Basic Technical Drawing(BTD)

Teachers Guide

Grade 12

Unit 2 - 5

2010 E.C

Edited By Dt & Ft

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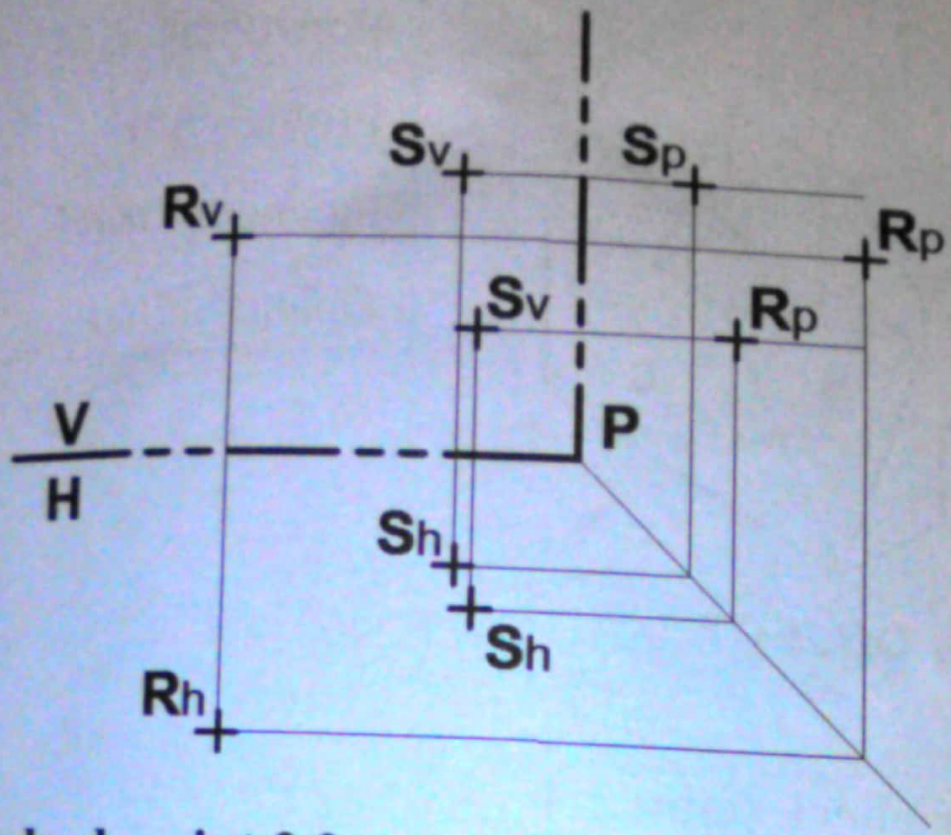
Reference

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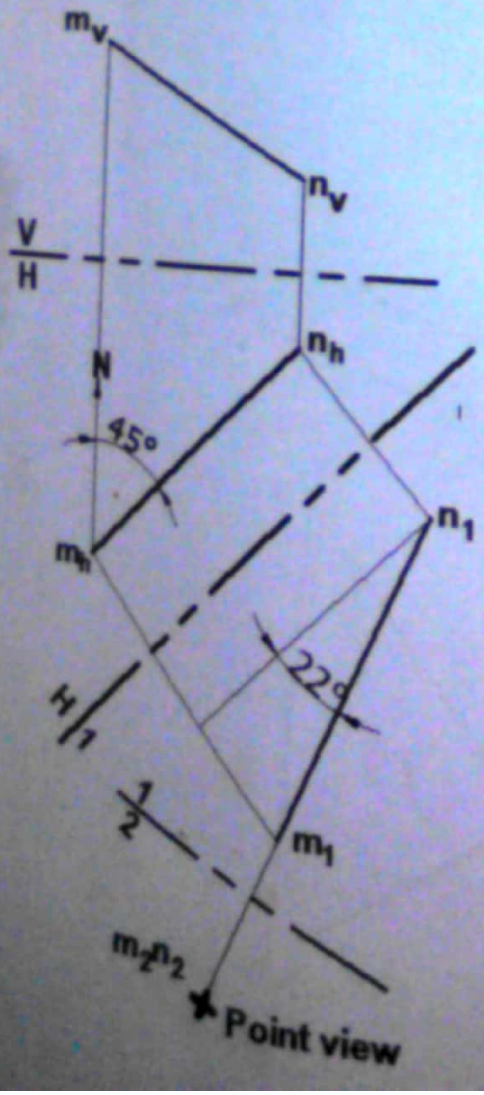
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Answer key for the question in the textbook

Solution for check point 2.1



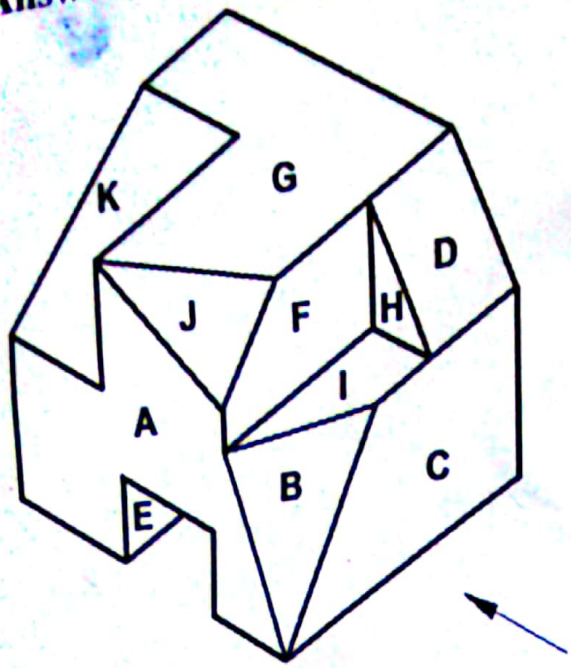
Solution for check point 2.2



Bearing (MN) = N 45° E
Slope (MN) = 22° CCW
True Length Projection = m1n1
End View Projection = m2n2

