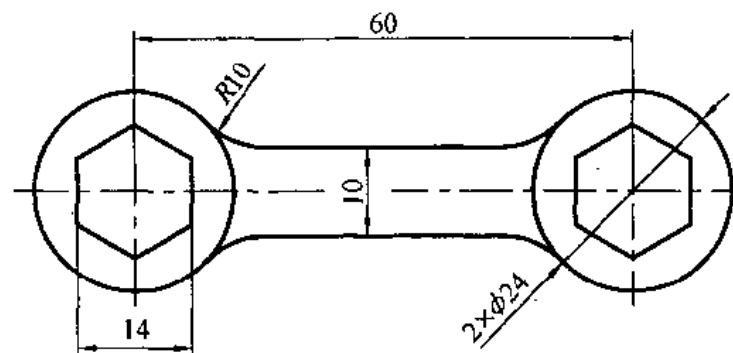
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(7)



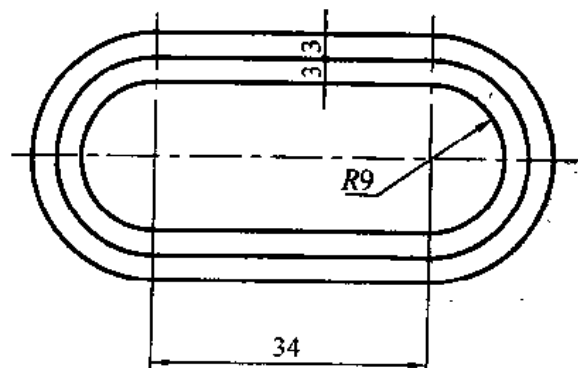
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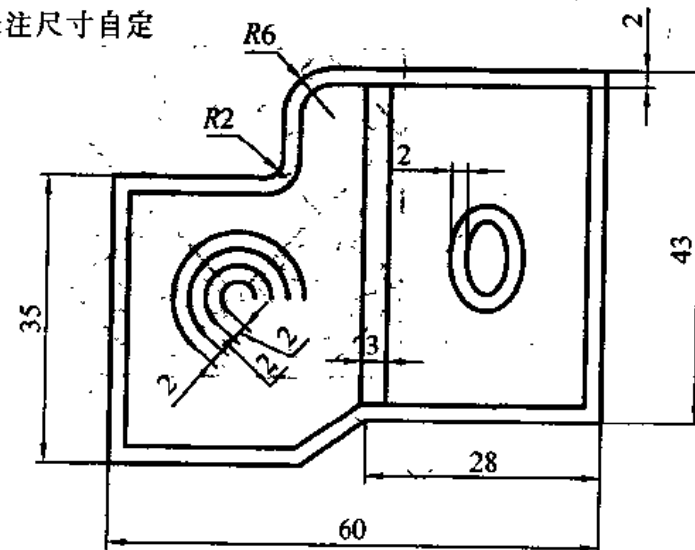
五、等距线

按 1:1 的比例绘制平面图形。

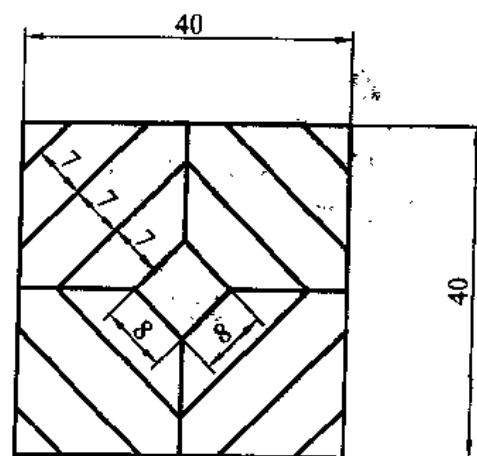
(1)



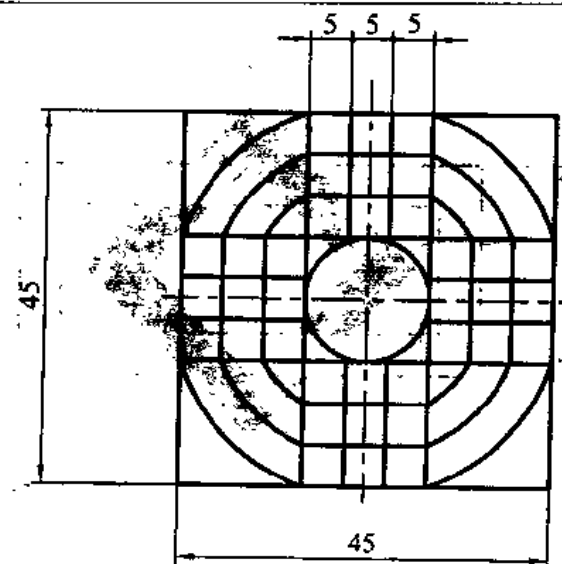
(2) 未注尺寸自定



(3)



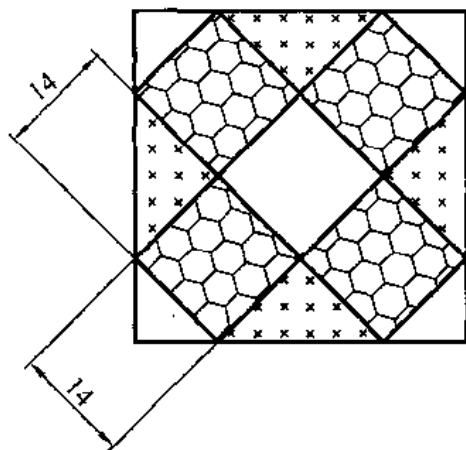
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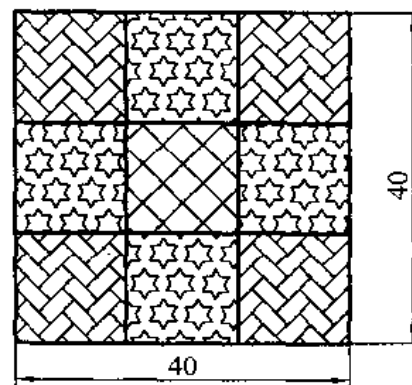
六、图案填充

1. 按 1:1 的比例绘制平面图形。

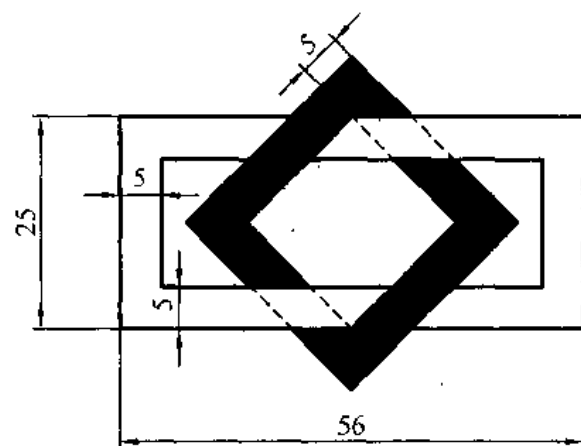
(1)



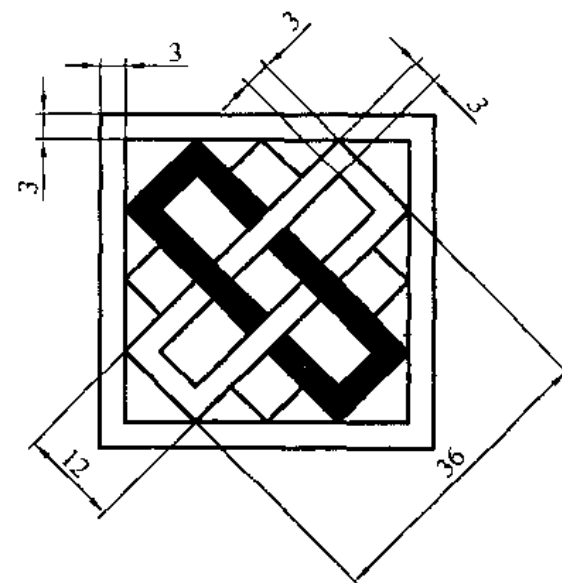
(2)



(3)

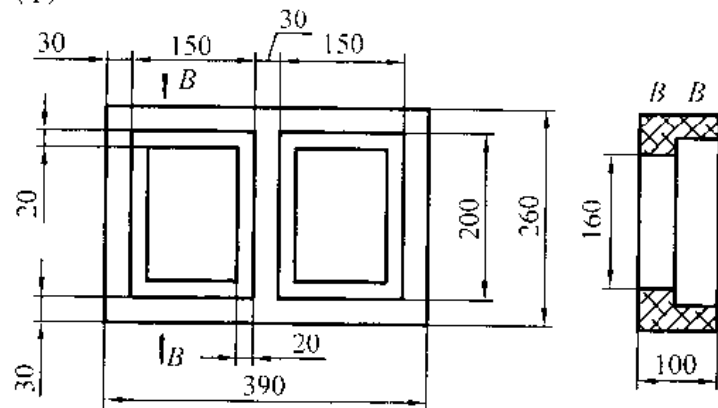


(4)

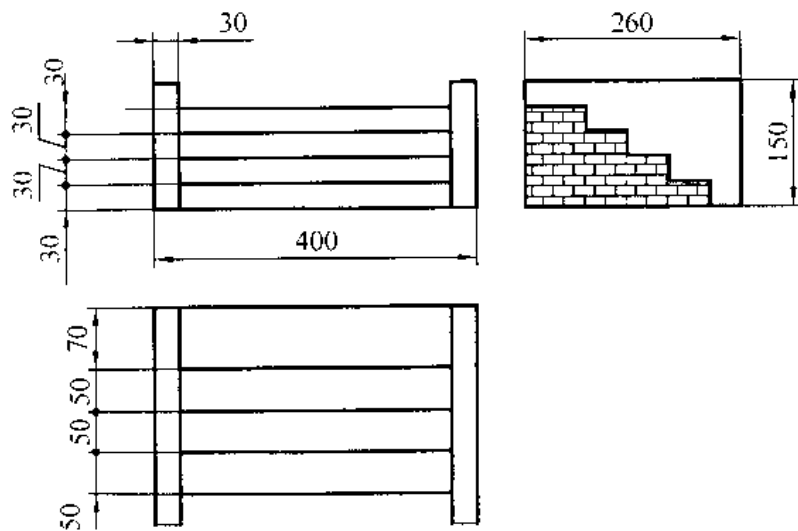


2. 按 1:1 的比例绘制建筑图形。

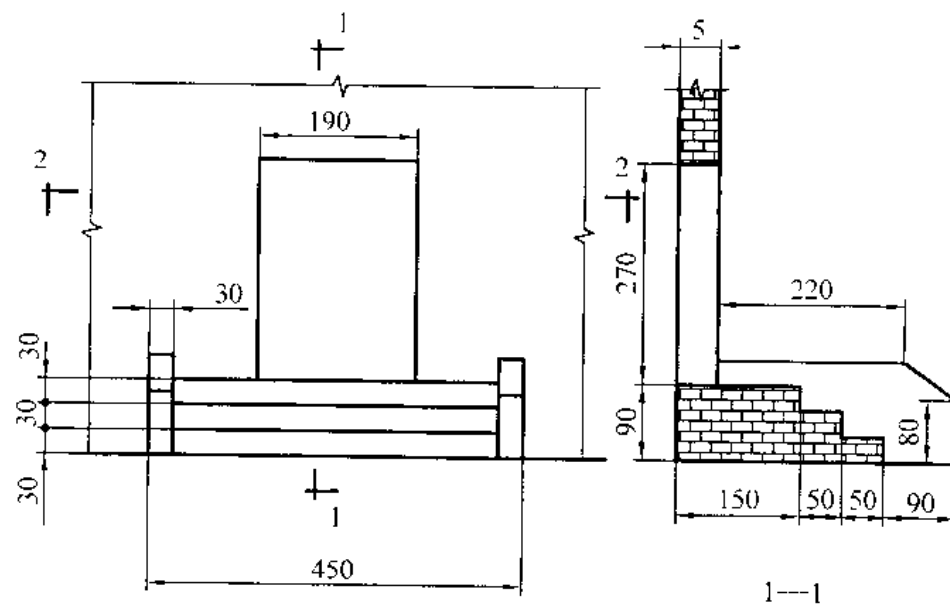
(1)



(2)



(3) 画出 2-2 剖视图

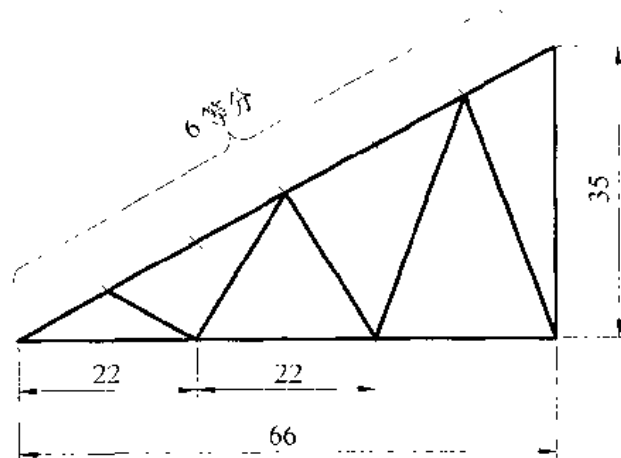


2 2

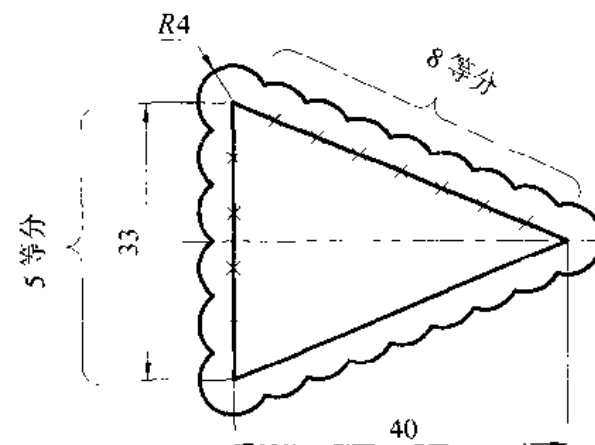
七、点和曲线

1. 按 1:1 的比例绘制平面图形。

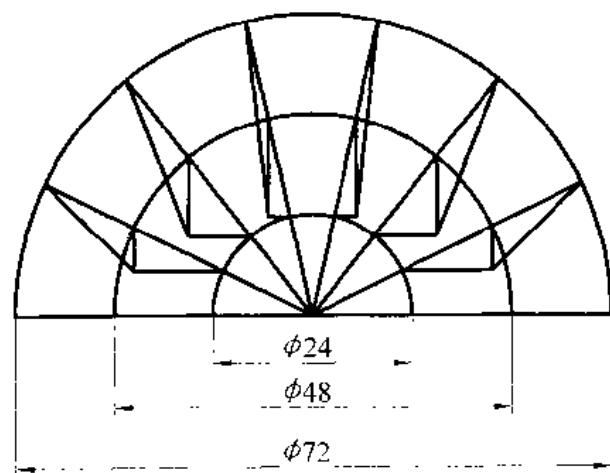
(1)



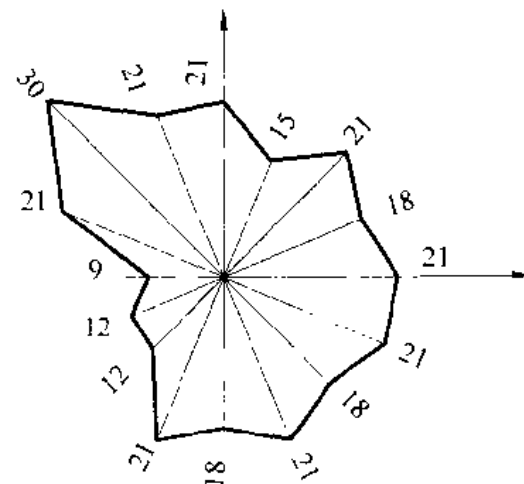
(2)



(3)

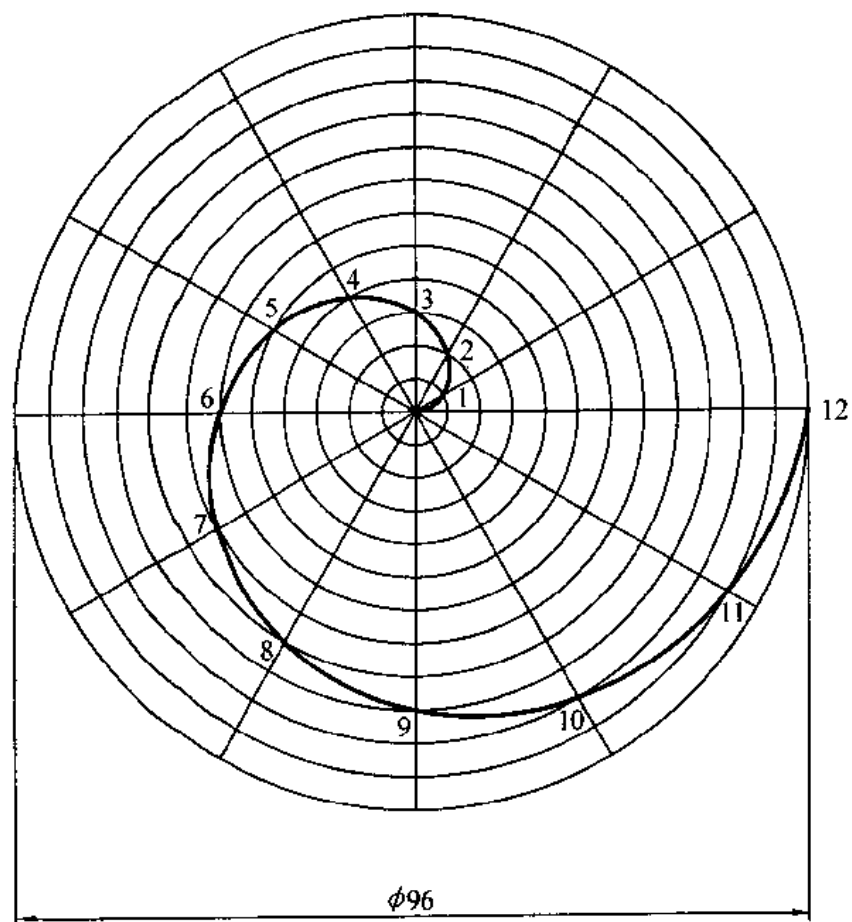


(4) 直线沿圆周均布, 每 22.5° 一条, 数字代表直线的长度

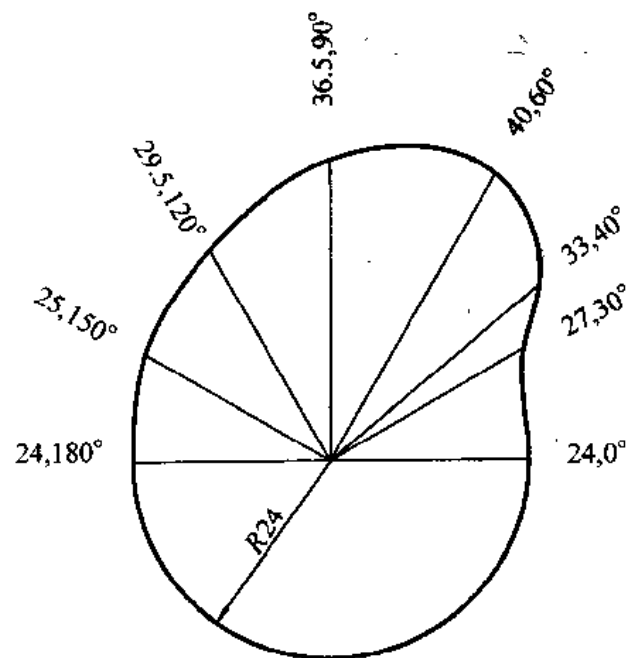


2. 按 1:1 的比例绘制曲线图形。

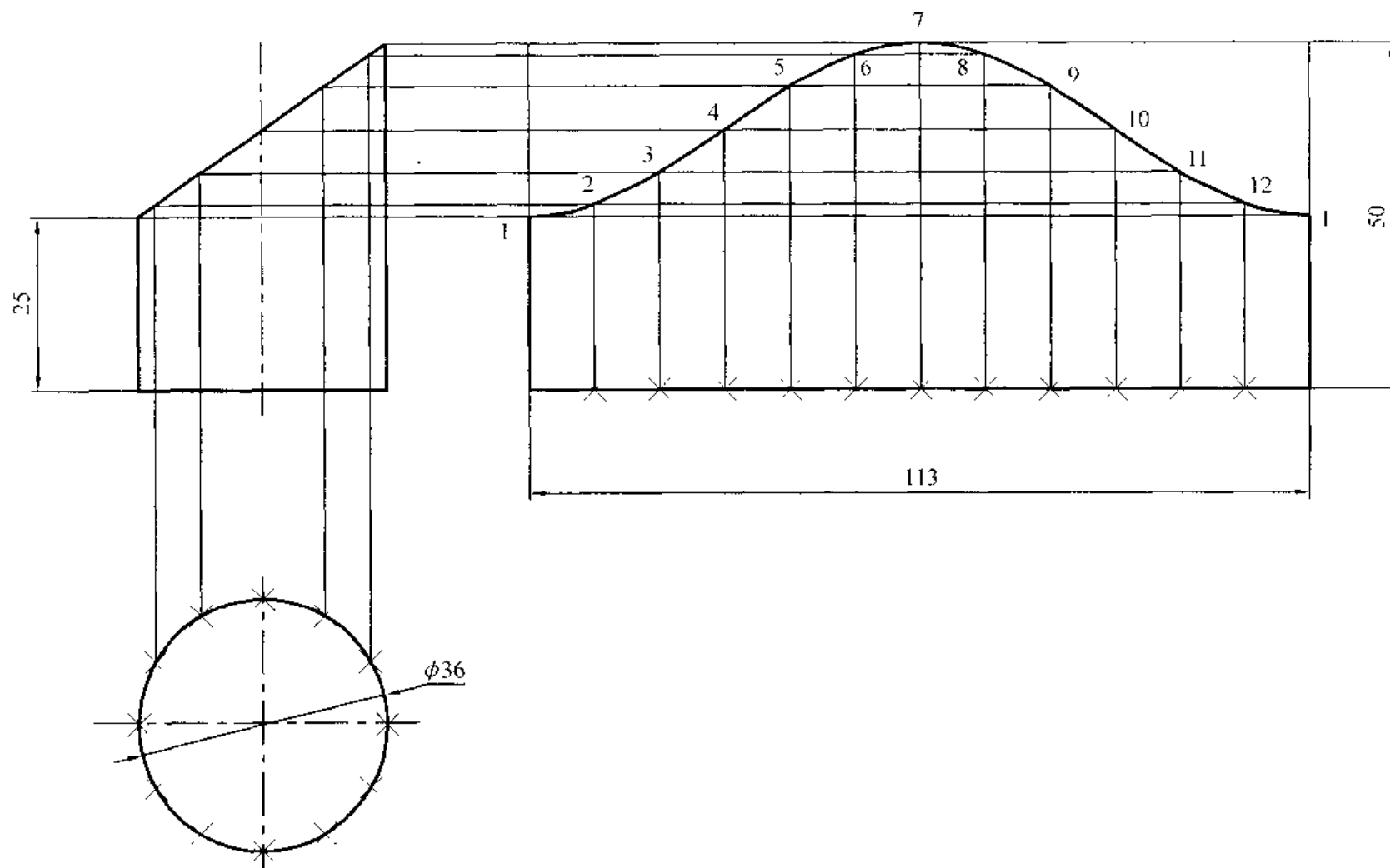
(1) 阿基米德螺线。将圆周和半径分为 12 等分，在各条辐射线上截取线段，分别等于圆半径的 $1/12, 2/12, \dots$ ，得 1, 2, ... 点，用曲线命令光滑连接各点即得。



(2) 凸轮。标注的数字为确定凸轮上各点位置的线段的长度和角度，用曲线命令光滑连接各点即得。



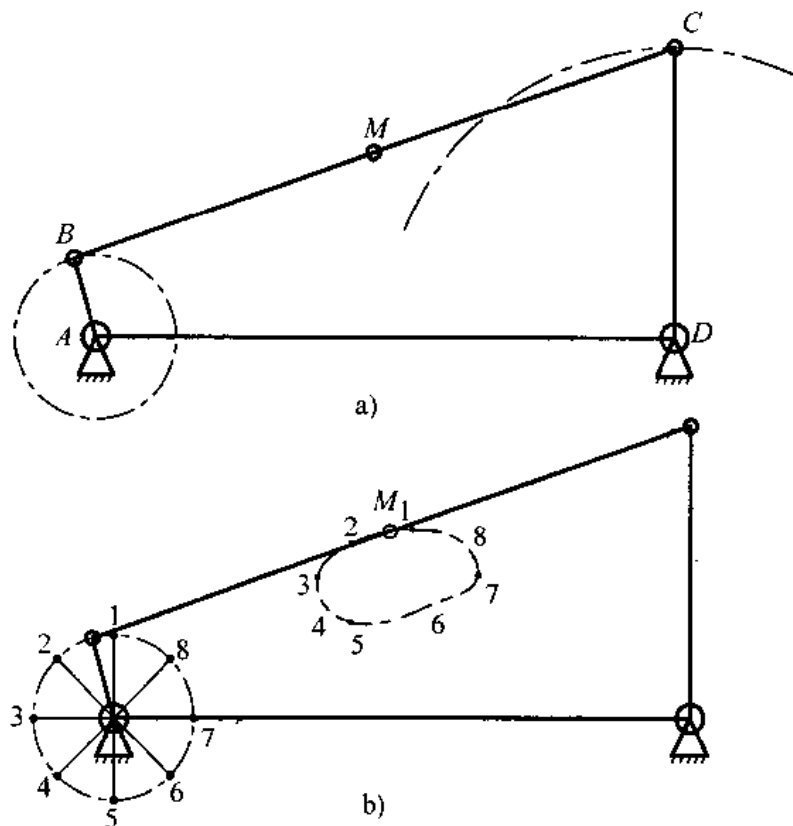
(3) 圆柱面的展开图。将俯视图圆周分成 12 等分，将底圆展成一直线，也分成 12 等分，过各等分点作直线的垂线，在垂线上取相应素线的长度，得 1, 2, …等点，用曲线命令光滑连接各点即得



(4) 作曲柄摇杆机构 (见图 a) 中 BC 杆中 M 点的运动轨迹 (见图 b), 其中: $AB = 12\text{mm}$, $BC = 65\text{mm}$, $CD = 25\text{mm}$, $DA = 50\text{mm}$ 。

提示:

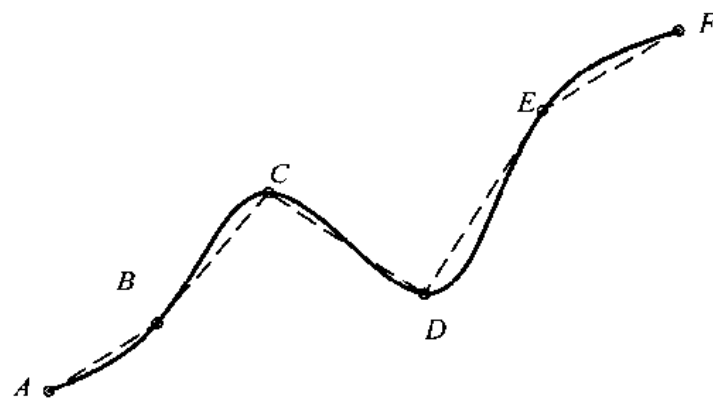
- 1) 曲柄摇杆机构 (见图 a) 中 AB 杆可以绕 A 点作整圆周运动。
- 2) 将 B 点的运动轨迹 (点画线圆) 分成 8 等分。
- 3) 画出当 B 点运动到 1, 2, 3, 4 等点时, BC 杆上 M 点的位置 1, 2, 3, 4 等点, 用通过各点的曲线将各点光滑连接起来。



(5) 作出实验曲线。A ~ F 各点的坐标值是在实验中得到的。
要求:

- 1) 画出各点;
- 2) 将各点顺序连成虚线;
- 3) 过各点连成光滑曲线 (实线)。

	A	B	C	D	E	F
X/mm	8	18.9	30	45.7	78	92
Y/mm	3	9.8	23	12.9	31.4	39.7



(6) 绘制齿轮的渐开线齿形。已知齿轮的齿数为 20；模数 5；分度圆直径 $\phi 100\text{mm}$ ；齿顶圆直径 $\phi 110\text{mm}$ ；齿根圆直径 $\phi 87.5\text{mm}$ ；基圆直径 $\phi 93.97\text{mm}$ 。

a) 画渐开线的基圆。将圆周 24 等分。

b) 分别过 1、2、3、4、5 和 6 点作各自的等分线的垂直线，长度分别为 0.1 、 0.2 、 $\dots$ 的弧长。

c) 将 0 点和各垂直线的端点顺序连直线。

d) 画出分度圆、齿顶圆和齿根圆。将渐开直线延伸到齿根圆。

e) 将 d) 中的渐开直线拟合为光滑曲线。

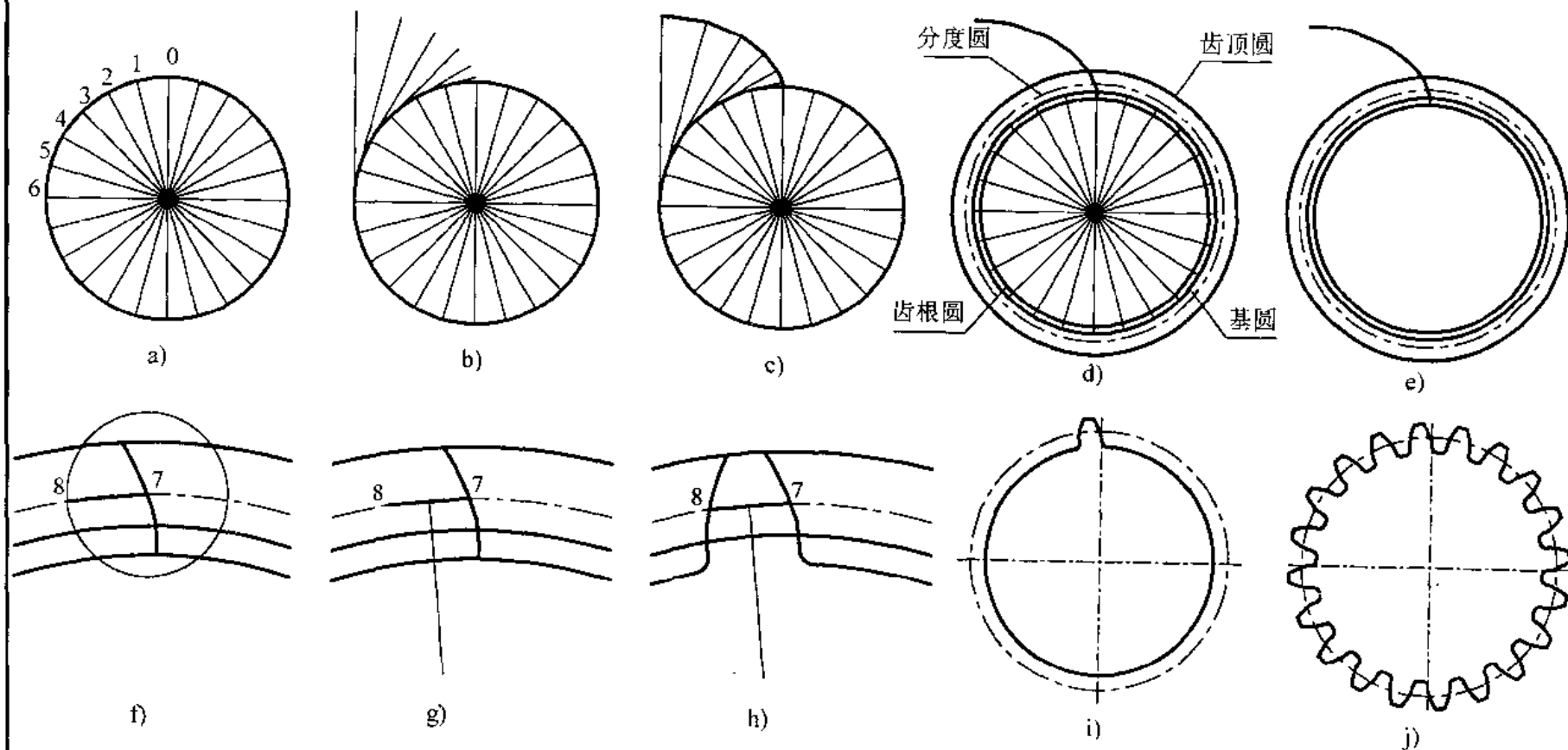
f) 以分度圆上 7 点为圆心画圆。圆的直径为 $\phi 7.846\text{mm}$ (分度圆上的齿厚)，交于分度圆于 8 点。将 7、8 点连线。

g) 过接基圆圆心向 7、8 线作垂直线。

h) 以垂直线为对称线作渐开线的对称图形，在齿根处倒半径为 $R1$ 的圆角。

i) 删除多余线条。

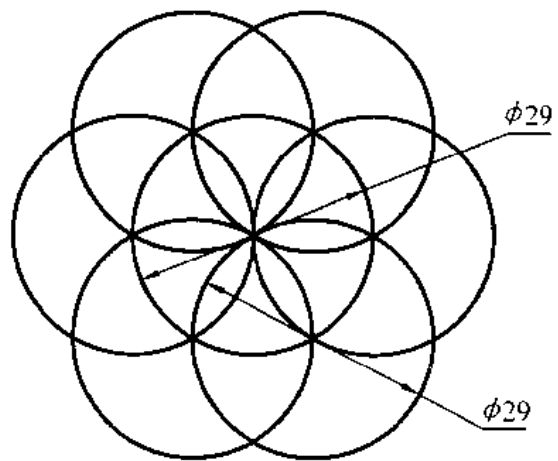
j) 将齿形阵列 20 个。



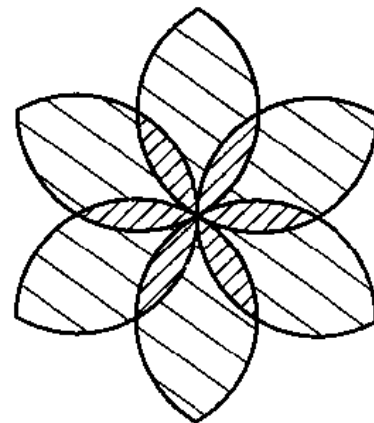
八、阵列

按 1:1 的比例绘制平面图形。

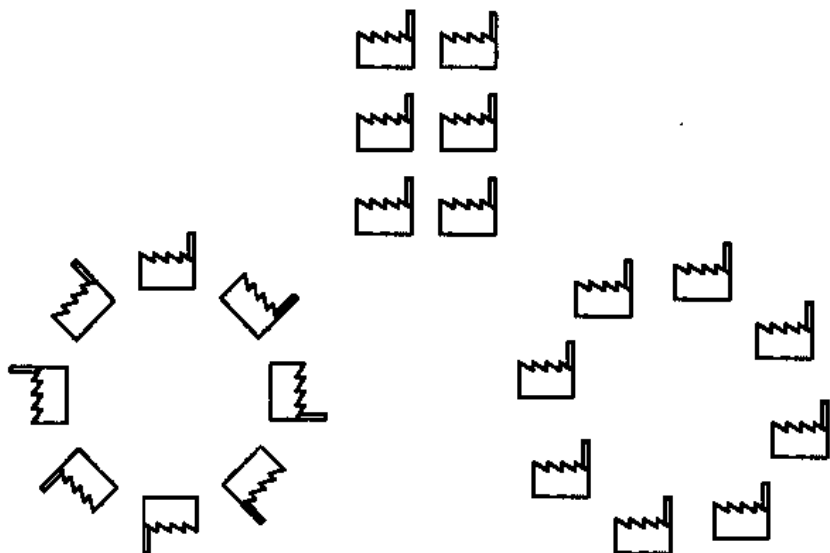
(1)



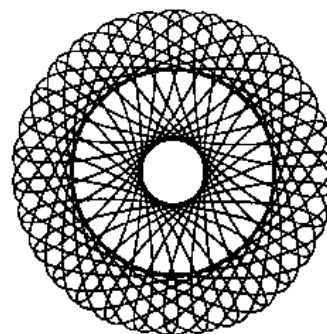
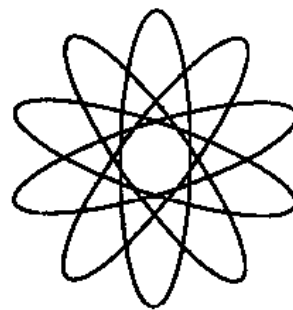
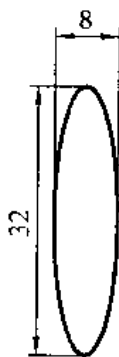
(2) 在题 (1) 图的基础上裁剪图形, 并填充图案



(3) 尺寸自定



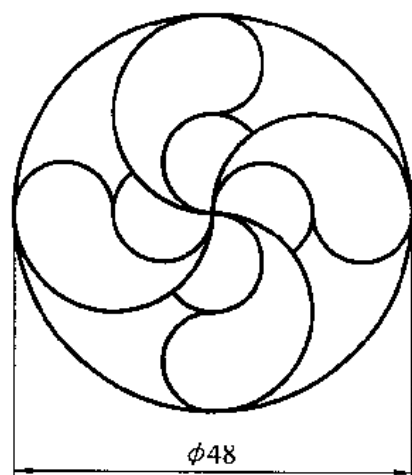
(4) 作椭圆图形的阵列



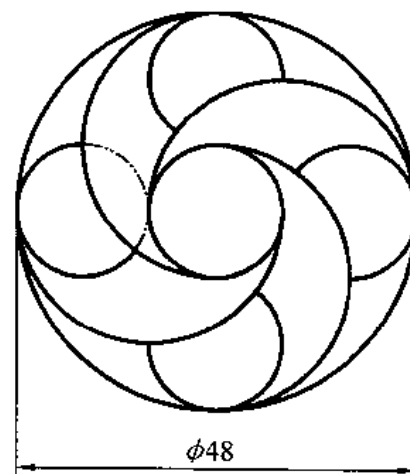
a) 作椭圆图形的阵列, 阵列中心在椭圆的圆心

b) 作椭圆图形的阵列, 阵列中心在椭圆的圆心向左 8mm 的位置, 阵列个数 40

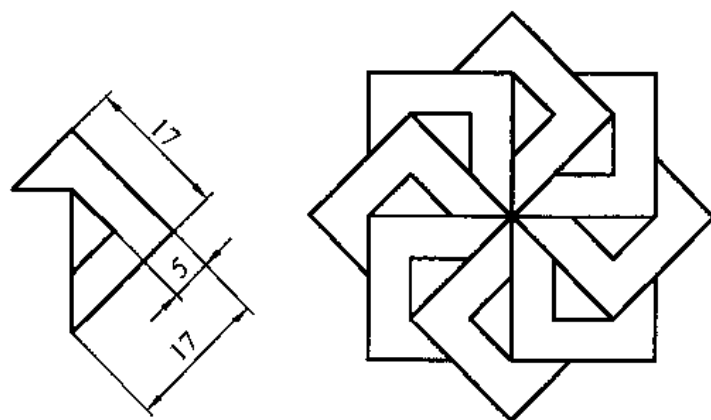
(5)



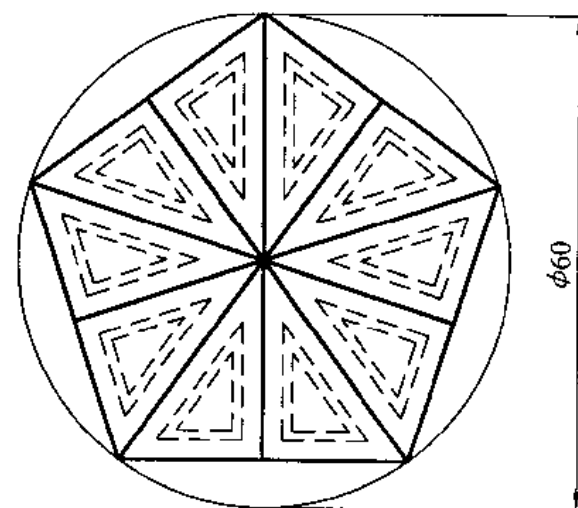
(6)



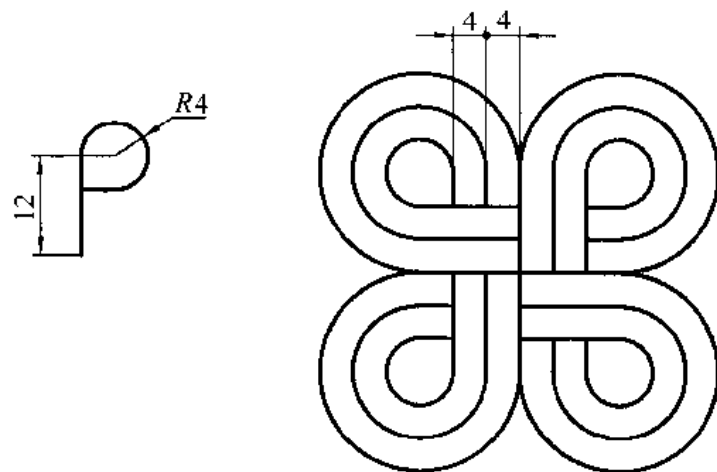
(7)



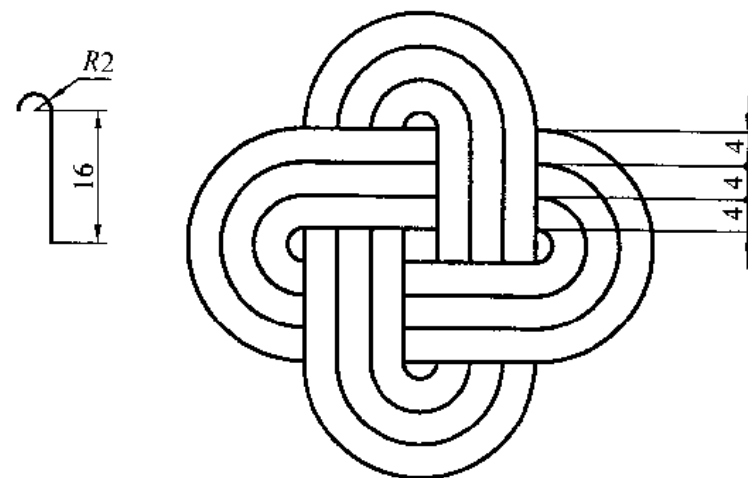
(8) 未注尺寸自定



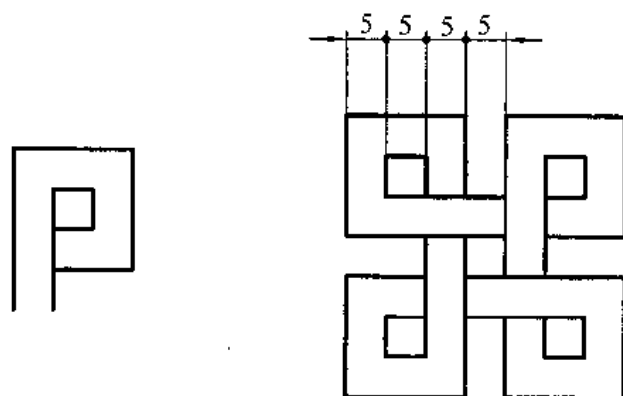
(9)