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Answer for check point 2.3



GIVEN OBJECT

Vertical:- F ,C & E

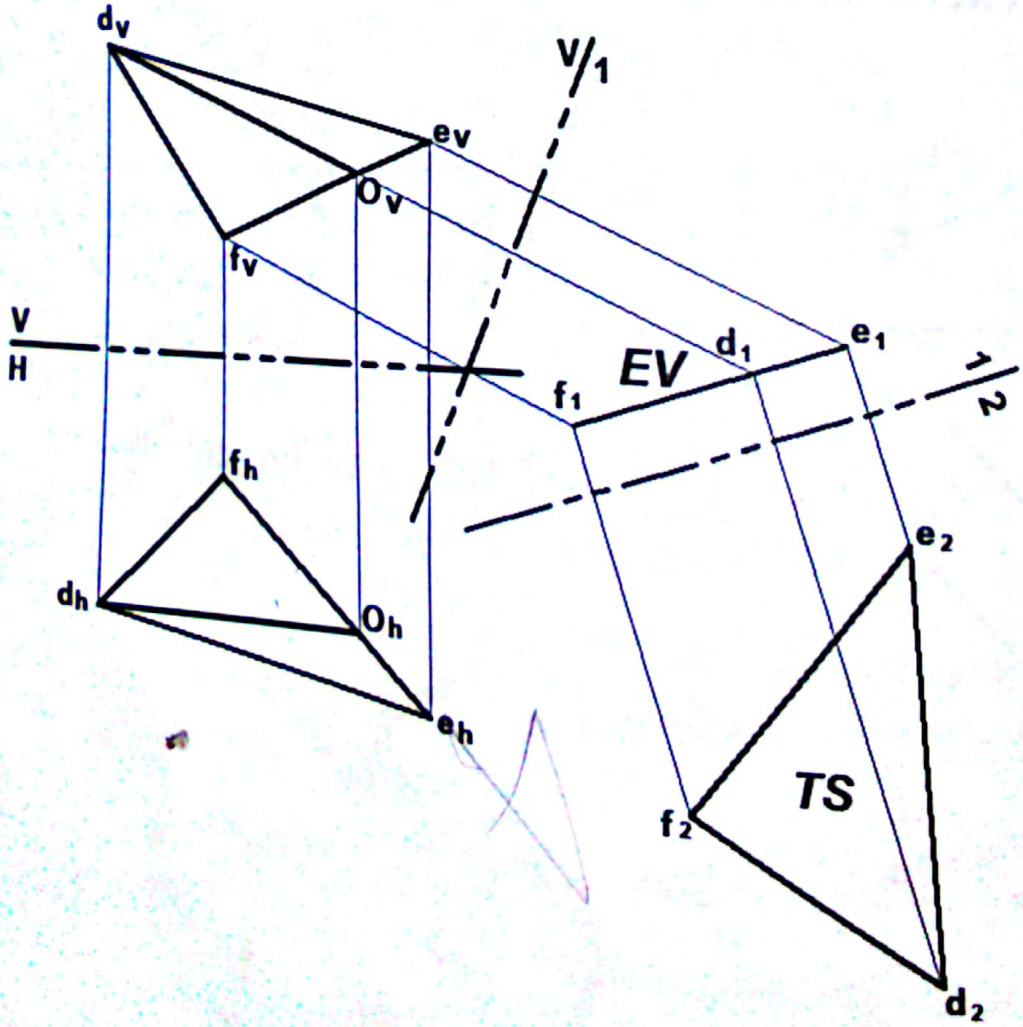
Horizontal:- G&I

Profile:- A&H

Inclined:- D&K

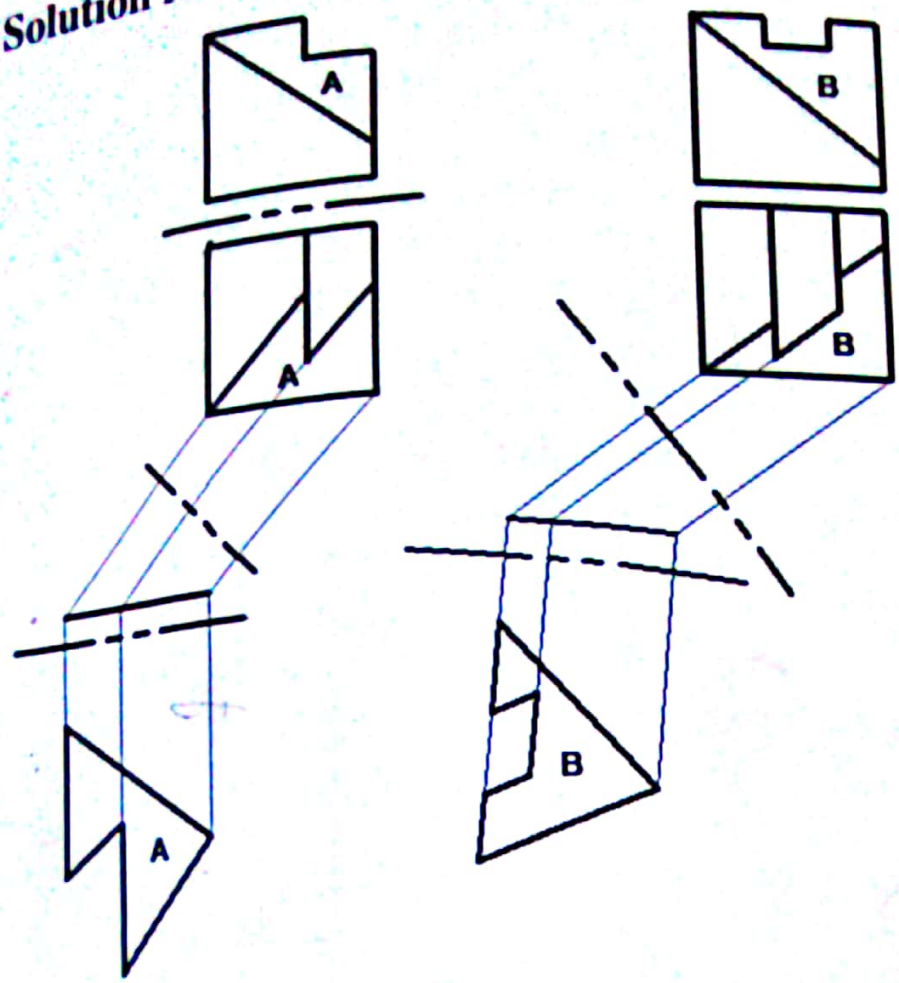
Oblique:- B&J

Solution for check point 2.4



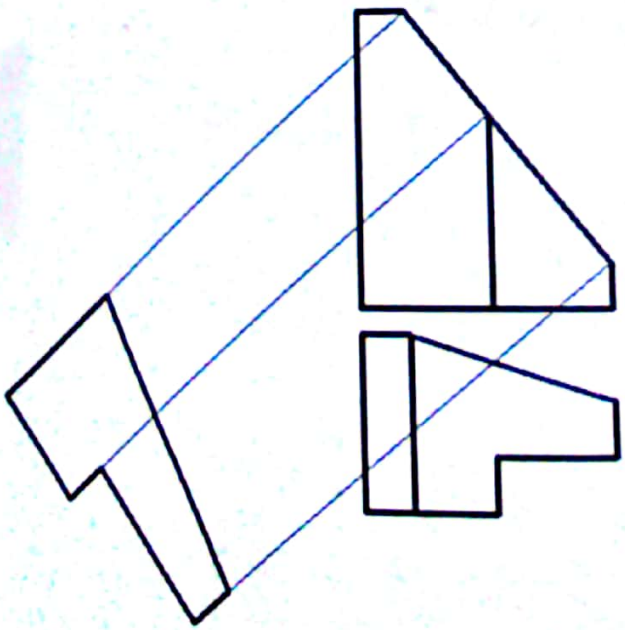
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Solution for check point 2.5

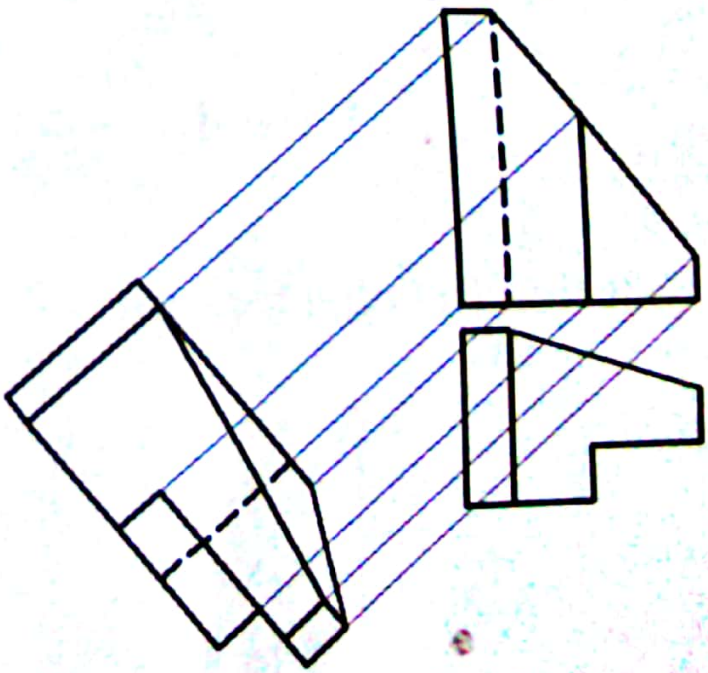


Solution for check point 2.6

A



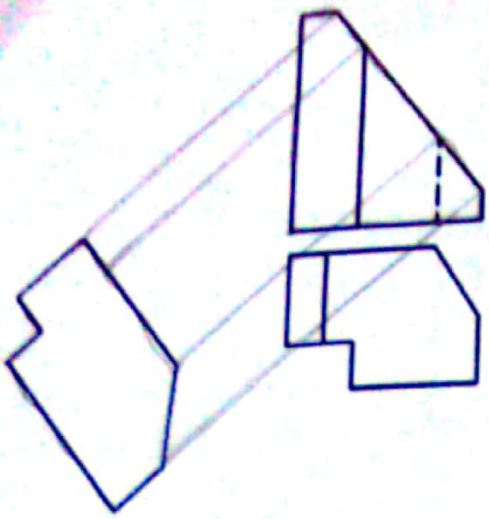
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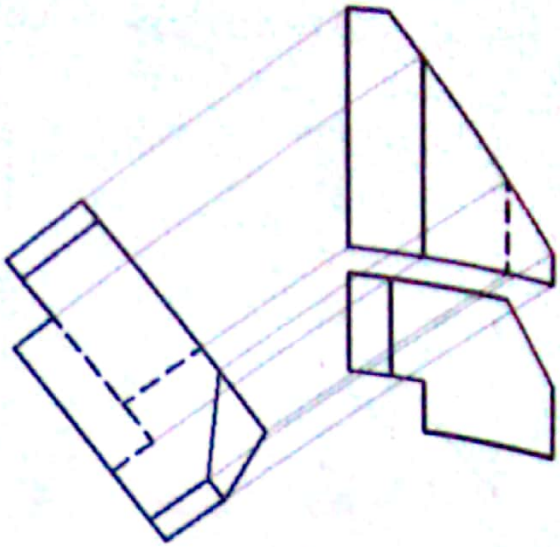
Complete

B

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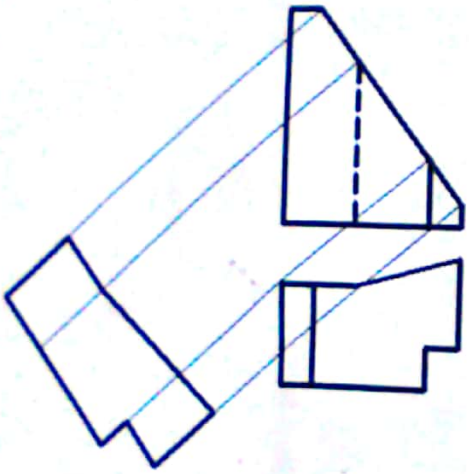


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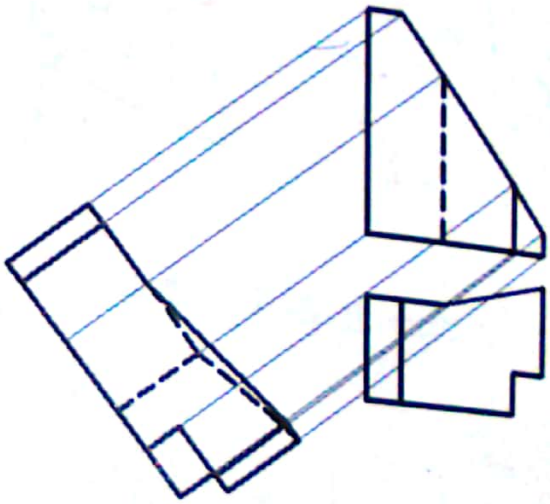


Complete

C

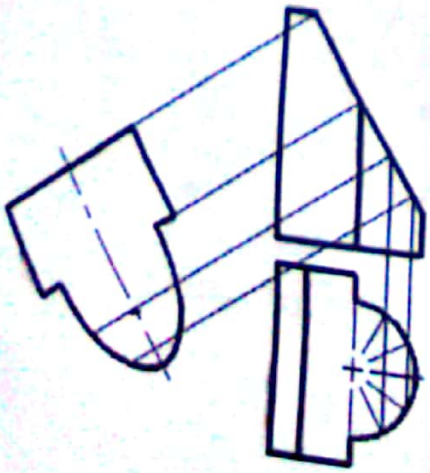


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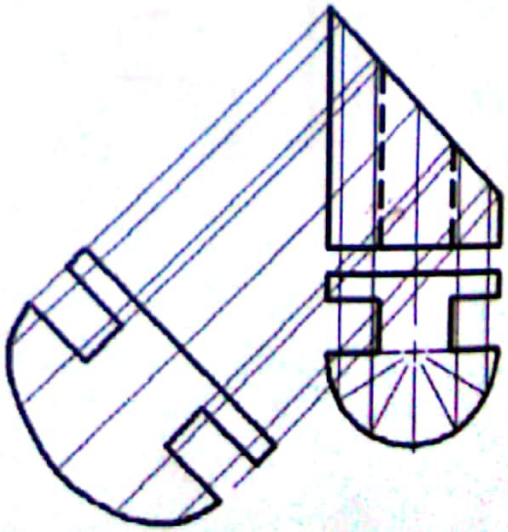


Complete

Solution for check point 2.7



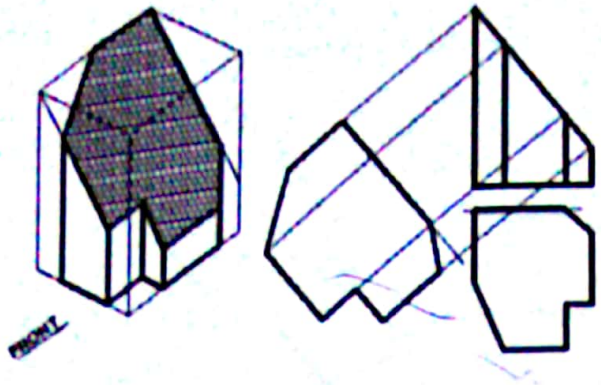
(a)



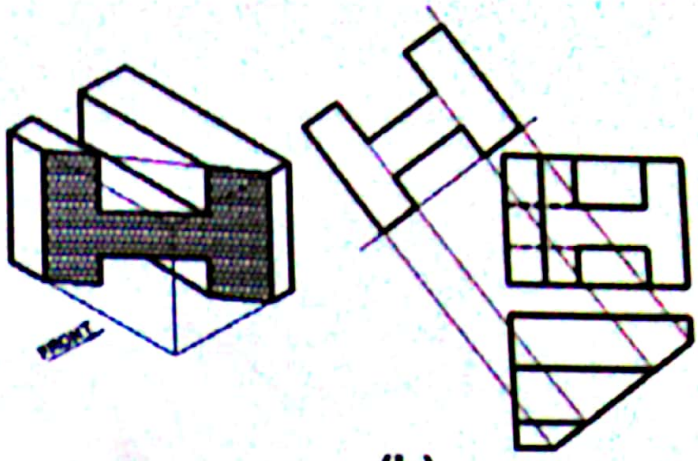
(b)

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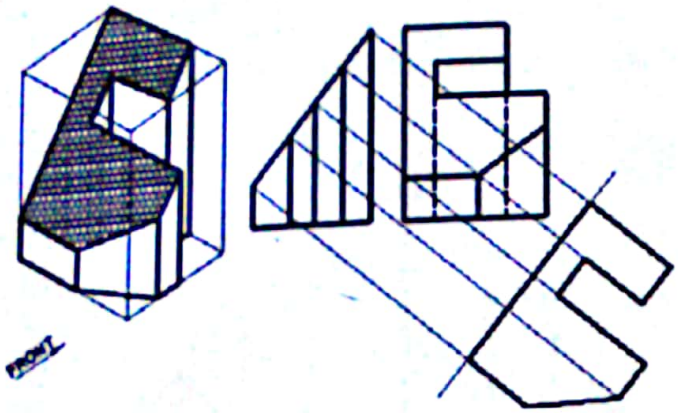
Solution for exercise 1



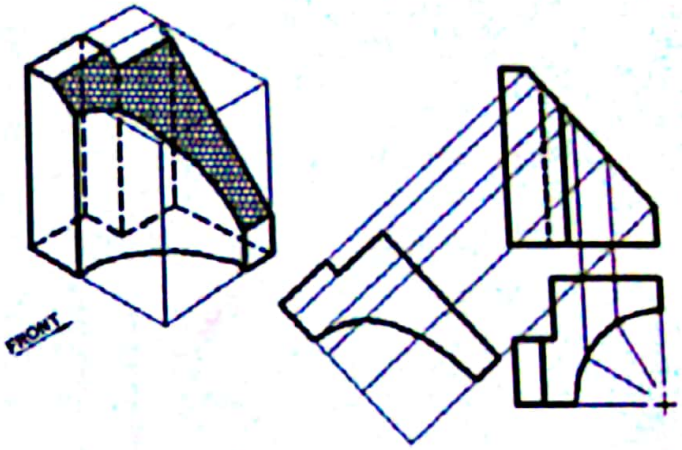
(a)



(b)

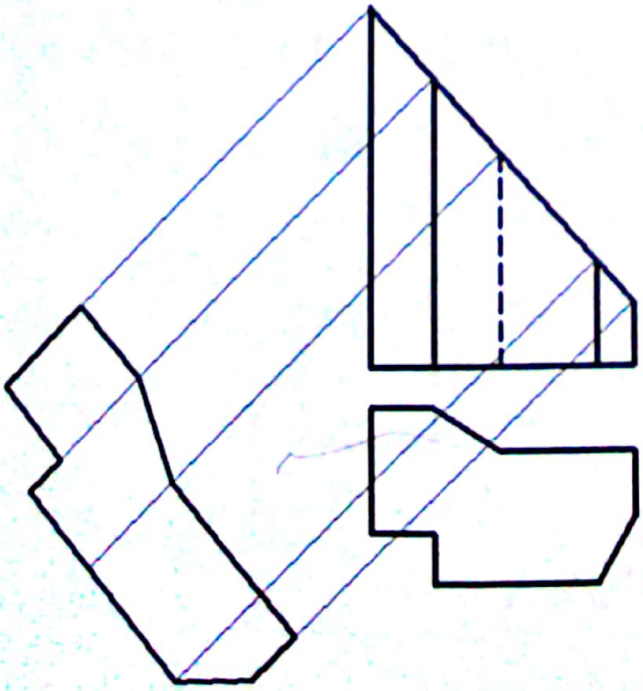


(c)

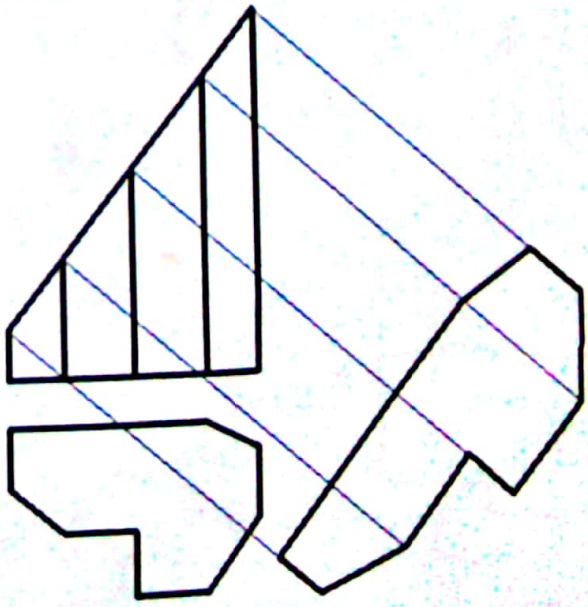


(d)