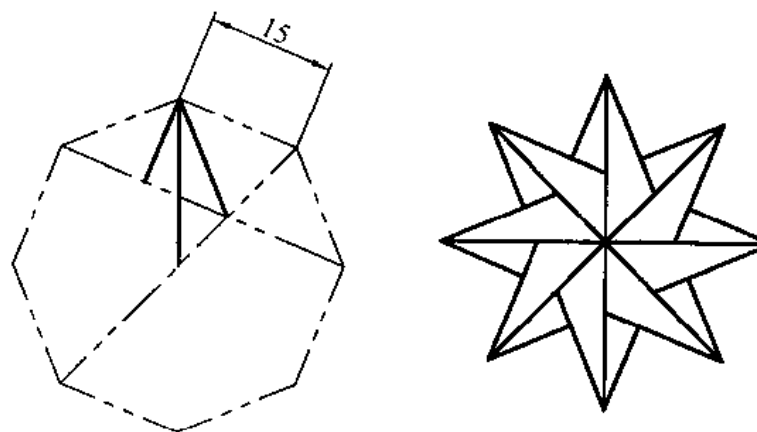
(10)



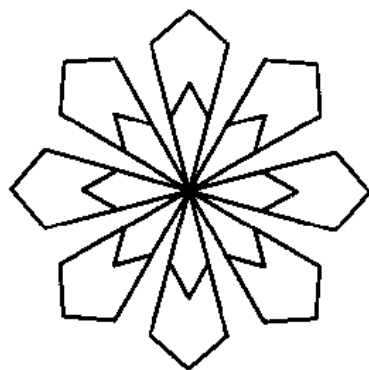
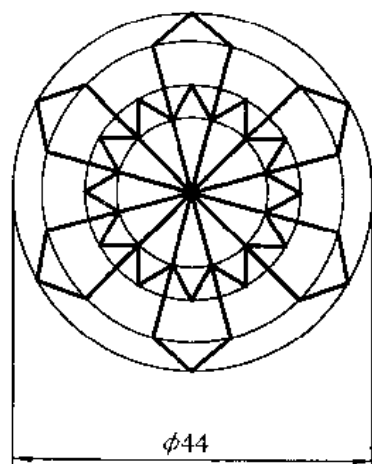
(11)



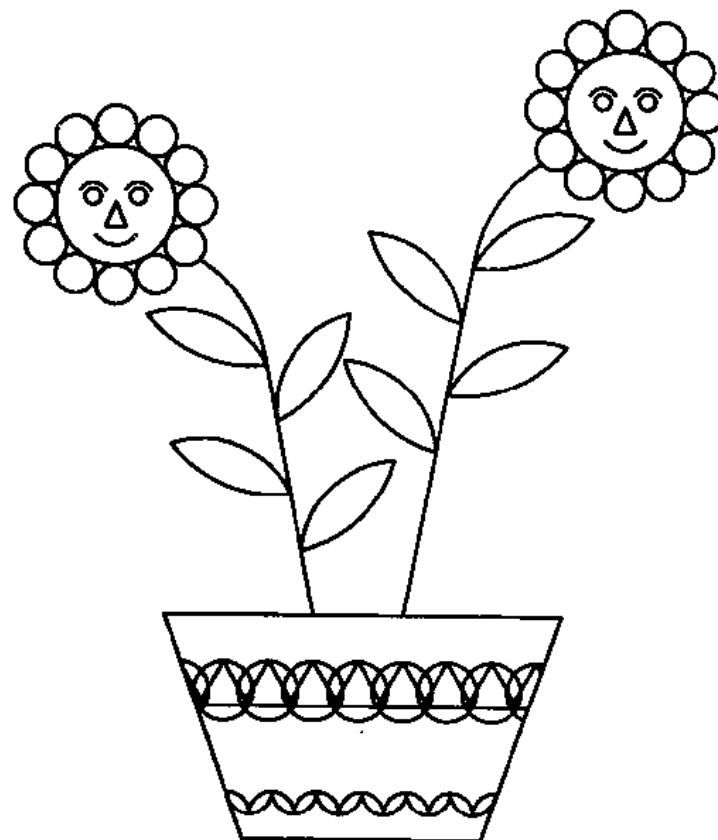
(12)



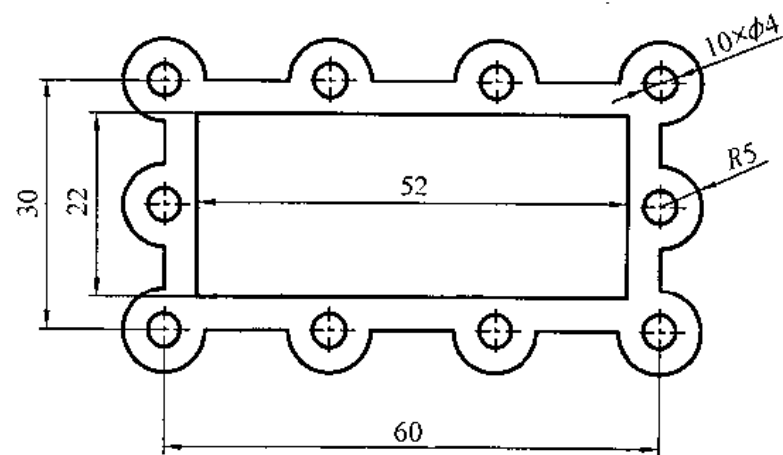
(13) 未注尺寸自定



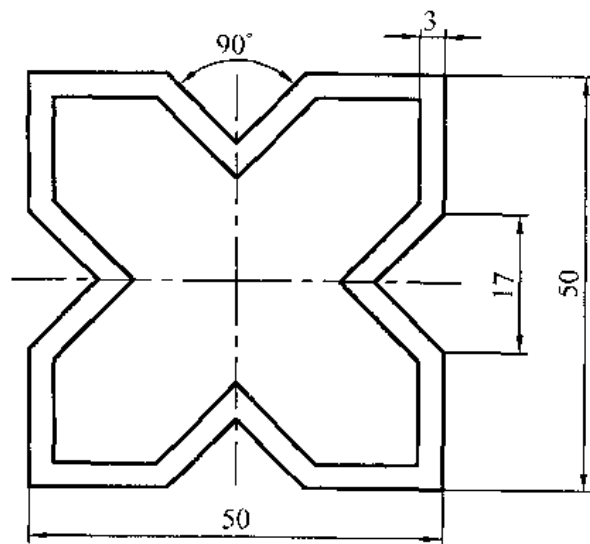
(15) 尺寸自定



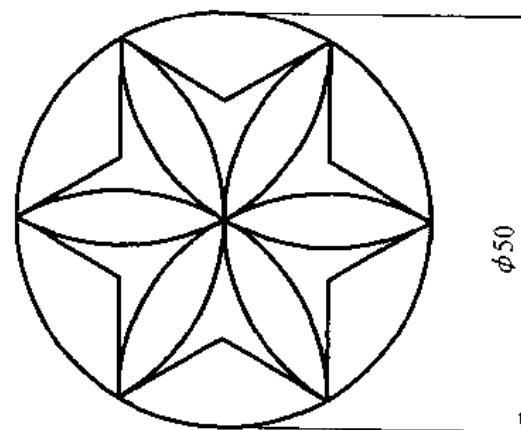
(14) 可利用矩形阵列功能画 $\phi 4$ 孔



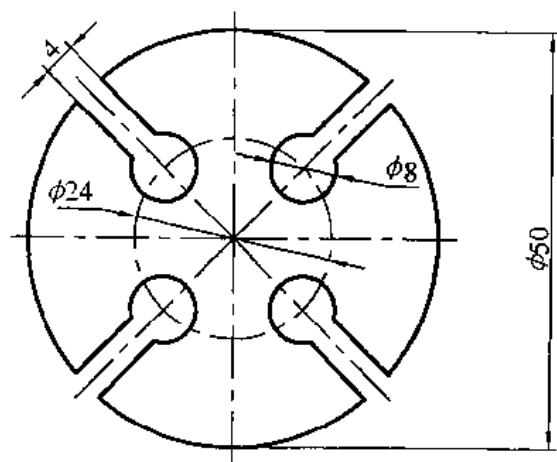
(16)



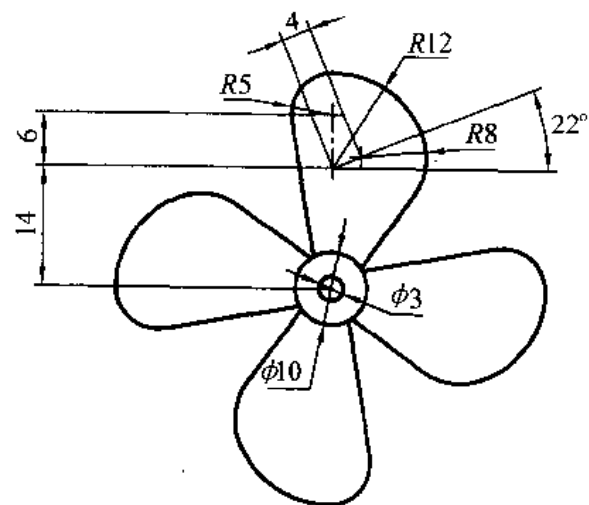
(17)



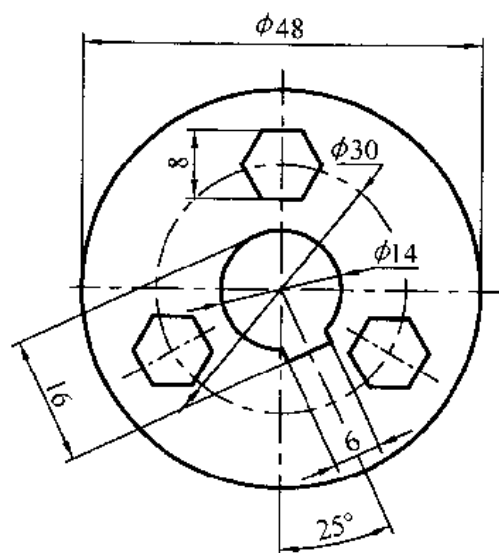
(18)



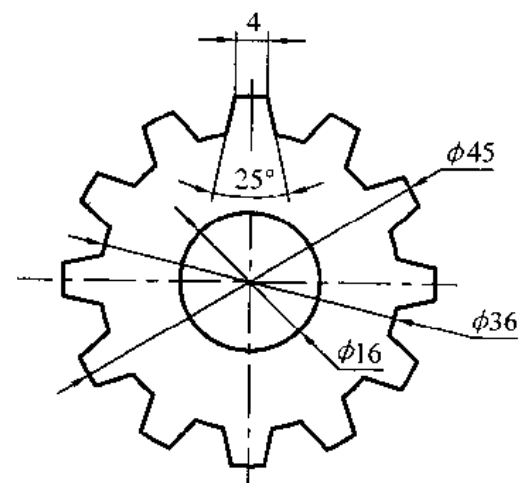
(19)



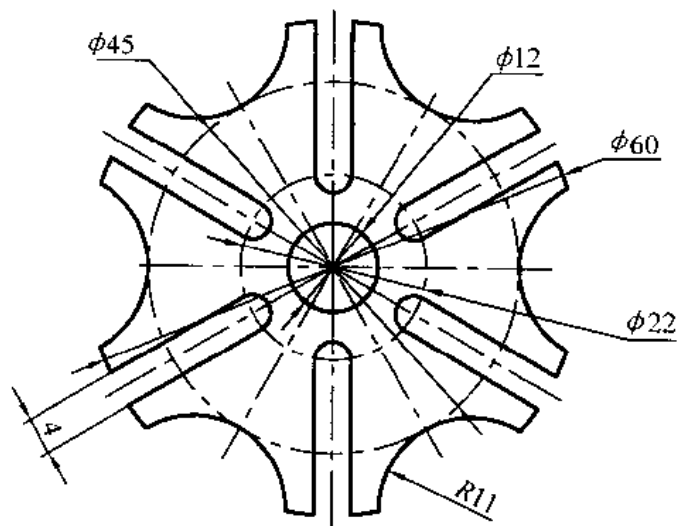
(20)



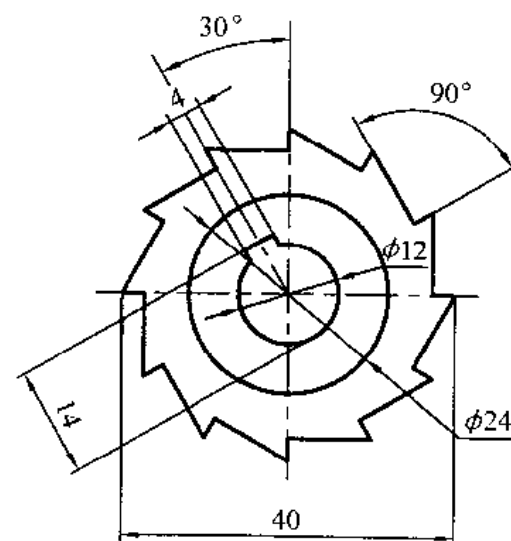
(21)



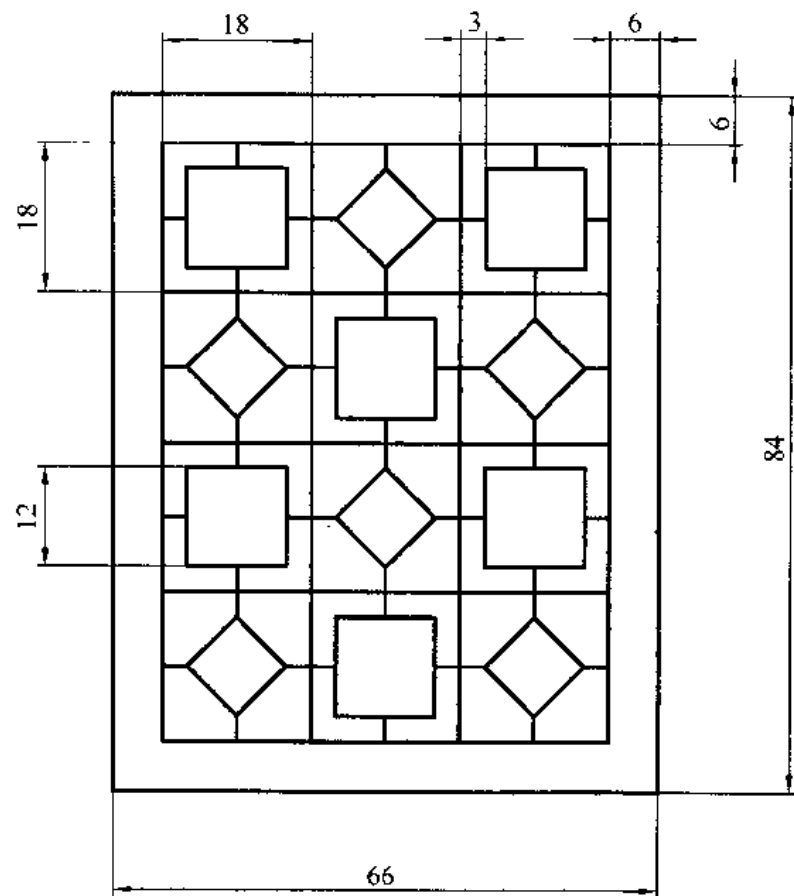
(22)



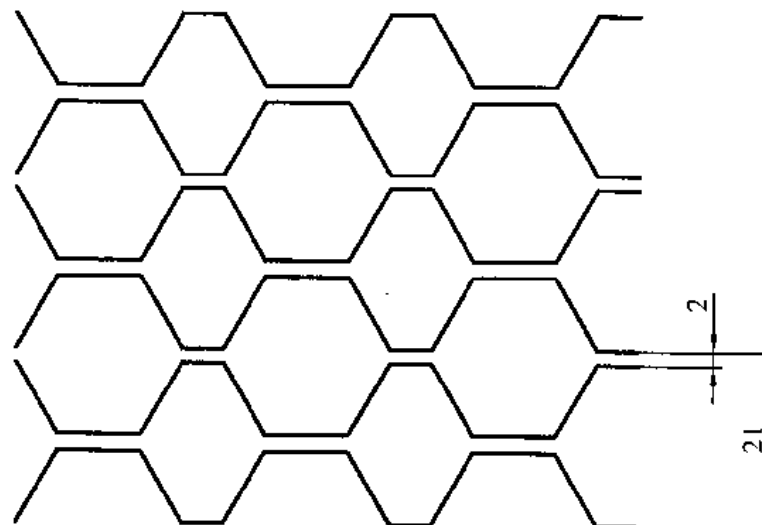
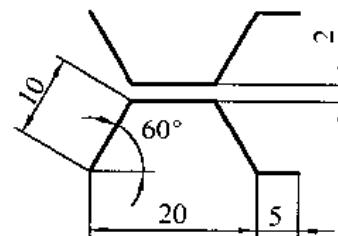
(23)



(24)

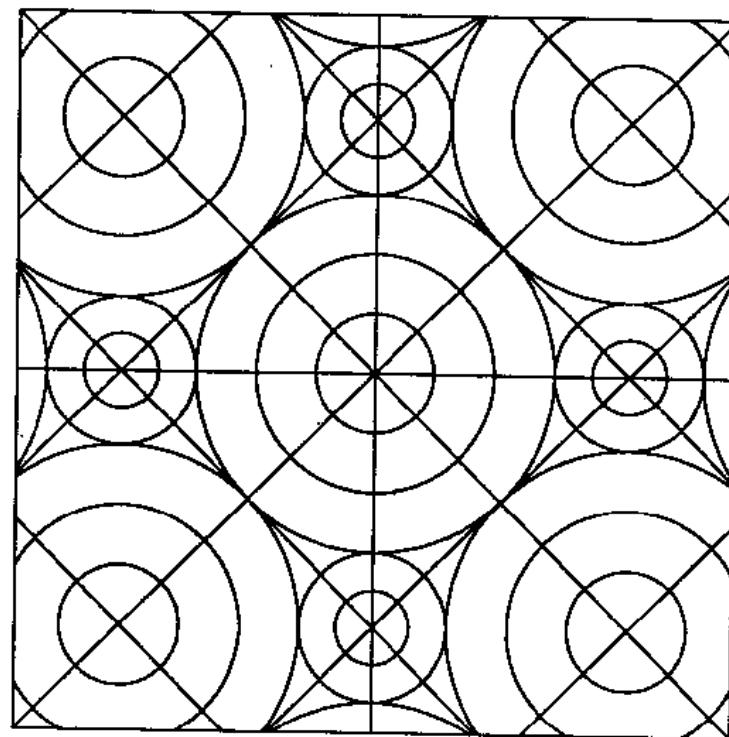
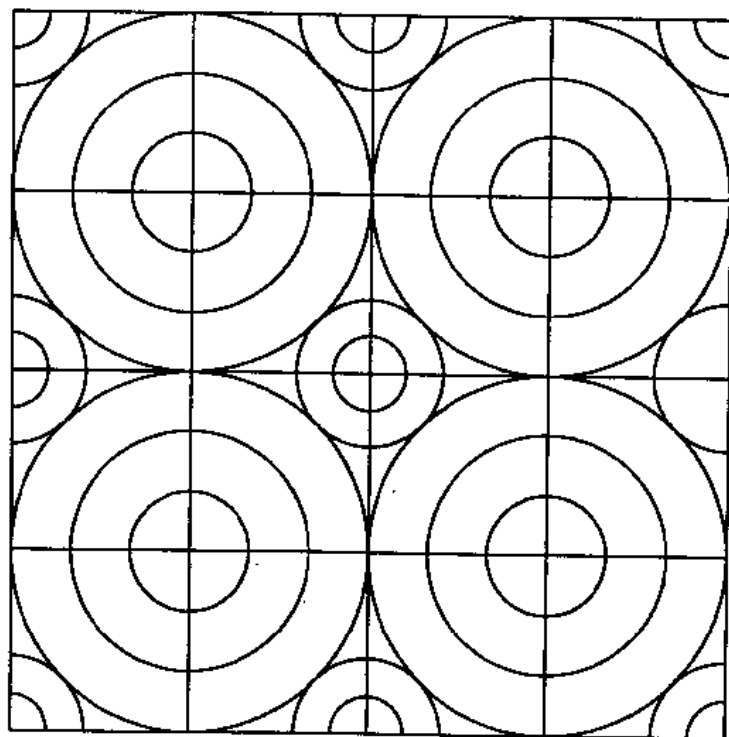
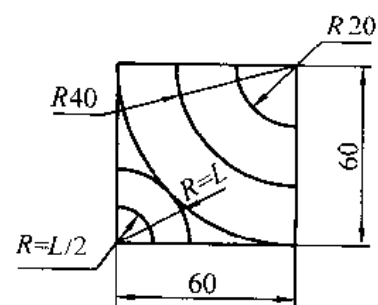


(25)

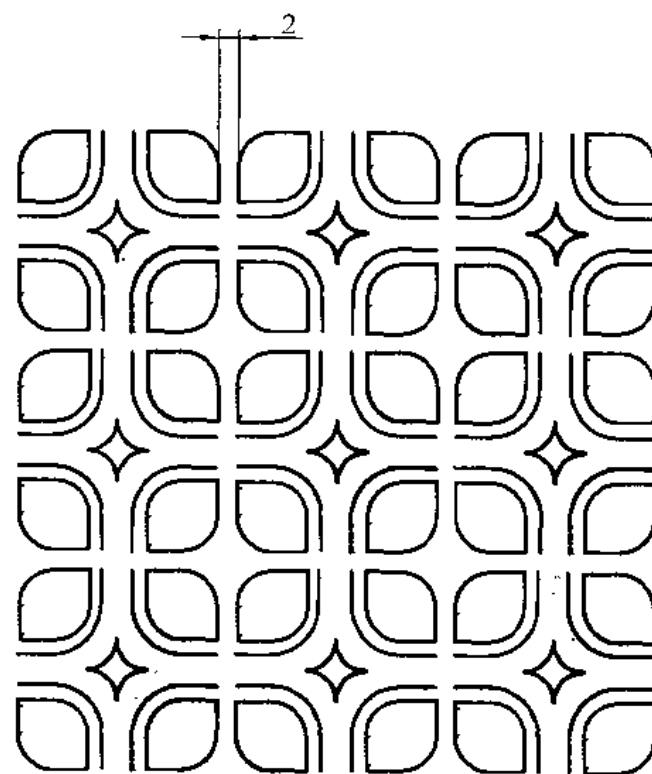
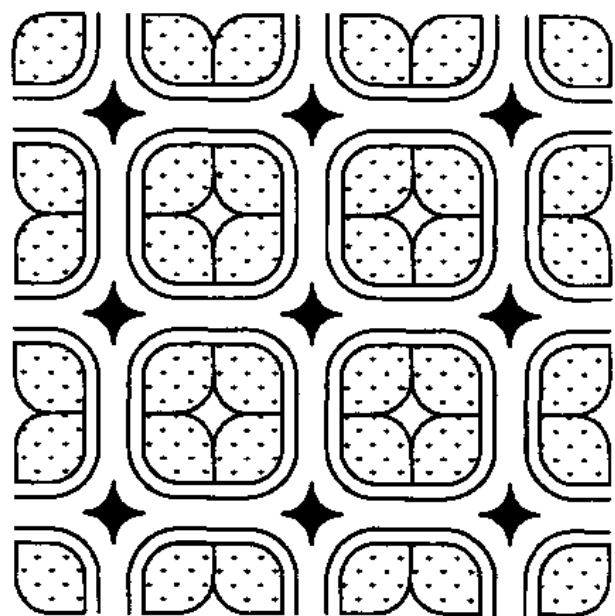
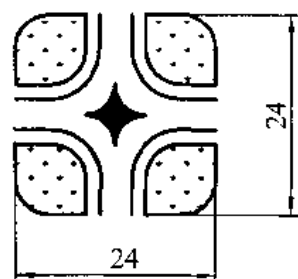


(26)

L 值由作图确定



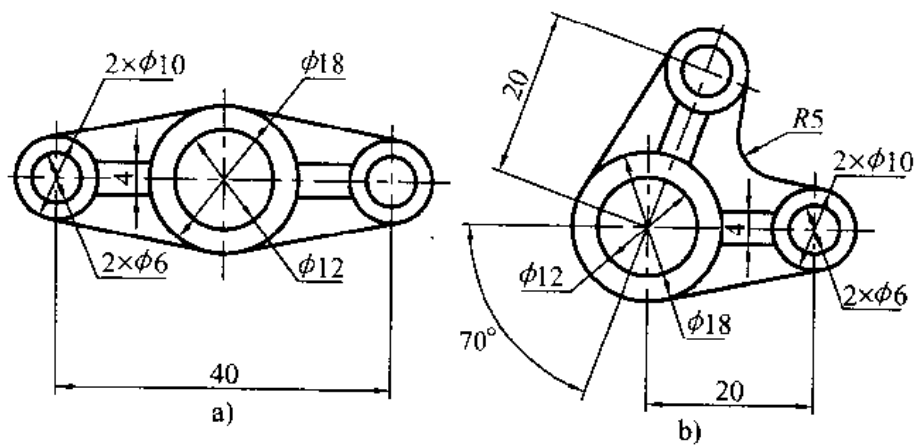
(27) 未注尺寸自定



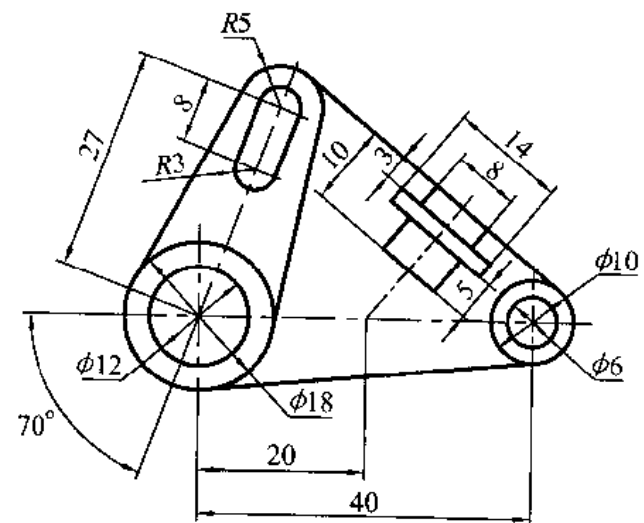
九、旋转

按 1:1 的比例绘制平面图形。

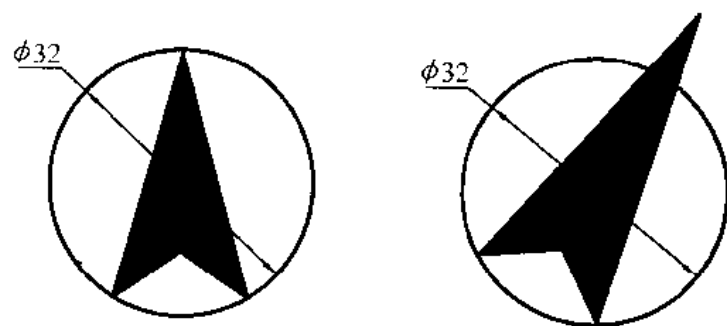
(1) 利用旋转功能将图 a 改为图 b



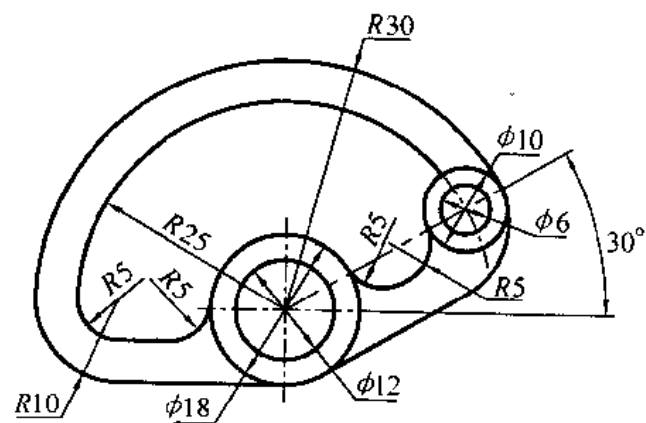
(2)



(3) 未注尺寸自定



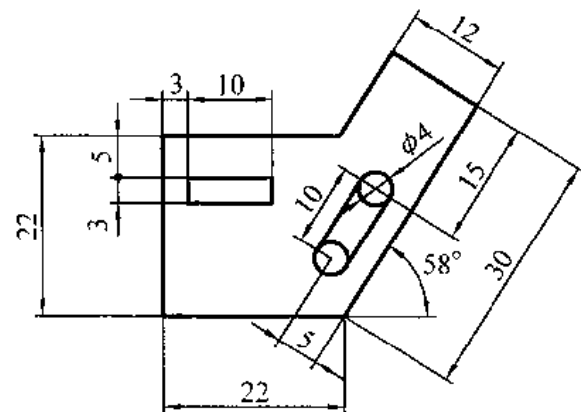
(4)



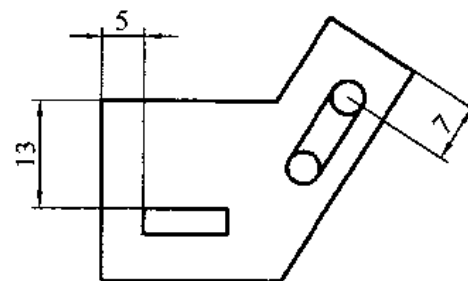
十、移动和拉伸

按 1:1 的比例绘制平面图形。

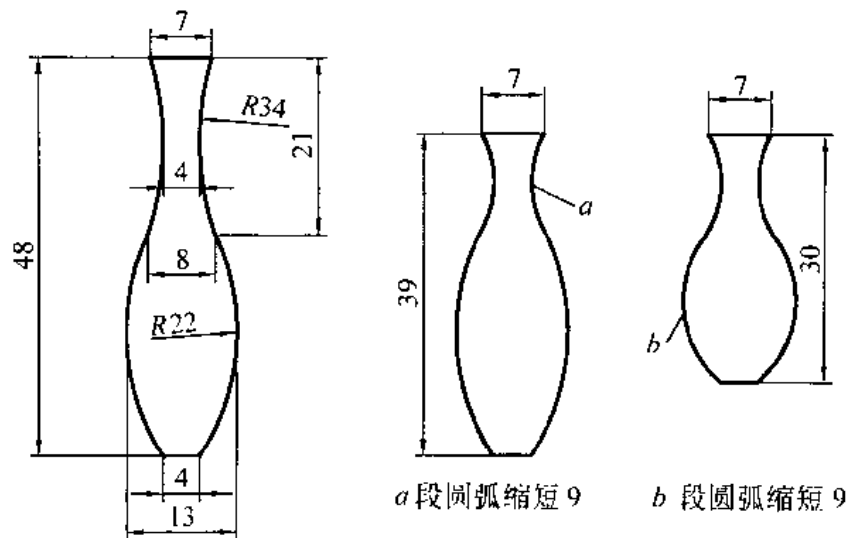
(1)



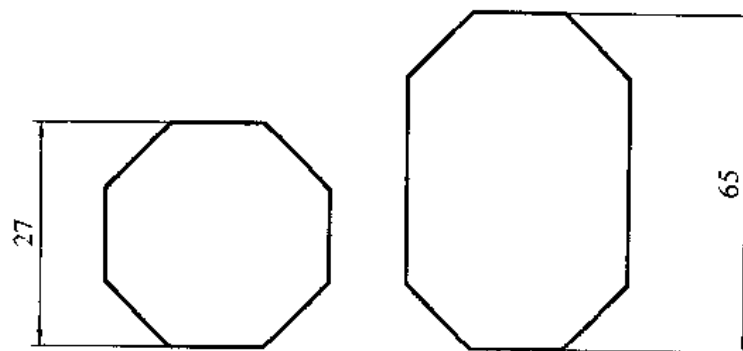
(2) 由 (1) 图改为本图, 其它尺寸不变



(3) 按图示尺寸拉伸 a 、 b 两段圆弧, 使花瓶变矮



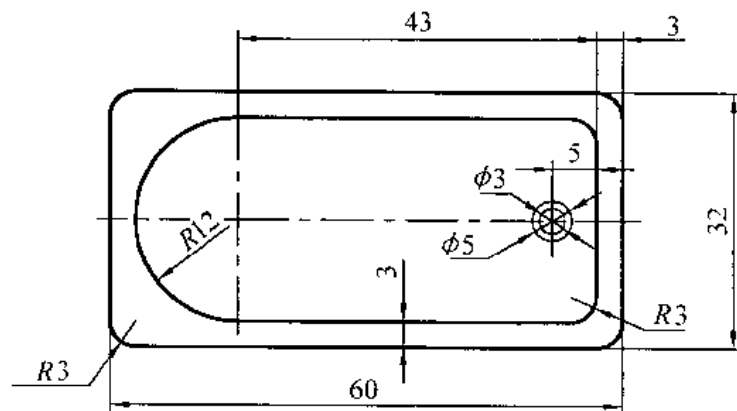
(4) 将复制后的八边形按尺寸纵向拉长



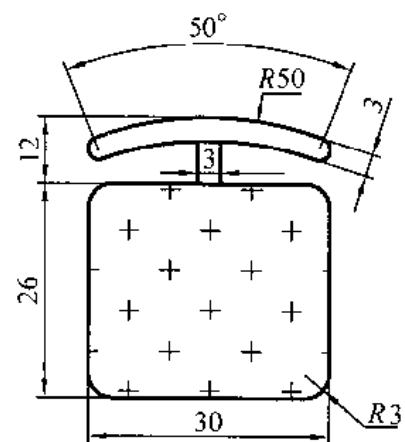
十一、倒角和圆角

按 1:1 的比例绘制平面图形。

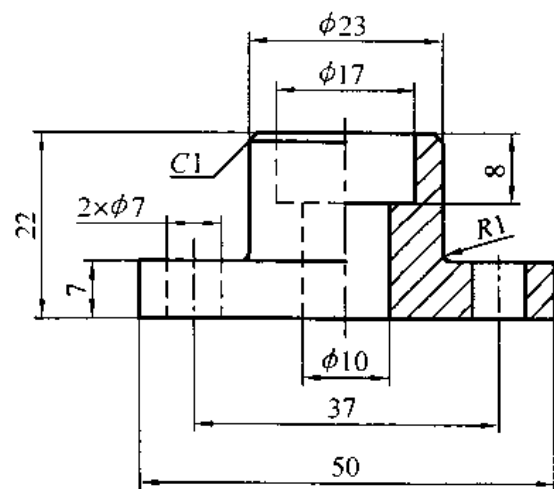
(1)



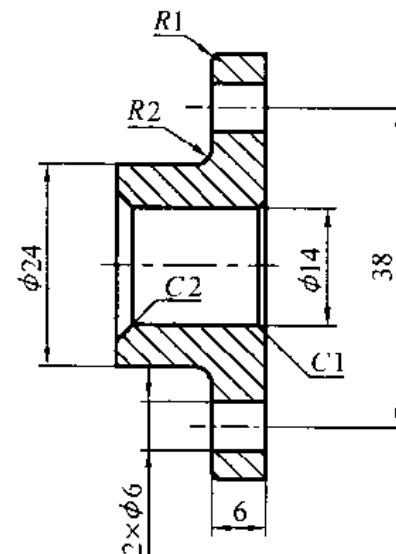
(2)



(3)



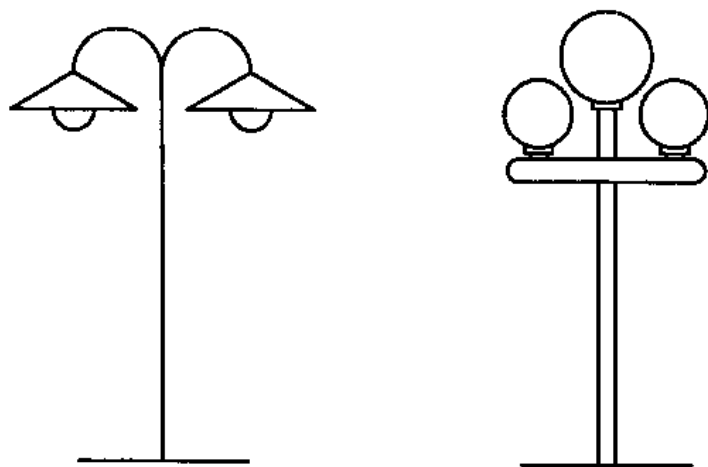
(4)



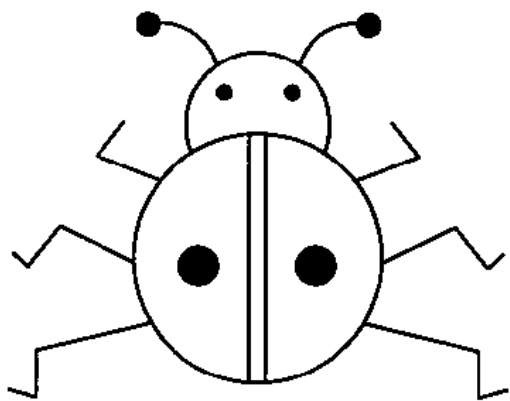
十二、镜向

按 1:1 的比例绘制平面图形。

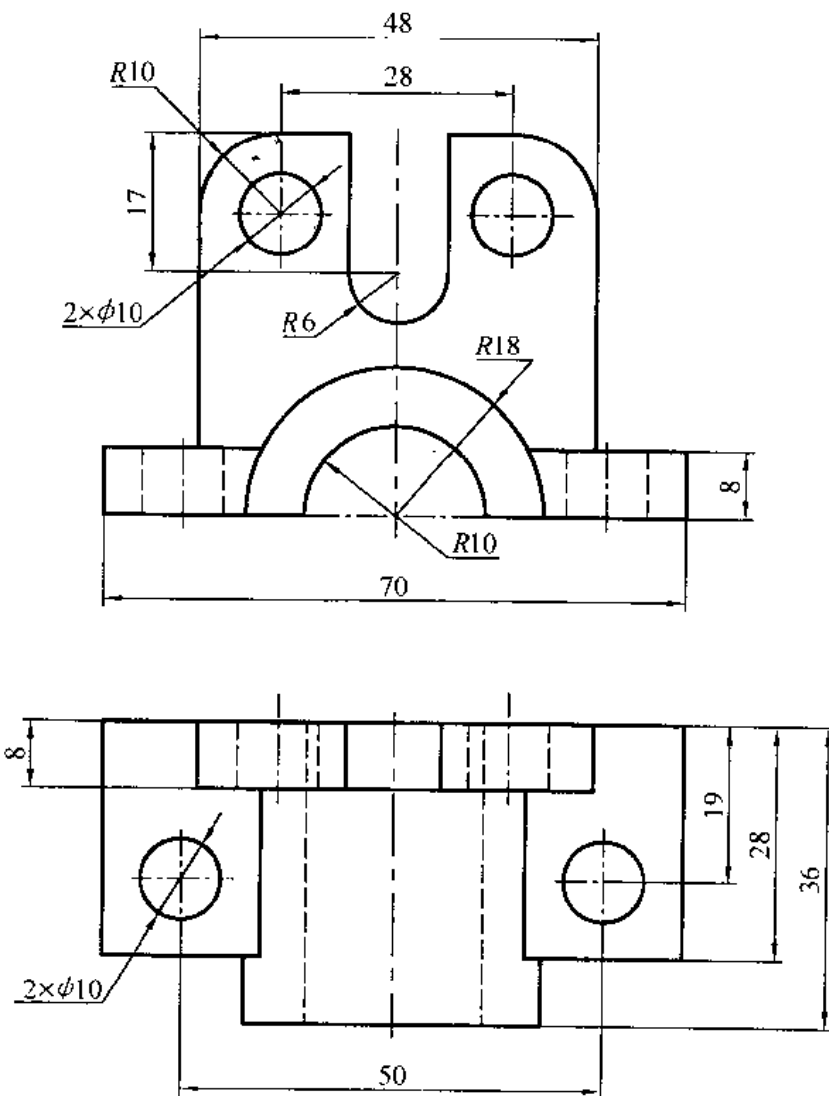
(1) 尺寸自定



(3) 尺寸自定



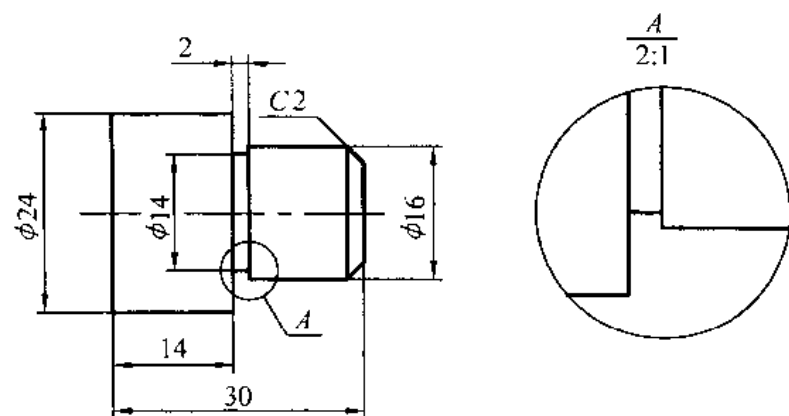
(2)



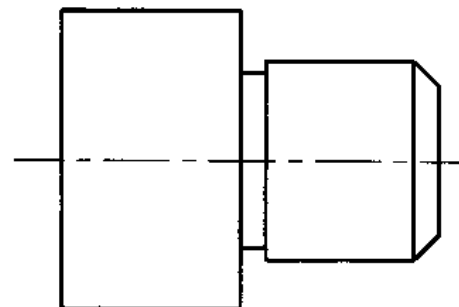
十三、比例缩放

按 1:1 的比例绘制图形。

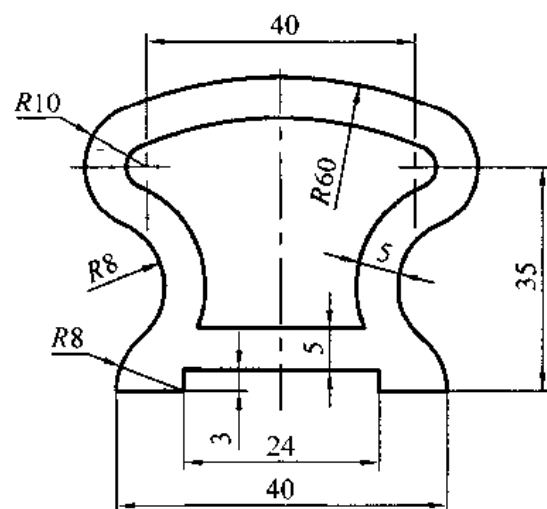
(1) 作轴的退刀槽的 2:1 局部放大图



(2) 在题 (1) 图的基础上将图形放大 2 倍



(3)