Solution for exercise 2

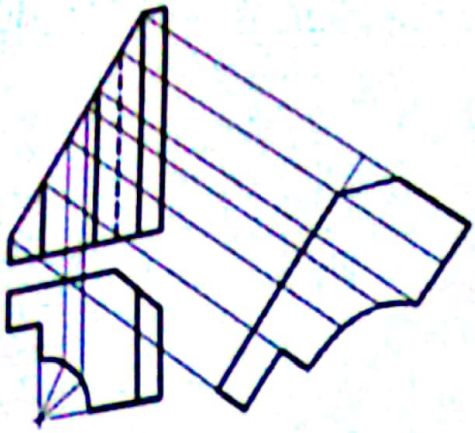


(a)

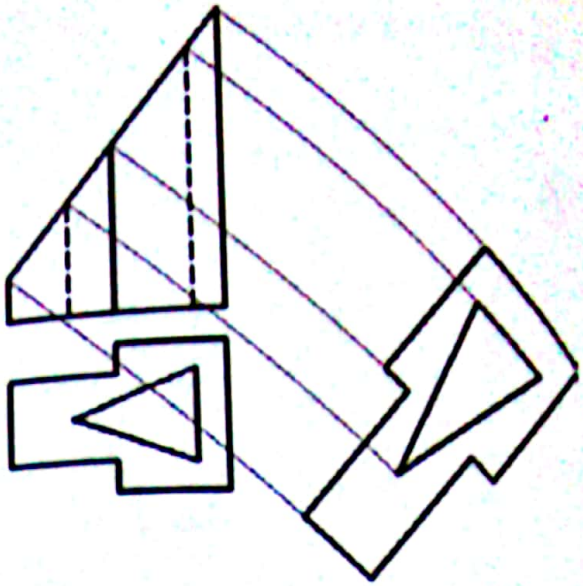


(b)

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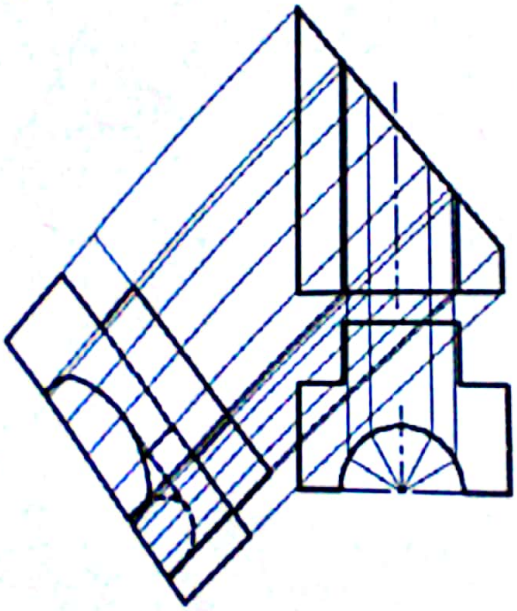


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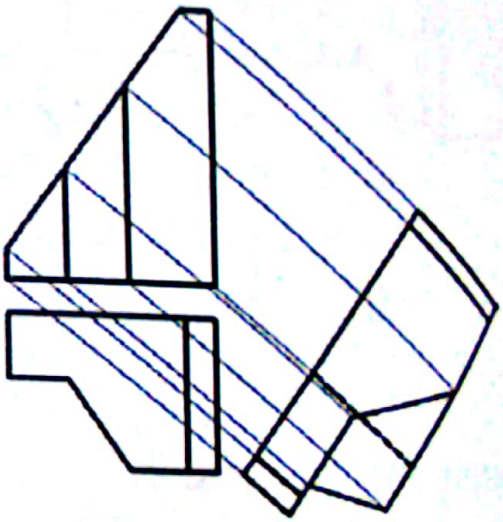


(d)

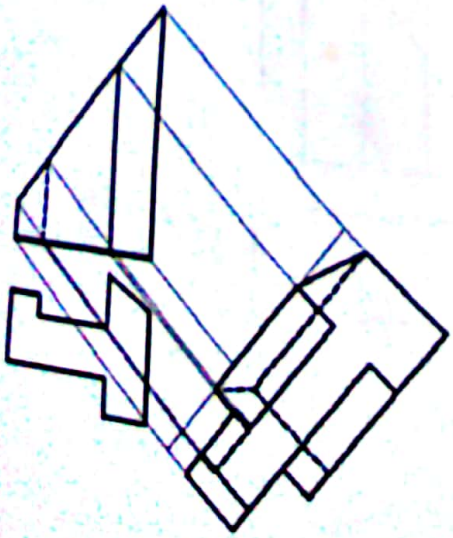
Solution for exercise 3

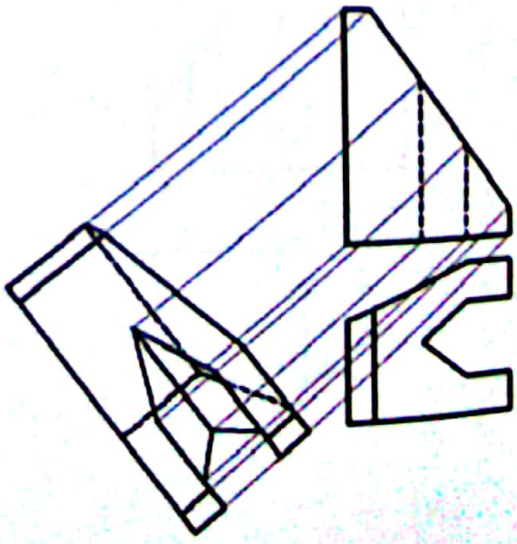


(a)



(b)





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UNIT 3

SECTIONAL VIEW

Total Periods: 12

Unit Outcomes

At the end of this unit, students should be able to:

- ✓ Understand the main purpose of sectional views;
- ✓ Analyze the types of sectional views according to their particular advantage in describing the interior feature of objects;
- ✓ Show sectional view of structure to describe the interior feature for complete description.

Unit Overview

Sections are used to show interior details clearly. For sections it is commonly used a cutting-plane line which shows where object was cut to obtain the section view. In addition a cross hatching in the section view shows the solid surface of the object which was cut through to produce the section.

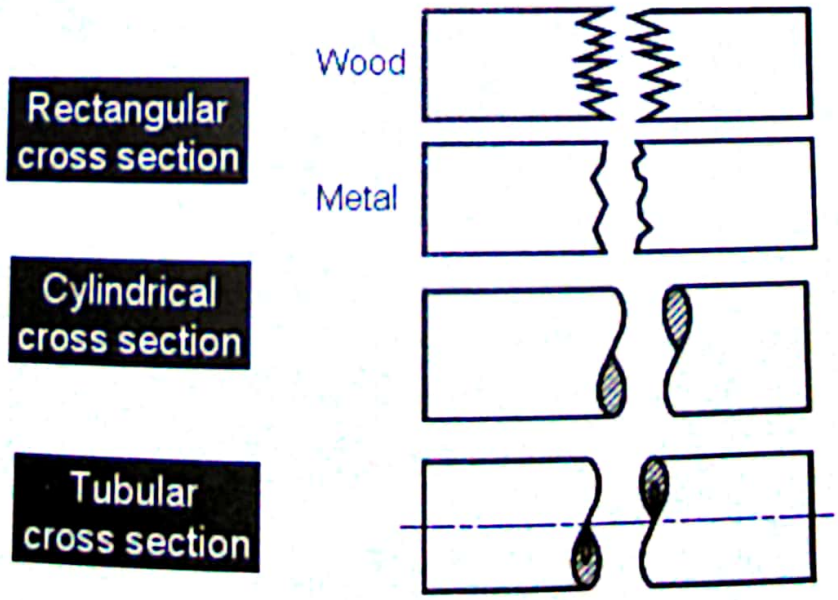
Section views may replace standard views however there're some conventional practices, such as not showing hatching on ribs and webs, help make sections easier to interpret correctly. Mainly section views are used when important hidden details are in the interior of an object. These details appear as hidden lines in one of

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1. You can start the [illegible] question about conventional representation in sectioning and other sectional view representation from the textbook.
2. Create a display illustrating materials and the sectioned symbols they represent
3. Discuss and demonstrate about conventional representation in sectioning and other sectional view representation. Have students keep main points from the discussion in a notebook.
4. Provide parts of a small gas engine from which sections have been precut. Have students draw these parts as section drawings. (Be sure all parts are thoroughly cleaned.)
5. Allow students to practice on check points 3.5 and exercises in class individually and in group.

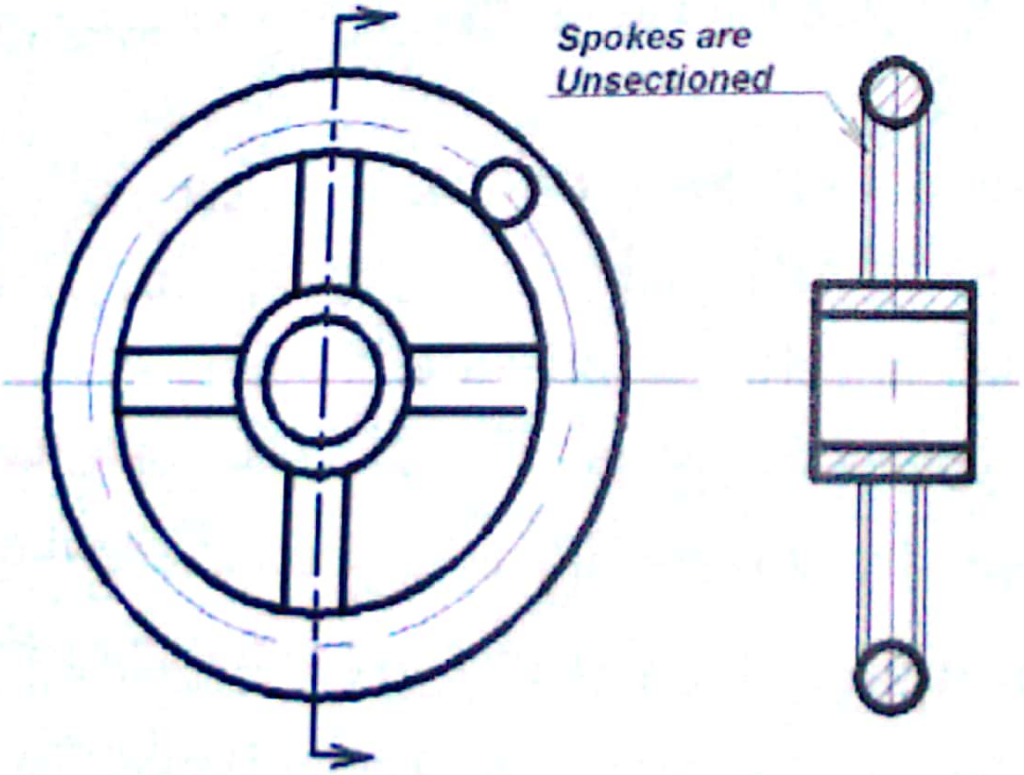
Teaching Note

One of an example of conventional practice is for *long objects* that have to draw in a small scale to fit them on the paper; it is recommended to remove its long portion (which contains *no* important information) and draw the break lines at the broken ends.



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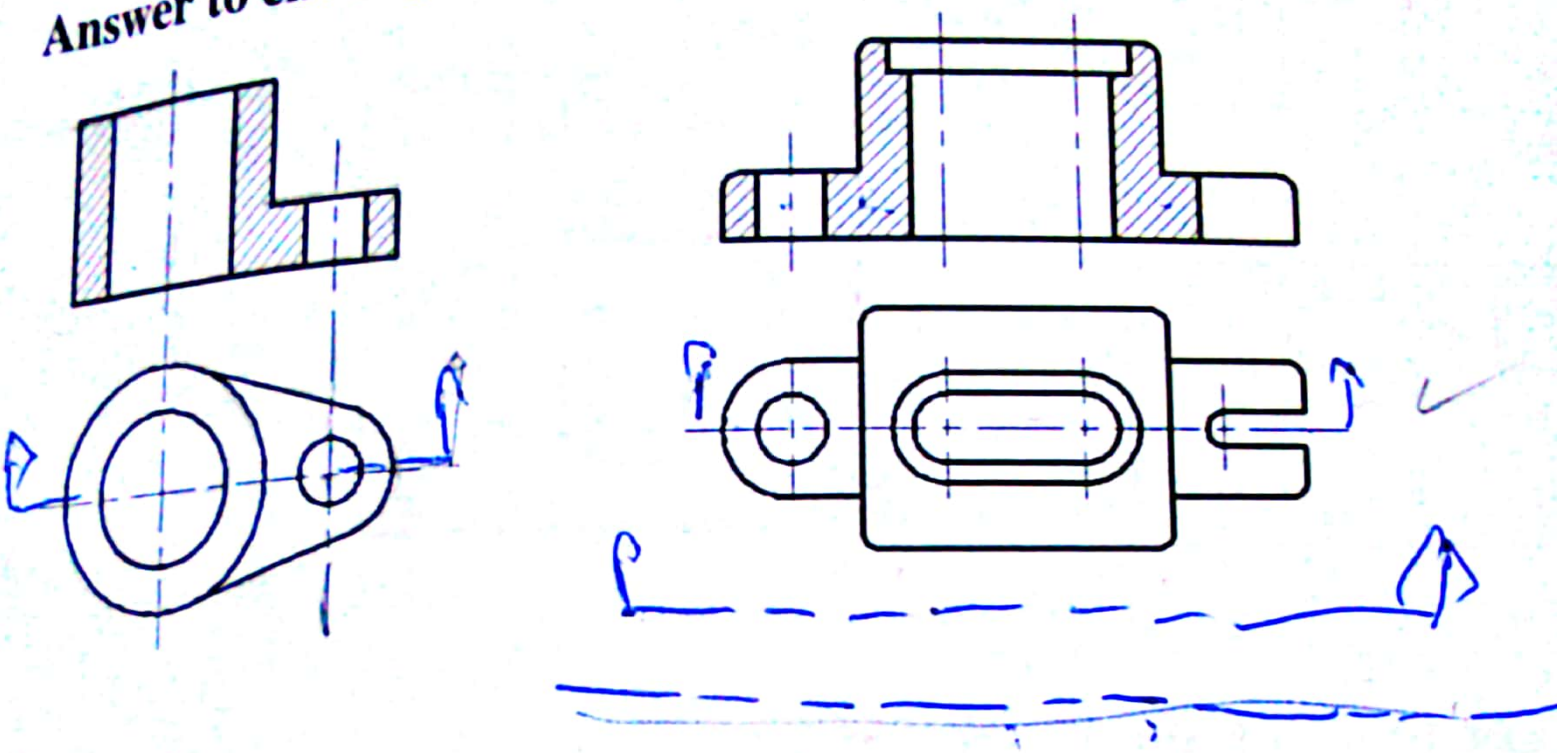
Some solid features of certain parts like spokes of a wheel are
sectioned, even though the cutting plane passes through them. S
representation is used to distinguish a wheel with spokes fro
wheel with thin plate or web. The general practice, the sectio
representation of a wheel with spokes and with plate is as follow



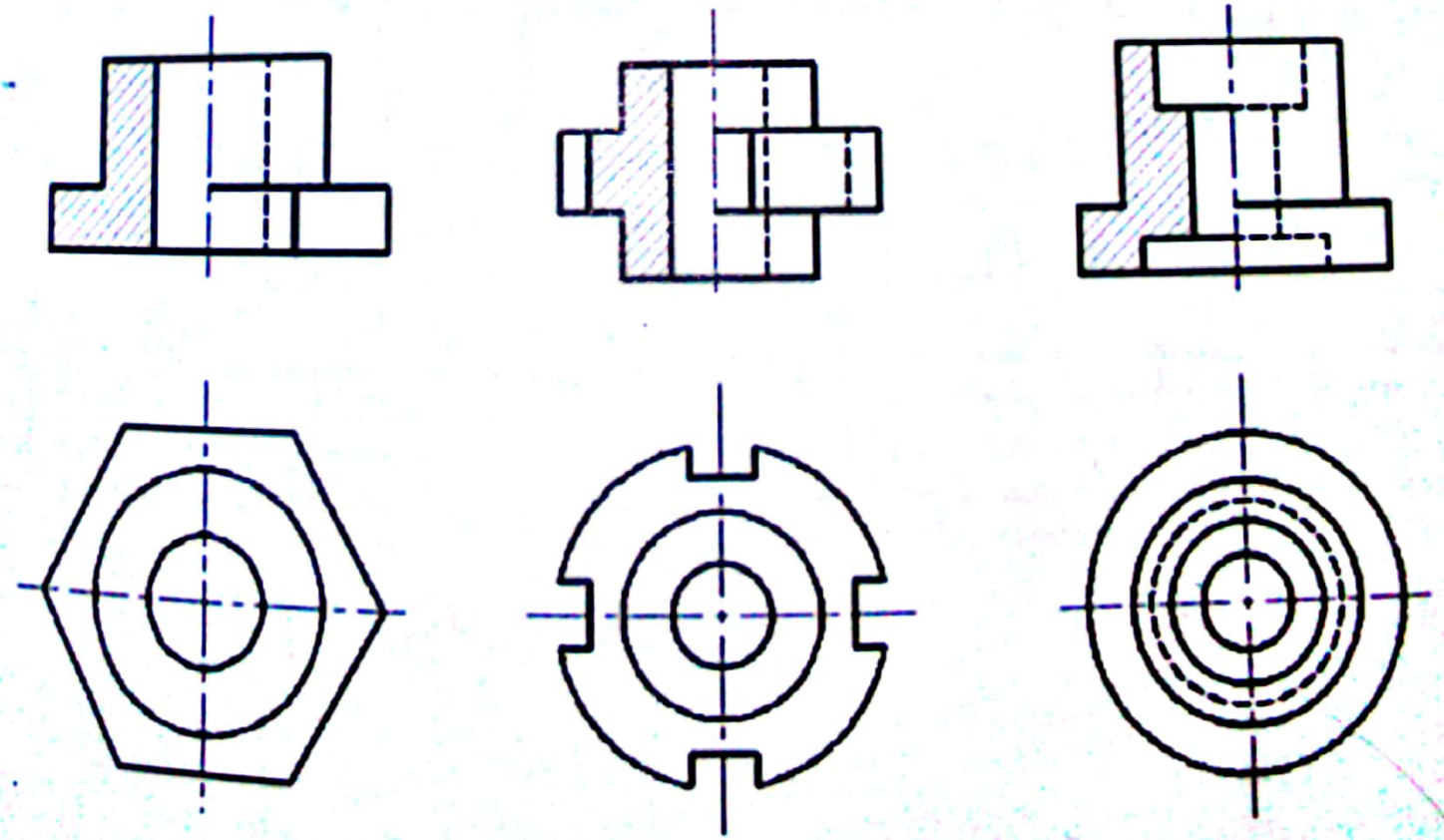
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Answer key for the question in the textbook