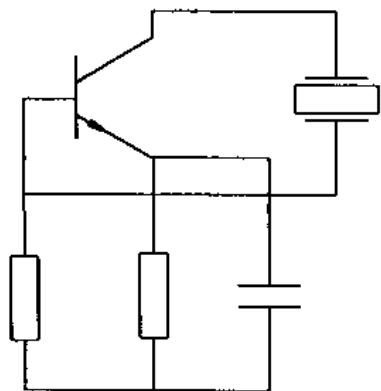
(4) 将题 (3) 图复制后缩小一倍



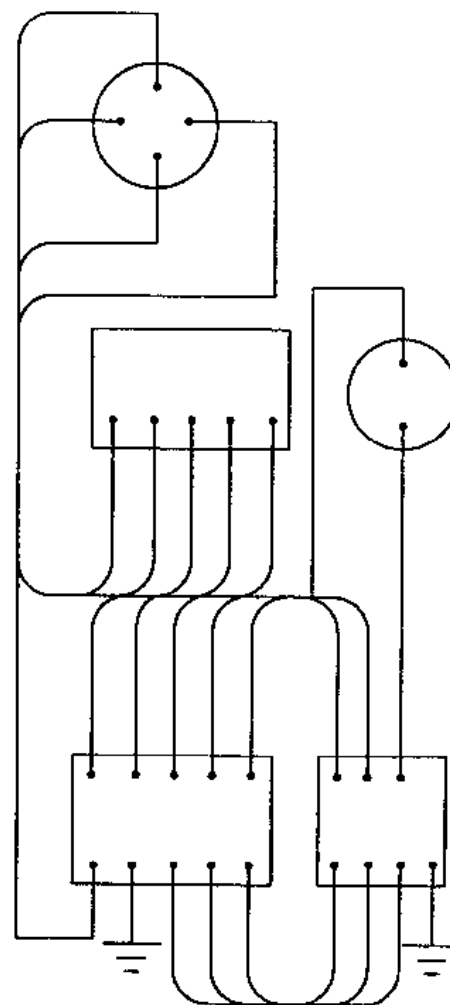
十四、复制

绘制电路图。

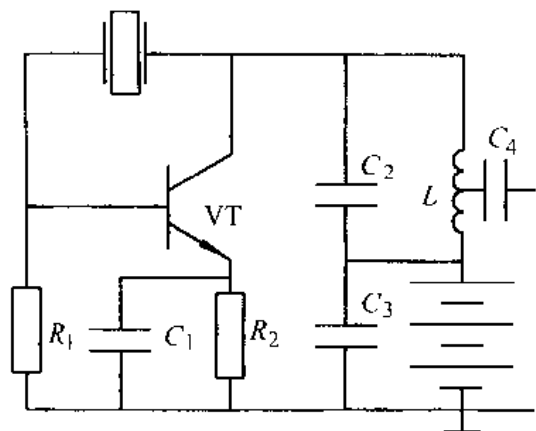
(1) 尺寸自定



(2) 尺寸自定



(3) 尺寸自定

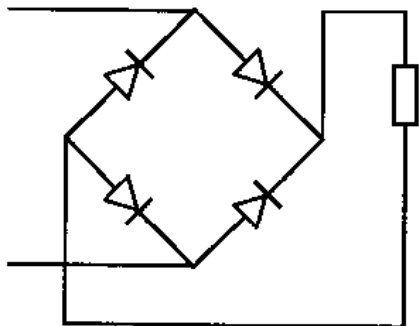


第二章 综合应用

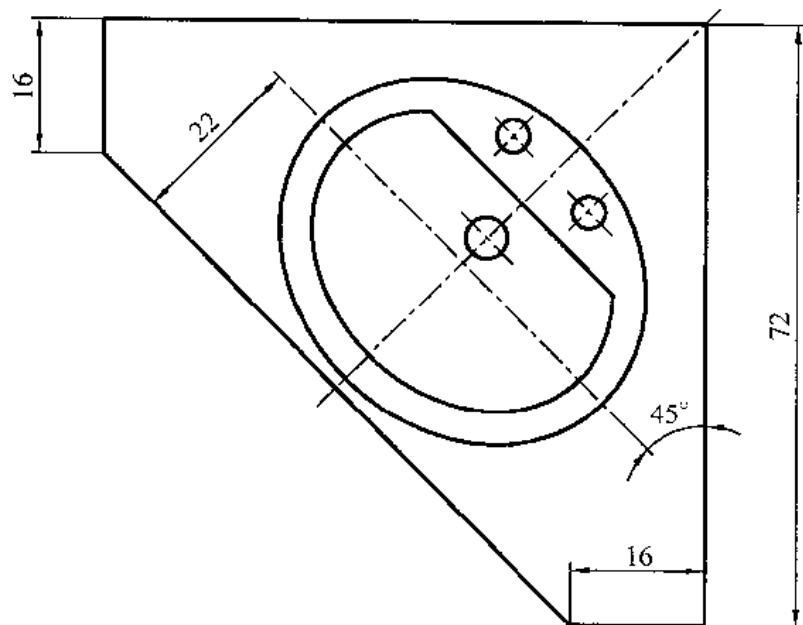
一、图块

应用图块功能绘制平面图形。

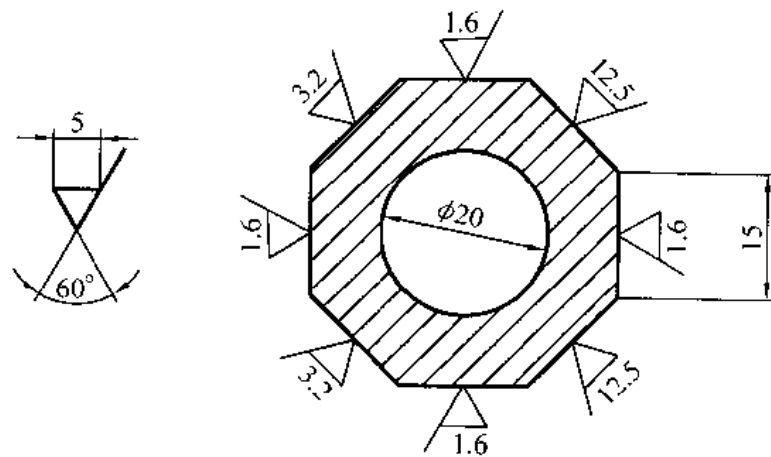
(1) 尺寸自定



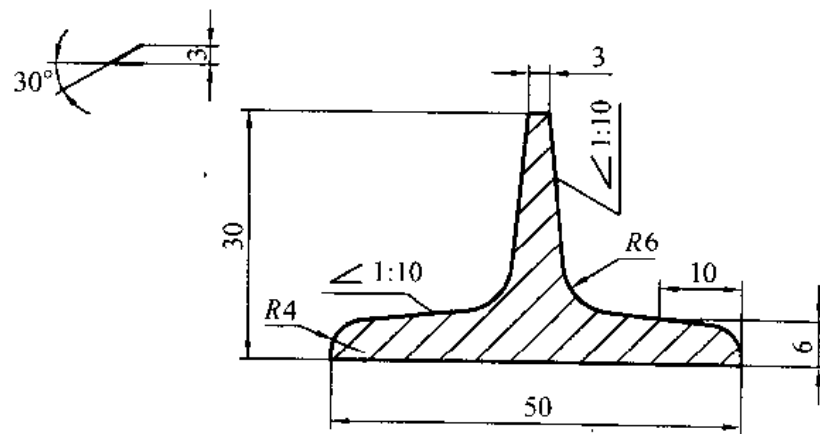
(3) 调用第 6 页 (5) 题洗手池图形, 按 1:1 的比例, 在图示位置插入



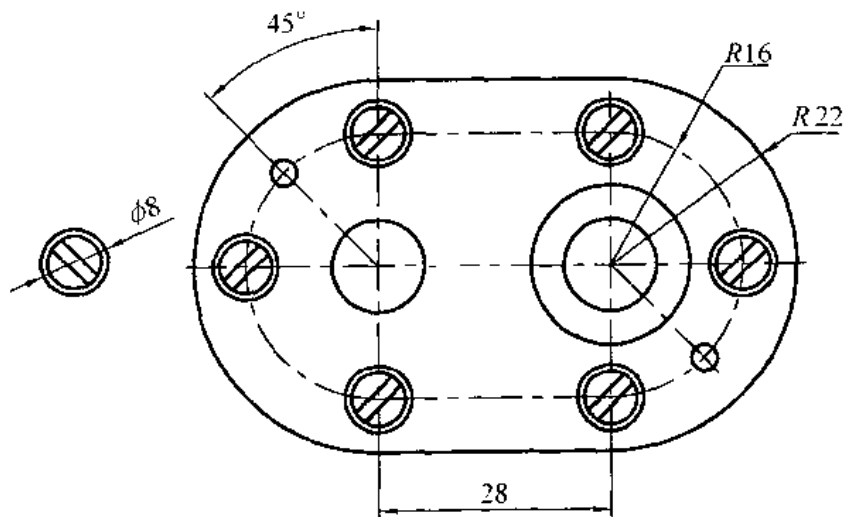
(2) 将表面粗糙度符号定义为图块, 在图示位置插入



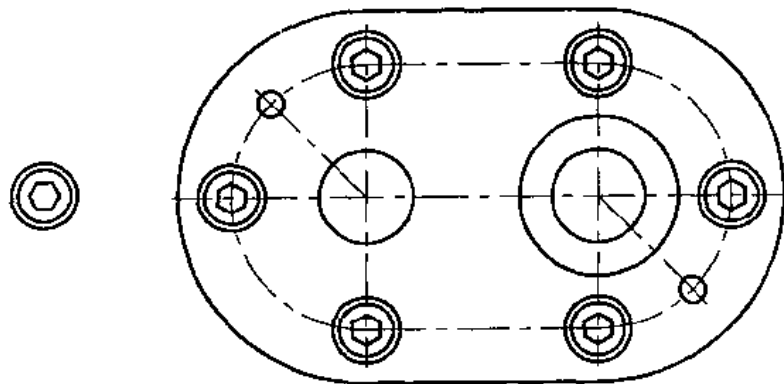
(4) 将斜度符号定义为图块, 在图示位置插入



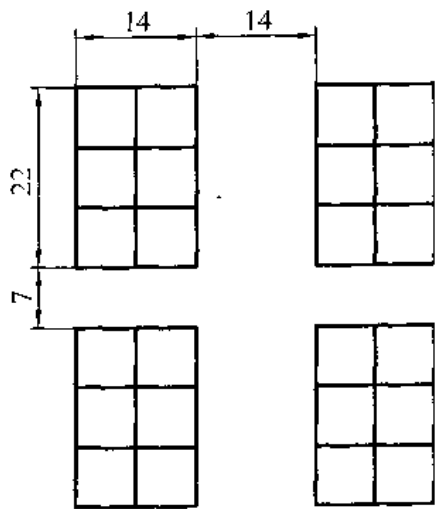
(5) 利用图块功能将螺钉插入到图形中, 未注尺寸自定



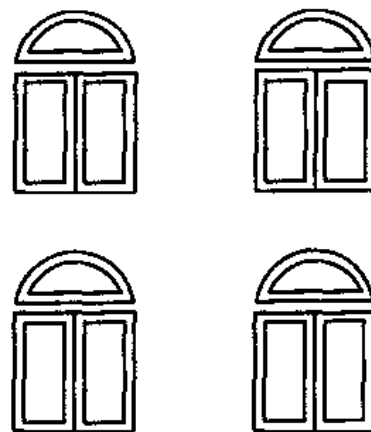
(6) 应用图块的更新功能, 将 (5) 题圆柱头螺钉更换成内六角头螺钉



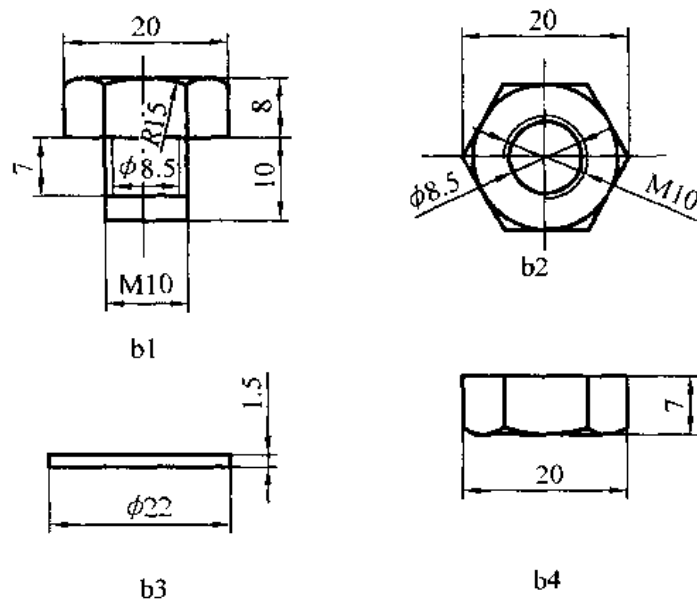
(7) 利用图块的多重插入功能, 画出图形



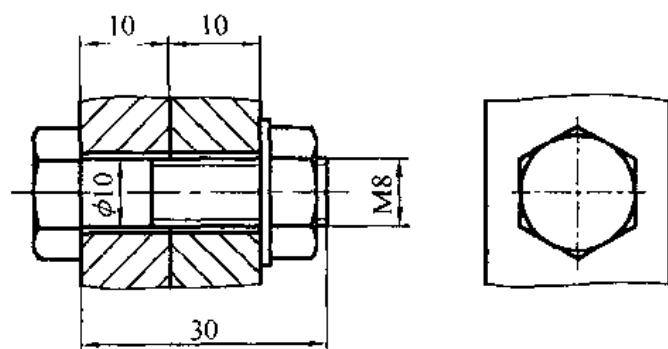
(8) 应用图块的更新功能, 将 (7) 题更新为所示图形



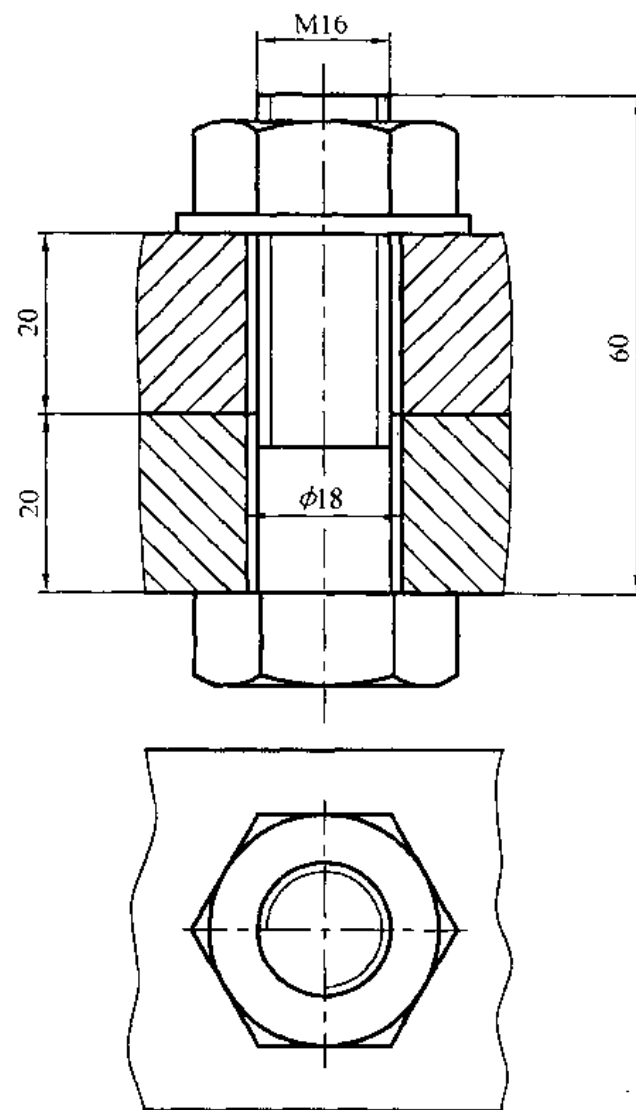
(9) 取螺栓公称直径 $d = 10\text{mm}$ 画图, 并将其定义成四个图块



(10) 取适当的比例和角度插入 (9) 题中图块



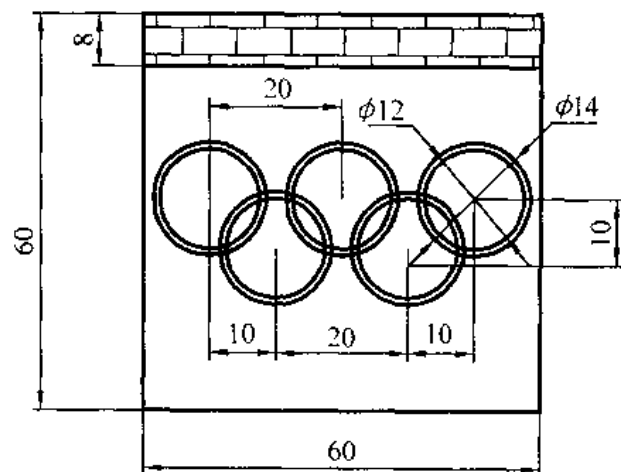
(11) 取适当的比例和角度插入 (9) 题中图块



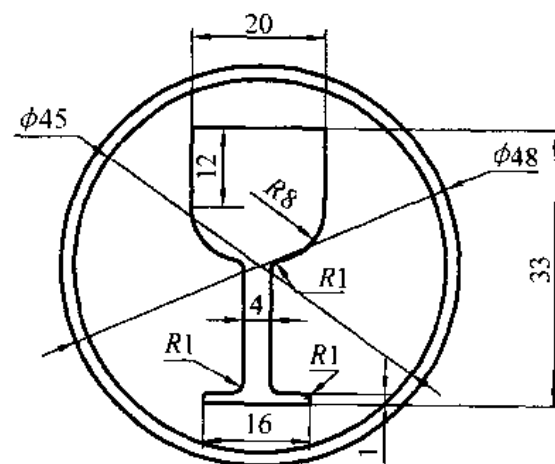
二、尺寸标注

按 1:1 的比例绘制运动场馆标识的平面图形并标注尺寸。

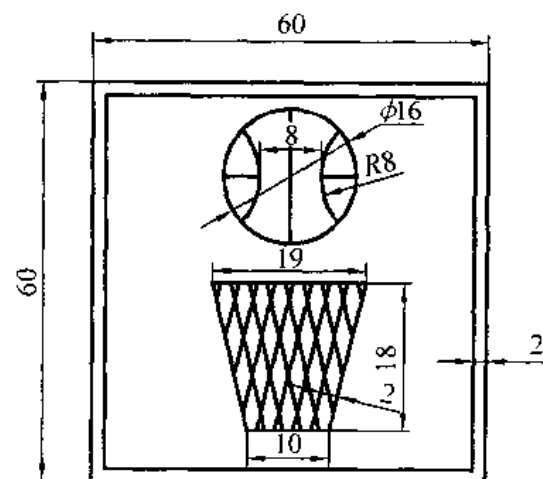
(1) 奥运村标识



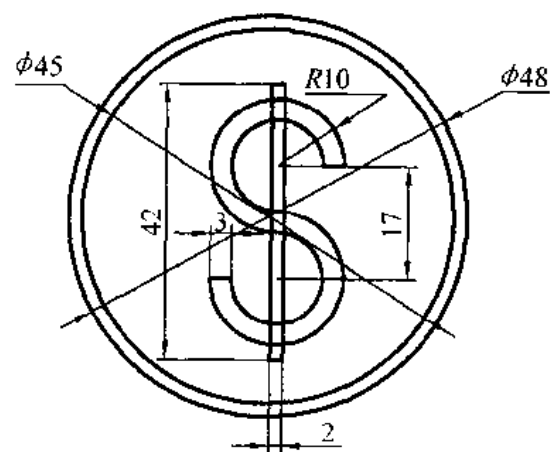
(2) 酒吧标识



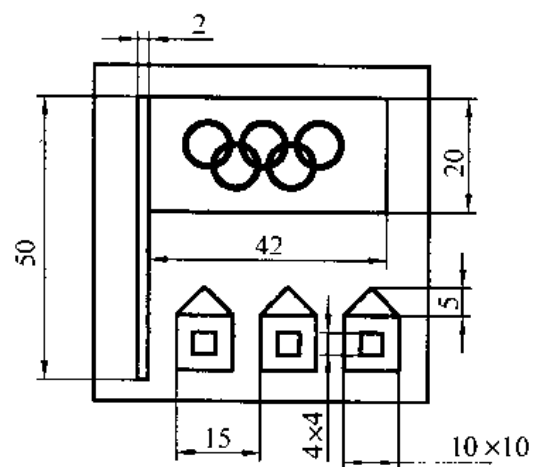
(3) 篮球馆标识



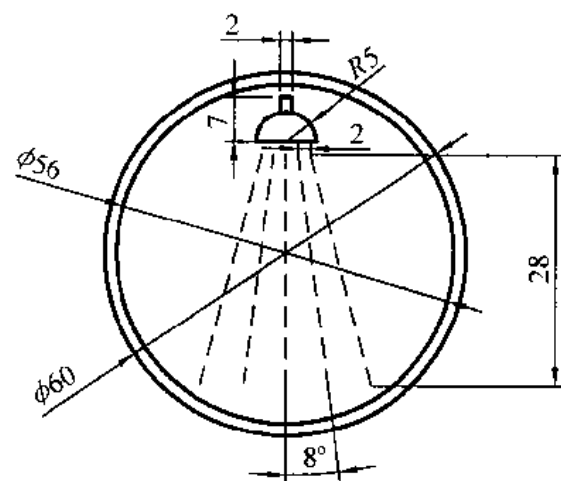
(4) 货币兑换处标识



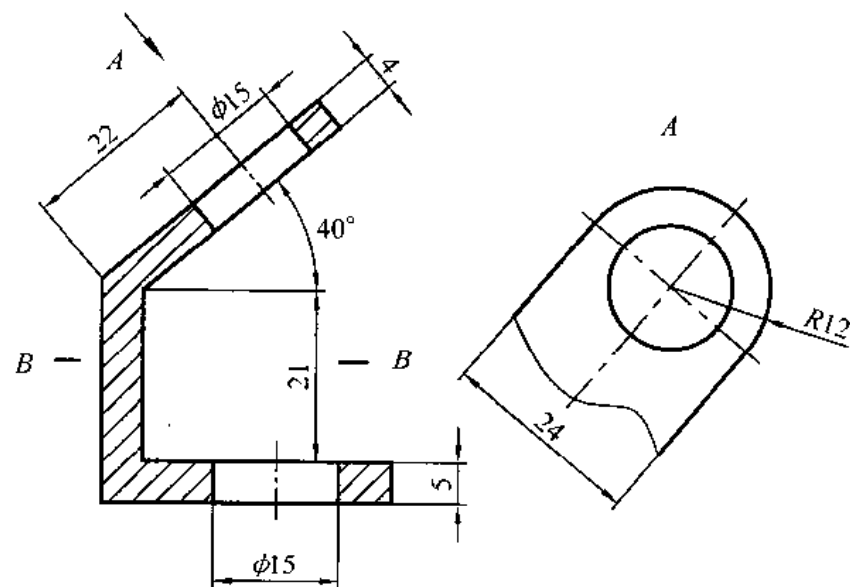
(5) 奥运村运动员宿舍标识



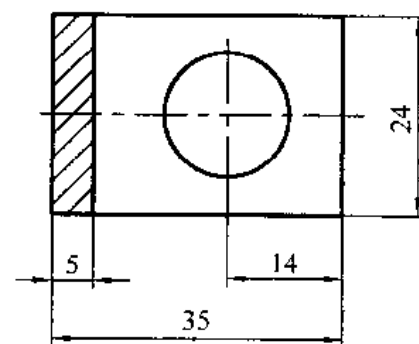
(6) 浴室标识



(7)



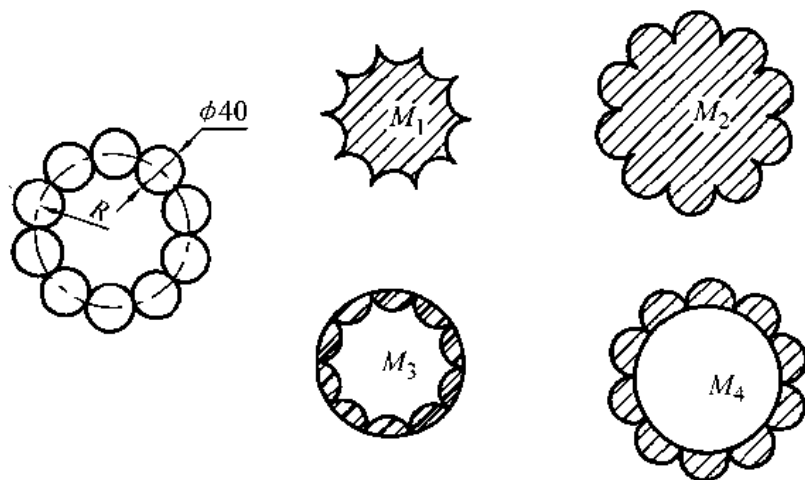
B B



三、查询

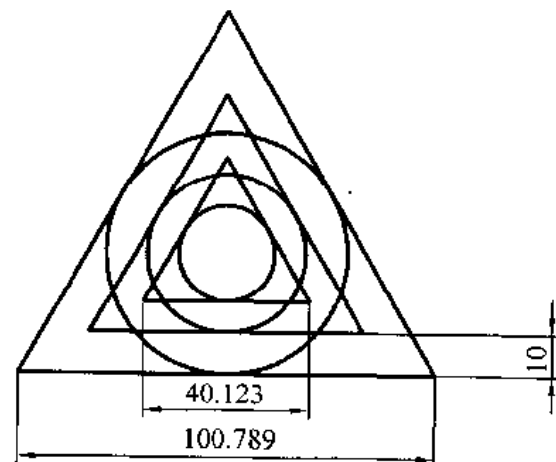
1. 选择正确答案。

(1)



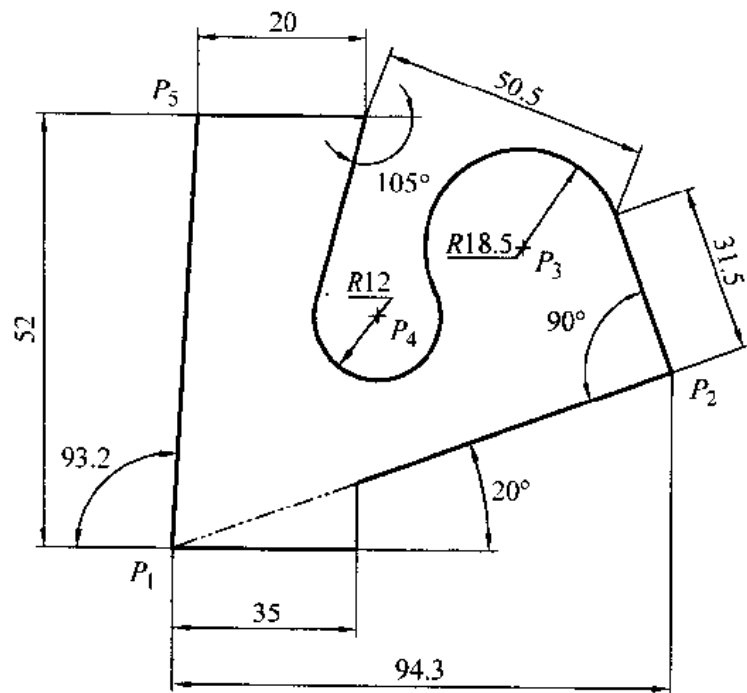
- 1) 节圆半径 R 的值为 ()
 - A. 64.712mm
 - B. 64.217mm
 - C. 64.721mm
 - D. 64.127mm
- 2) 阴影区域 M_1 的面积为 ()
 - A. 7284.816mm
 - B. 7284.168mm
 - C. 7284.186mm
 - D. 7284.618mm
- 3) 阴影区域 M_2 的面积为 ()
 - A. 19850.557mm
 - B. 19850.755mm
 - C. 19850.777mm
 - D. 19850.577mm
- 4) 阴影区域 M_3 的面积为 ()
 - A. 4618.185mm
 - B. 4618.518mm
 - C. 4618.158mm
 - D. 4618.851mm
- 5) 阴影区域 M_4 的面积为 ()
 - A. 7947.502mm
 - B. 7947.520mm
 - C. 7947.052mm
 - D. 7947.025mm

(2)



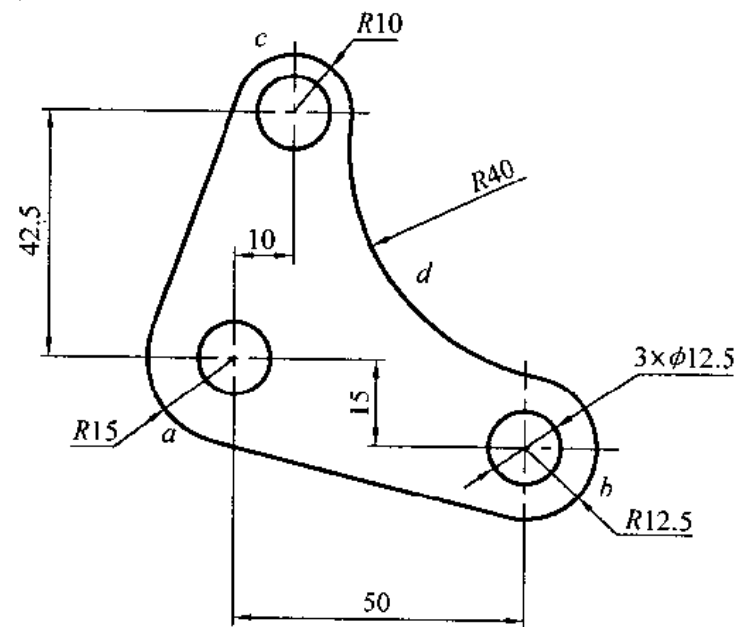
- 1) 由内而外第一个正三角形面积为 ()
 - A. 697.990mm
 - B. 697.099mm
 - C. 697.088mm
 - D. 697.880mm
- 2) 由内而外第二个正三角形面积为 ()
 - A. 1894.671mm
 - B. 1894.167mm
 - C. 1894.761mm
 - D. 1894.716mm
- 3) 由内而外第三个正三角形面积为 ()
 - A. 4398.267mm
 - B. 4398.726mm
 - C. 4398.276mm
 - D. 4398.762mm
- 4) 由内而外第一个内切圆的半径为 ()
 - A. 11.835mm
 - B. 11.358mm
 - C. 11.538mm
 - D. 11.583mm
- 5) 由内而外第二个内切圆的半径为 ()
 - A. 19.905mm
 - B. 19.509mm
 - C. 19.059mm
 - D. 19.095mm

(3)



- 1) 点 P_1 至点 P_4 的距离为多少?
 - A. 58.74mm
 - B. 58.83mm
 - C. 58.71mm
- 2) 点 P_5 至点 P_2 的距离为多少?
 - A. 36.531mm
 - B. 35.491mm
 - C. 35.451mm
- 3) 点 P_5 至点 P_2 的水平距离为多少?
 - A. 89.736mm
 - B. 98.746mm
- 4) 点 P_1 至点 P_3 的角度值为多少?
 - A. 40.331mm
 - B. 41.313mm
 - C. 41.049mm
- 5) 图形所围成的周长为多少?
 - A. 397.825mm
 - B. 396.611mm
 - C. 397.611mm

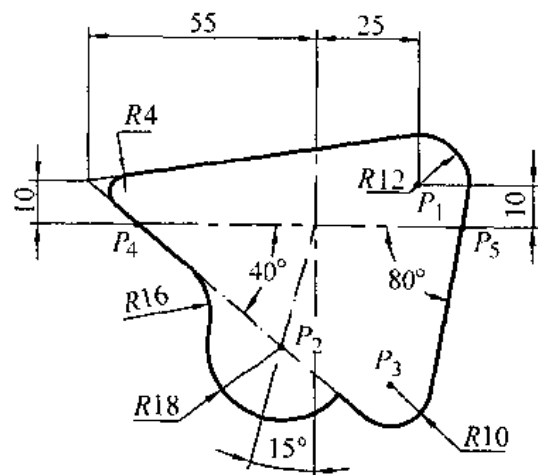
(4)



- 1) a 弧圆心至 b 弧圆心距离为多少?
 - A. 52.05mm
 - B. 52.10mm
 - C. 52.15mm
- 2) a 弧圆心至 c 弧圆心距离为多少?
 - A. 43.66mm
 - B. 47.70mm
 - C. 43.74mm
- 3) b 弧圆心至 c 弧圆心水平距离为多少?
 - A. 69.90mm
 - B. 69.98mm
 - C. 70.04mm
- 4) 圆弧段 b 的长度值为多少?
 - A. 39.94mm
 - B. 40.00mm
 - C. 40.06mm
- 5) 去除三个直径为 12.5 的圆孔的图形总面积为多少?
 - A. 2717.9mm
 - B. 2718.7mm
 - C. 2719.3mm

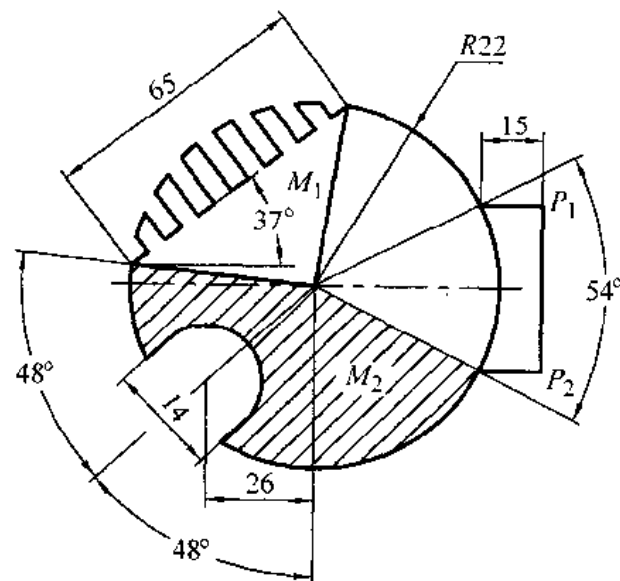
2. 填写正确答案。

(1)



- 1) 此图形所围成的面积为_____。
- 2) P_1 点至 P_2 点的距离为_____。
- 3) P_1 点至 P_3 点的距离为_____。
- 4) P_4 点至 P_5 点的距离为_____。

(2)

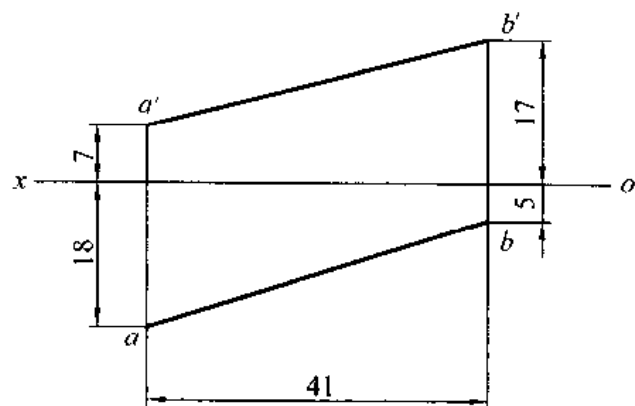


- 1) 封闭区域 M_1 的面积为_____。
- 2) 填充区域 M_2 的面积为_____。
- 3) P_1 点至 P_2 点的距离为_____。

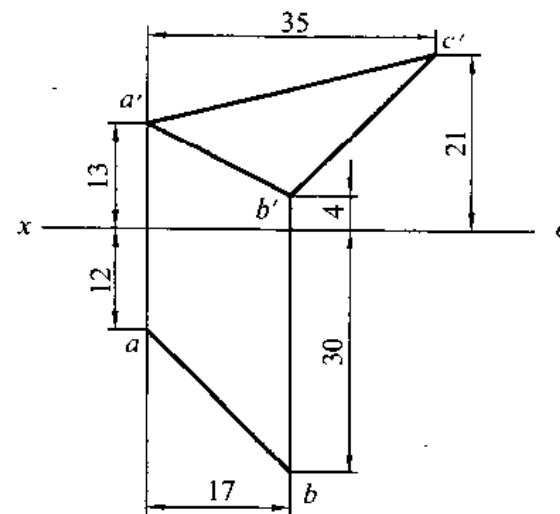
四、点、线、面投影的应用

1. 投影变换。

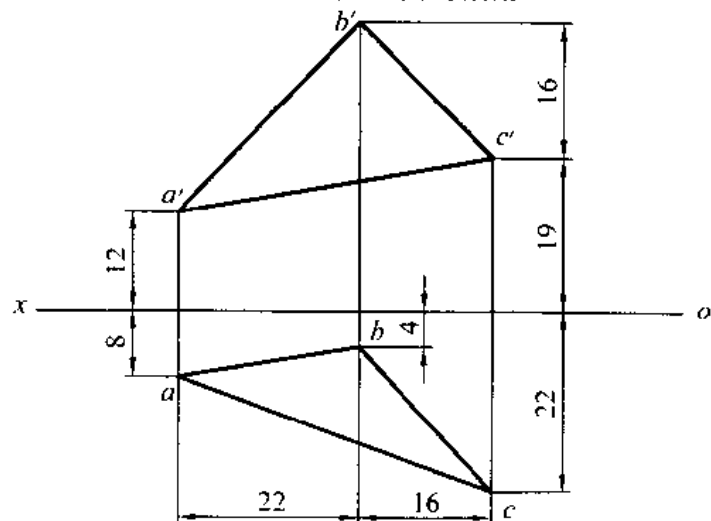
(1) 用换面法在直线 AB 上找一点 C , 使 AC 实长为 20mm



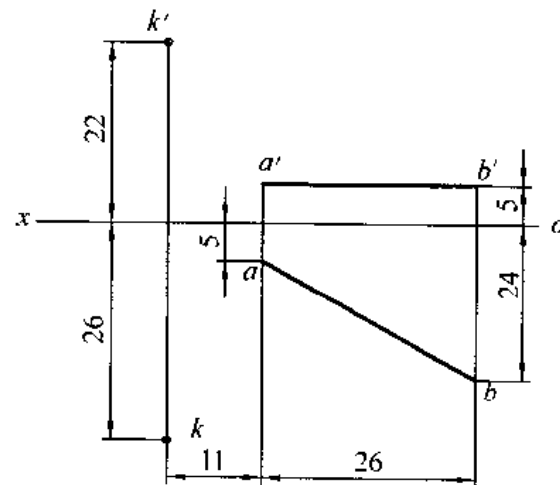
(2) 用换面法补全以 AB 为底边的等腰三角形 ABC 的水平投影



(3) 求三角形 ABC 对 H 面和 V 面的倾角

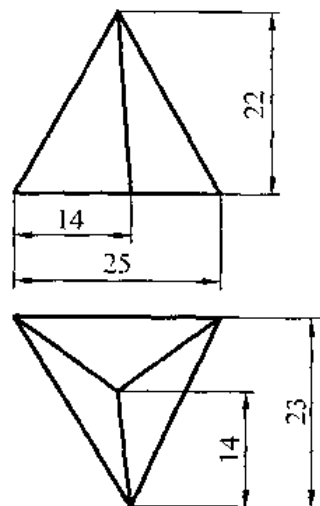


(4) 求点 K 到直线 AB 的距离

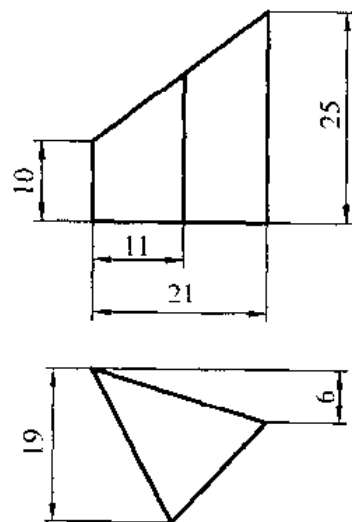


2. 点、线、面的投影。

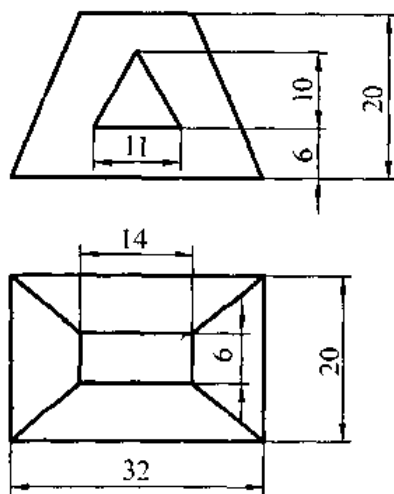
(1) 利用点的投影规律，补画三棱锥的左视图



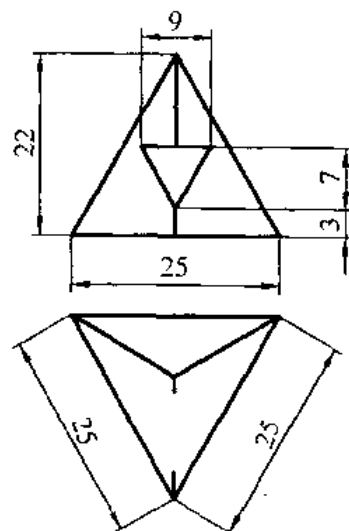
(2) 补画截头三棱柱的左视图



(3) 补全物体的俯视图



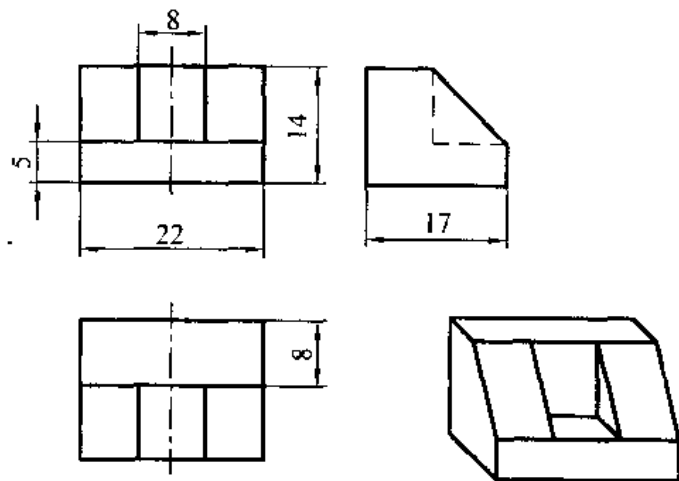
(4) 补全物体的俯视图，补画左视图



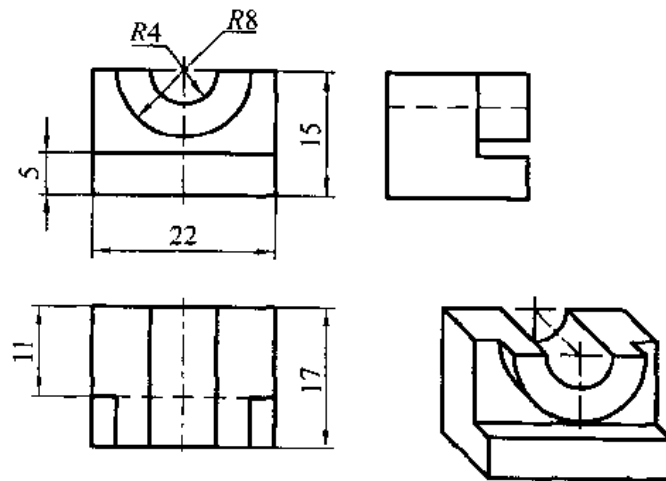
五、组合体

1. 按 1:1 的尺寸比例绘制组合体的三视图和立体图。

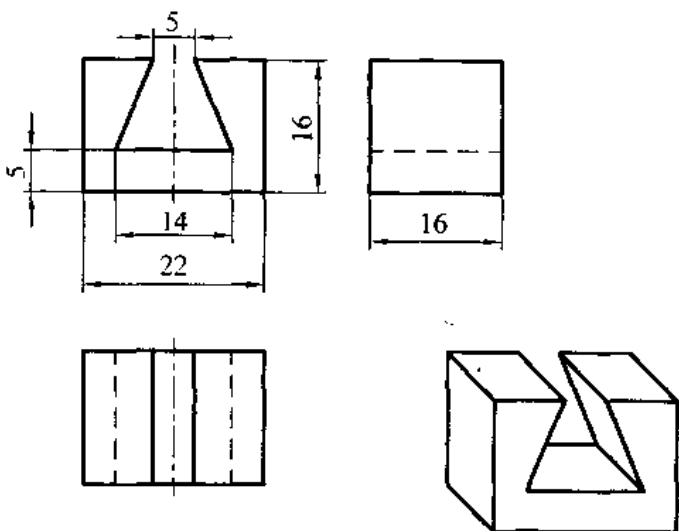
(1)



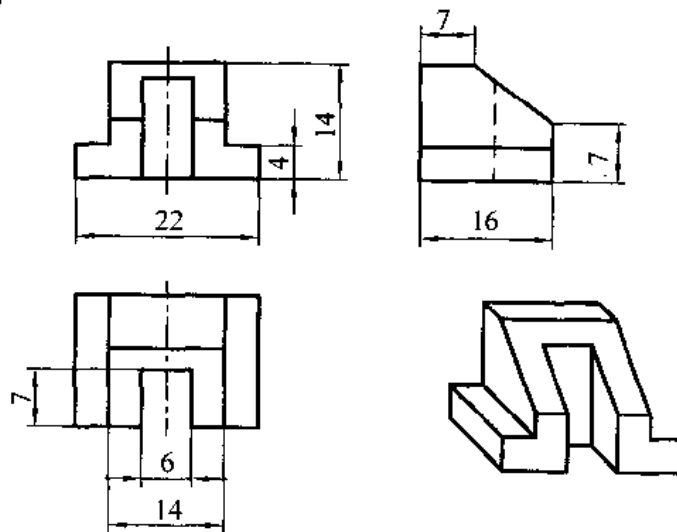
(2)



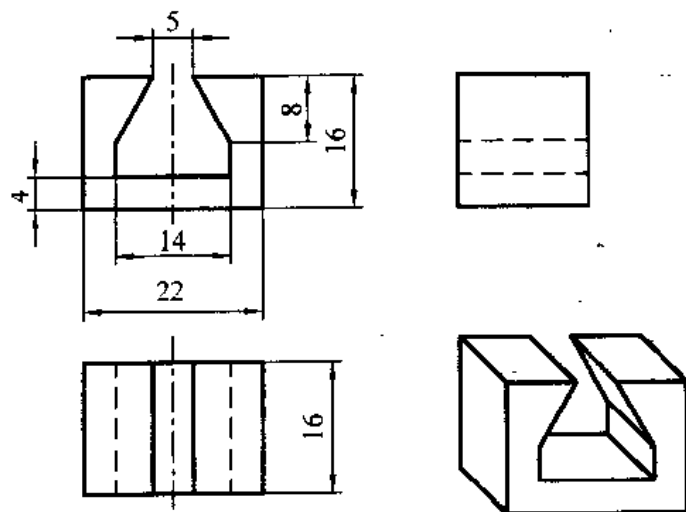
(3)



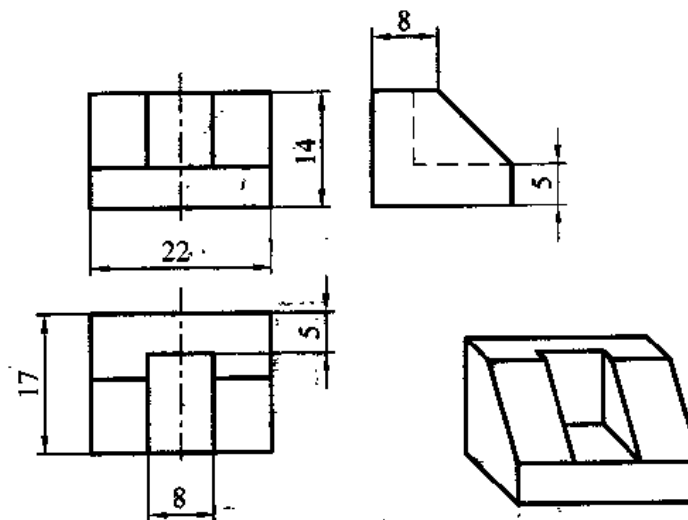
(4)



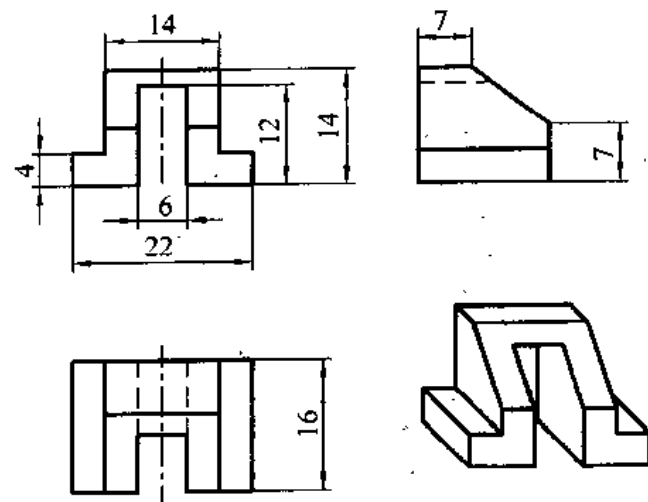
(5)



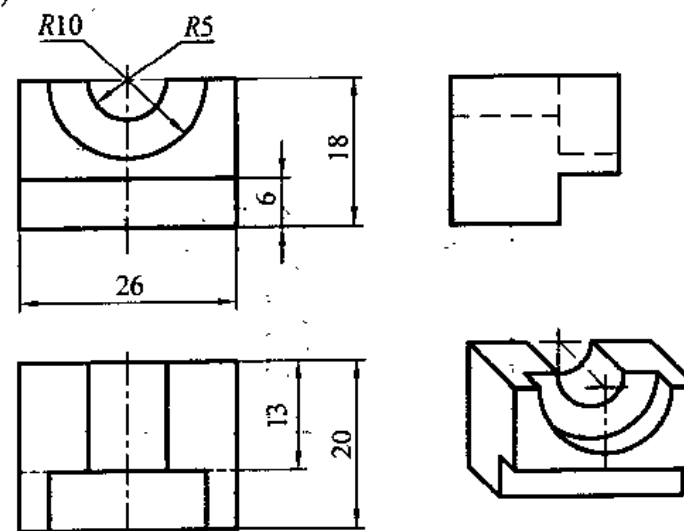
(6)



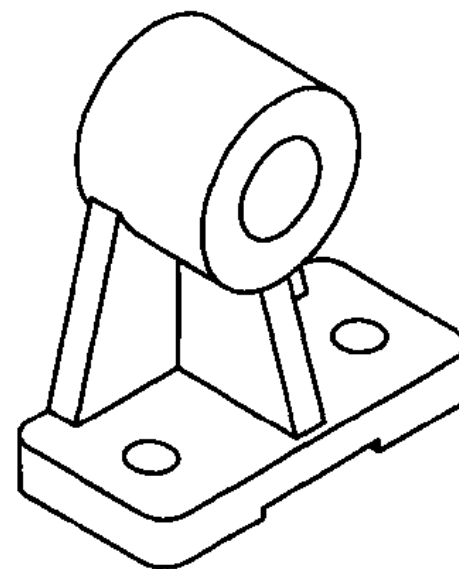
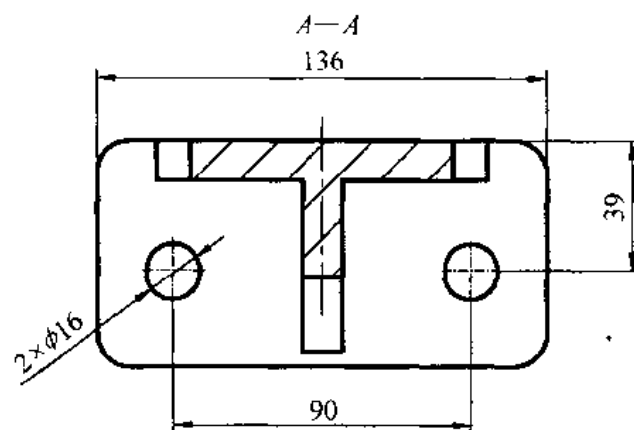
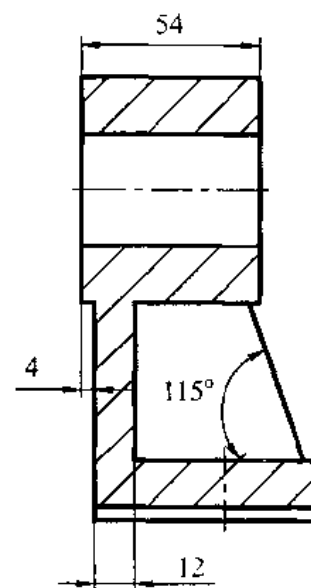
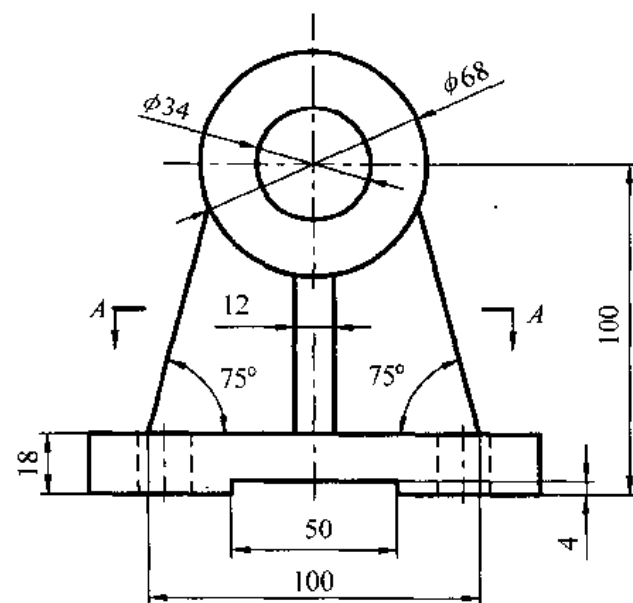
(7)



(8)

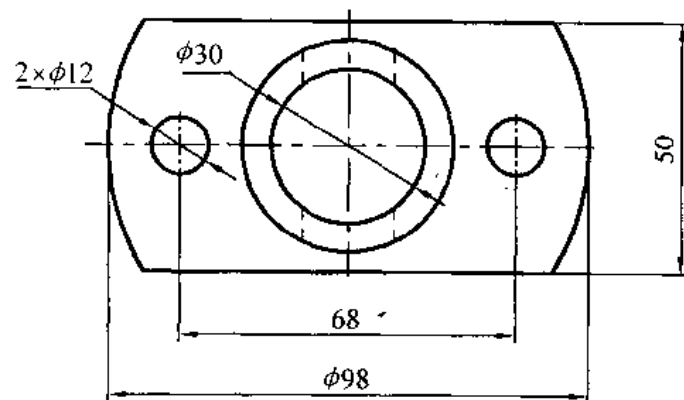
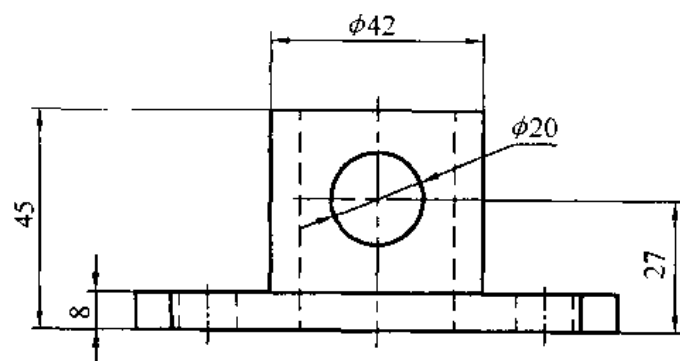


(9)

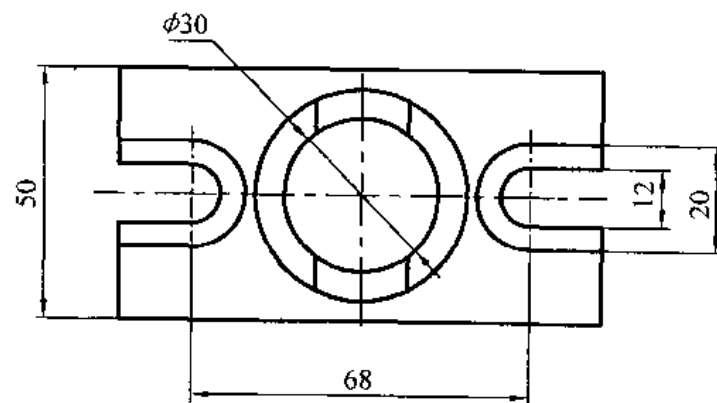
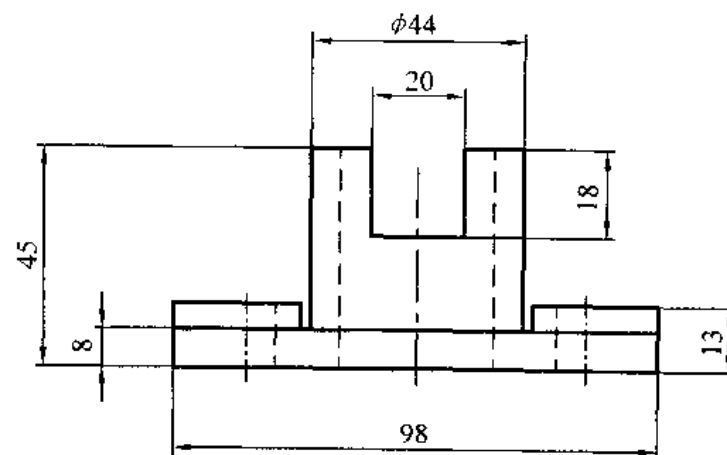


2. 画组合体的视图。

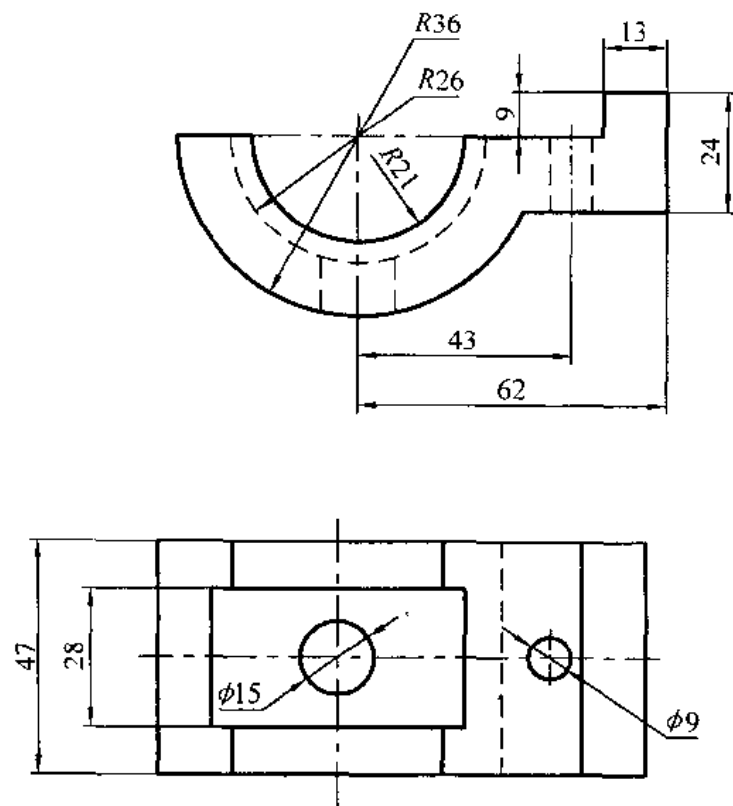
(1)



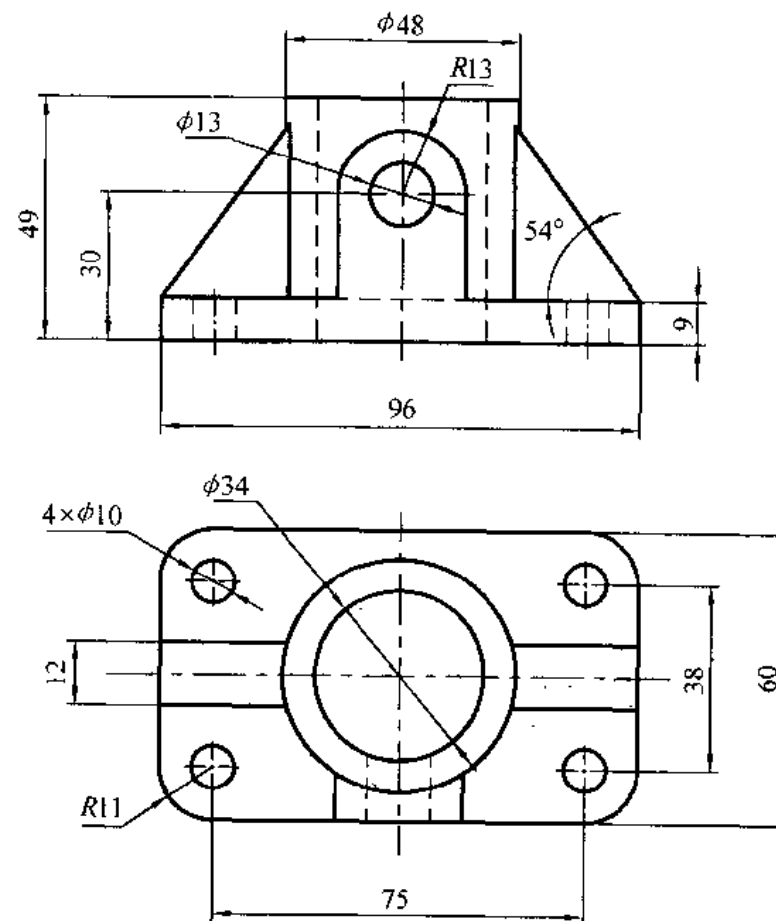
(2)



(3)

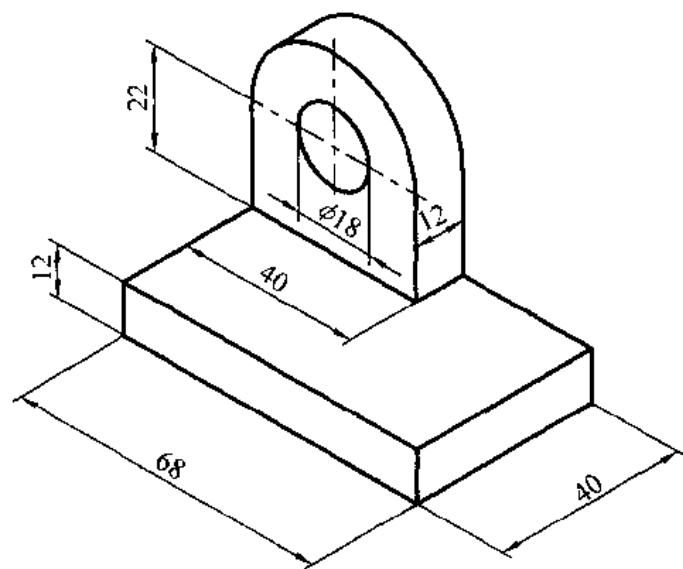


(4)

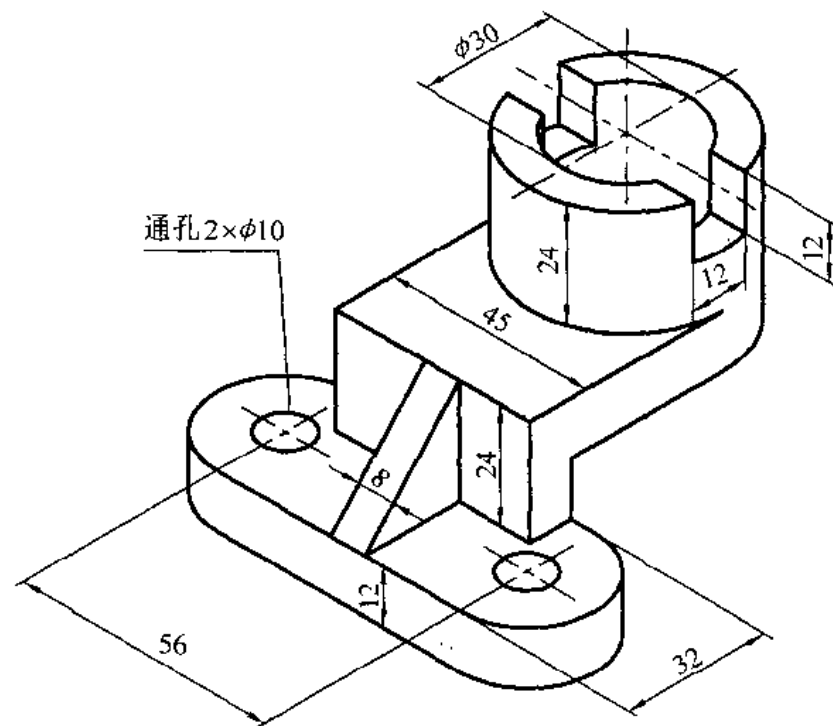


3. 按 1:1 的尺寸比例根据组合体的立体图绘制组合体的三视图。

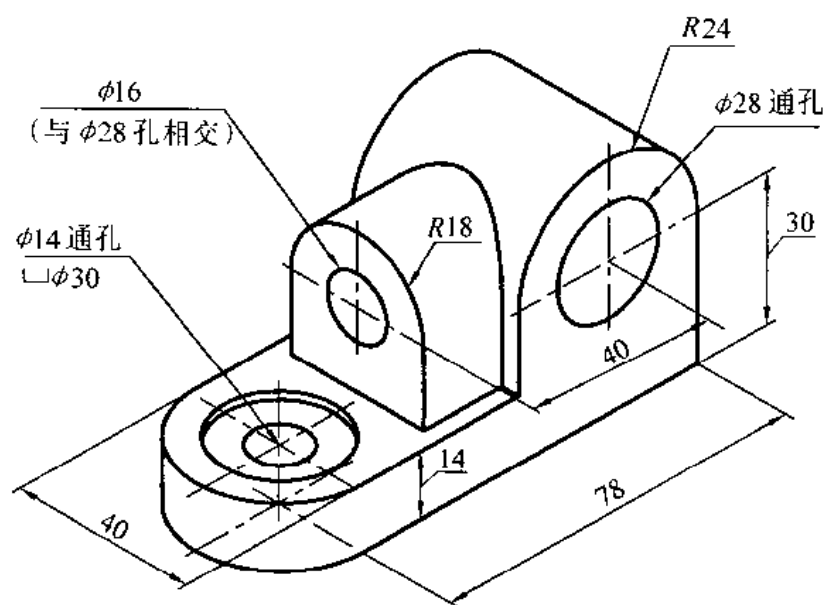
(1)



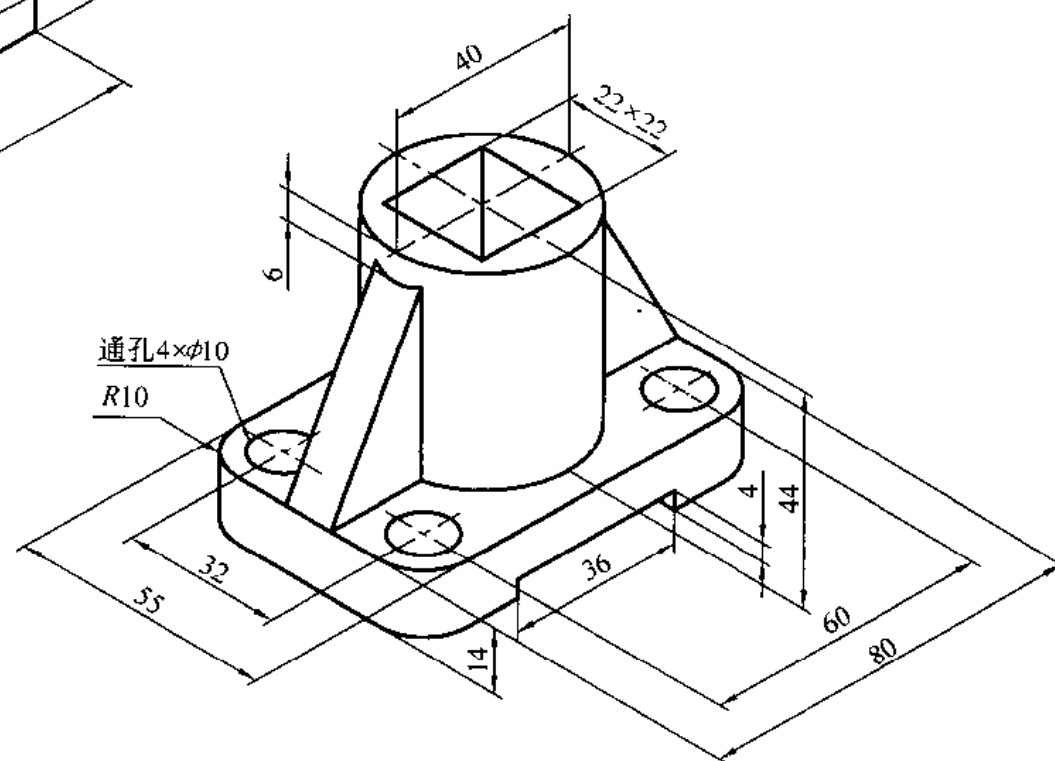
(2)



(3)



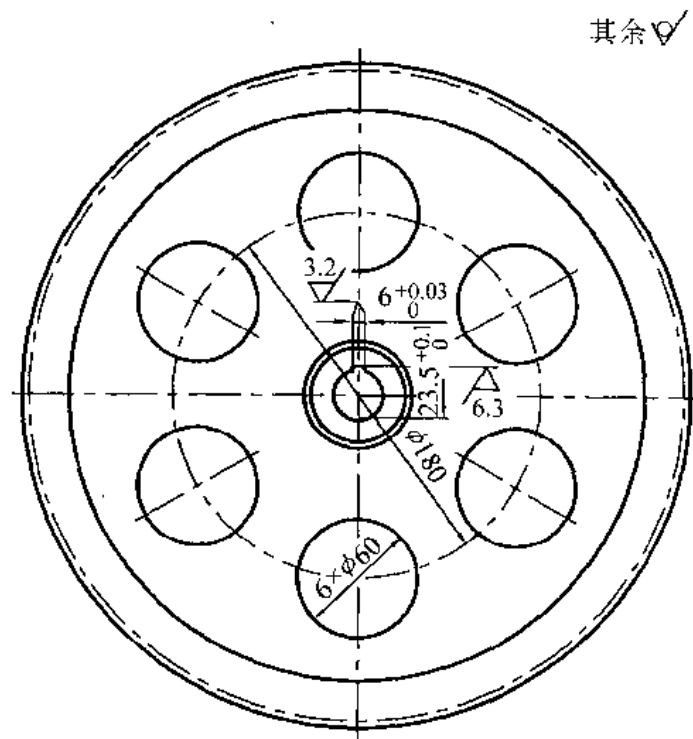
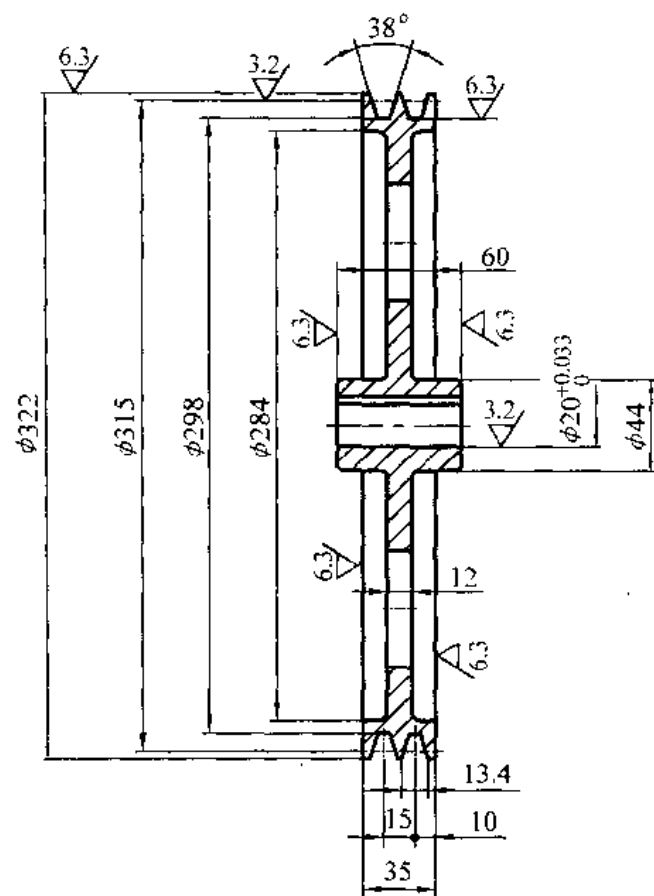
(4)



六、零件图

1. 按 1:1 的比例绘制零件图。

(1) 图幅 A2 (420 × 594)



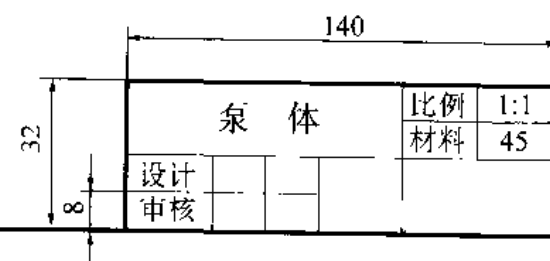
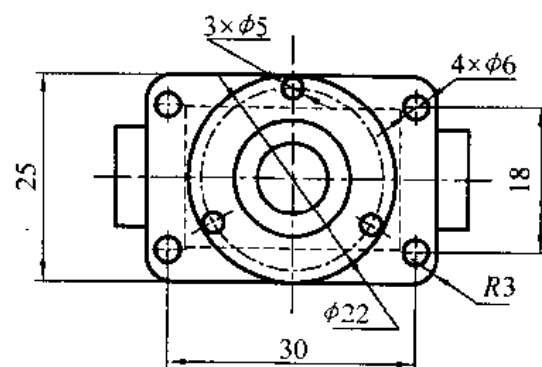
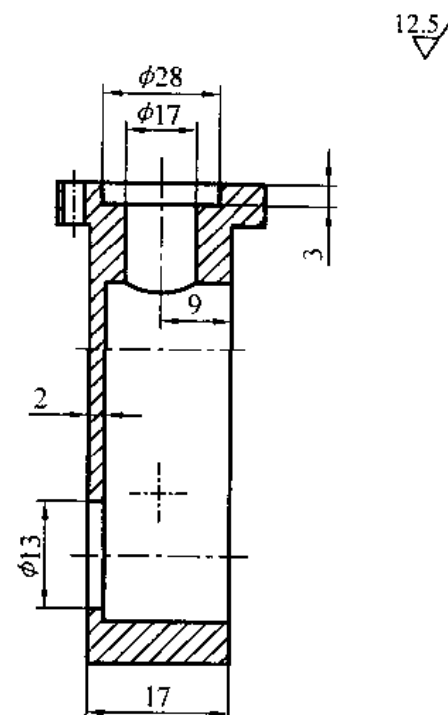
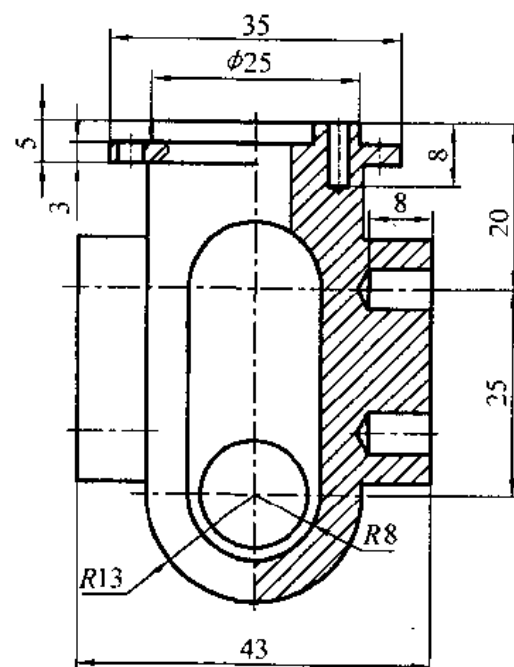
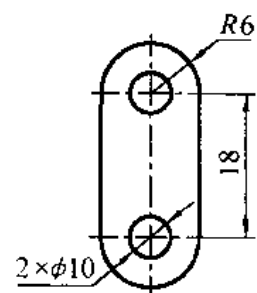
其余 ∇

技术要求

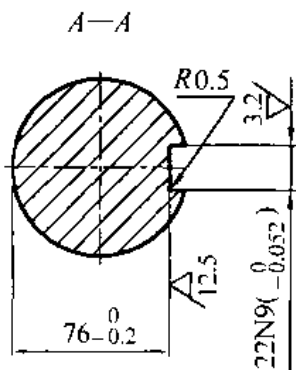
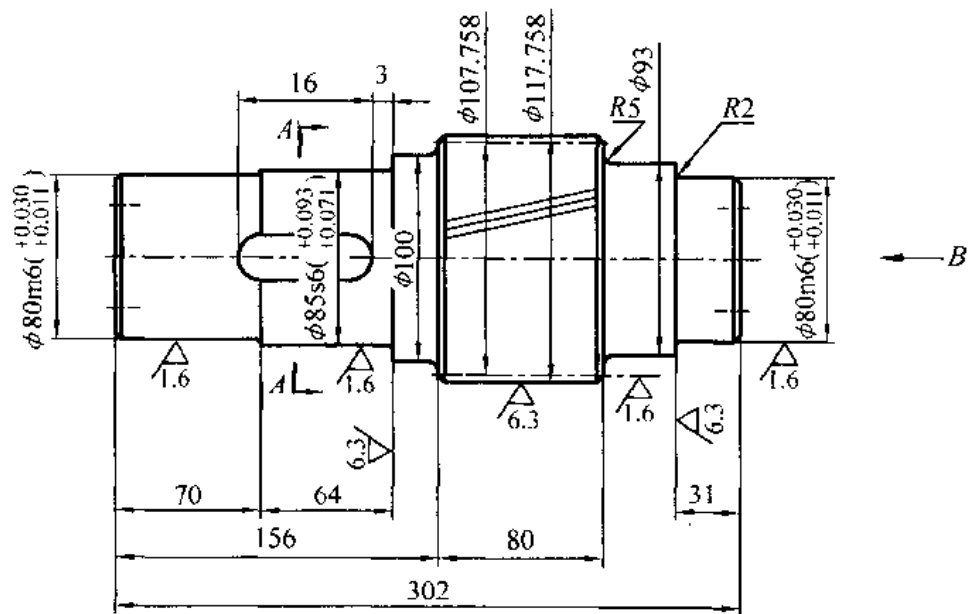
1. 铸造圆角 $R2 \sim R3$ 。
2. 未注倒角 $C2$ 。

140		32	
带 轮		比例	1:1
设计		材料	ZG310-570
审核			

(2) 图幅 A4 (210×297)



(3) 图幅 A3 (297×420)

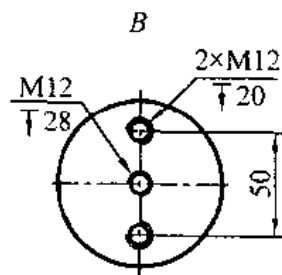
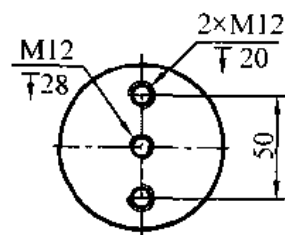


技术要求

1. 未注圆角 $R2 \sim R3$ 。
2. 未注倒角 $C2$ 。

其余 $\sqrt{25}$

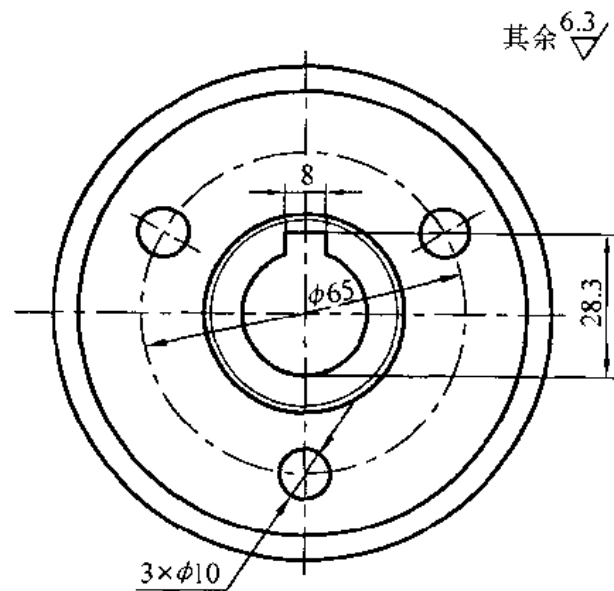
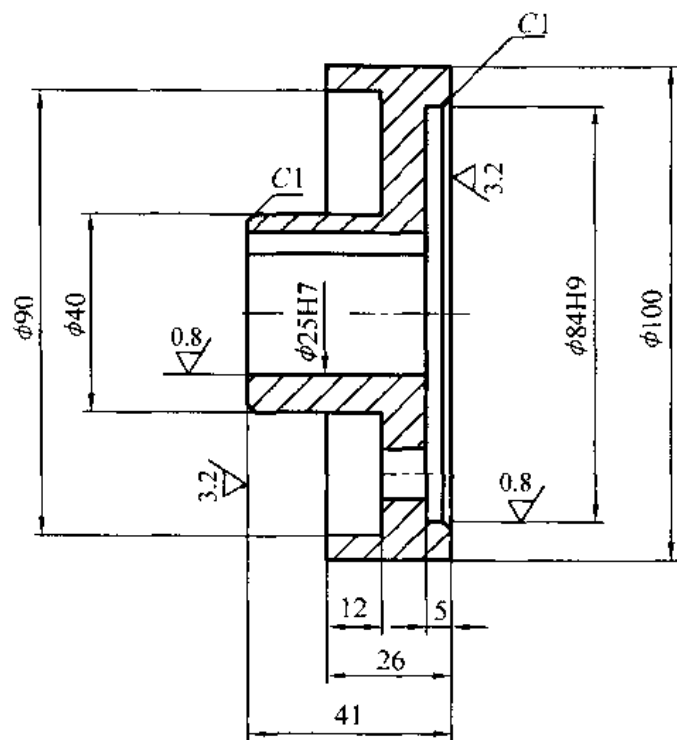
法向模数	m_n	5
齿数	Z	21
齿形角	α	20°
齿顶高系数	h_a^*	1
螺旋角	β	13°
螺旋方向	左旋	



140			
32			
8			
齿 轮 轴		比例	1:1
		材料	45
设计			
审核			

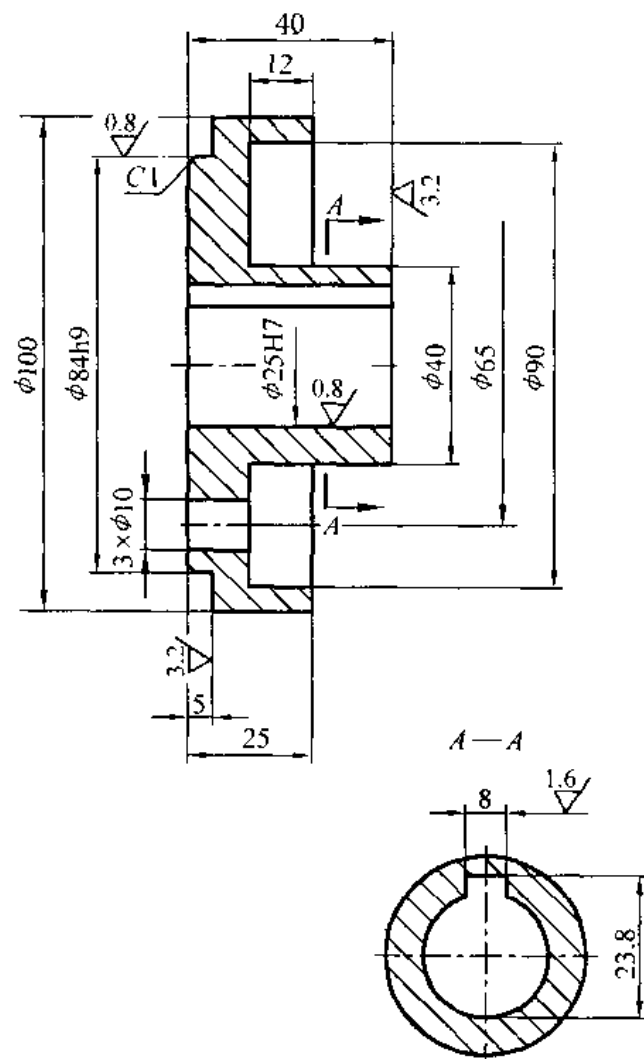
2. 联轴器零件图。

(1) 左半联轴器



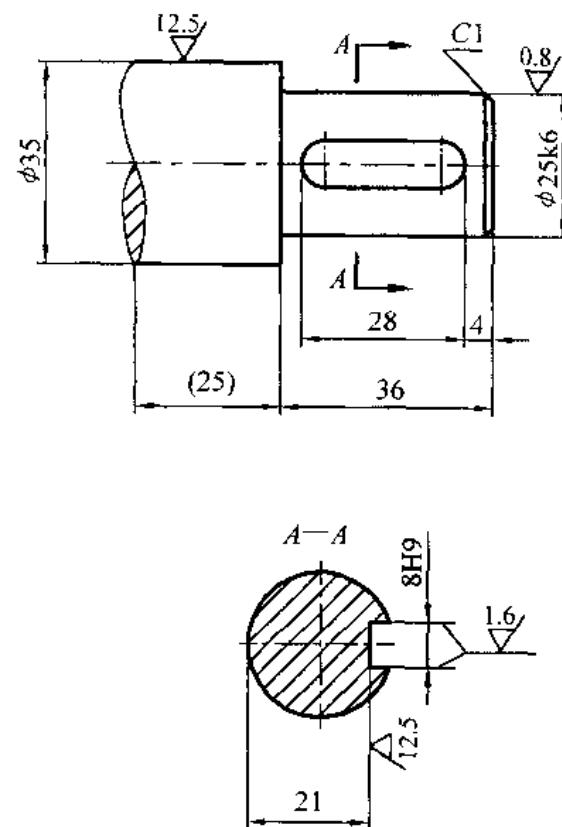
(2) 右半联轴器

其余 $\sqrt[6.3]{\text{V}}$

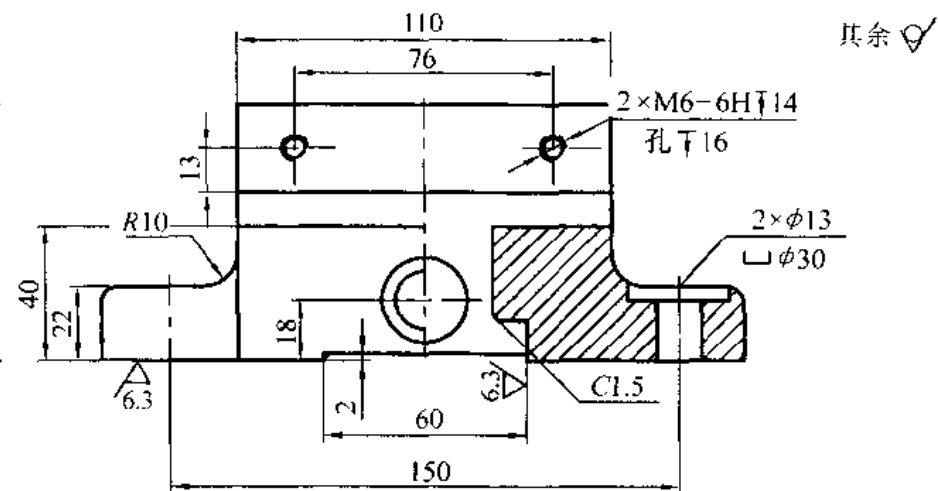
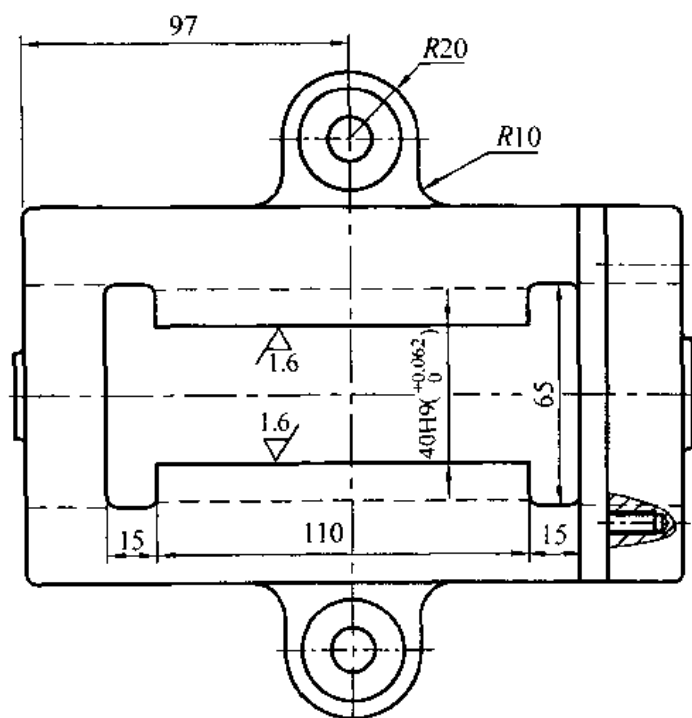
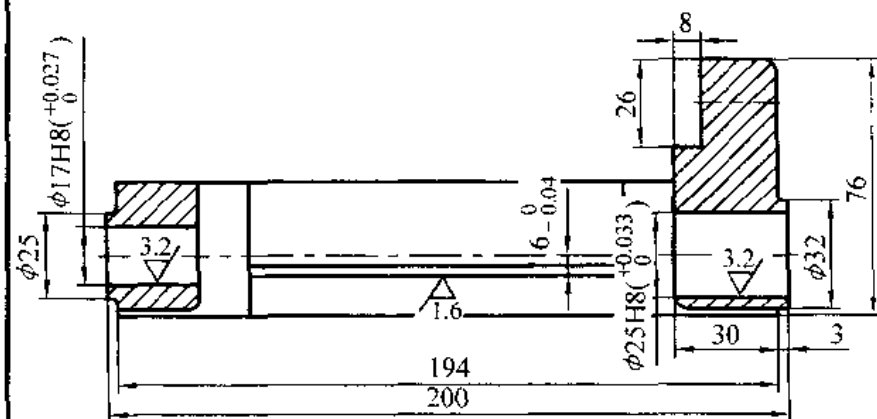