Answer to check point 3.1

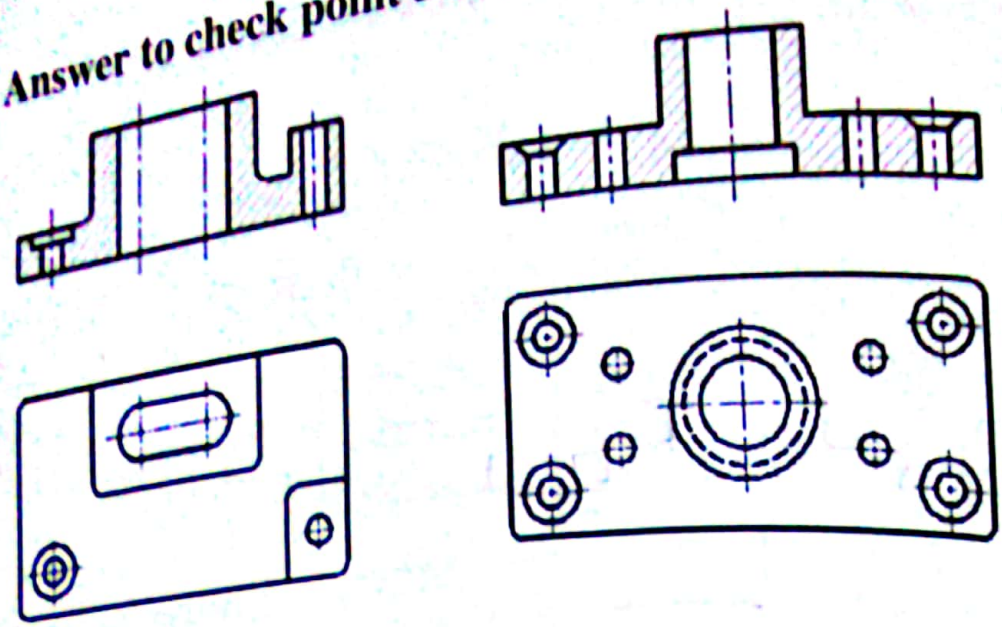


Answer to check point 3.2

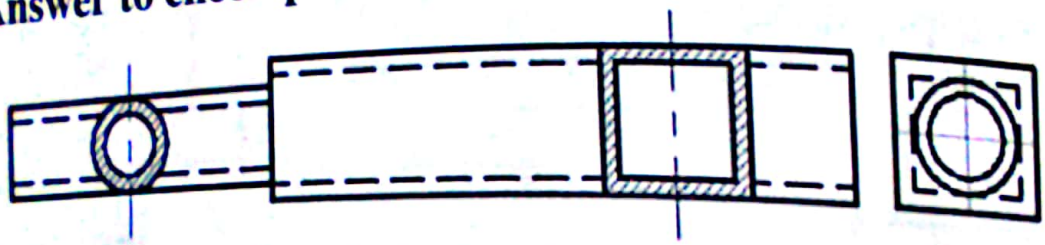


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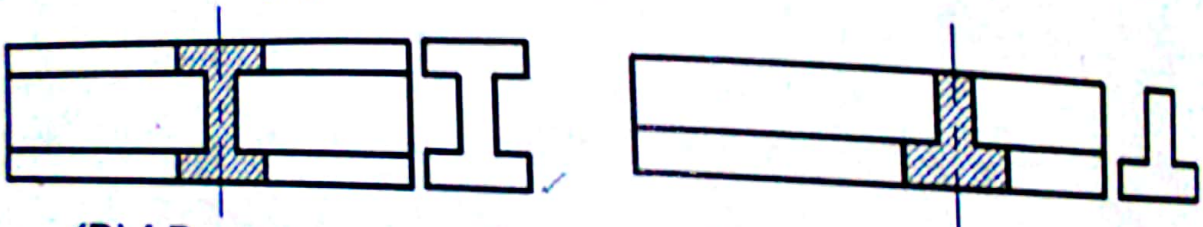
Answer to check point 3.3



Answer to check point 3.4



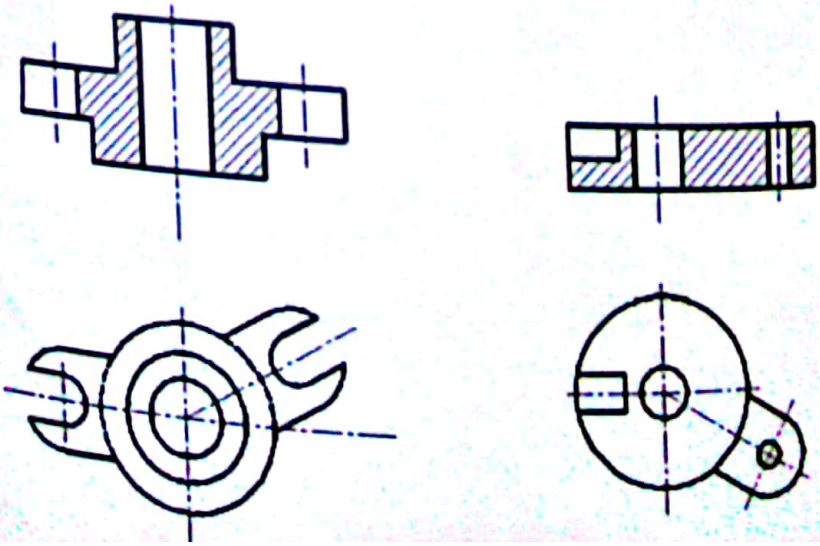
(A) Tubular Duct



(B) I Beam

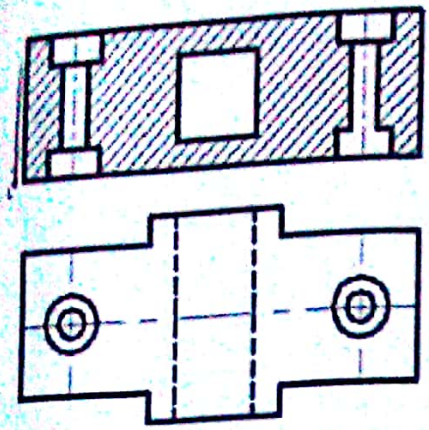
(C) T Bar

Answer to check point 3.5

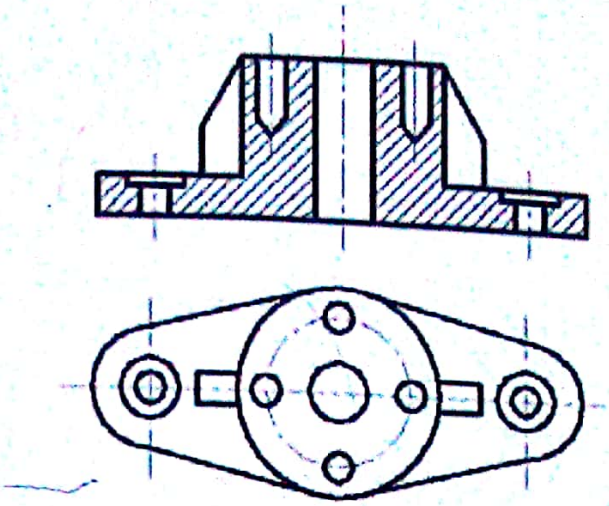


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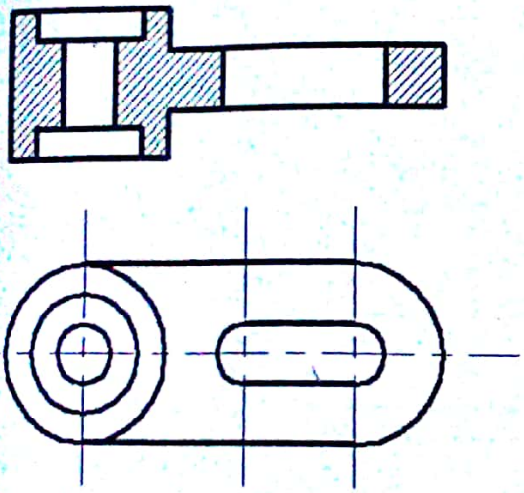
Answer to exercise 1