(3) 轴

其余 $\sqrt[6.3]{\text{V}}$

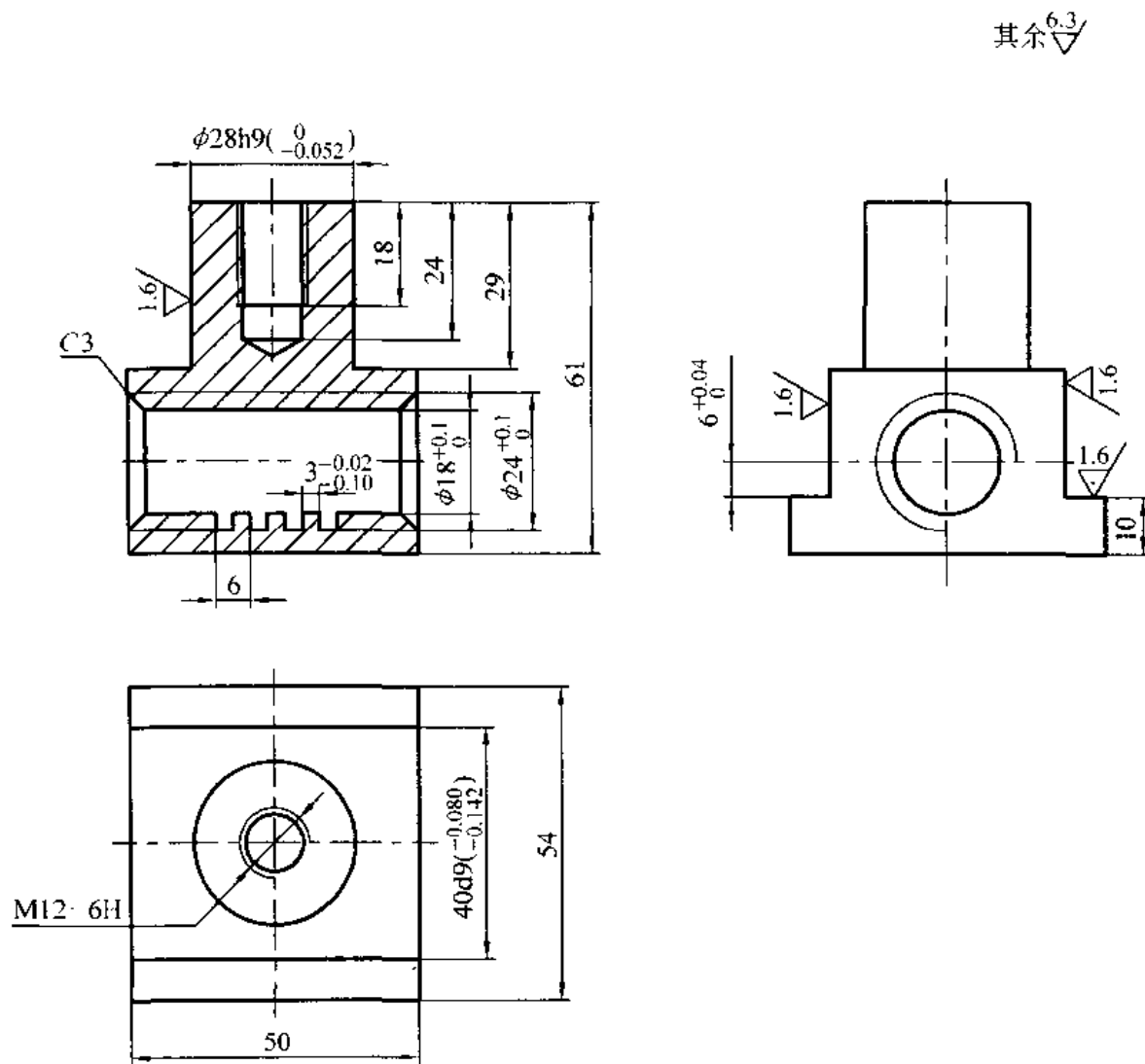


(1) 底座

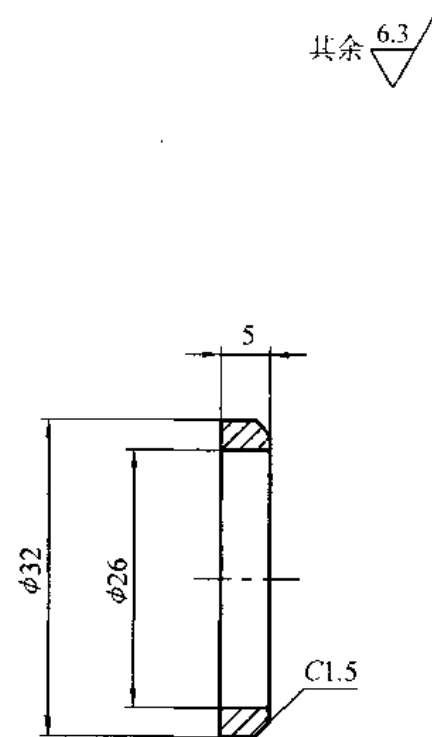


60

(6) 滑块

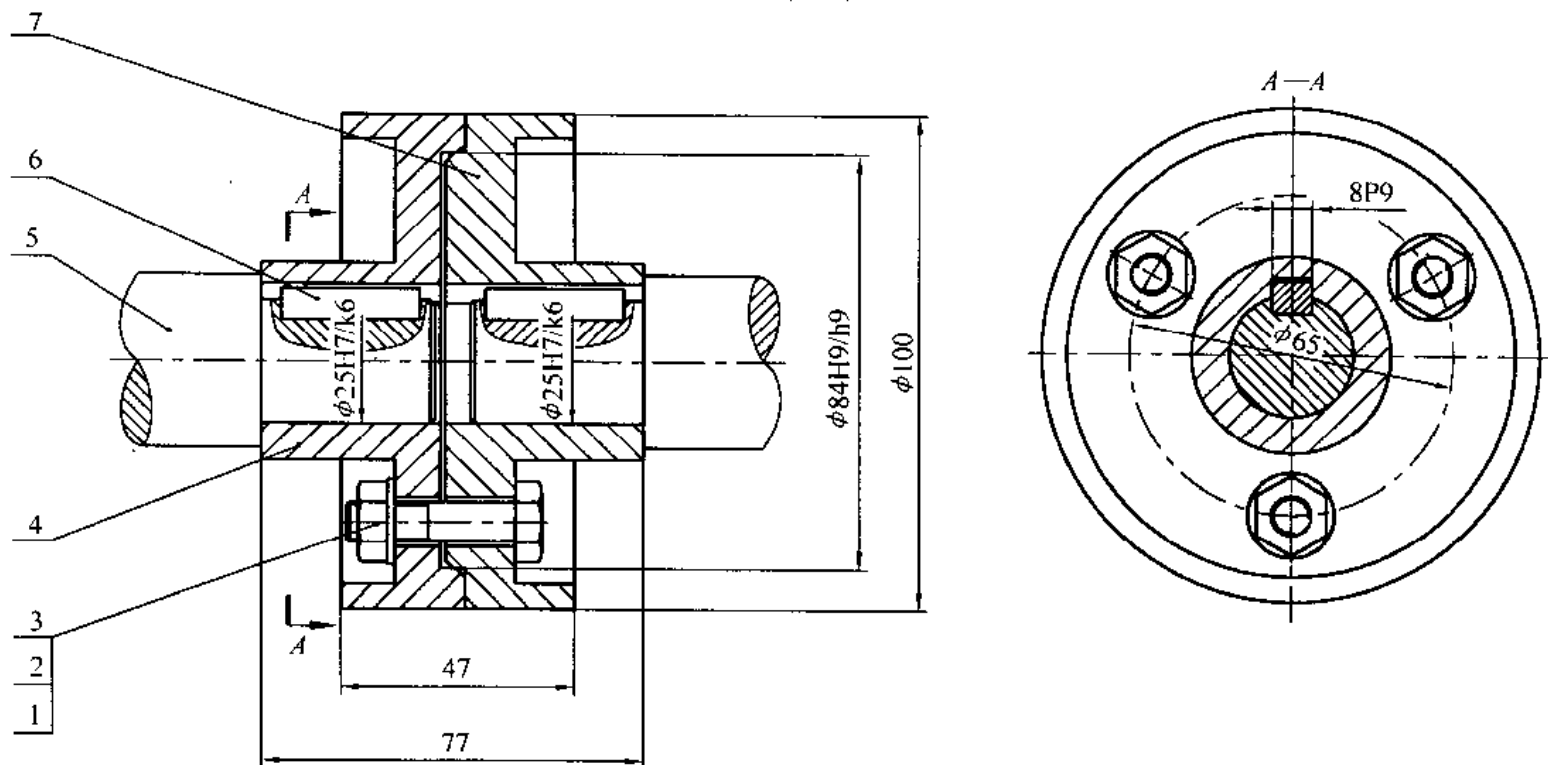


(7) 垫圈



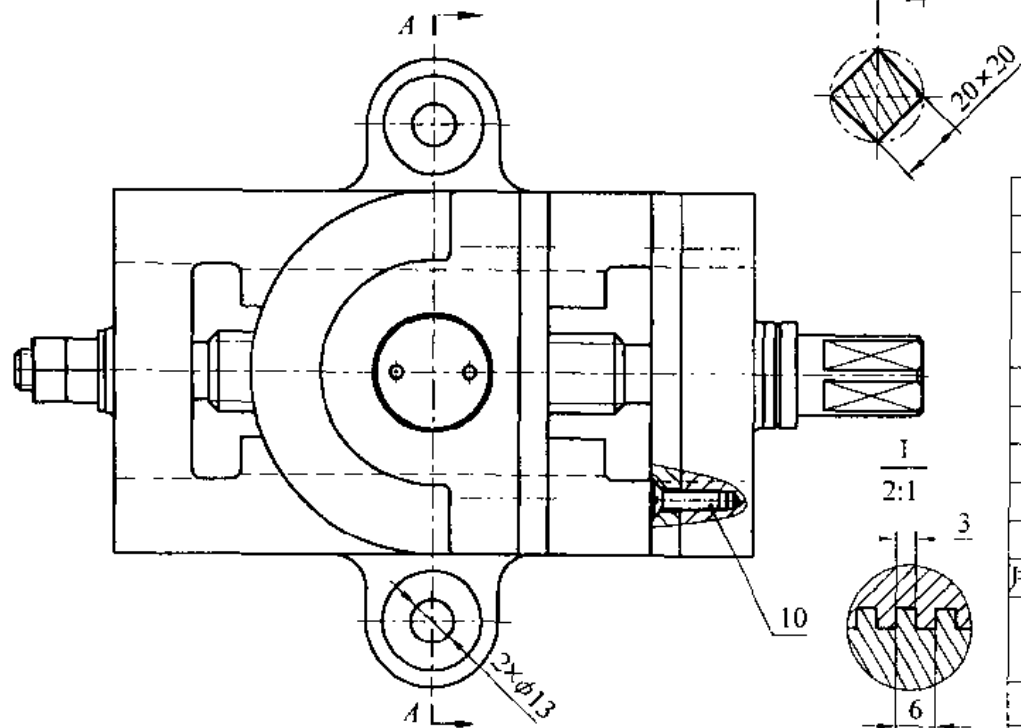
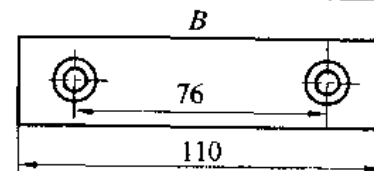
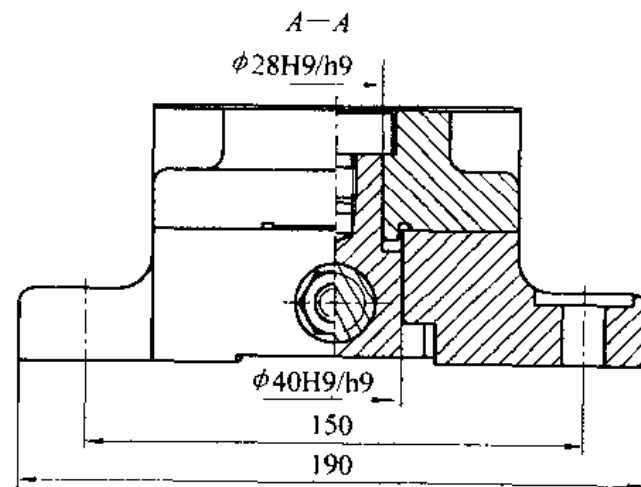
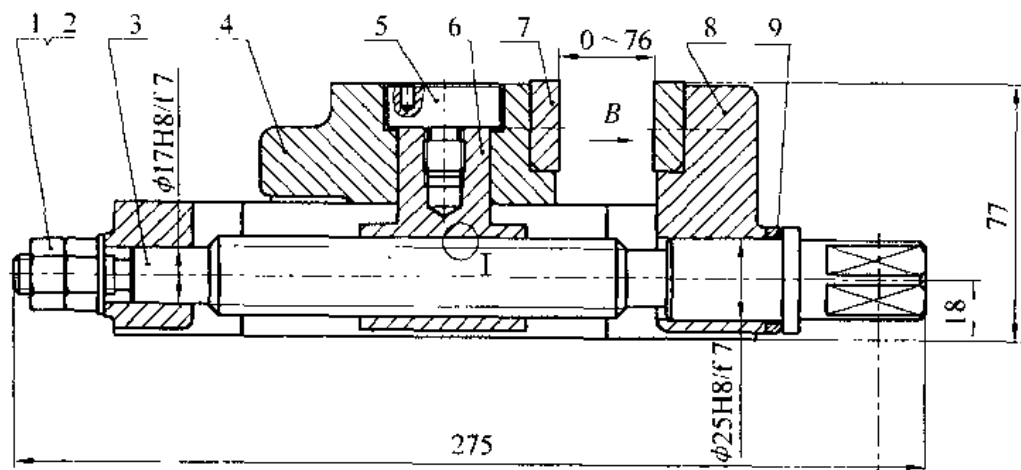
1

(1) 根据本习题集第 58 页、59 页联轴器的零件图, 拼画联轴器装配图



							3	GB/T97.1—2000	垫圈 8	Q235	3		
							2	GB/T6170—2000	螺母 8	Q235	3		
							1	GB/T5782—2000	螺栓 M8×35	Q235	3		
7	LZQ—03	右半联轴器	Q235	1			序号	图号或标准号	名称及规格	材料	数量	重量	备注
6	GB/T1096—1979	键 8×28	45	2			联 轴 器					比例	1:1
5	LZQ—02	轴	45	2								第 1 张 共 1 张	
4	LZQ—01	左半联轴器	Q235	1			设计						LZQ—00
序号	图号或标准号	名称及规格	材料	数量	重量	备注	审核						

(2) 根据本习题集第 60 页到 63 页虎钳的零件图, 拼画虎钳装配图



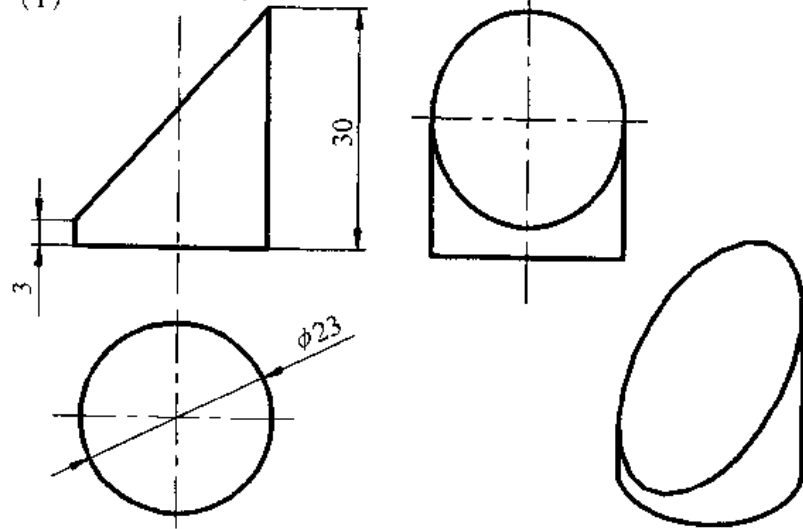
10	GB/T68 - 2000	螺钉 M6×20	Q235	4		
9	HQ - 07	垫圈	Q235	1		
8	HQ - 06	底座	HT150	1		
7	HQ - 05	钳口	Q235	2		
6	HQ - 04	滑块	Q235	1		
5	HQ - 03	圆螺钉	Q235	1		
4	HQ - 02	动掌	HT150	1		
3	HQ - 01	丝杠	Q275	1		
2	GB/T6170 - 2000	螺母 M12	Q235	2		
1	GB/T97.1 - 2000	垫圈 12	Q235	1		
序号	图号或标准号	名称	材料	数量	重量	备注
虎 钳				比例	1:1	
				第 1 张	共 1 张	
设计			HQ - 00			
审核						

第三章 三维绘图

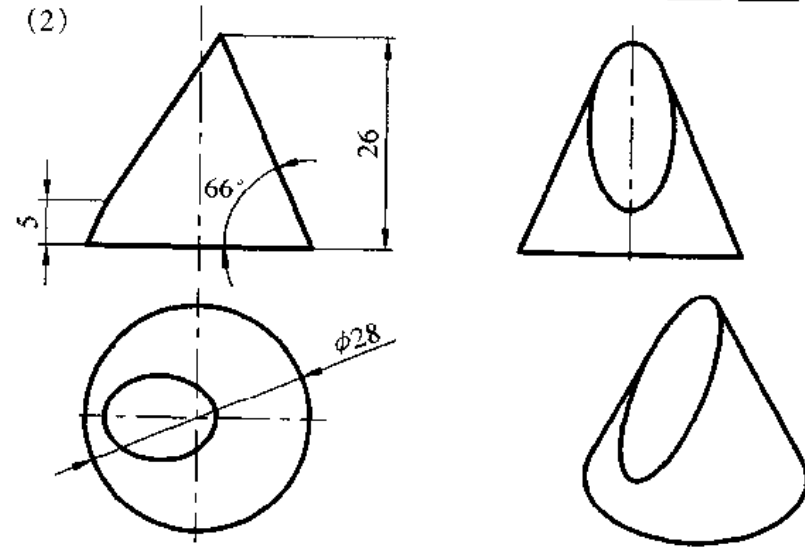
一、基础练习

根据三视图绘制三维模型。

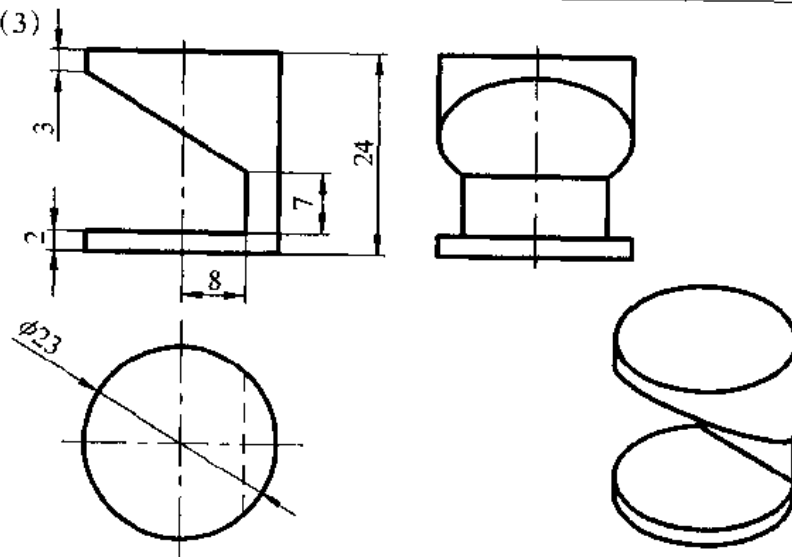
(1)



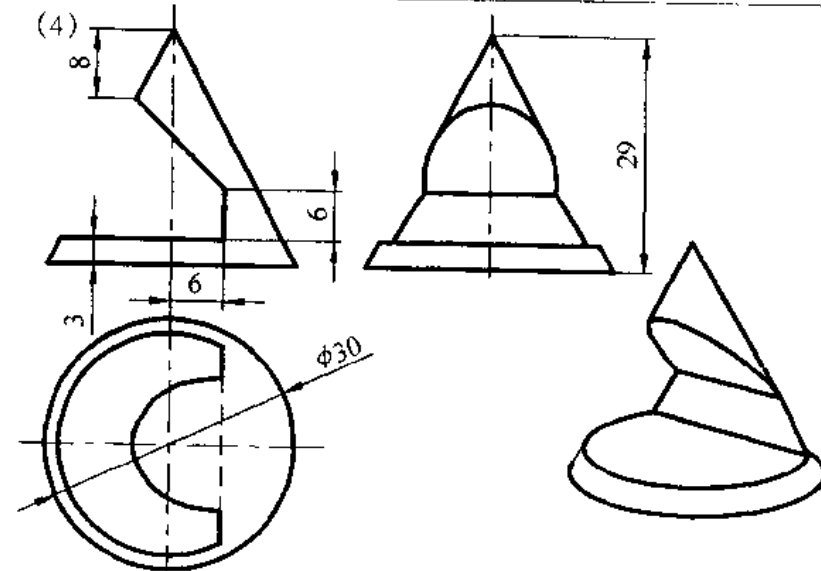
(2)



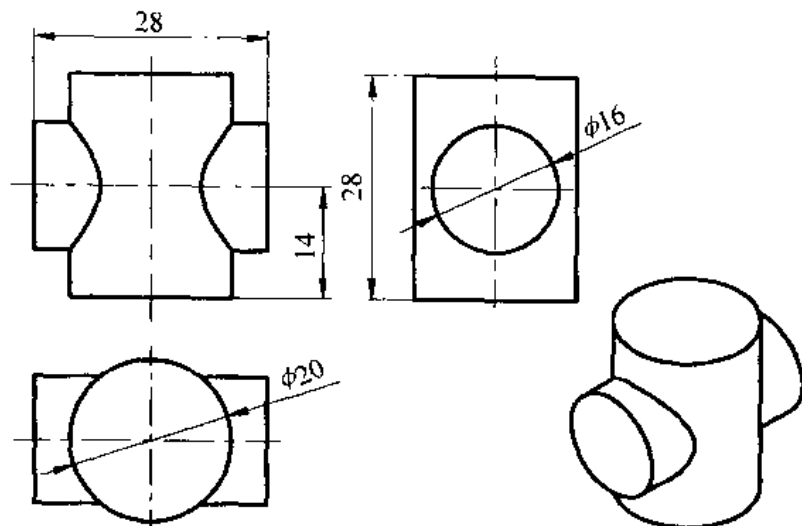
(3)



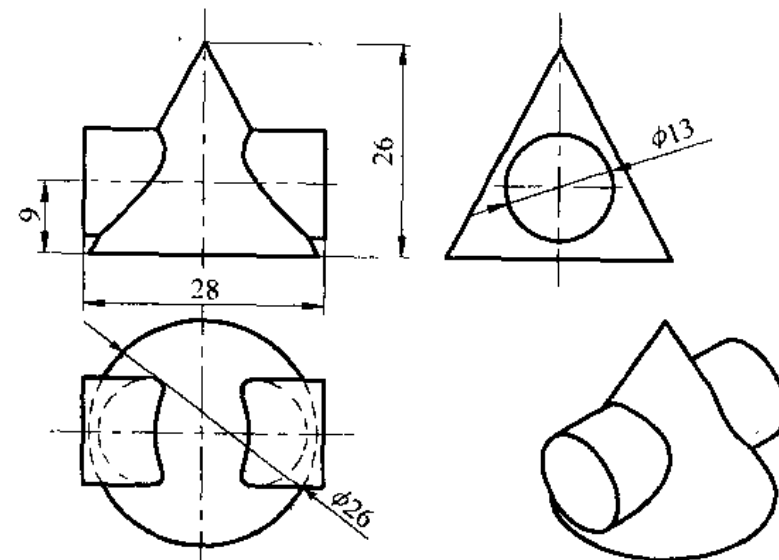
(4)



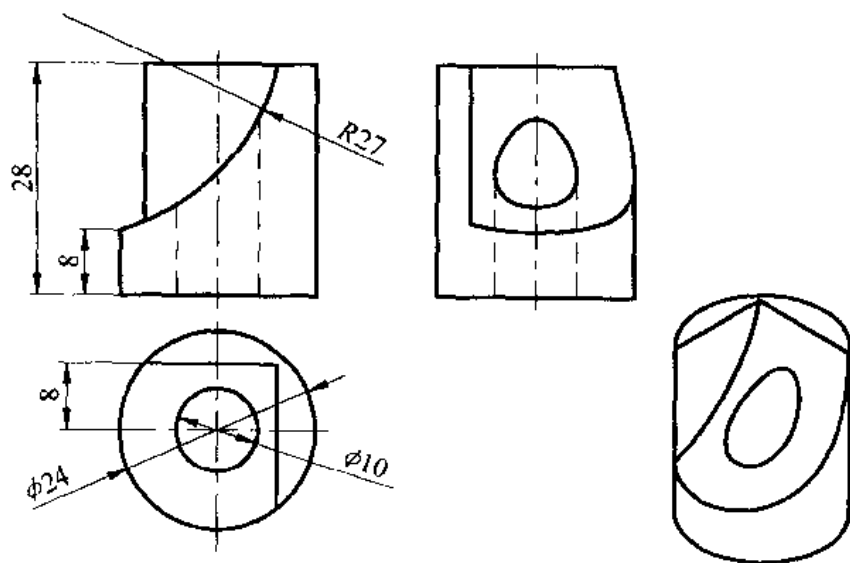
(5)



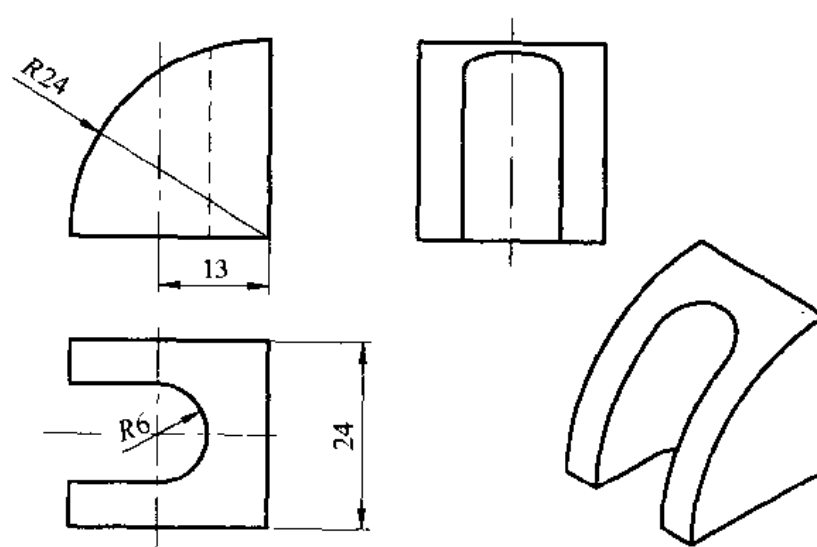
(6)



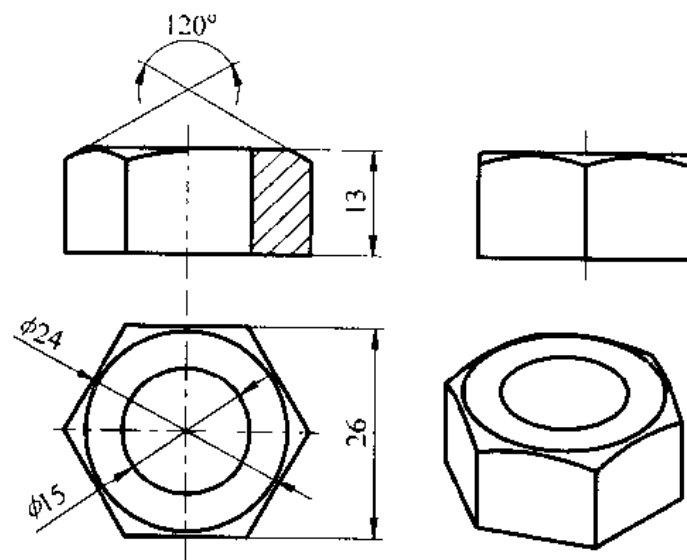
(7)



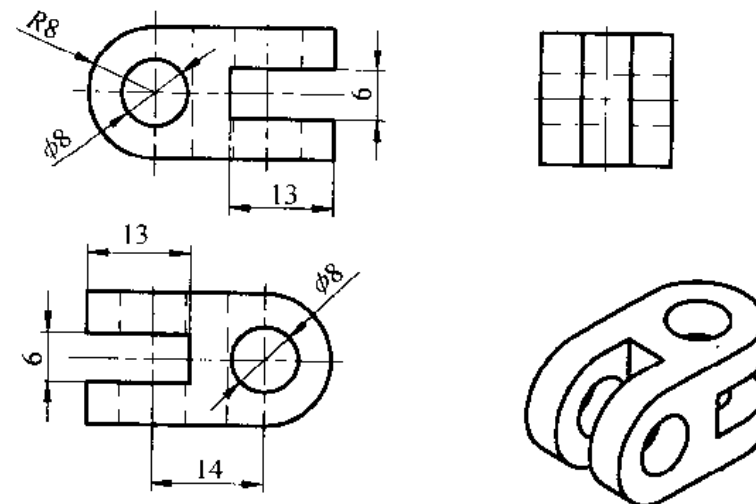
(8)



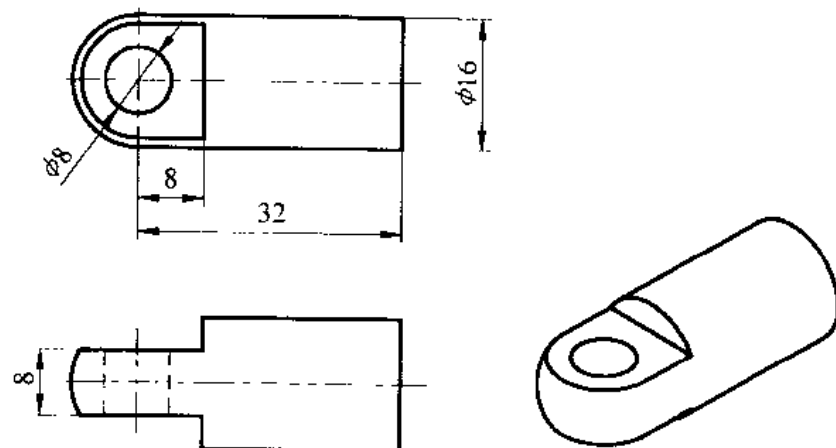
(9)



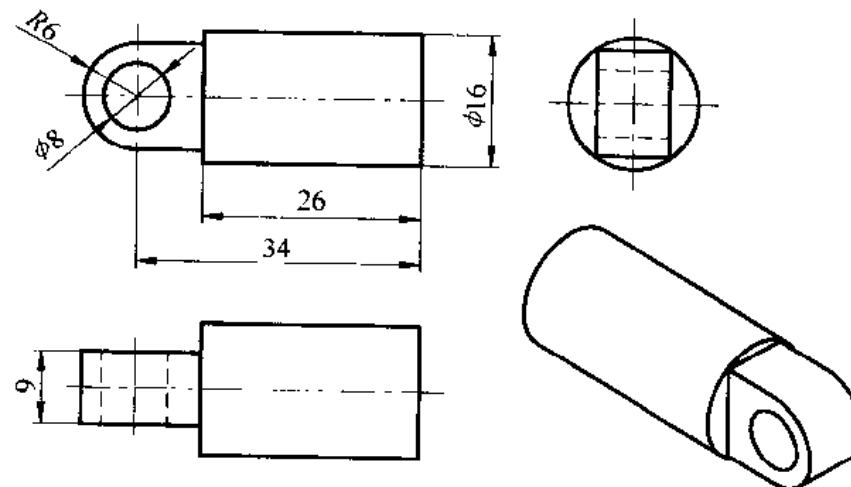
(10)



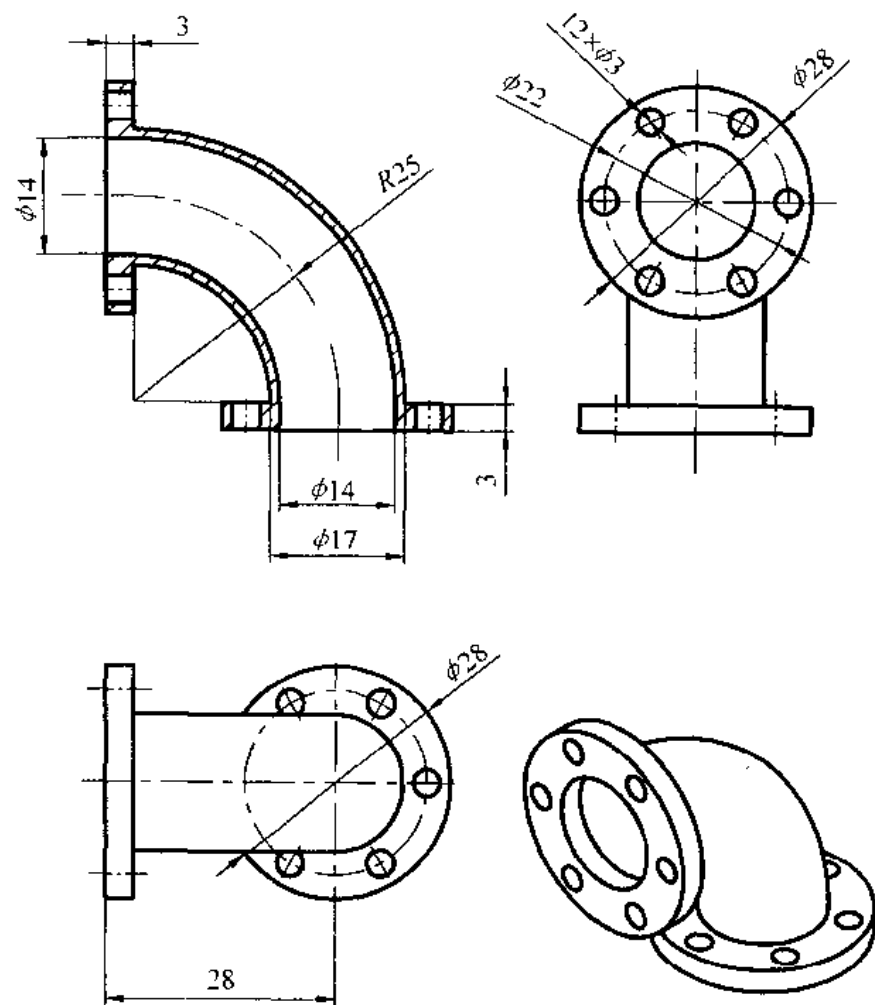
(11)



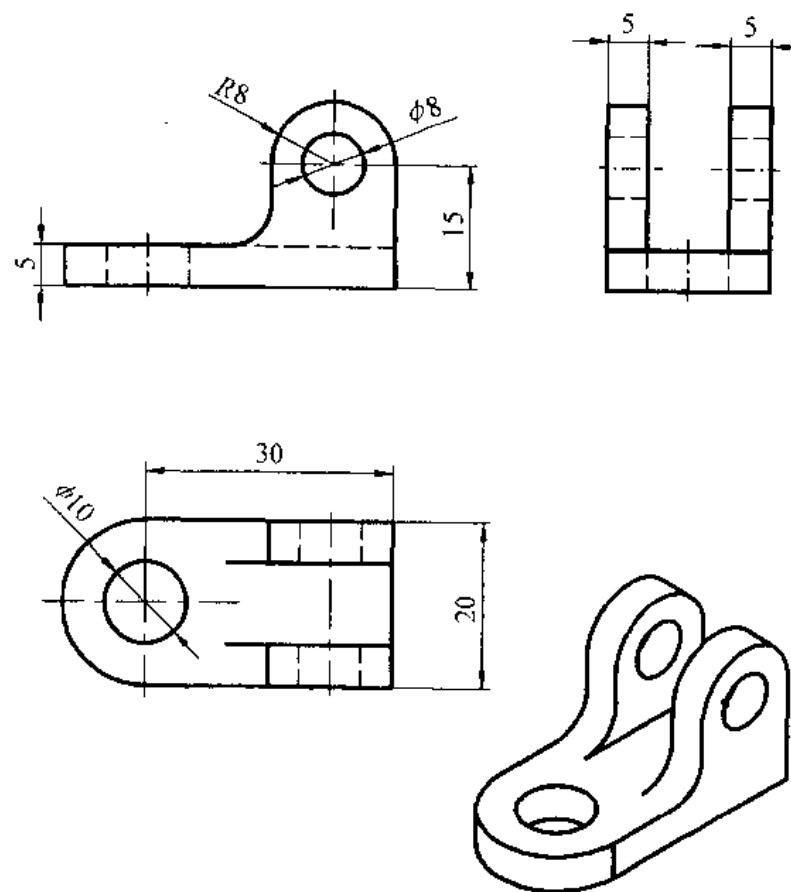
(12)



(13)



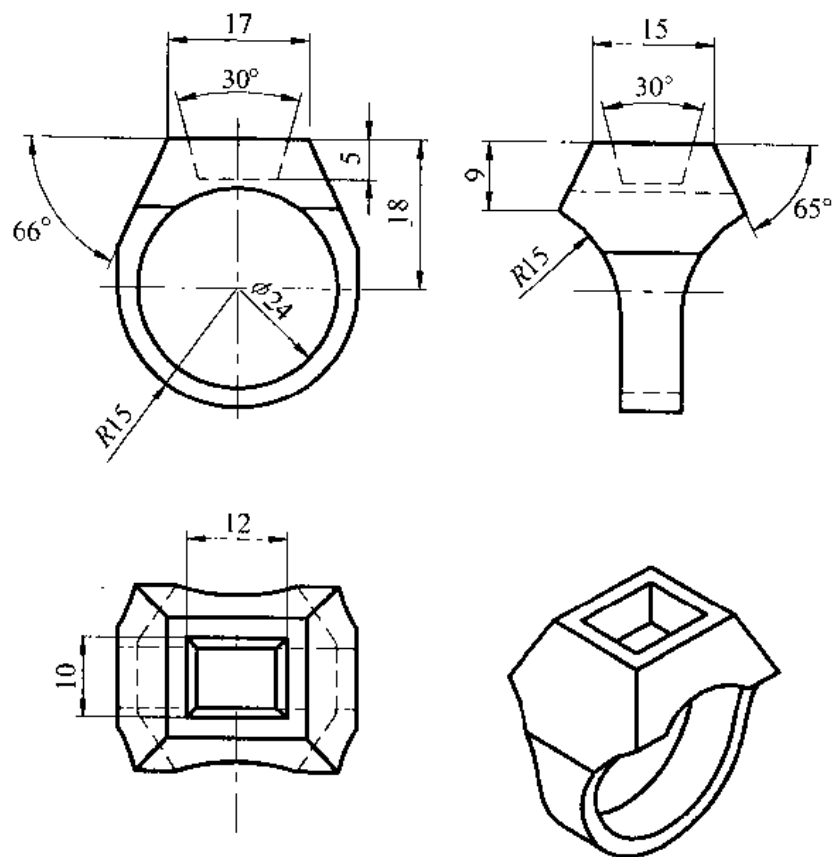
(14)



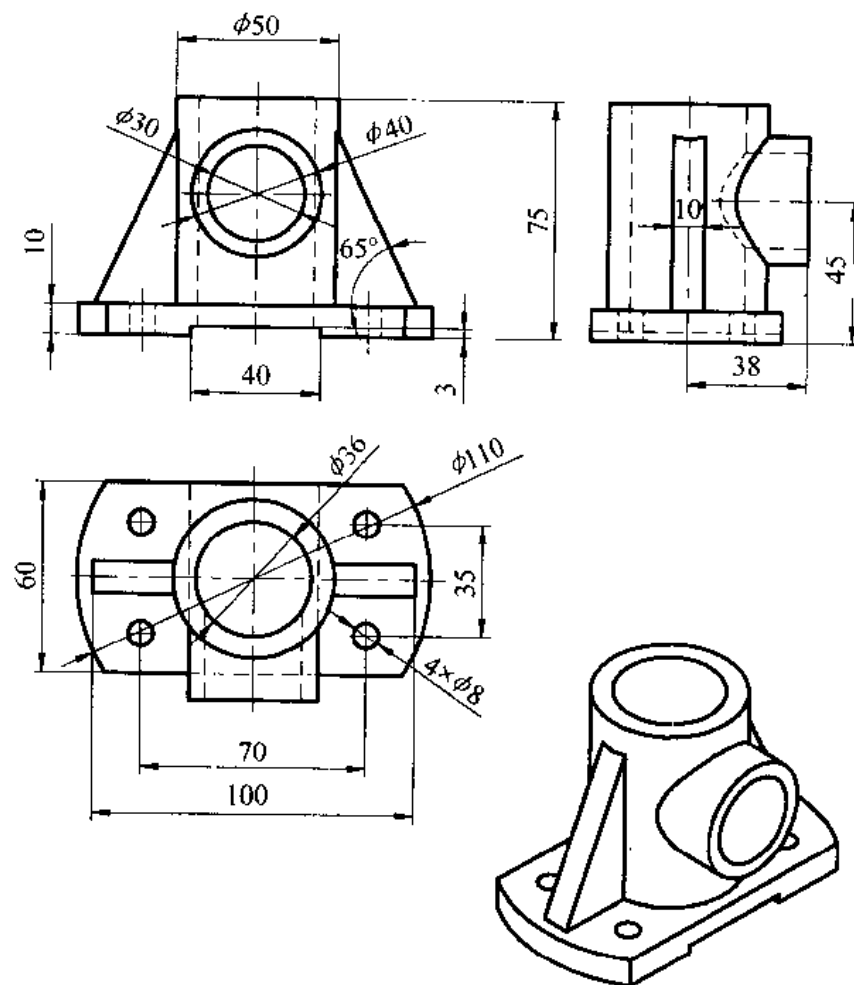
二、简单零件

1. 根据三视图绘制三维模型。

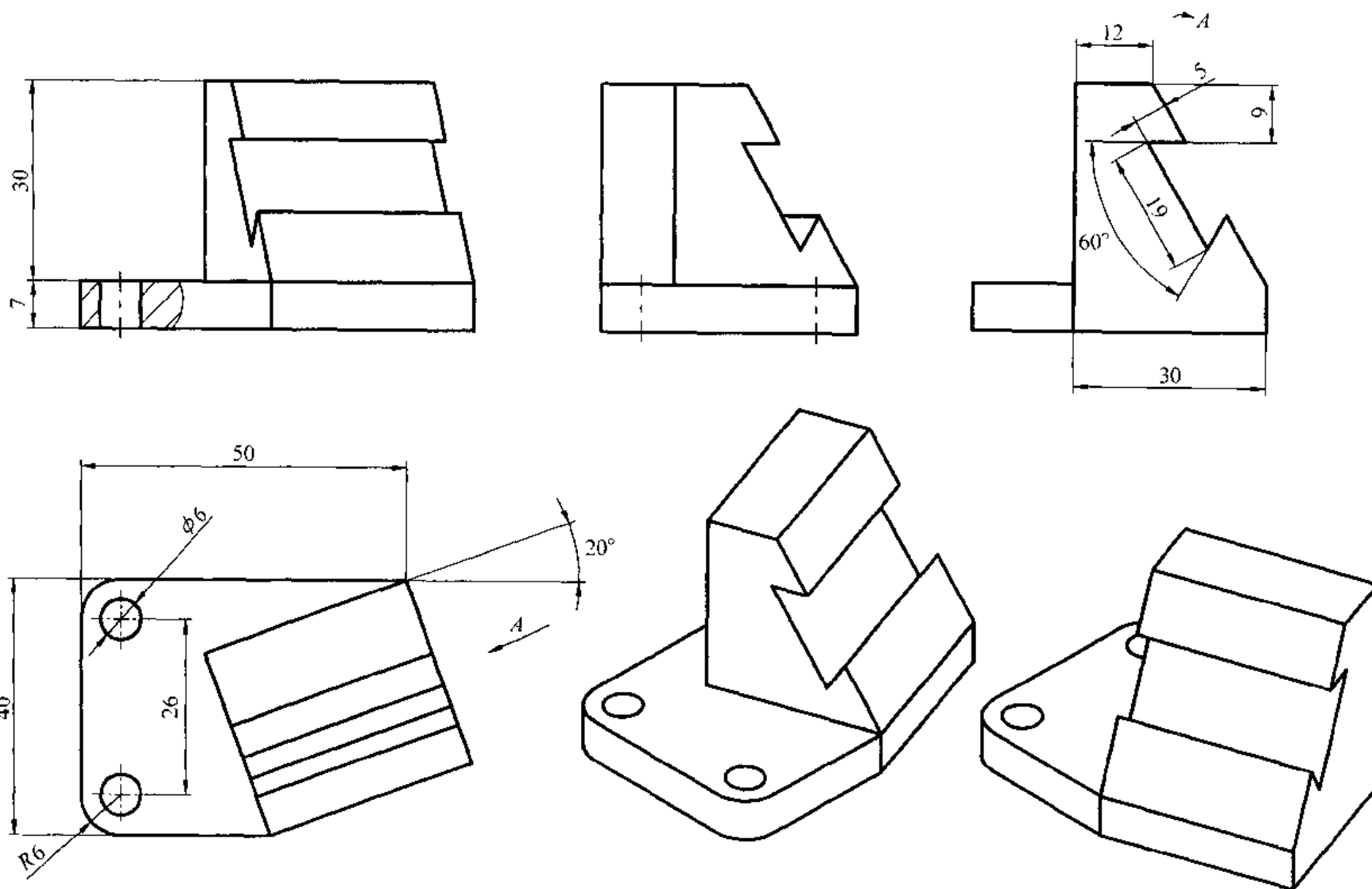
(1)



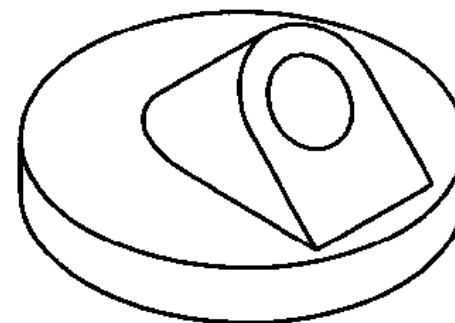
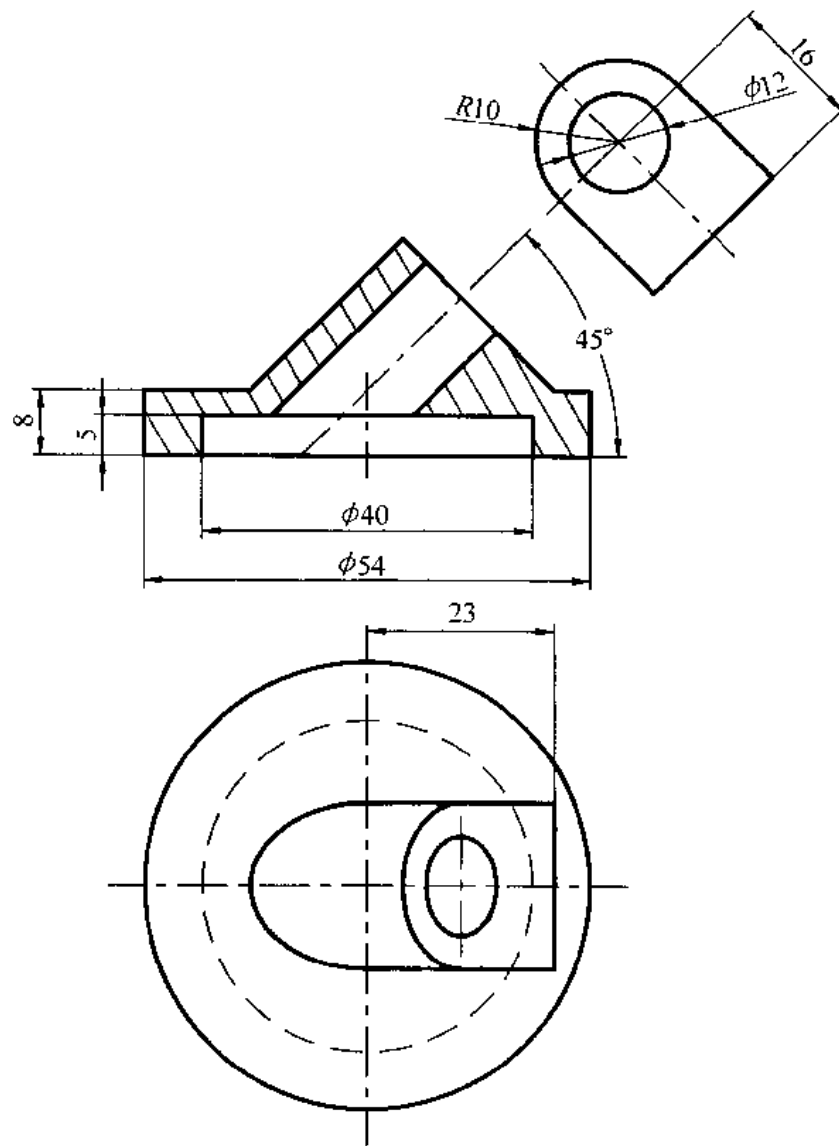
(2)



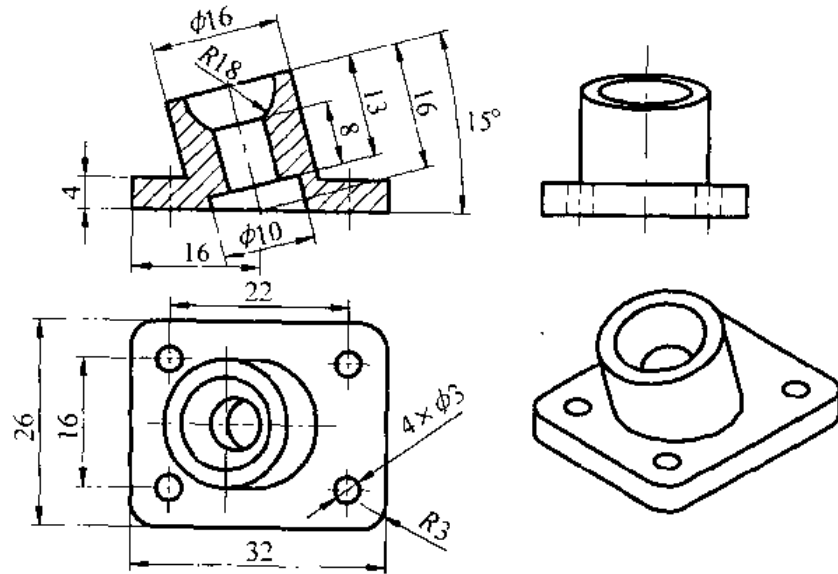
(3)



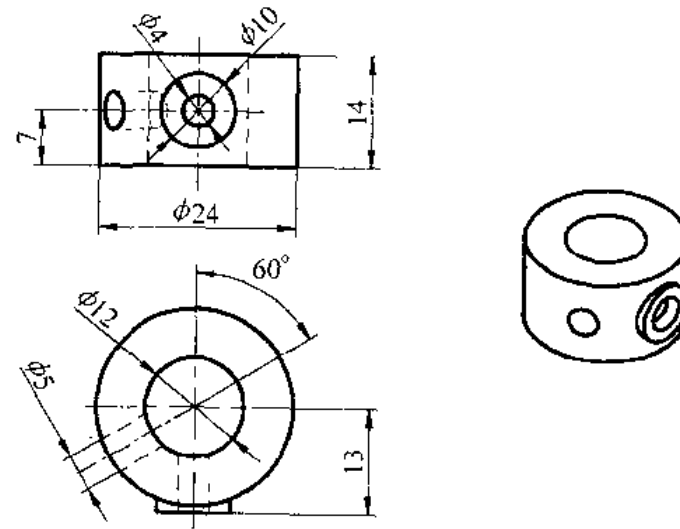
(4)



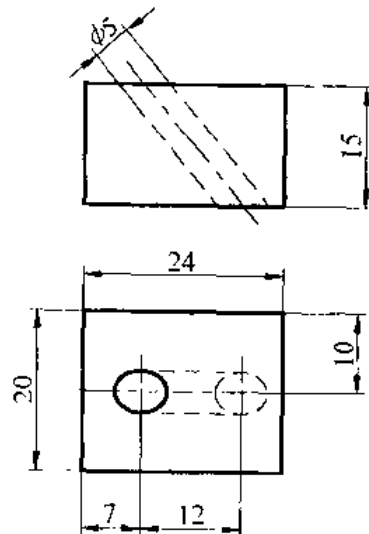
(5)



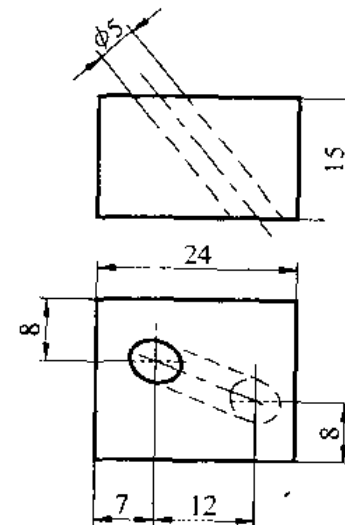
(6)



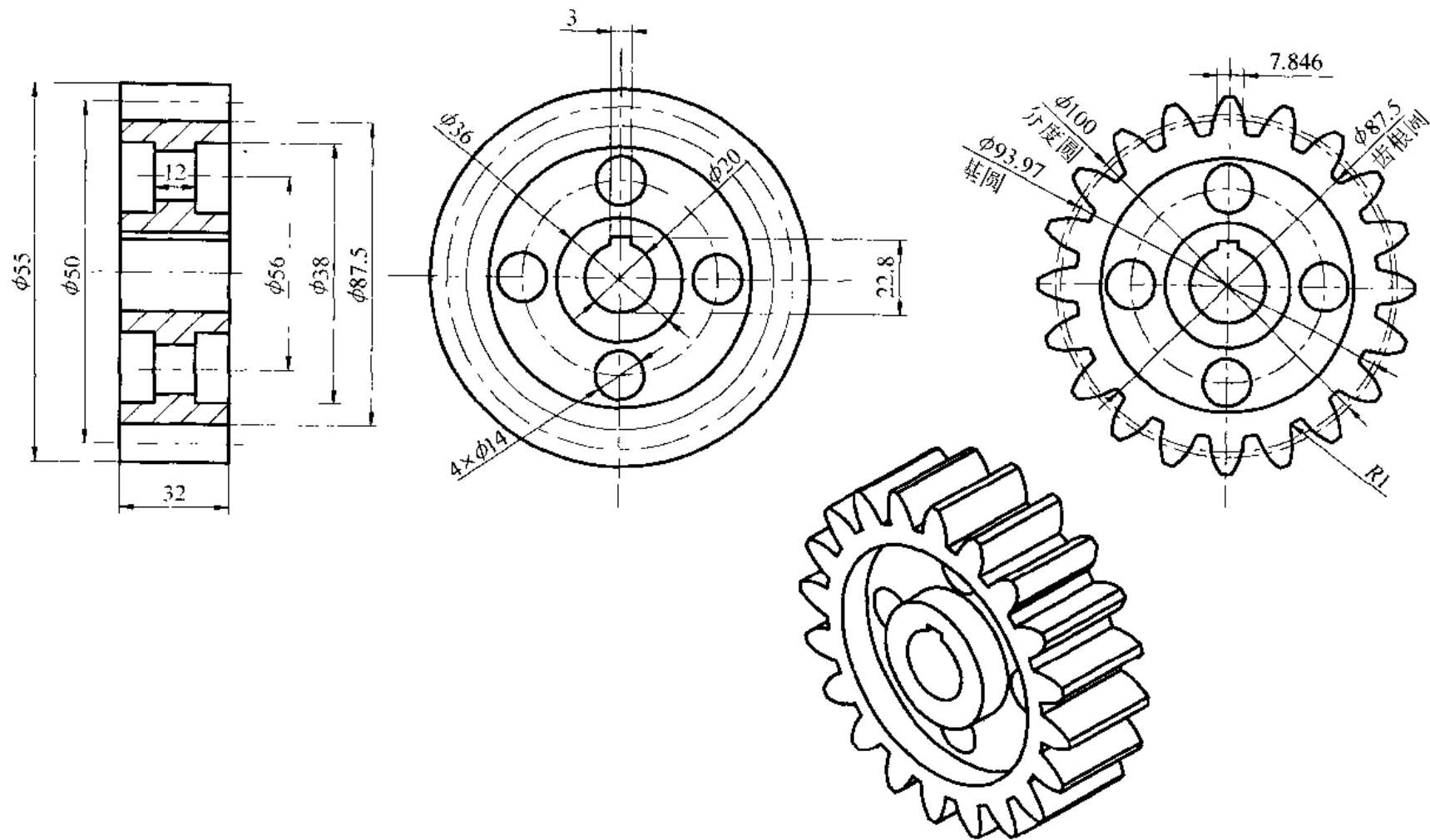
(7)



(8)



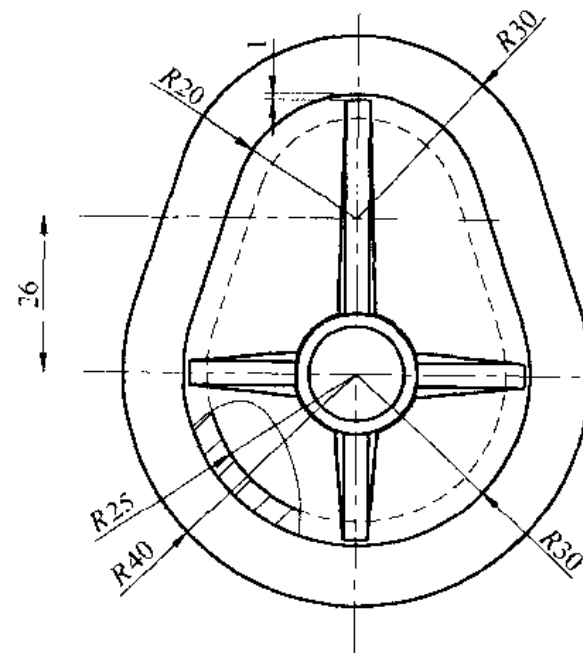
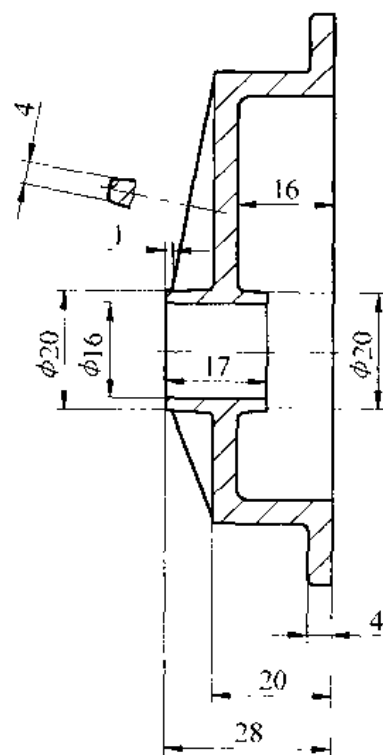
2. 按图示尺寸绘制齿轮的三维图形，渐开线齿形的画法参照第 22 页。



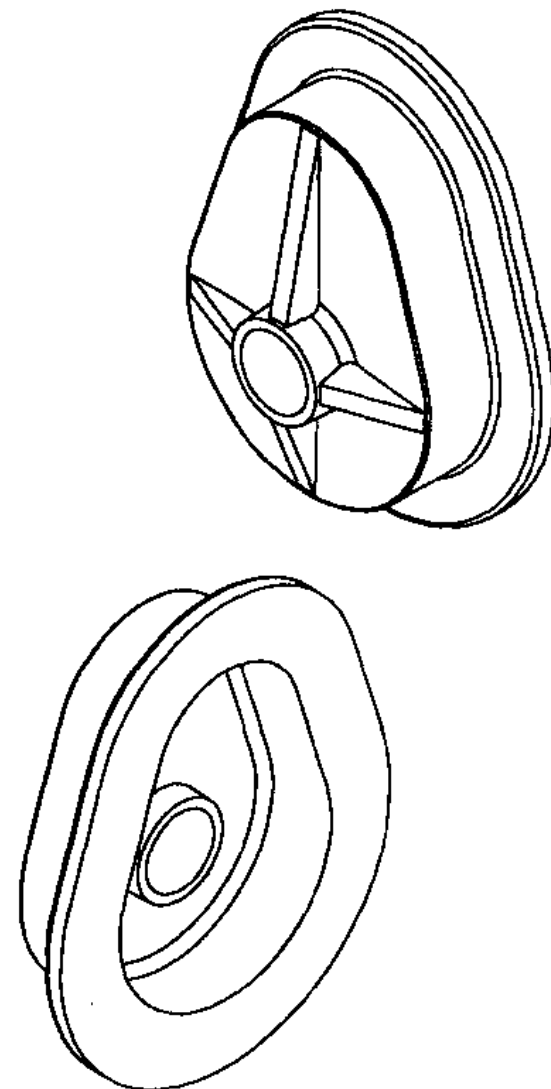
三、复杂零件

根据三视图绘制三维模型。

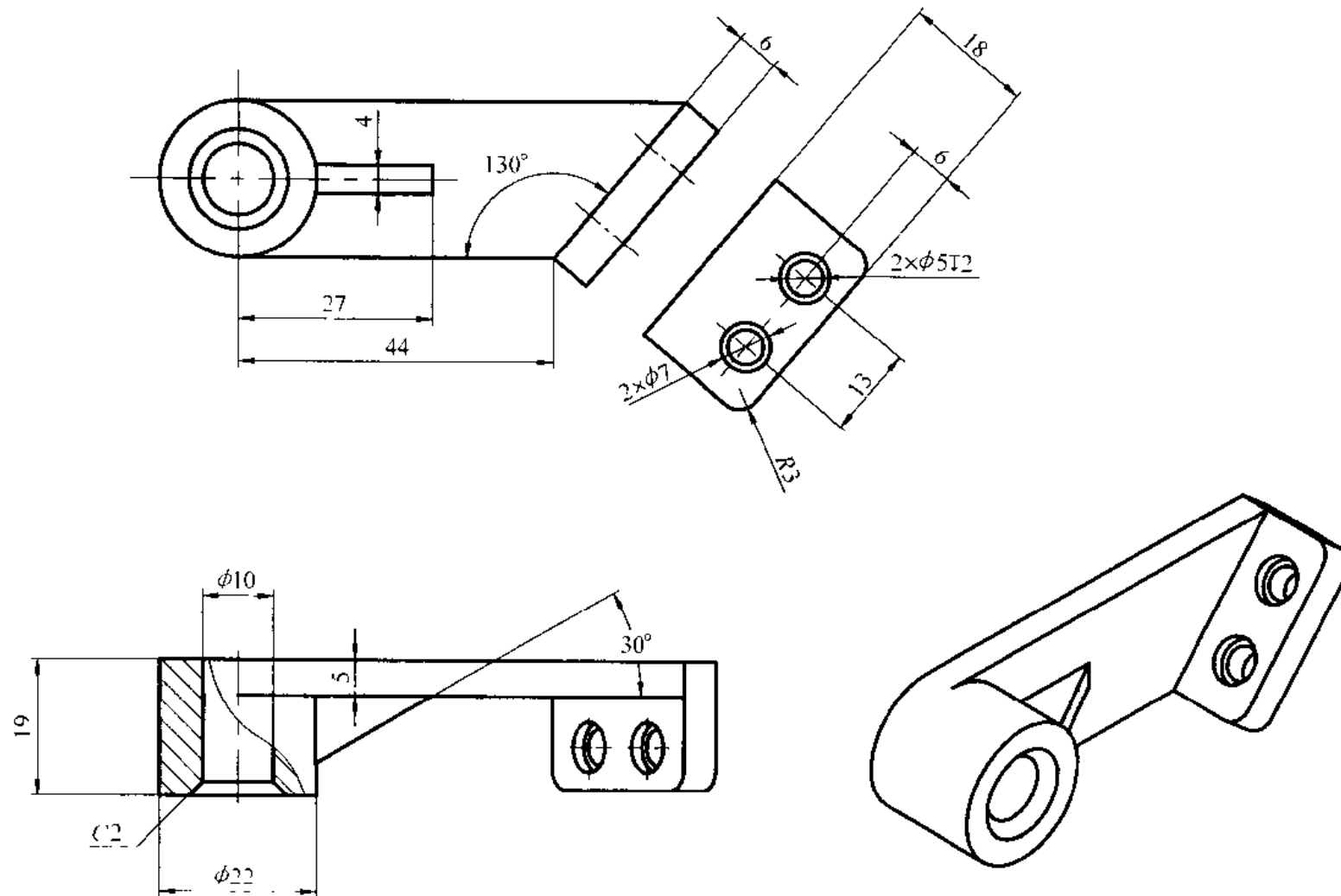
(1)



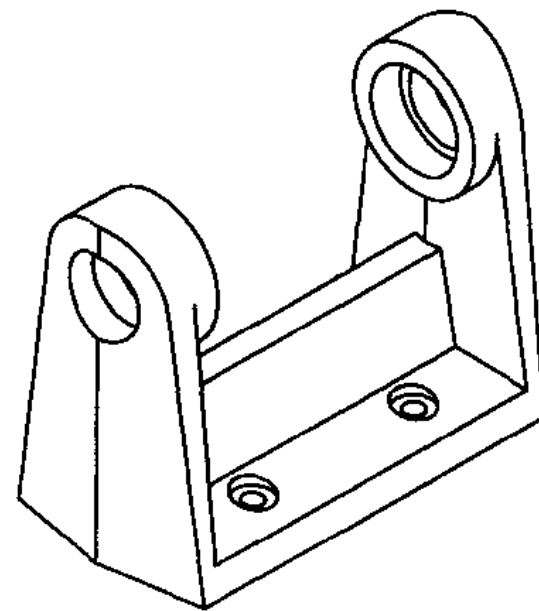
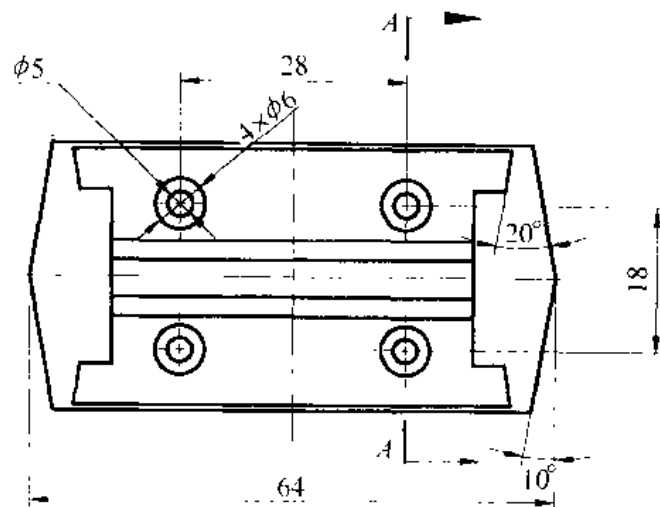
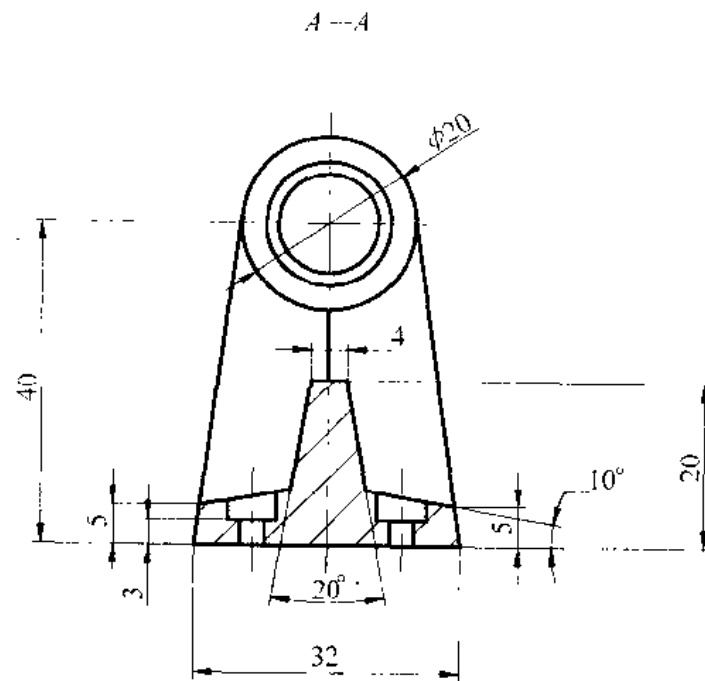
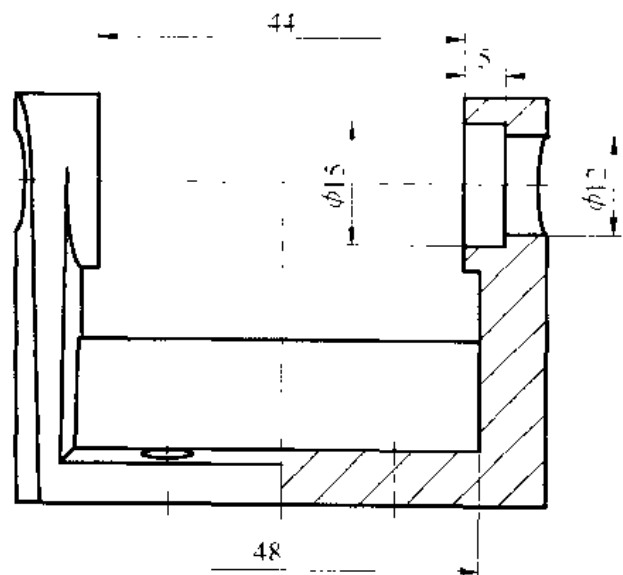
技术要求
未注圆角 $R1$ 。
未注拔模斜度 10° 。



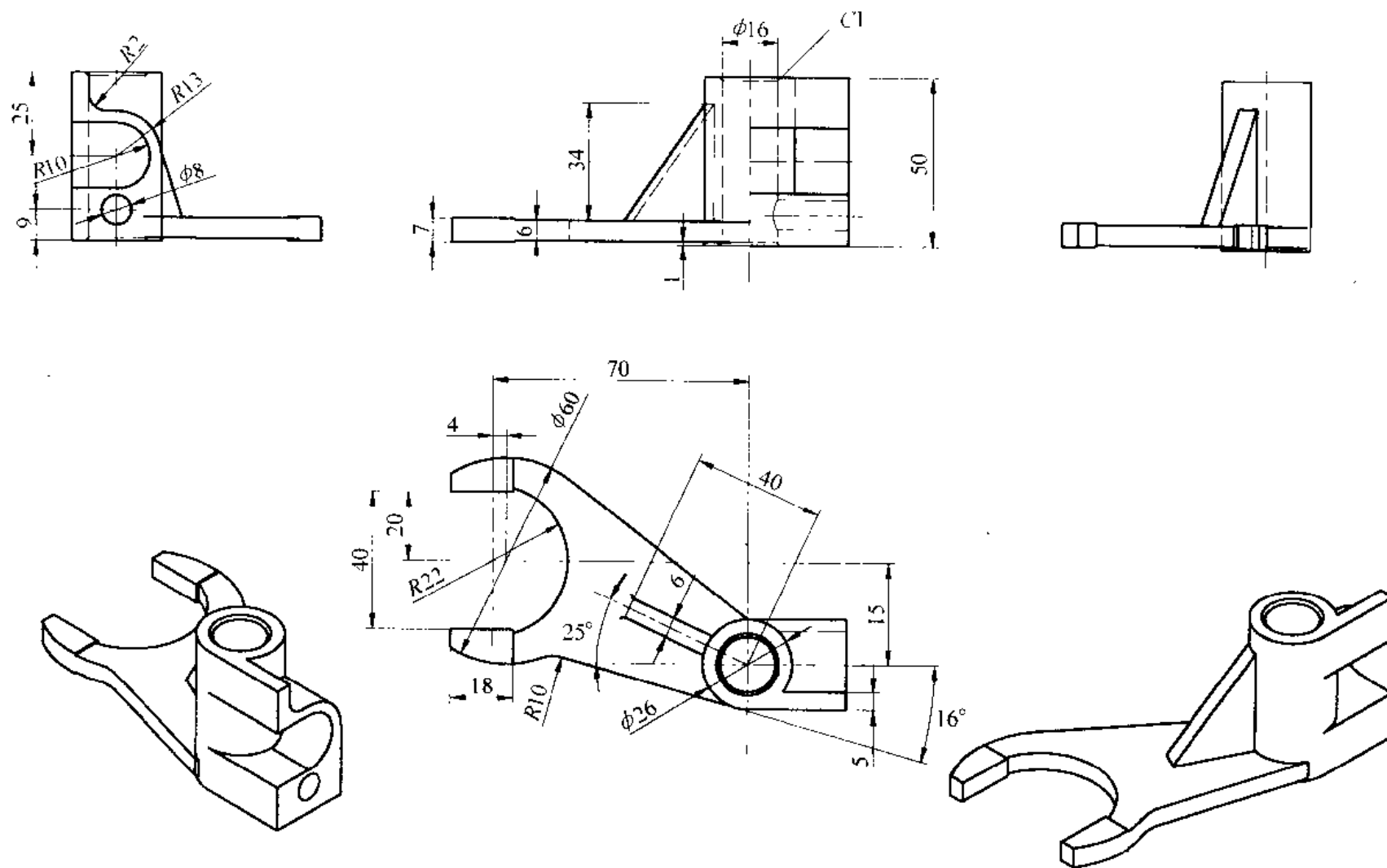
(2)



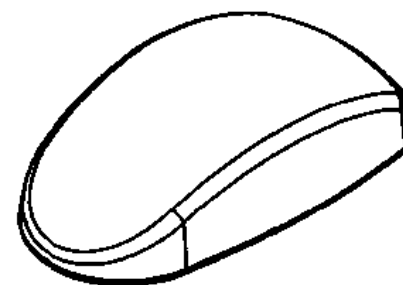
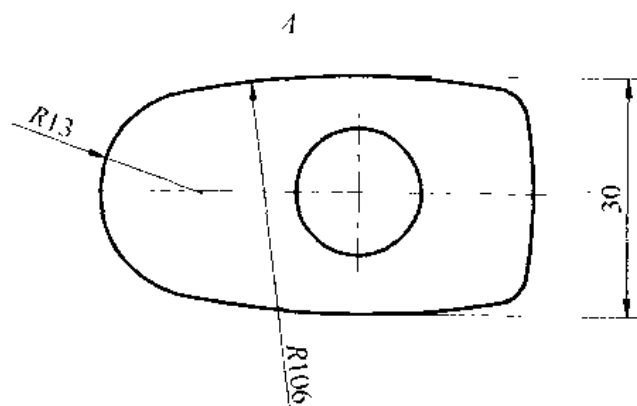
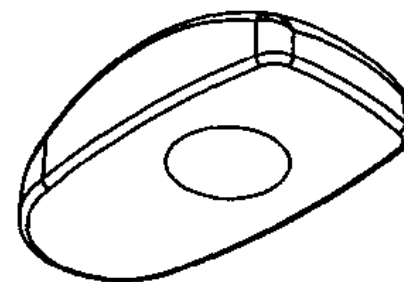
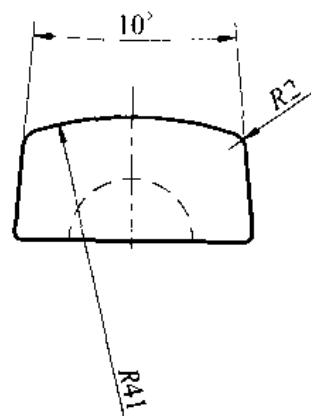
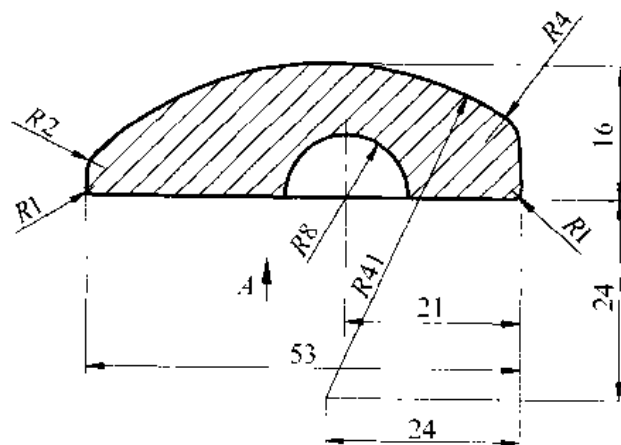
(3)



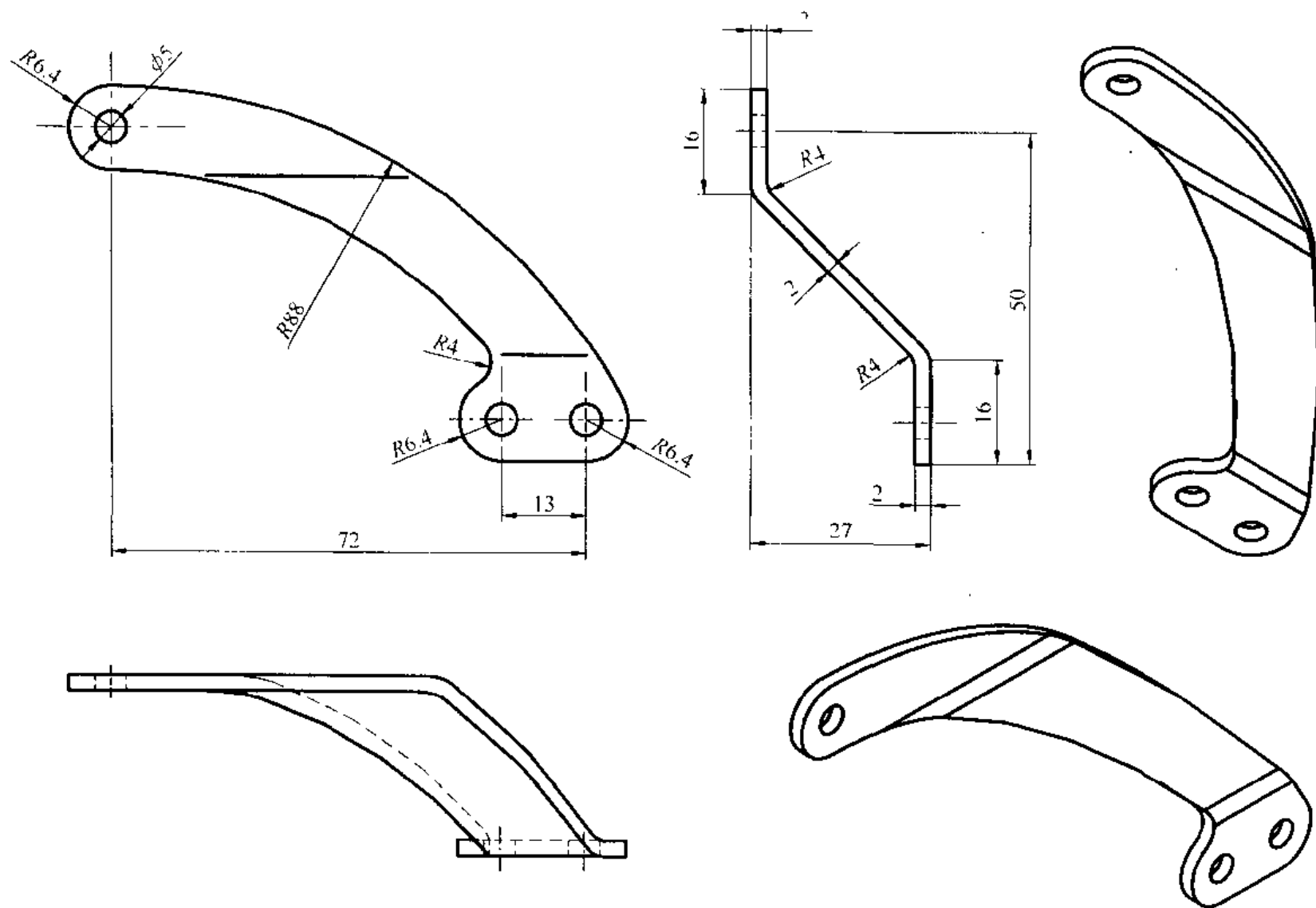
(4)



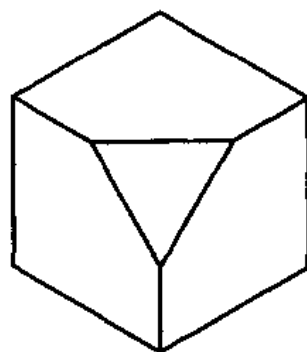
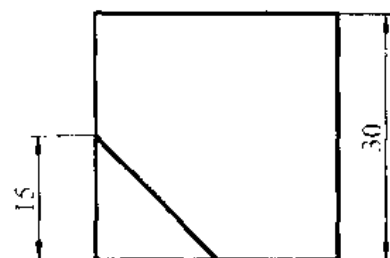
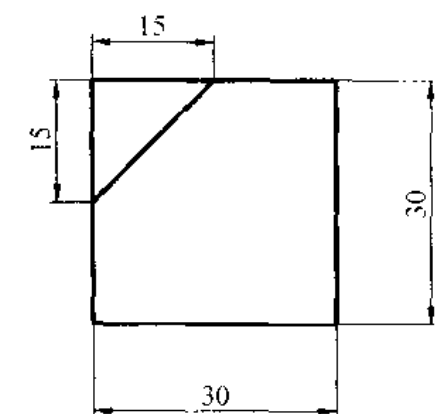
(5)



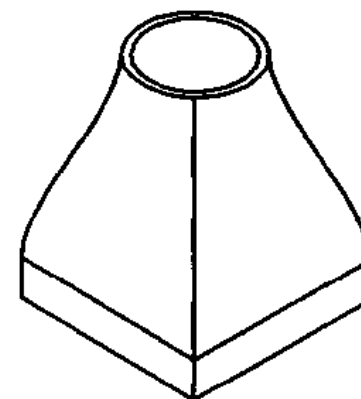
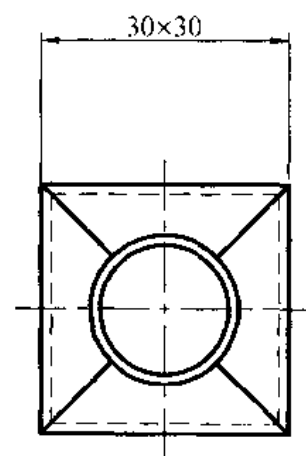
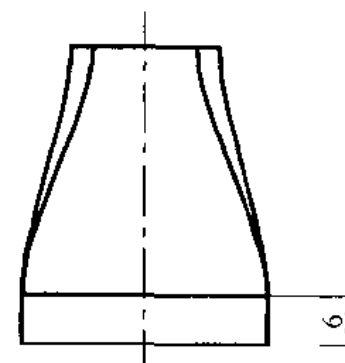
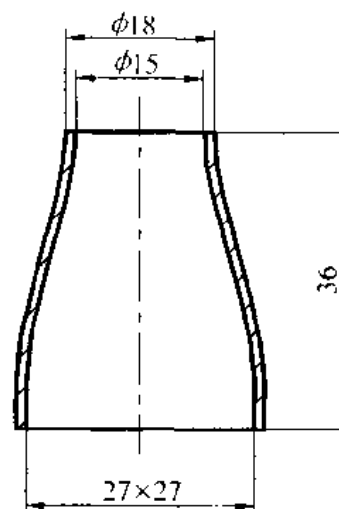
(6)



(7)



(8)



四、弹簧与螺纹

根据三视图绘制三维模型

(1)

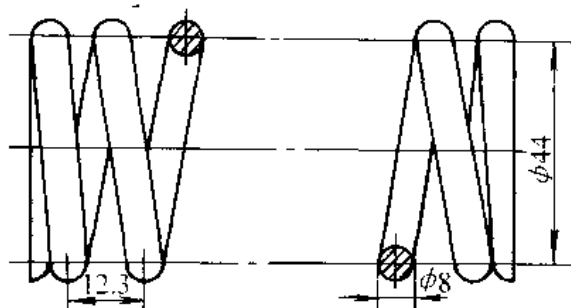
弹簧参数

圈数: 6

螺距: 12.3mm

中径: 44mm

弹簧丝直径: 8mm



(2)

弹簧参数

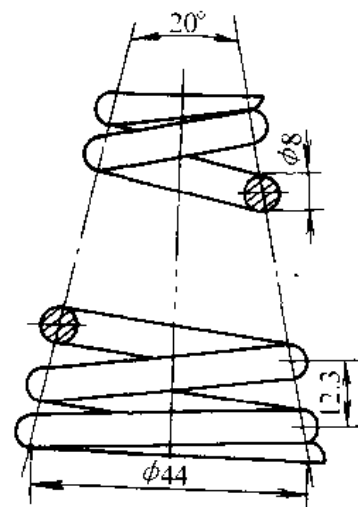
圈数: 6

螺距: 12.3mm

大端中径: 44mm

弹簧丝直径: 8mm

弹簧锥角度: 20°



(3)

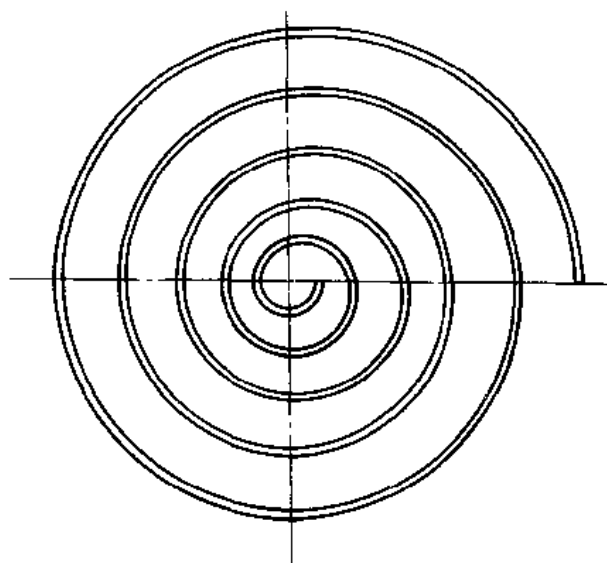
弹簧参数

圈数: 5

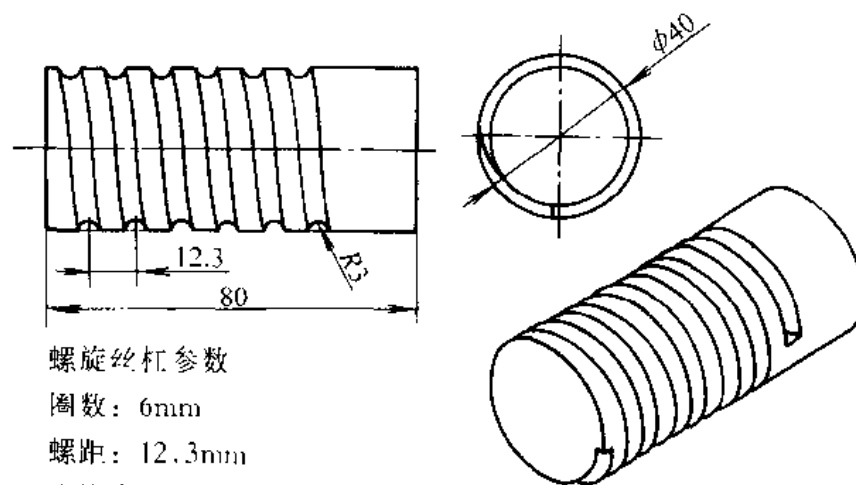
螺距: 5mm

内圈直径: 20mm

弹簧截面: 0.5 × 6mm



(4)