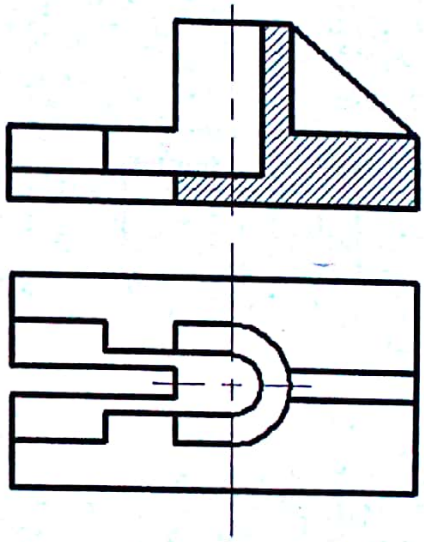
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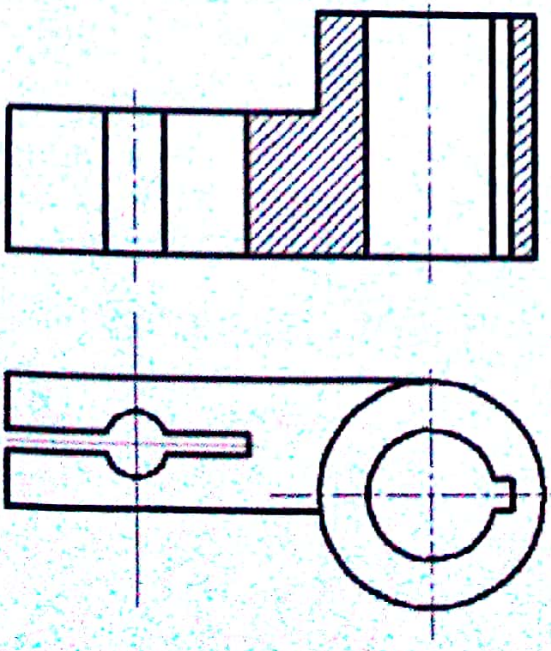
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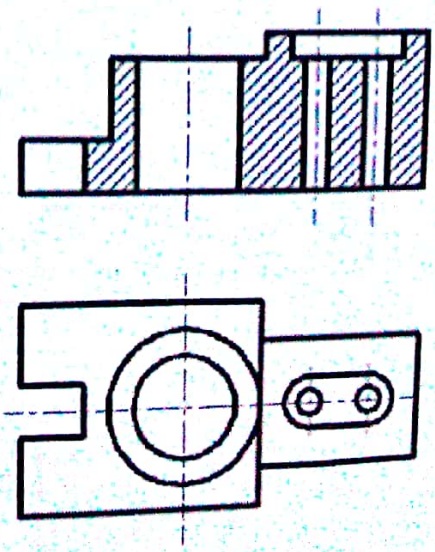
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D



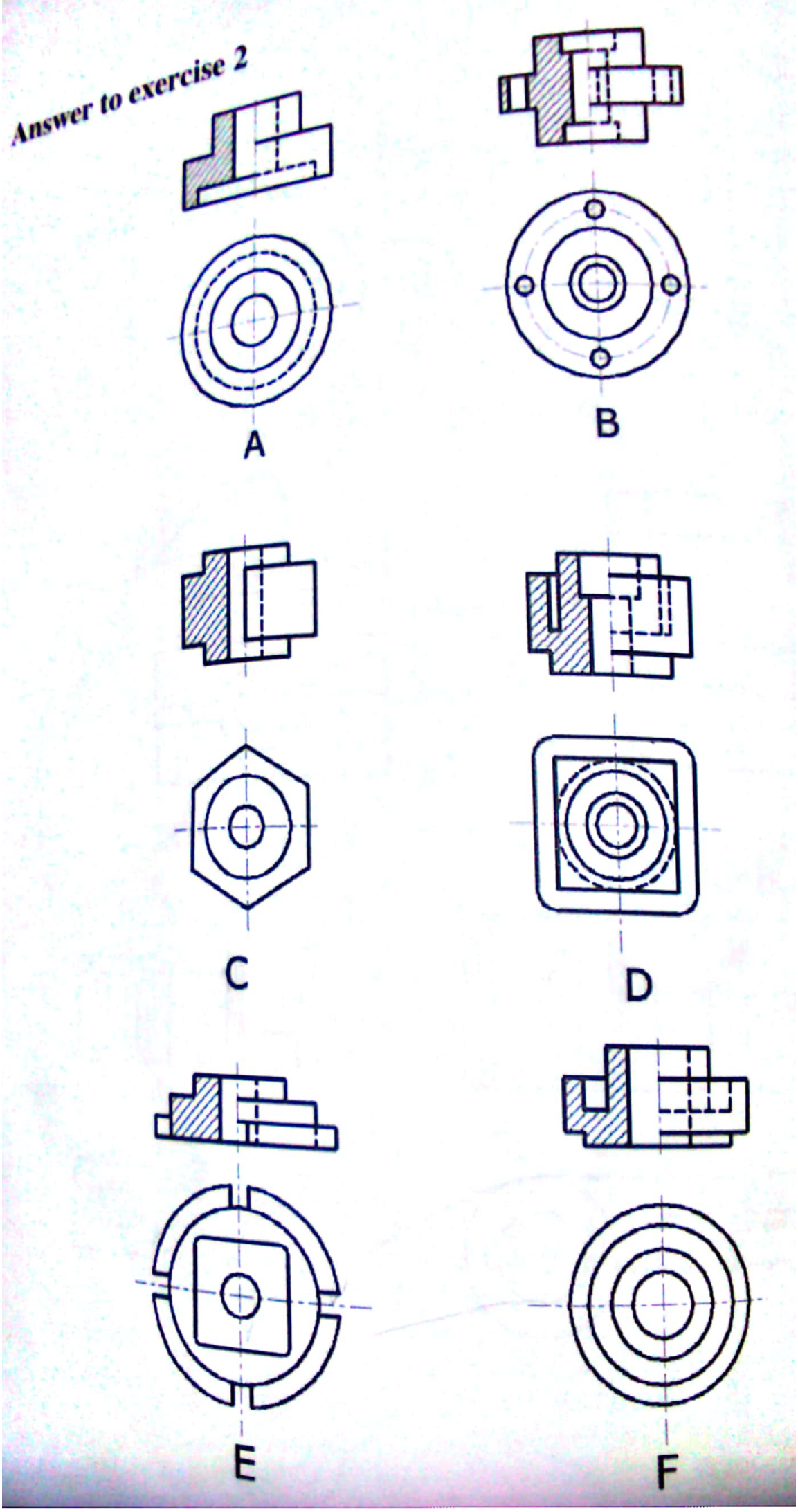
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F

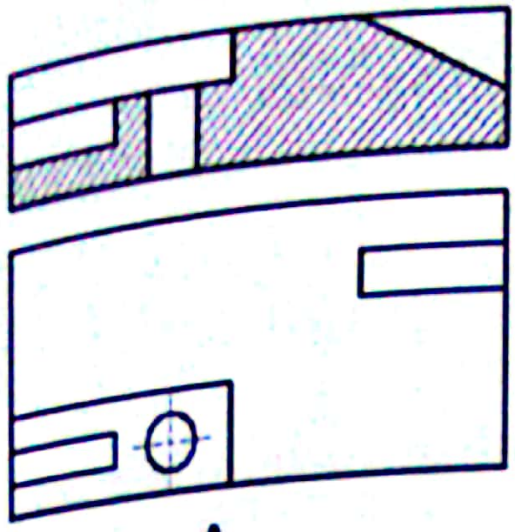
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Answer to exercise 2