螺旋丝杠参数

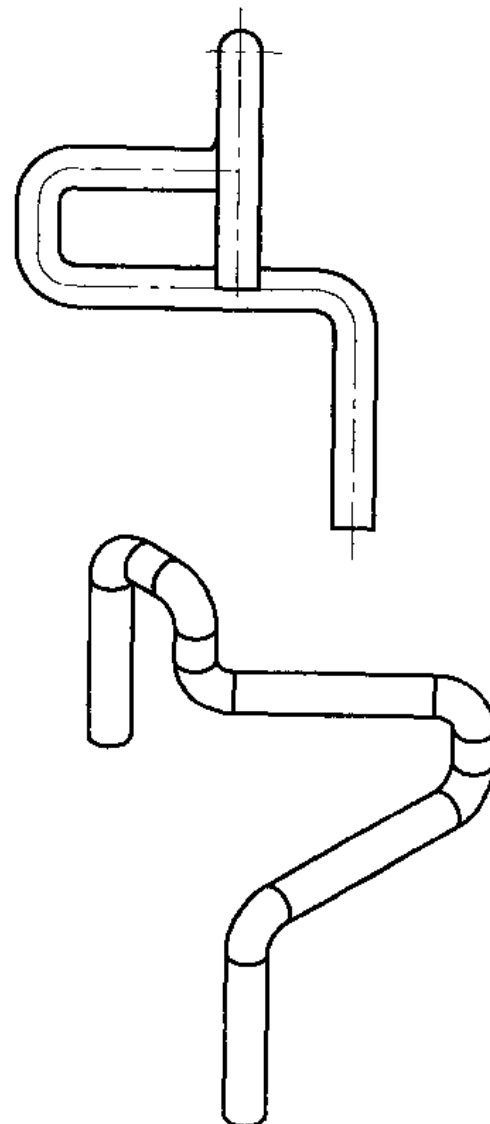
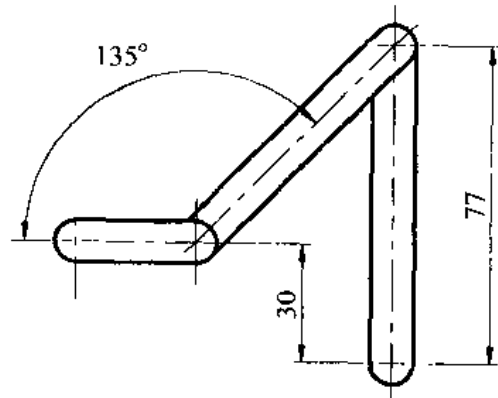
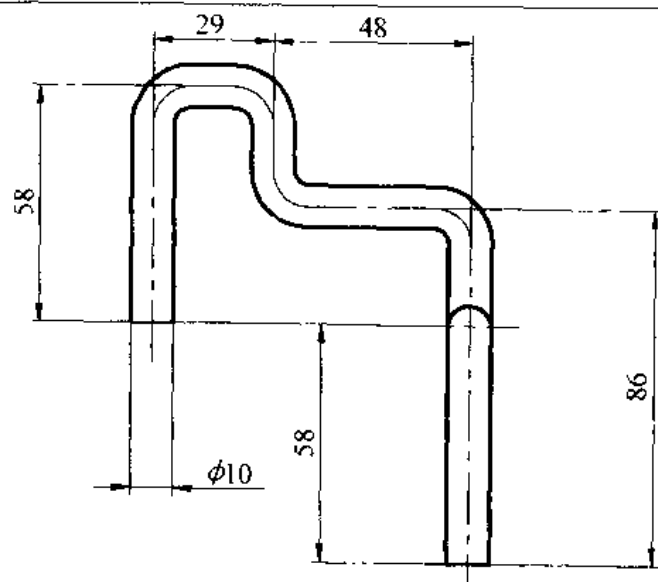
圈数: 6mm

螺距: 12.3mm

沟槽直径: 6mm

五、管道

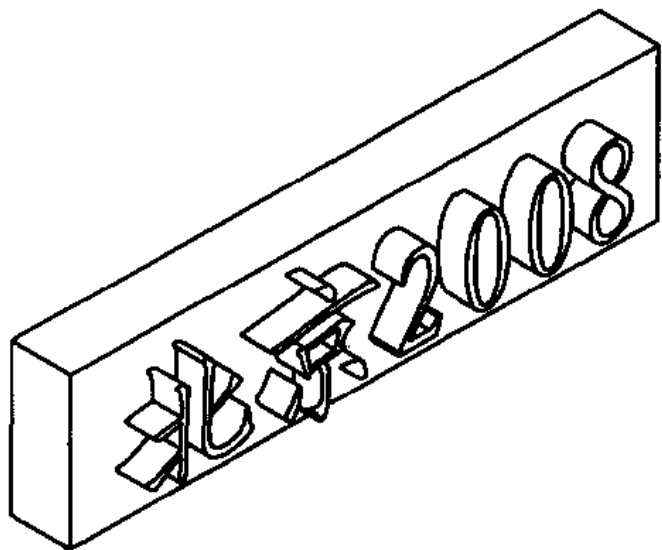
根据三视图绘制三维模型



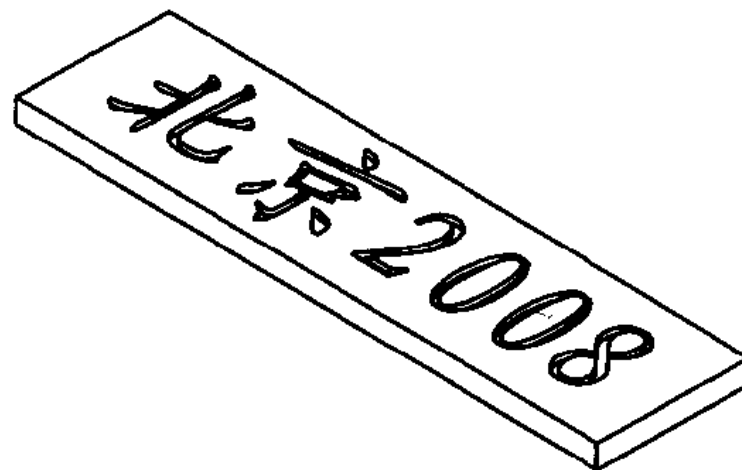
六、文字

绘制字体的三维模型 (尺寸自定)

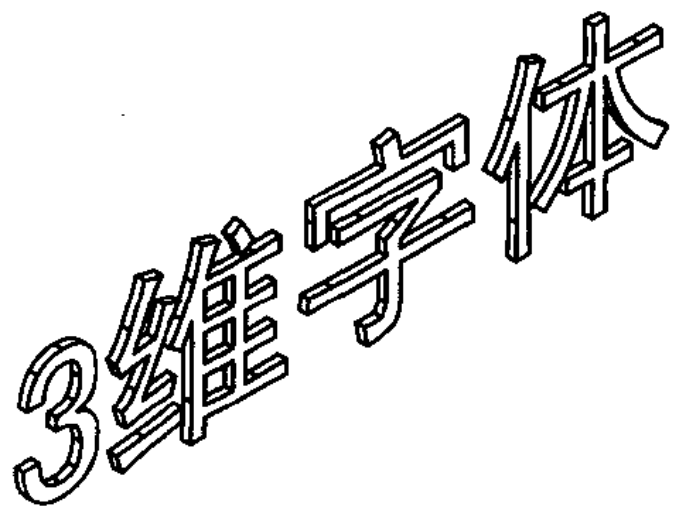
(1)



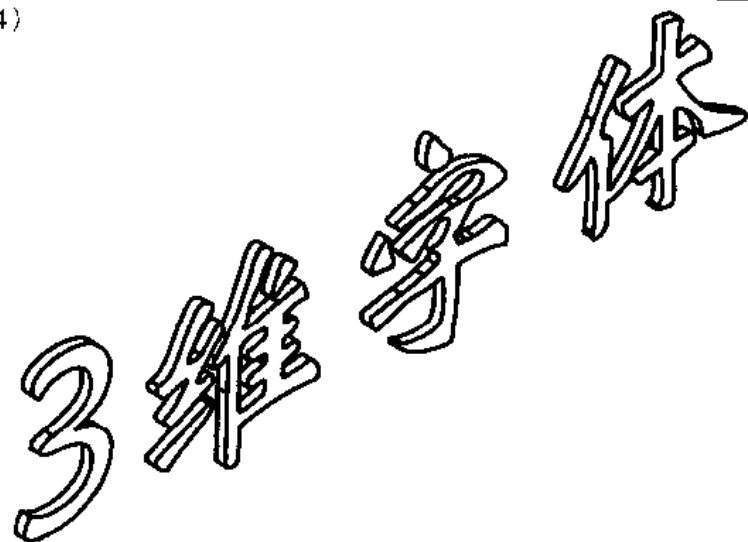
(2)



(3)



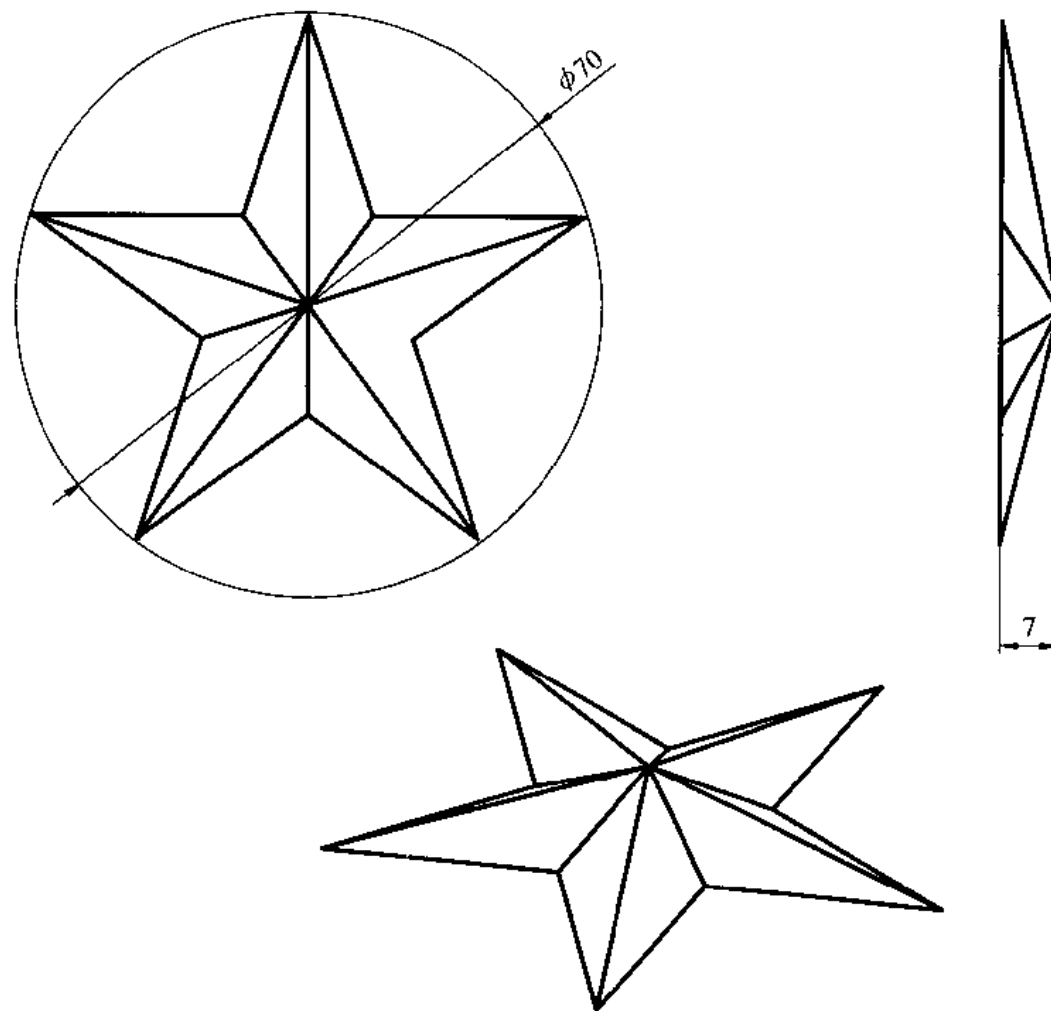
(4)



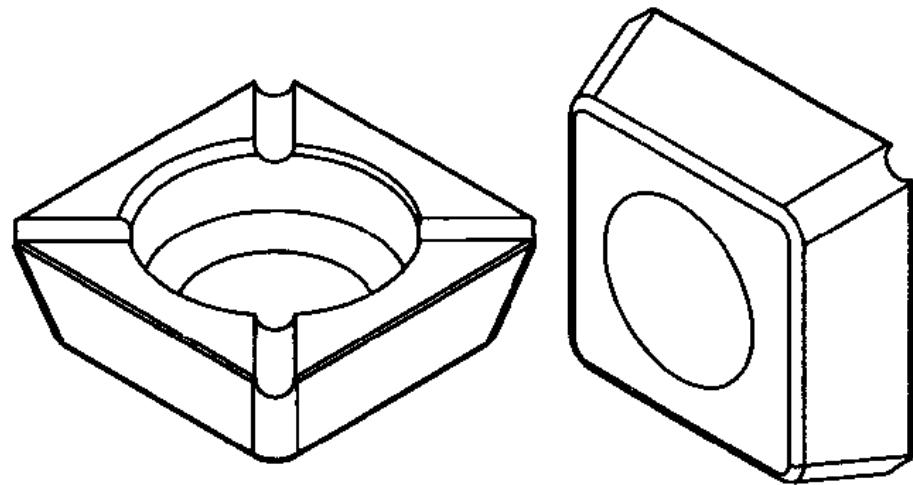
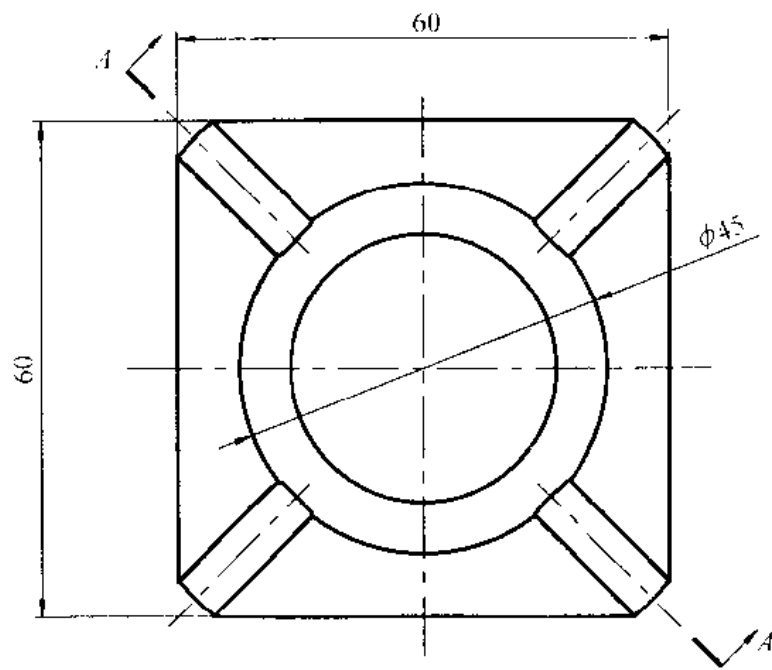
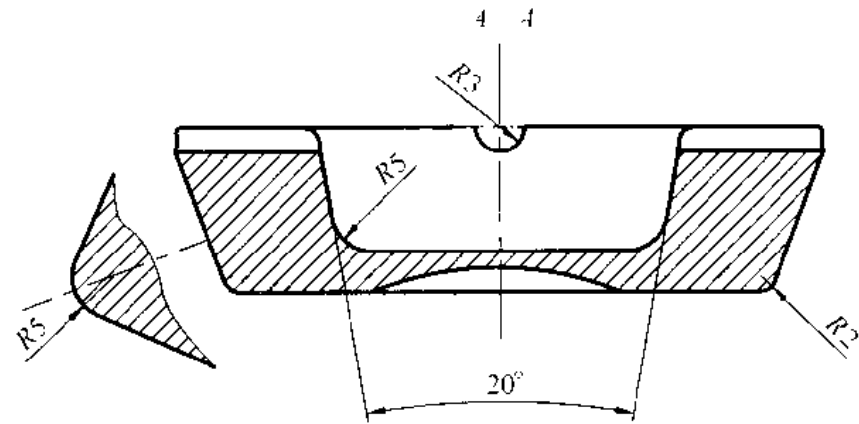
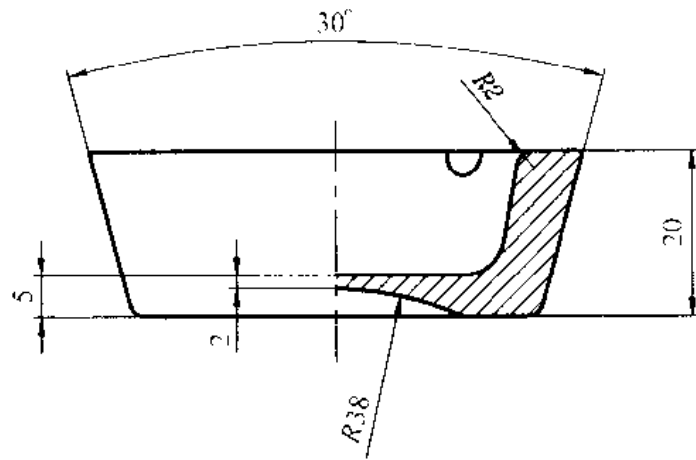
八、生活用品

根据二视图绘制三维模型。

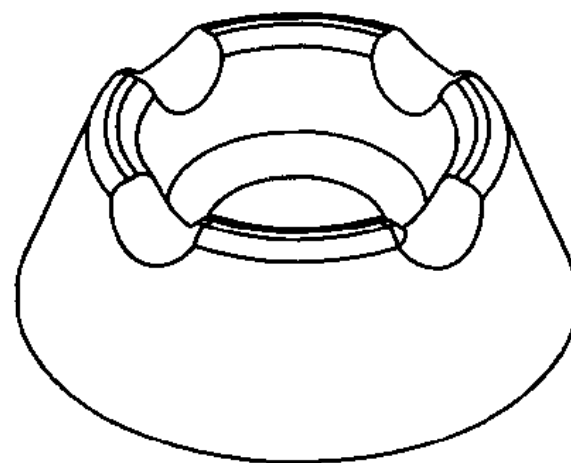
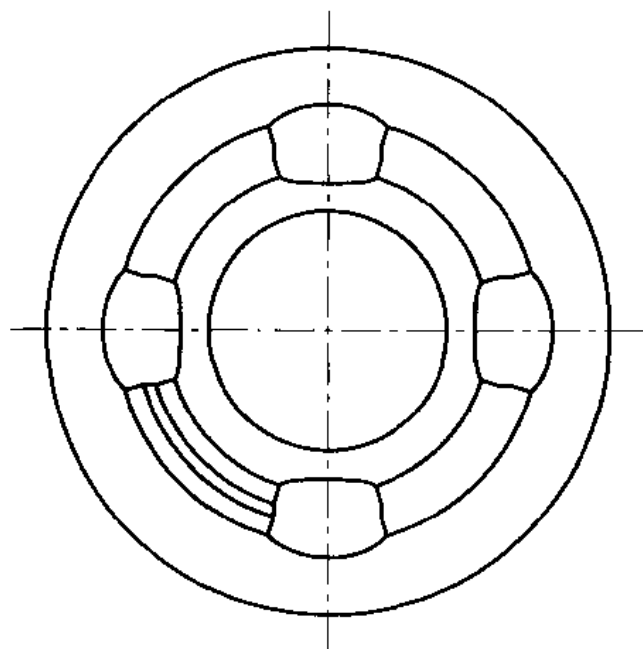
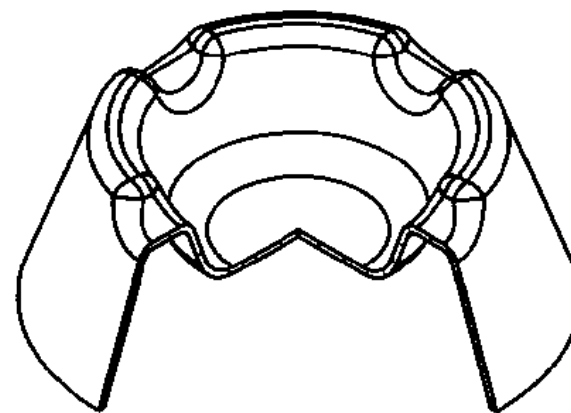
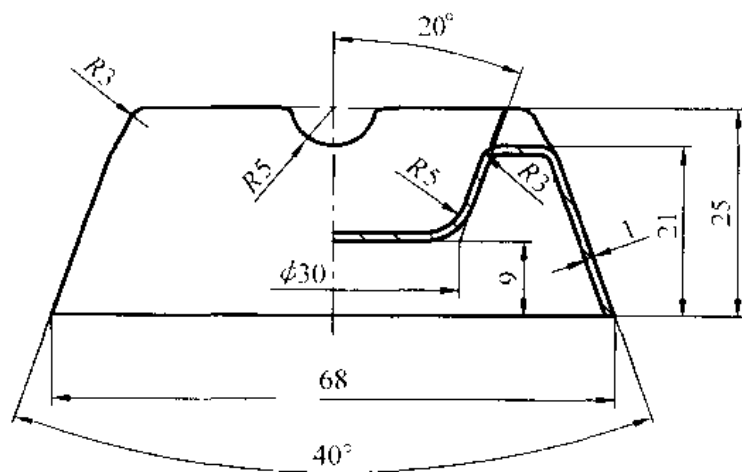
(1)



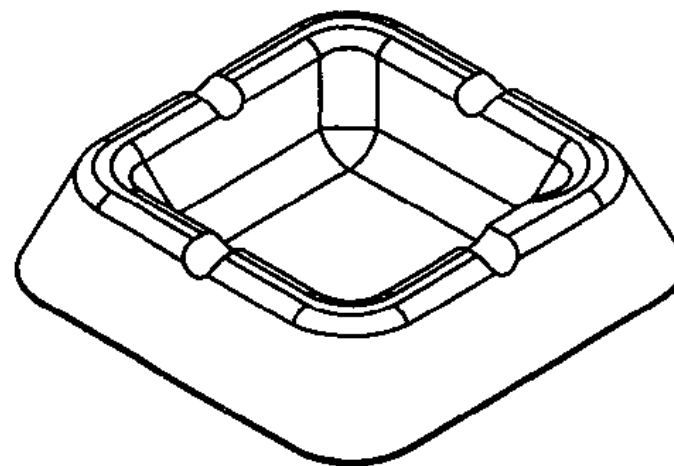
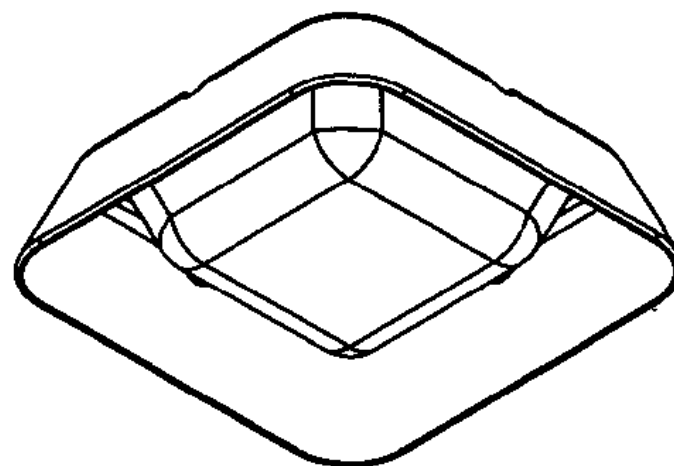
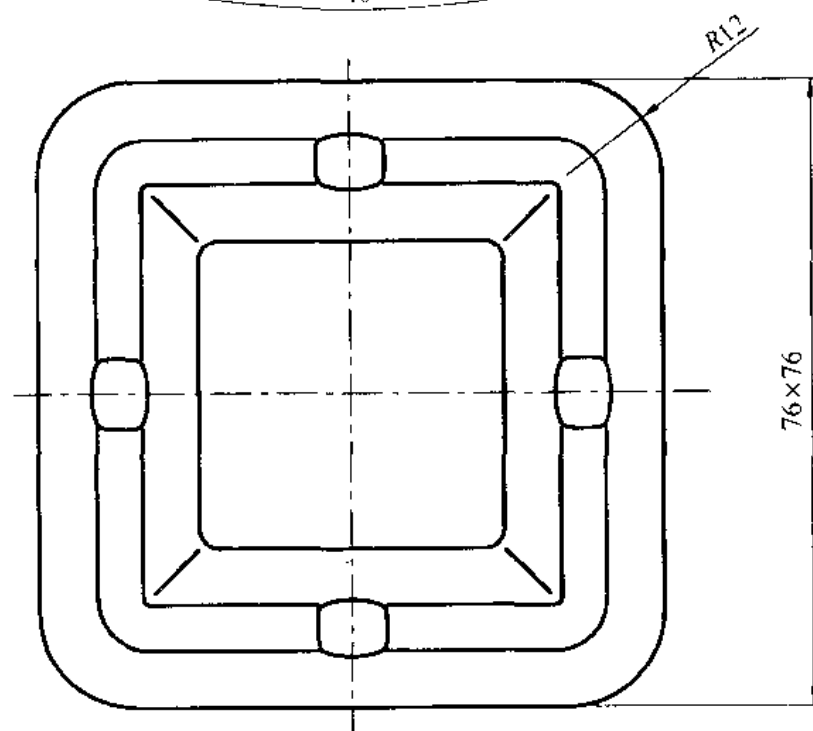
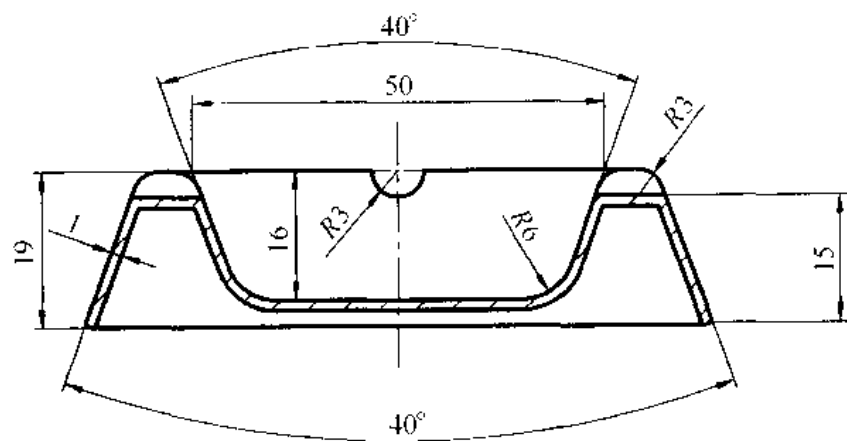
(2)



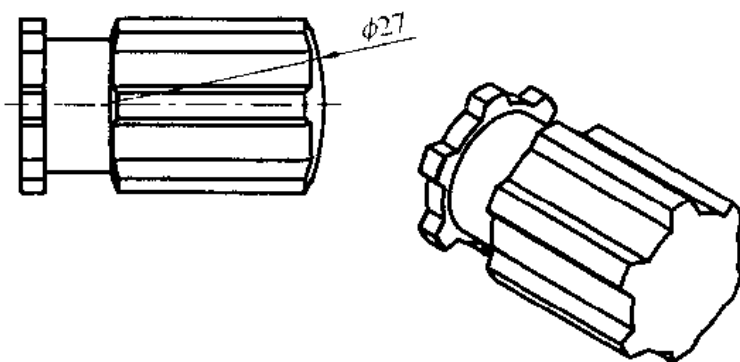
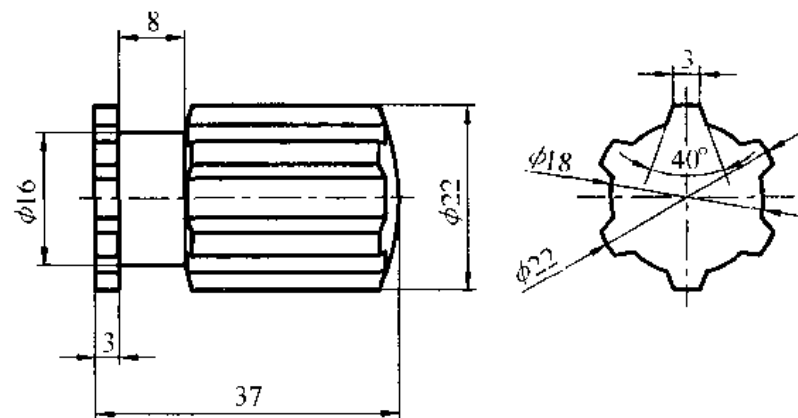
(3)



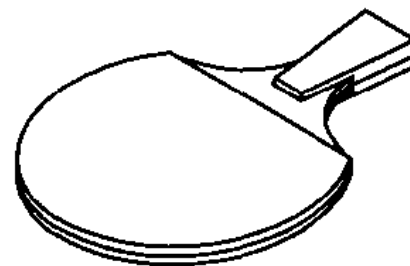
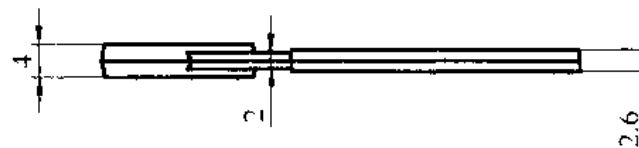
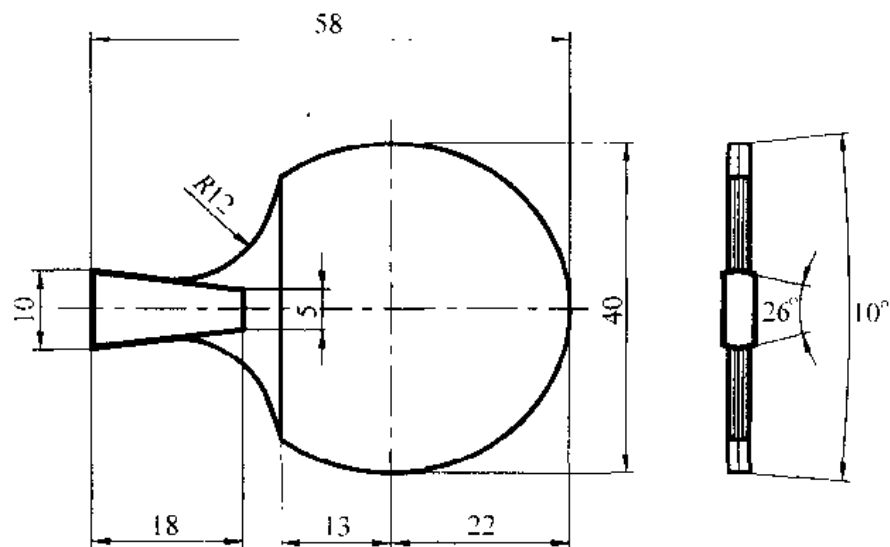
(4)



(5)

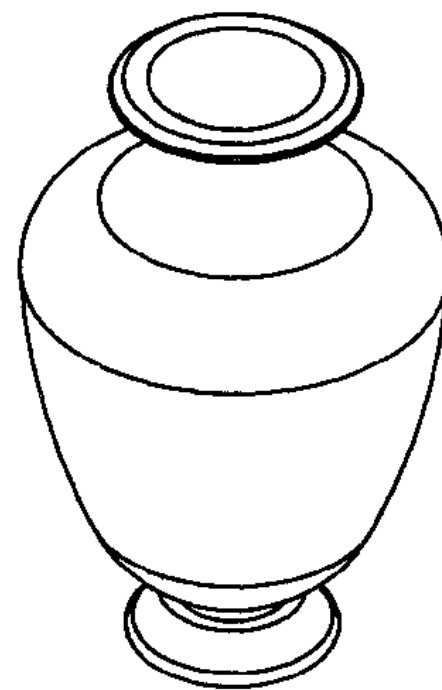
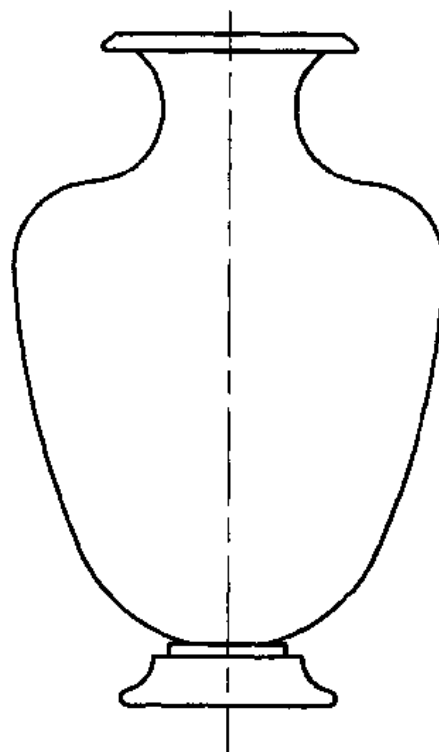


(6)

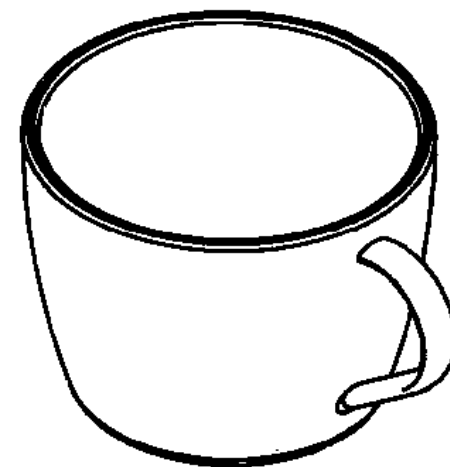
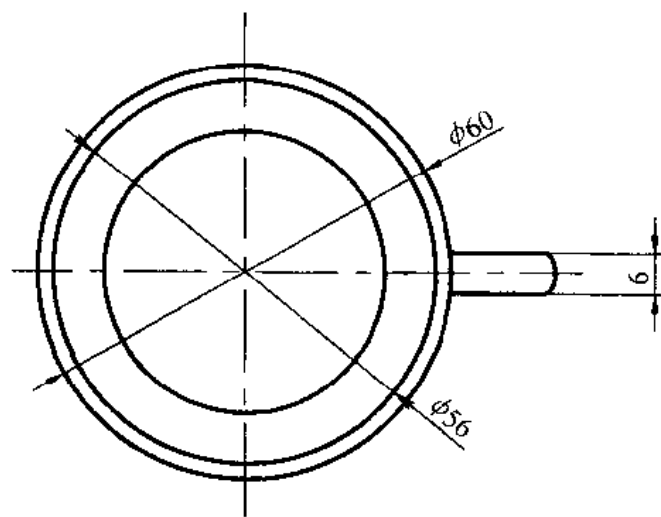
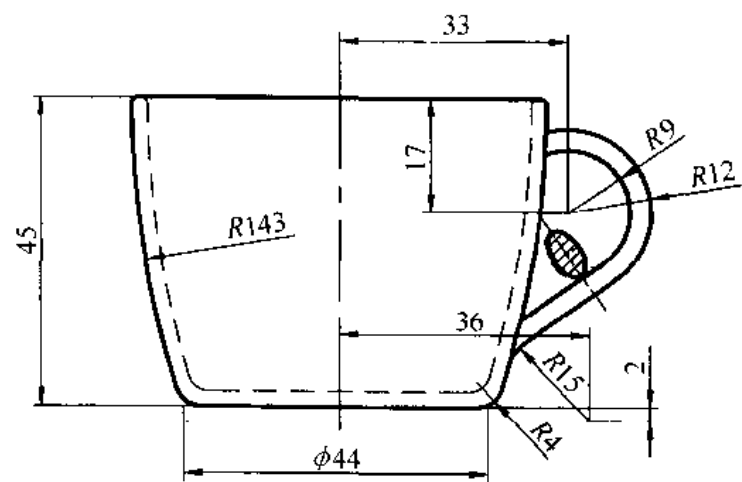


Technical drawing of a mechanical part (Fig. 10) showing a cross-section with dimensions and radii. The part features a central vertical axis and a base with a central hole. Key dimensions include:

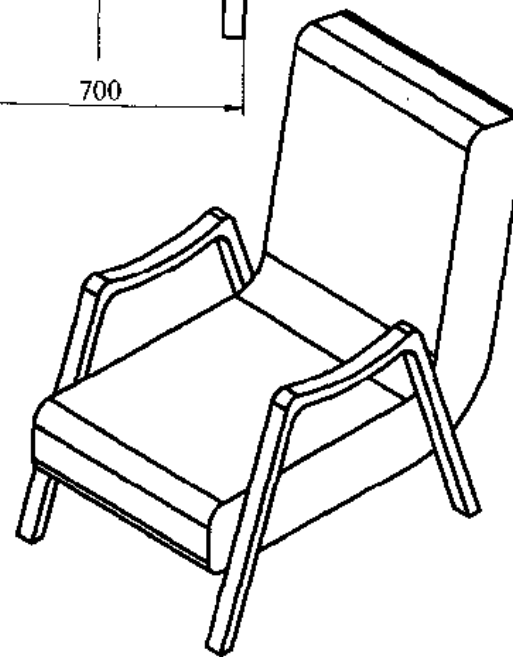
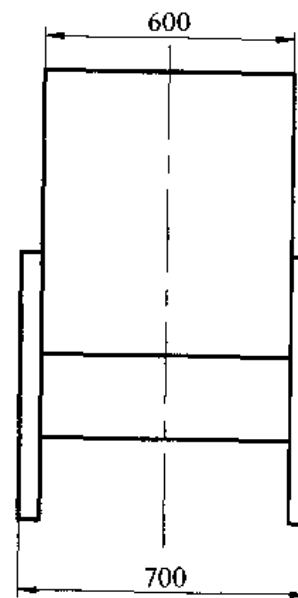
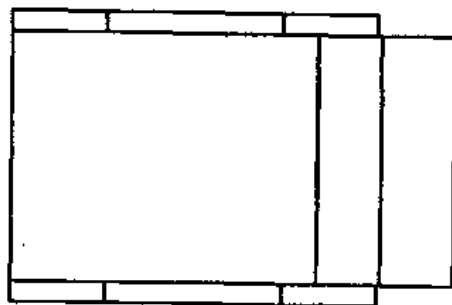
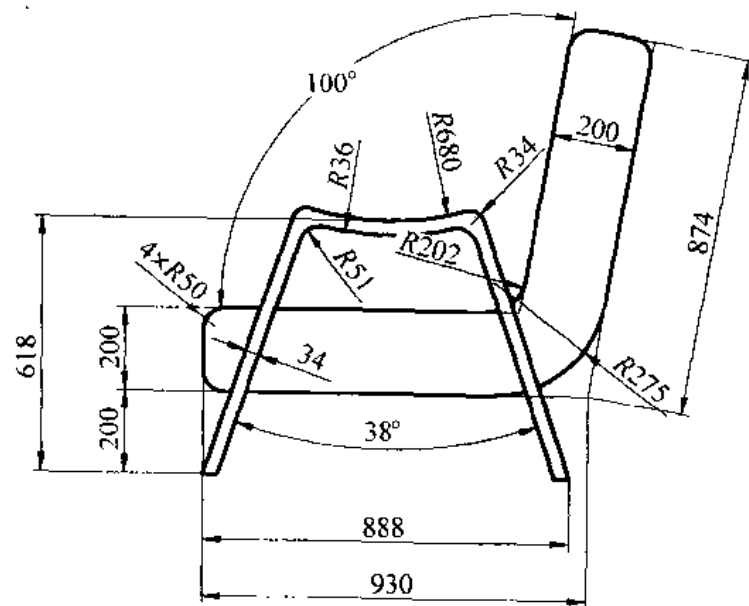
- Overall width: $\phi 34$
- Inner width: $\phi 31$
- Top radius: $R4$
- Top thickness: 2
- Top edge radius: $R1$
- Top edge thickness: 9
- Left side radius: $R11$
- Left side thickness: 28
- Inner width: 32
- Inner radius: $R8$
- Inner radius: $R91$
- Inner radius: $R91$
- Inner radius: $R18$
- Inner radius: $R20$
- Inner radius: $R4$
- Base thickness: 6
- Base radius: $R1$
- Base hole diameter: $\phi 14$
- Base hole diameter: $\phi 18$
- Base hole diameter: $\phi 26$
- Base hole depth: 8
- Overall height: 55
- Overall height: 27



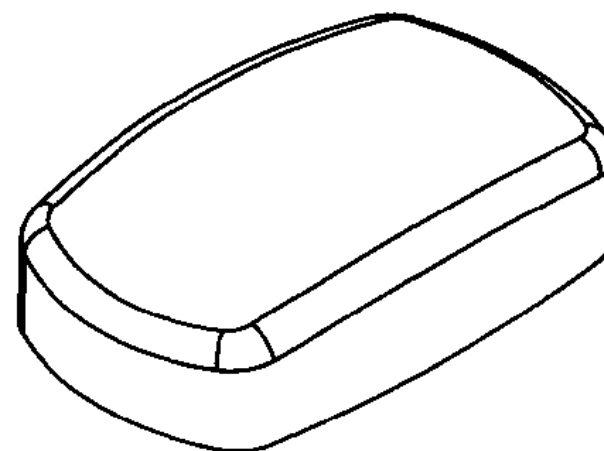
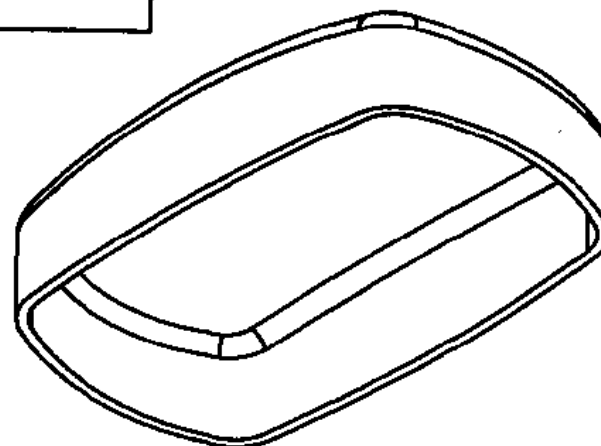
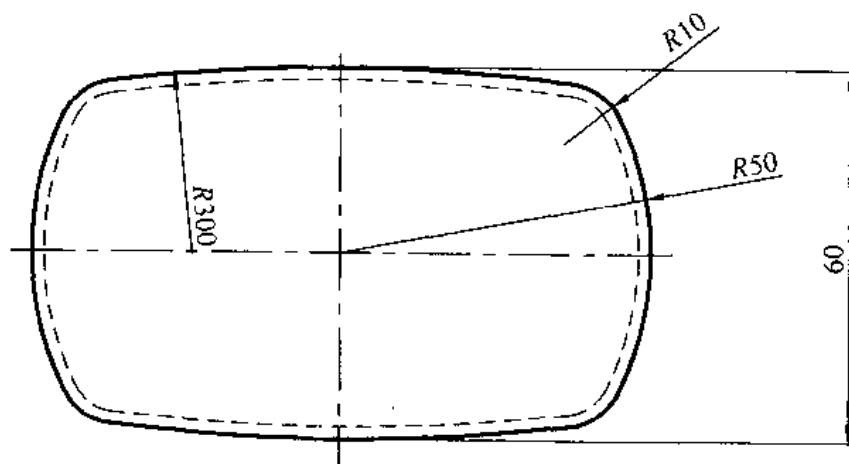
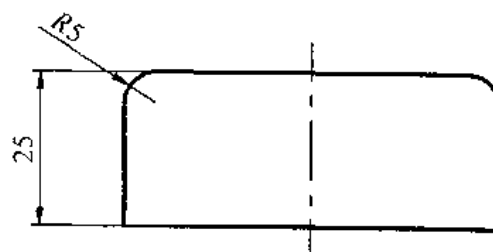
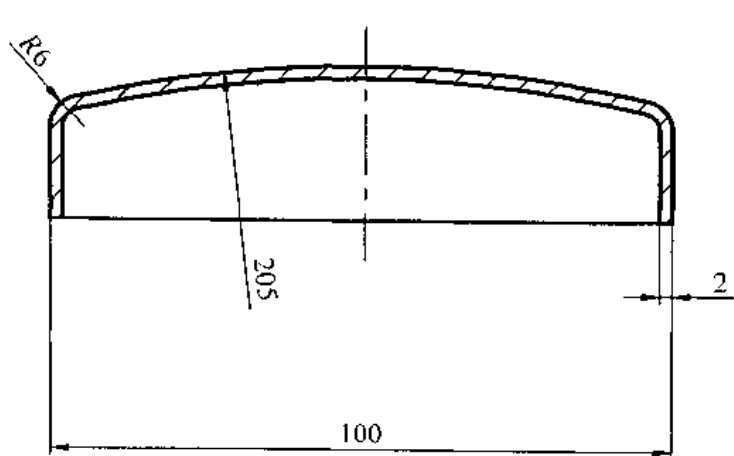
(8)



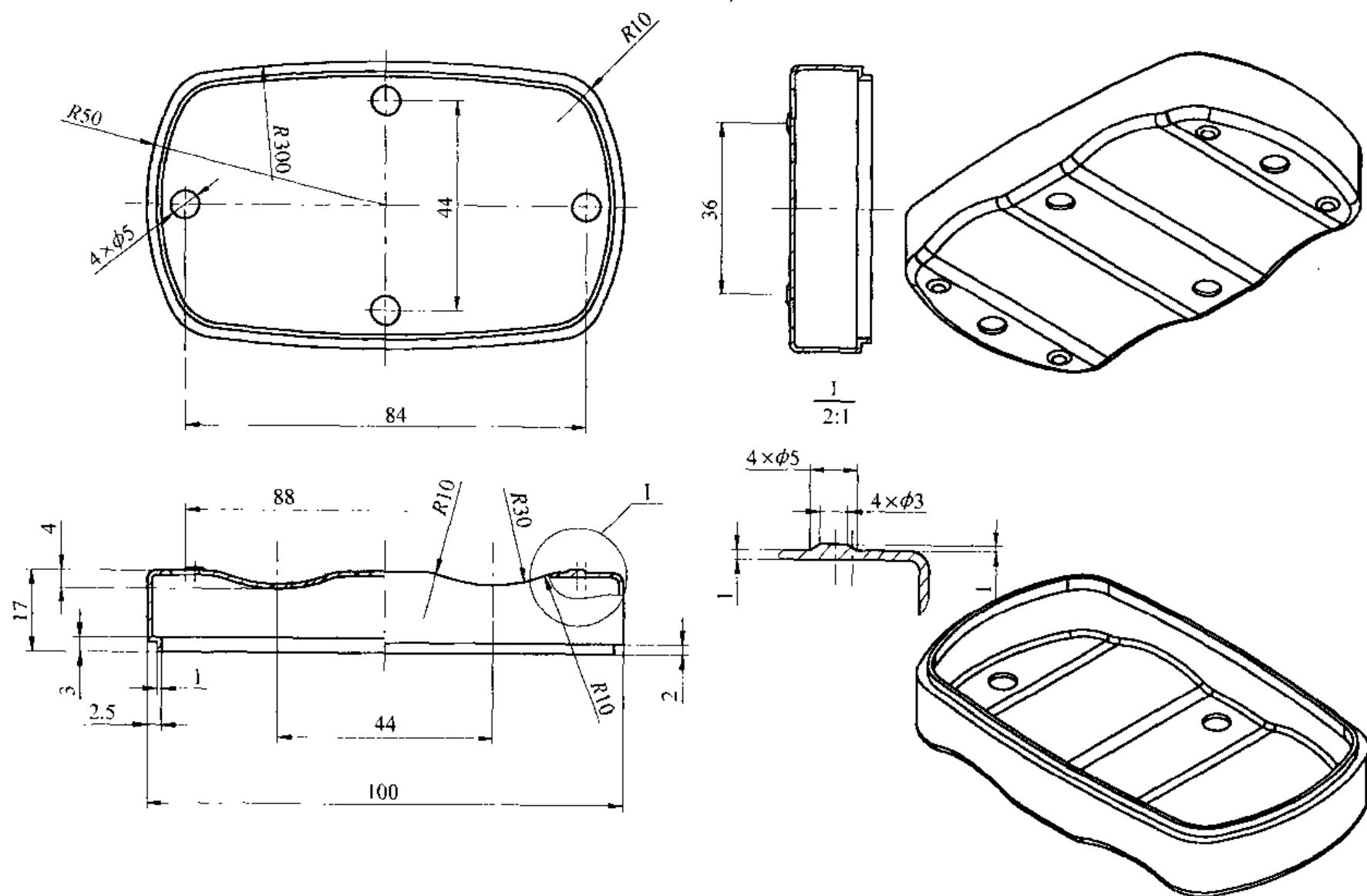
(9)



(10)

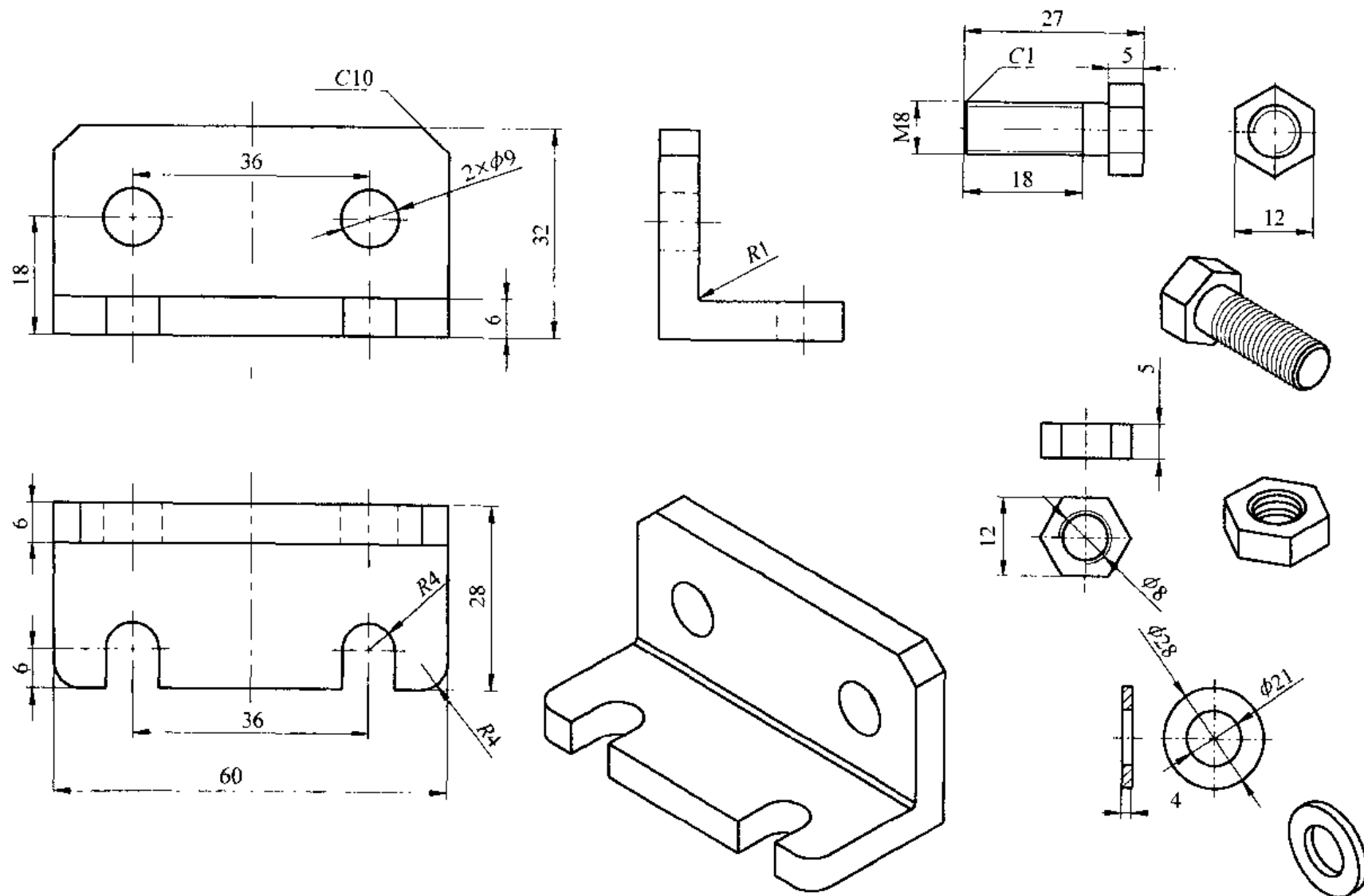


(11)

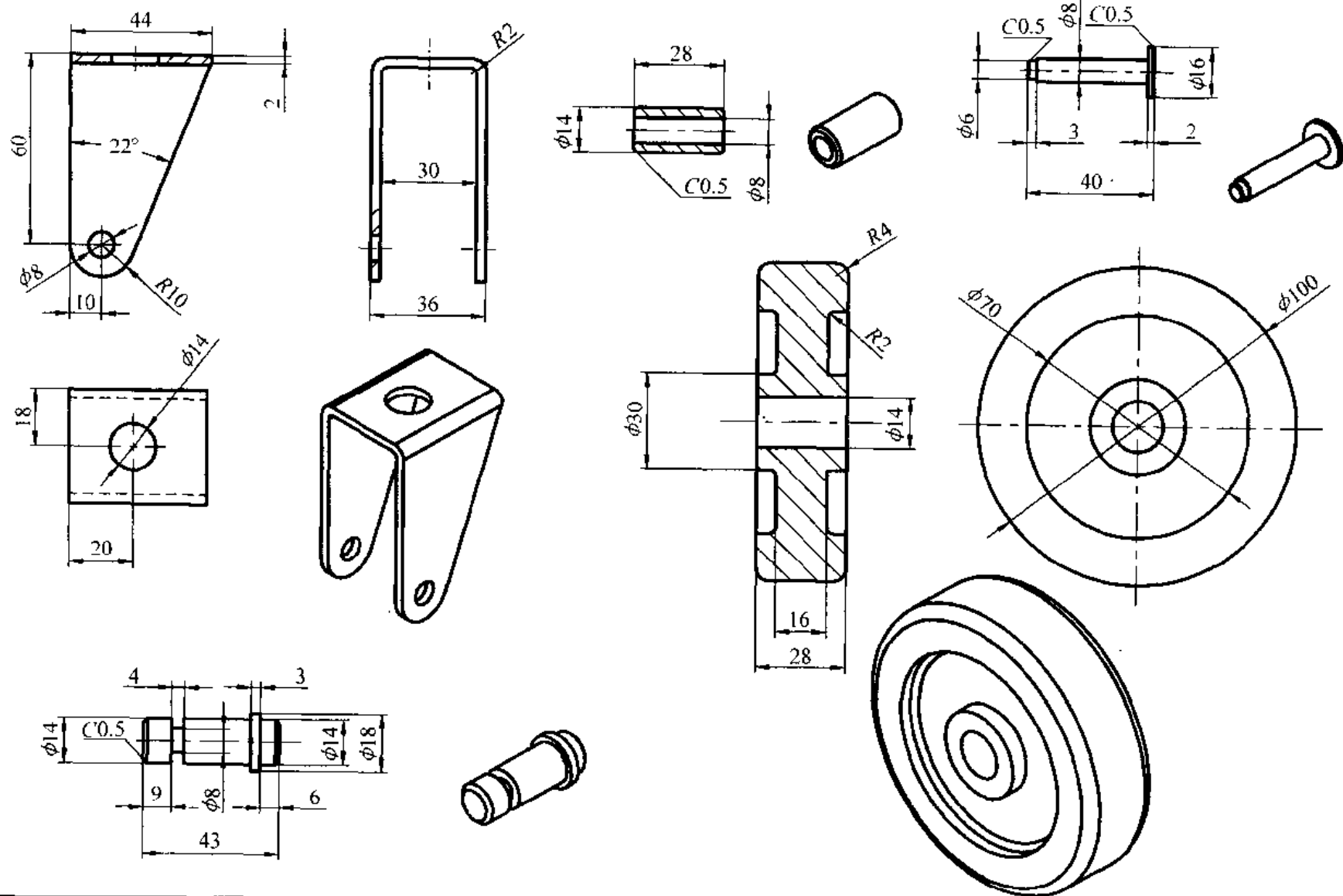


九、零件与装配体

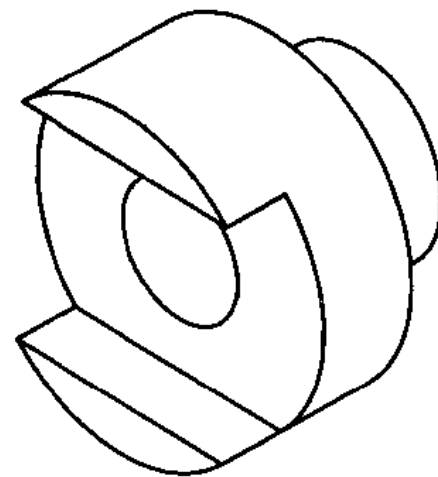
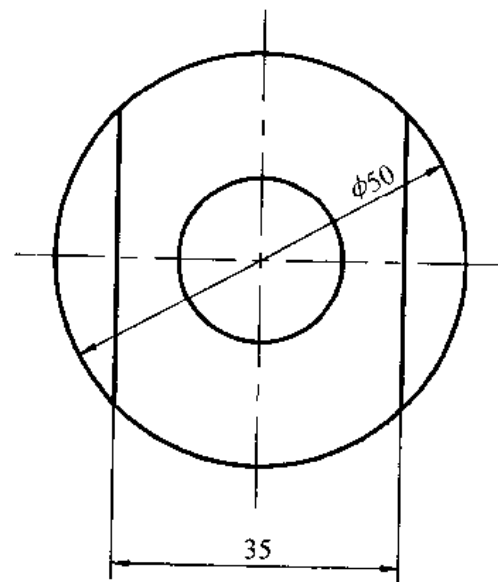
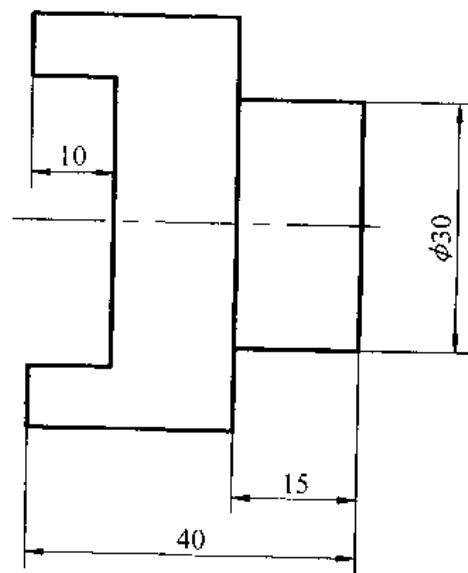
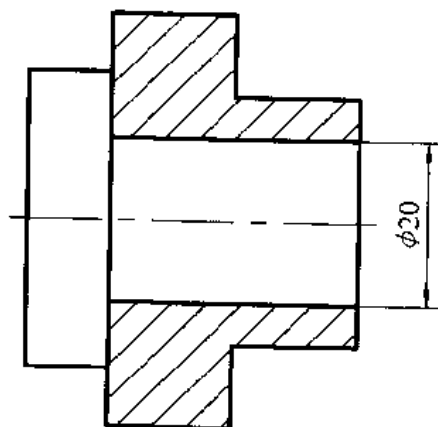
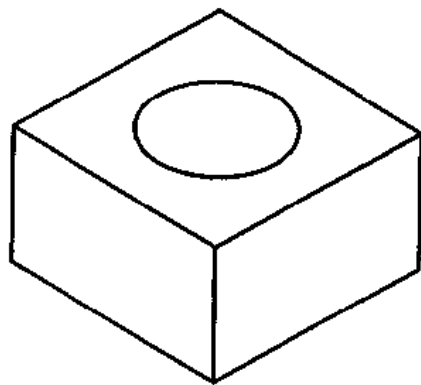
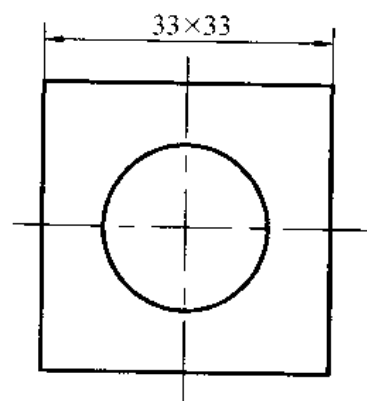
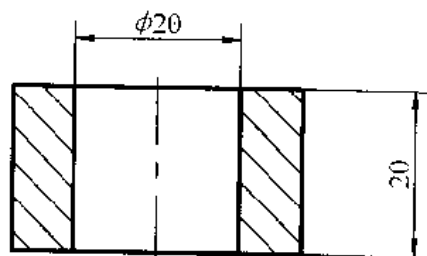
1. 根据连接架各零件的三视图绘制其三维图形, 再由三维图形自动转换成二维图形



3. 根据脚轮各零件的三视图绘制其三维图形, 再由三维图形自动转换成二维图形。

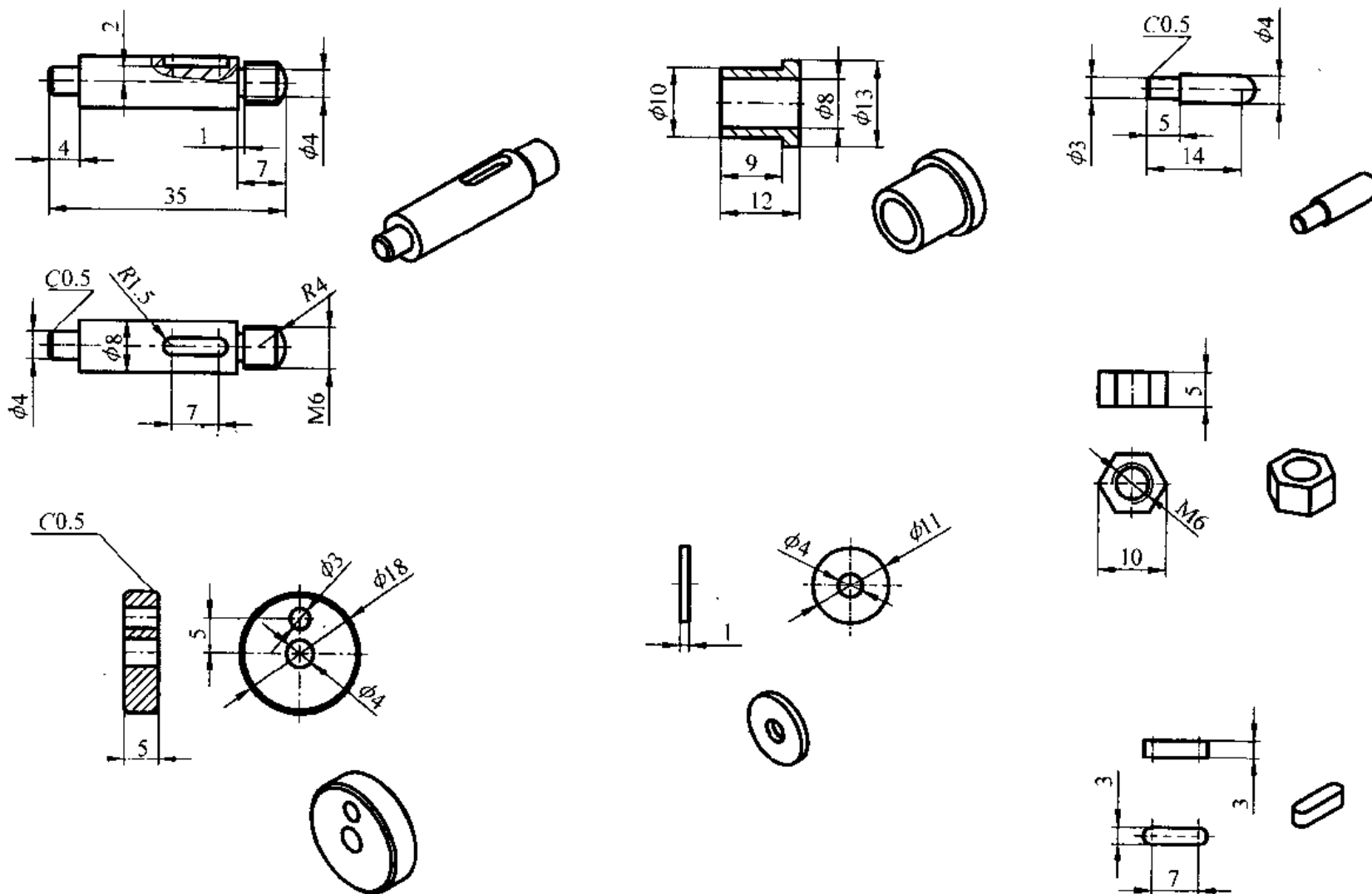


4. 根据联轴器各零件的三视图绘制其三维图形，再由三维图形自动转换成二维图形。

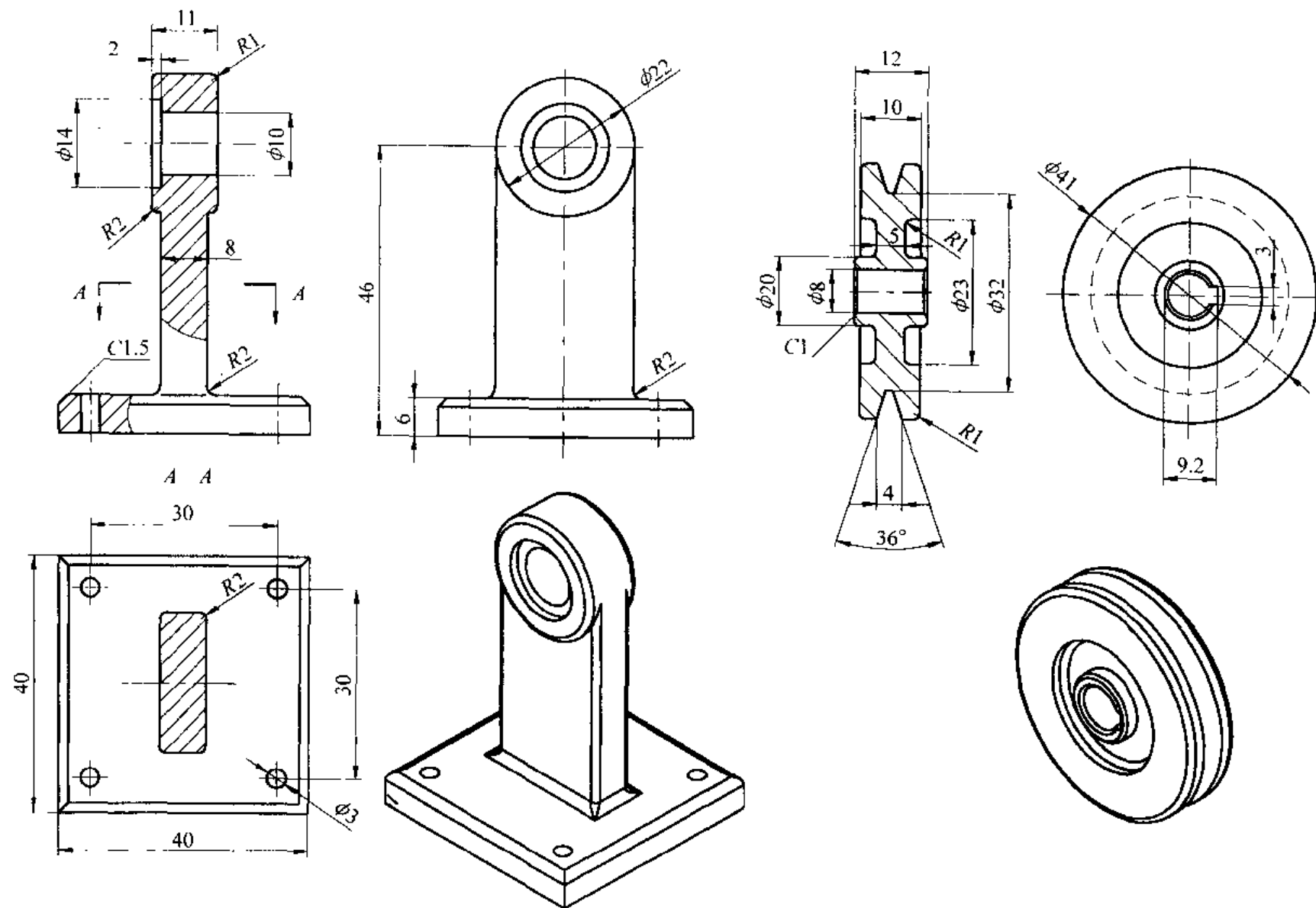


5. 根据带轮支架各零件的三视图绘制其三维图形，再由三维图形自动转换成二维图形。

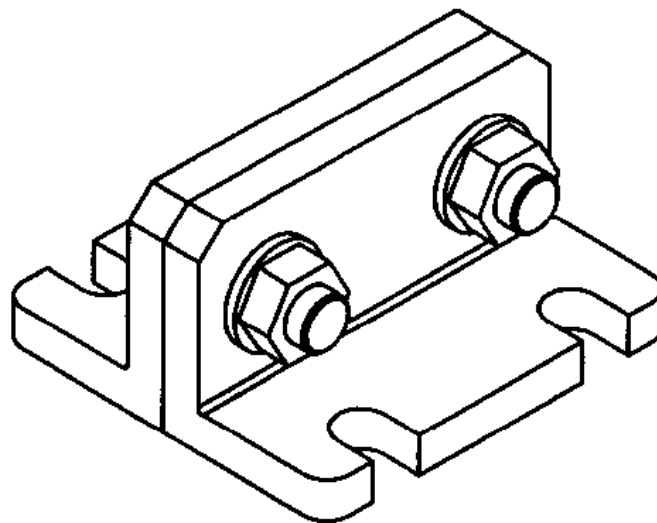
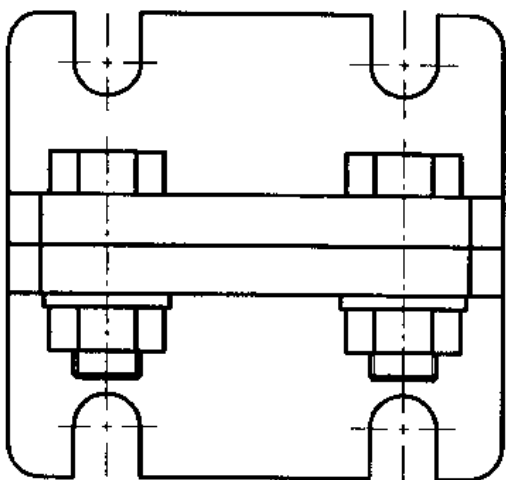
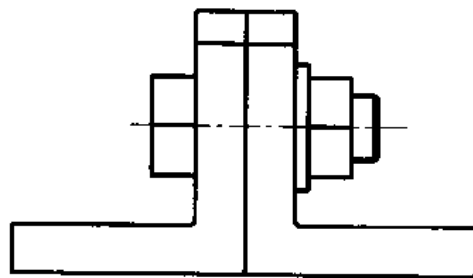
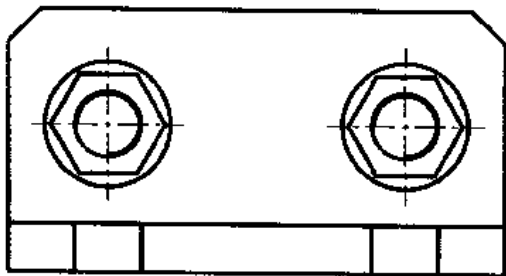
(1)



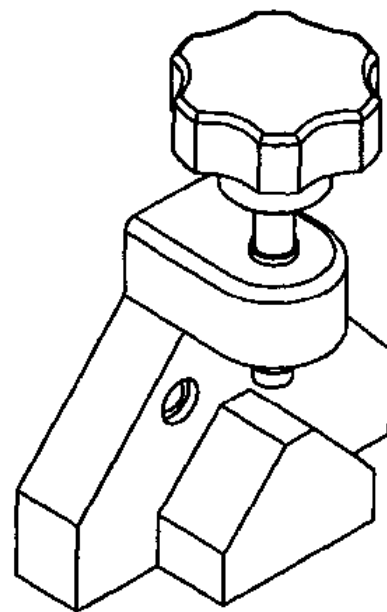
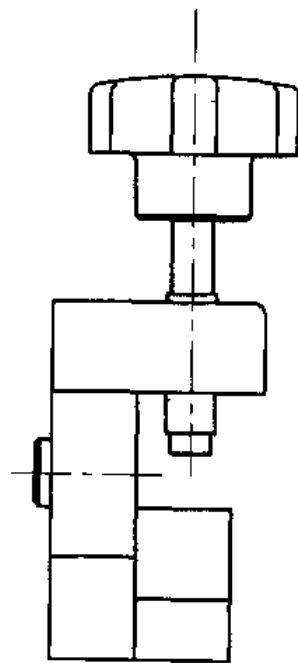
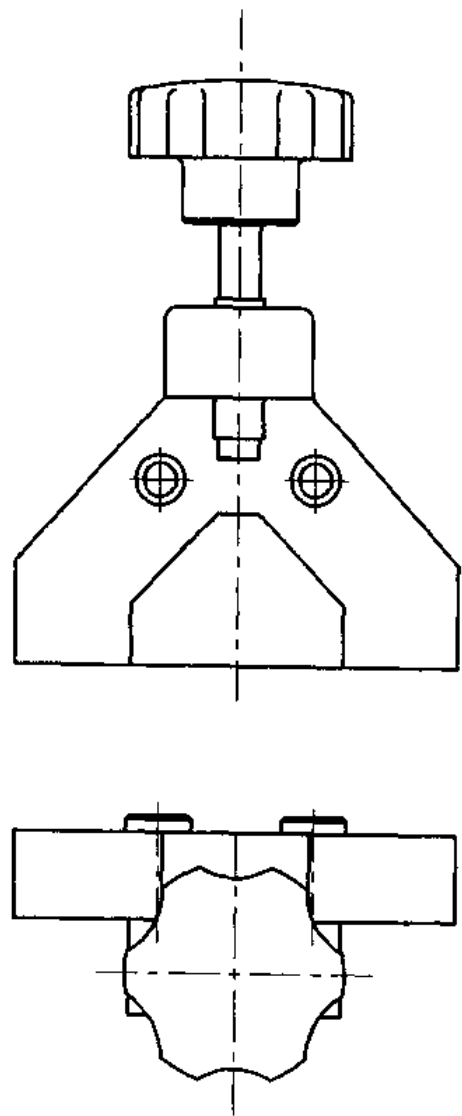
(2)



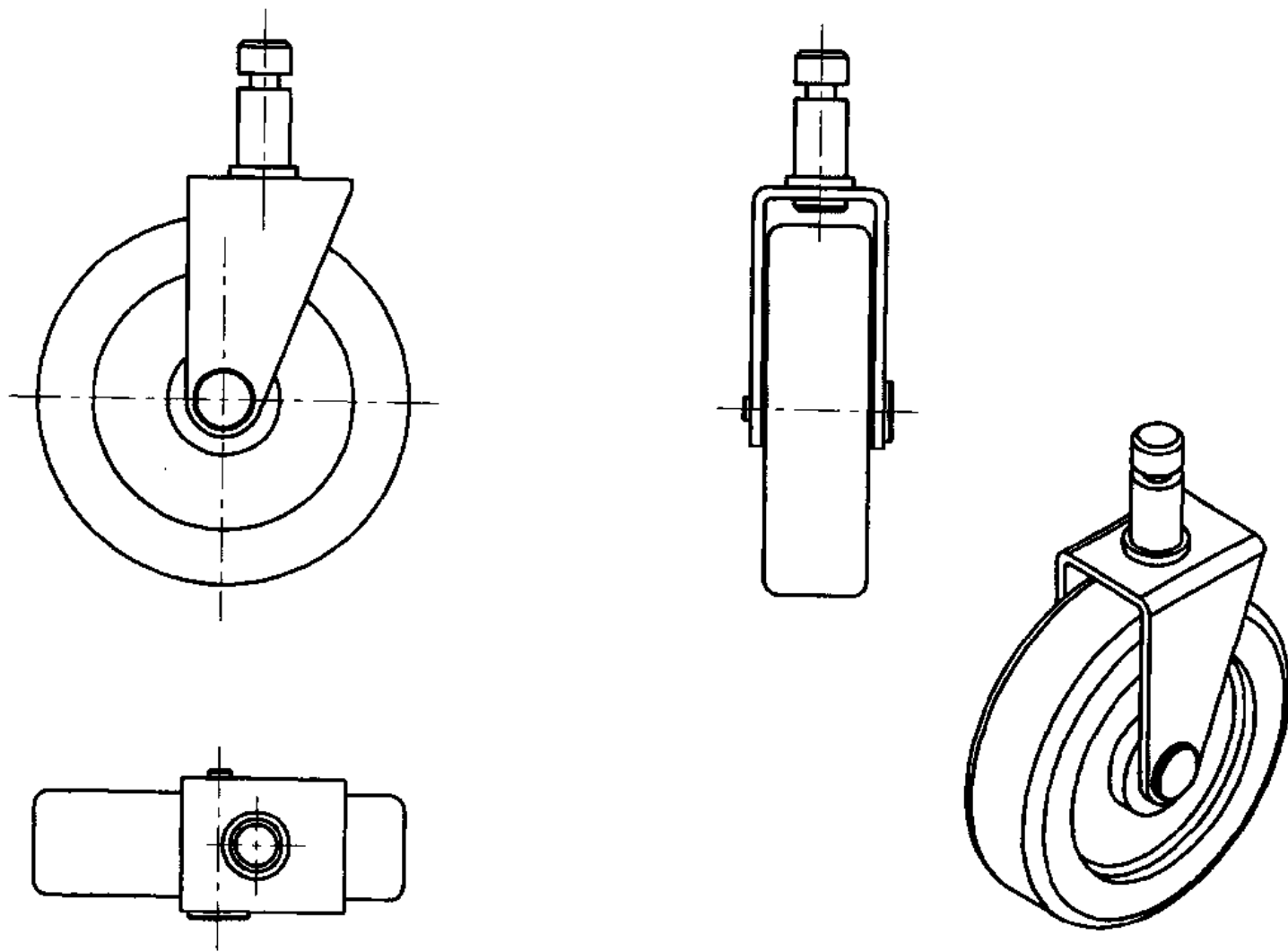
1. 根据连接架各零件的三维图形 (第 96 页), 绘制其三维装配图形, 再由三维图形自动转换成二维的装配图形。



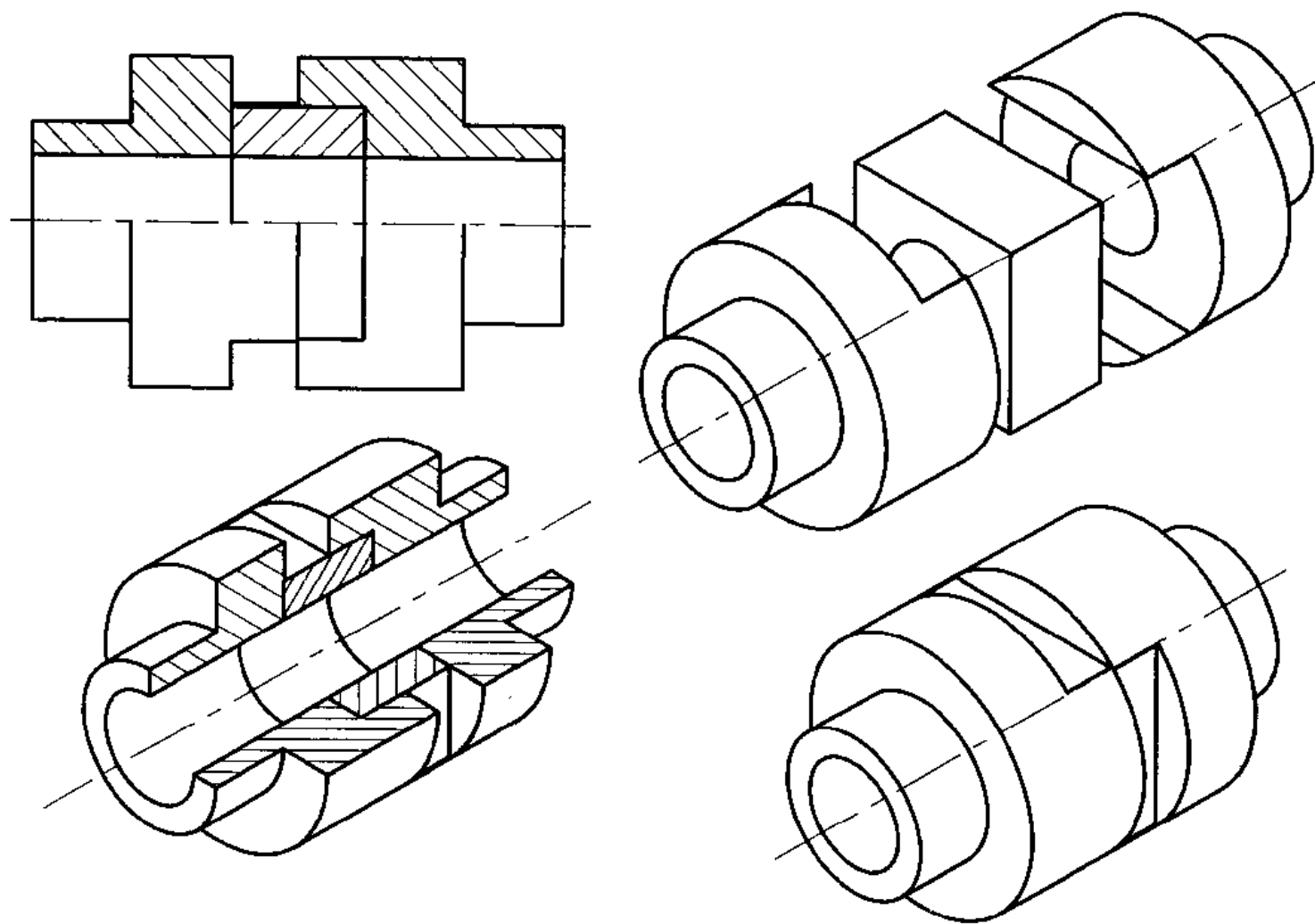
2. 根据压紧台各零件的三维图形 (第 97 页), 绘制其三维装配图形, 再由三维图形自动转换成二维的装配图形。



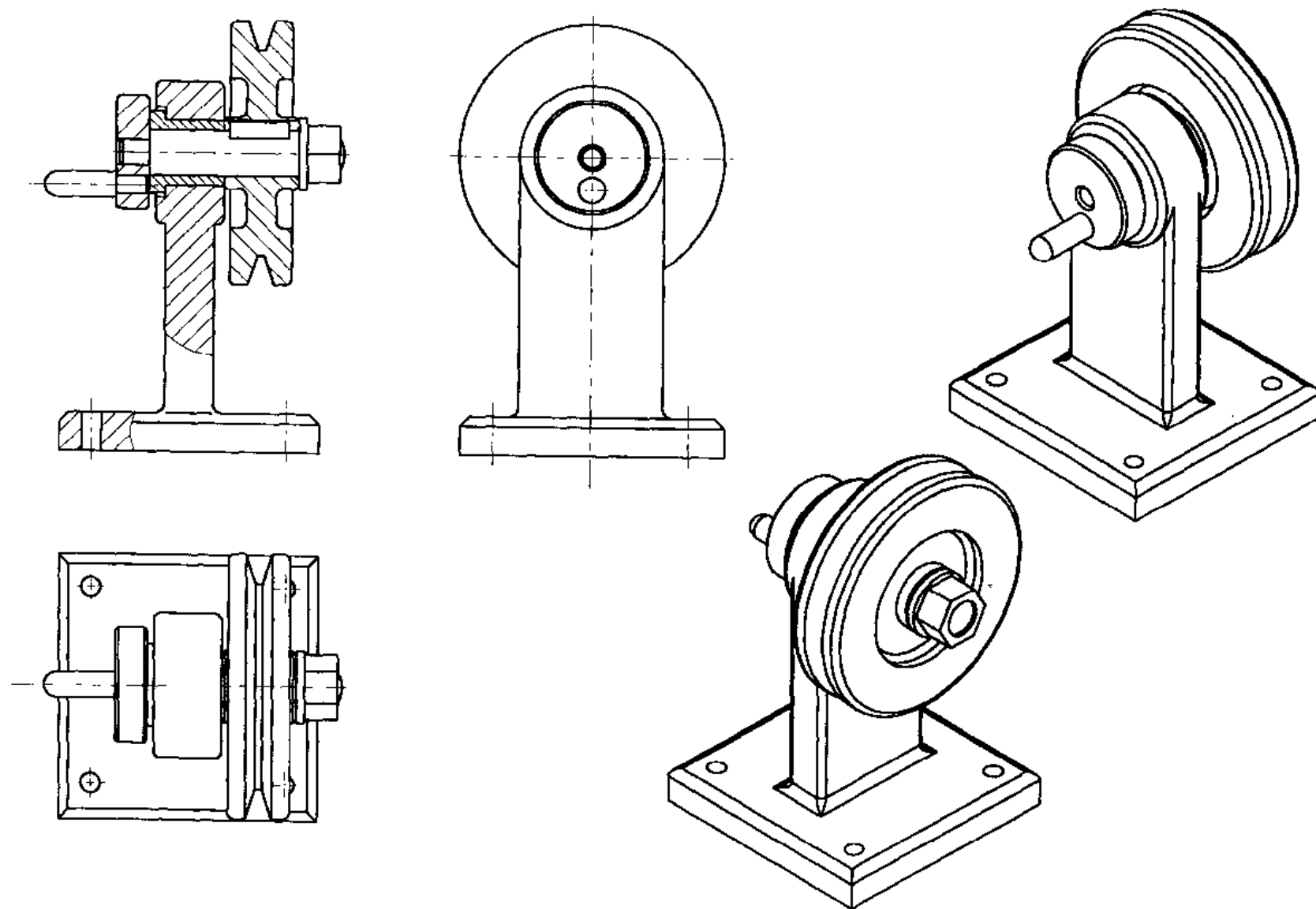
3. 根据脚轮各零件的三维图形 (第 98 页), 绘制其三维装配图形, 再由三维图形自动转换成二维的装配图。



4. 根据联轴器各零件的三维图形 (第 99 页), 绘制其三种形式的三维装配图形, 再由三维图形自动转换成二维的装配图形。



5. 根据带轮支架各零件的三维图形 (第 100、101 页), 绘制其三维的装配图形, 再由三维图形自动转换成二维的装配图形。



6. 由带轮支架的三维图形 (第 106 页) 绘制其三维分解图形。