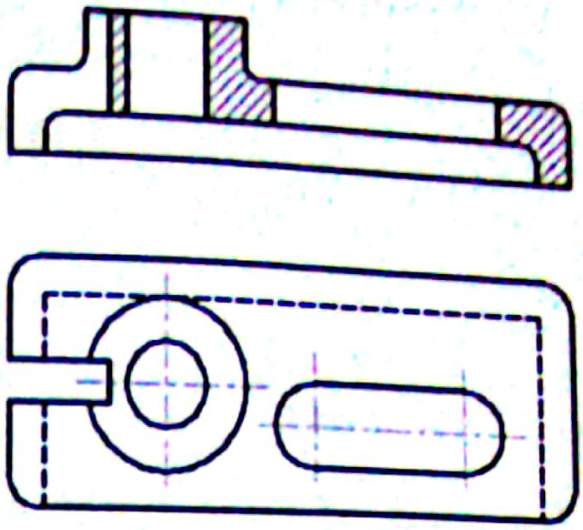


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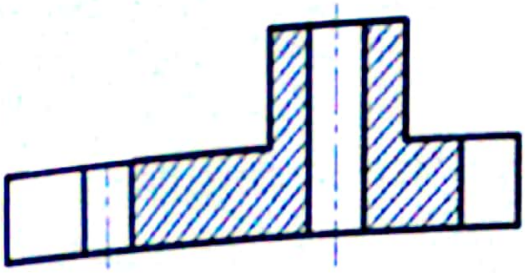
Answer to exercise 3



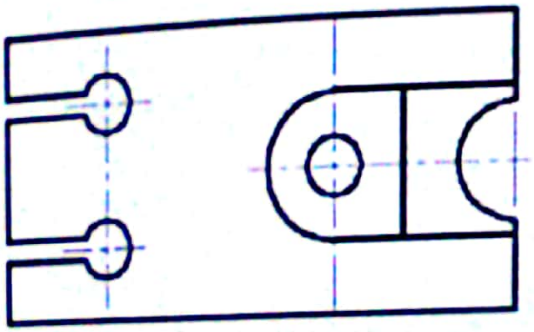
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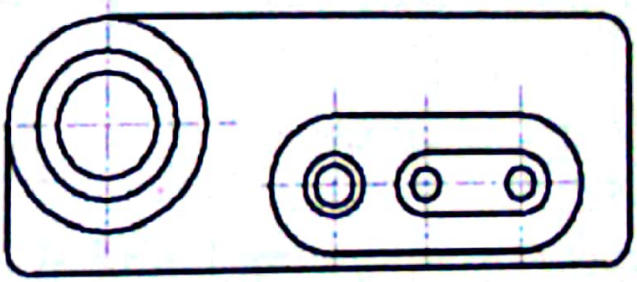
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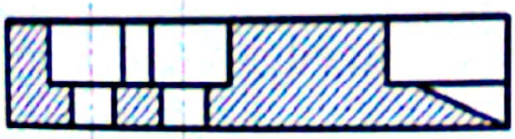


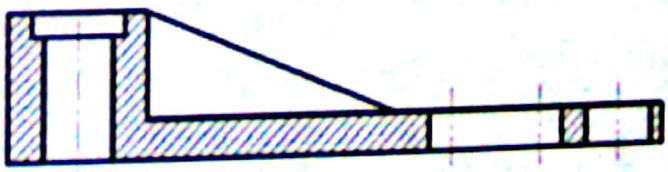


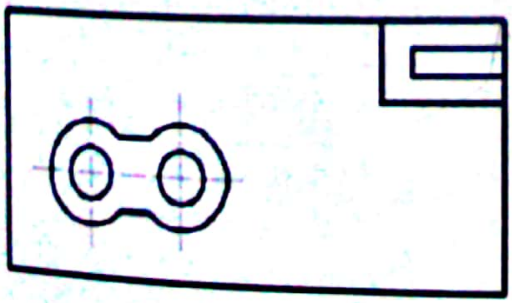
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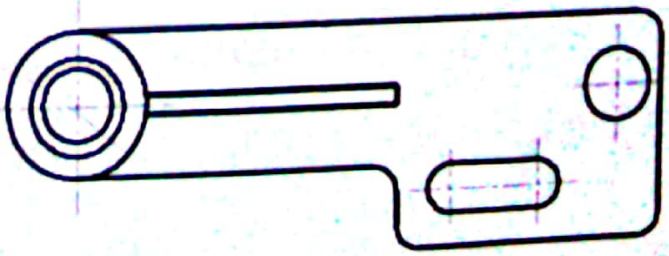
D







E



F

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UNIT 4

DIMENSIONING

Total Period

Unit Outcome

At the end of this unit, students should be able to:

- ✓ Understand the purpose, convention and principle dimensioning;
- ✓ Apply the standard dimensioning practice to describe the s of objects on technical drawing;
- ✓ apply the principles to dimension a given drawing.

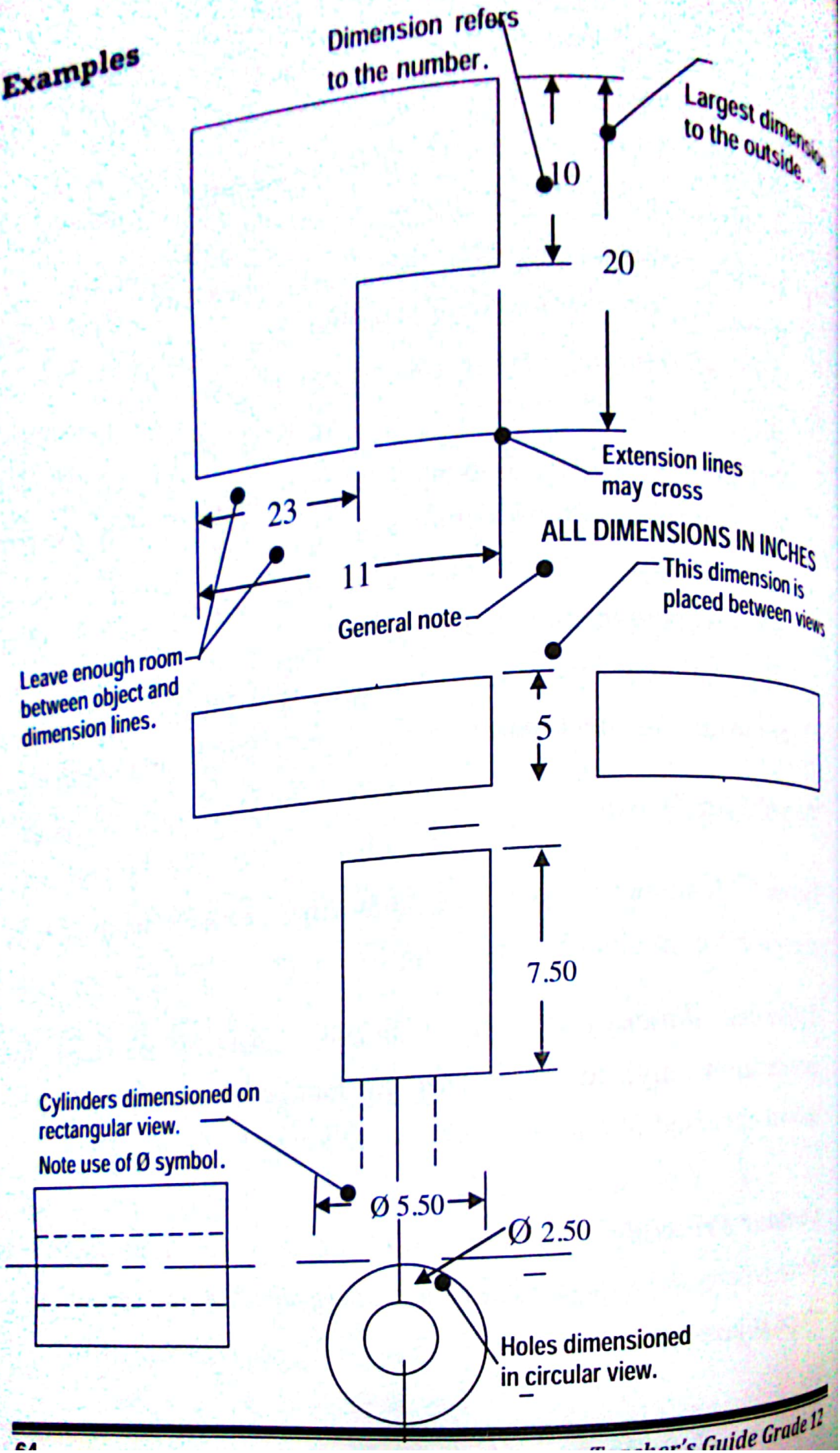
Unit Overview

A working drawing is one form which a part can be produced. Th drawing must be a complete set of instructions, so that it will not b necessary to give further information by word to the peopl fabricating the object. A working drawing, then, consists of th views necessary to explain the shape, the dimensions needed fo manufacture, and required specifications may be found in the note on the drawing, or they may be located in the title block.

There are rules and principles dimensioning a working drawing clearly and accurately. Therefore, mastering with the rules and principles is very important for drafters and engineers

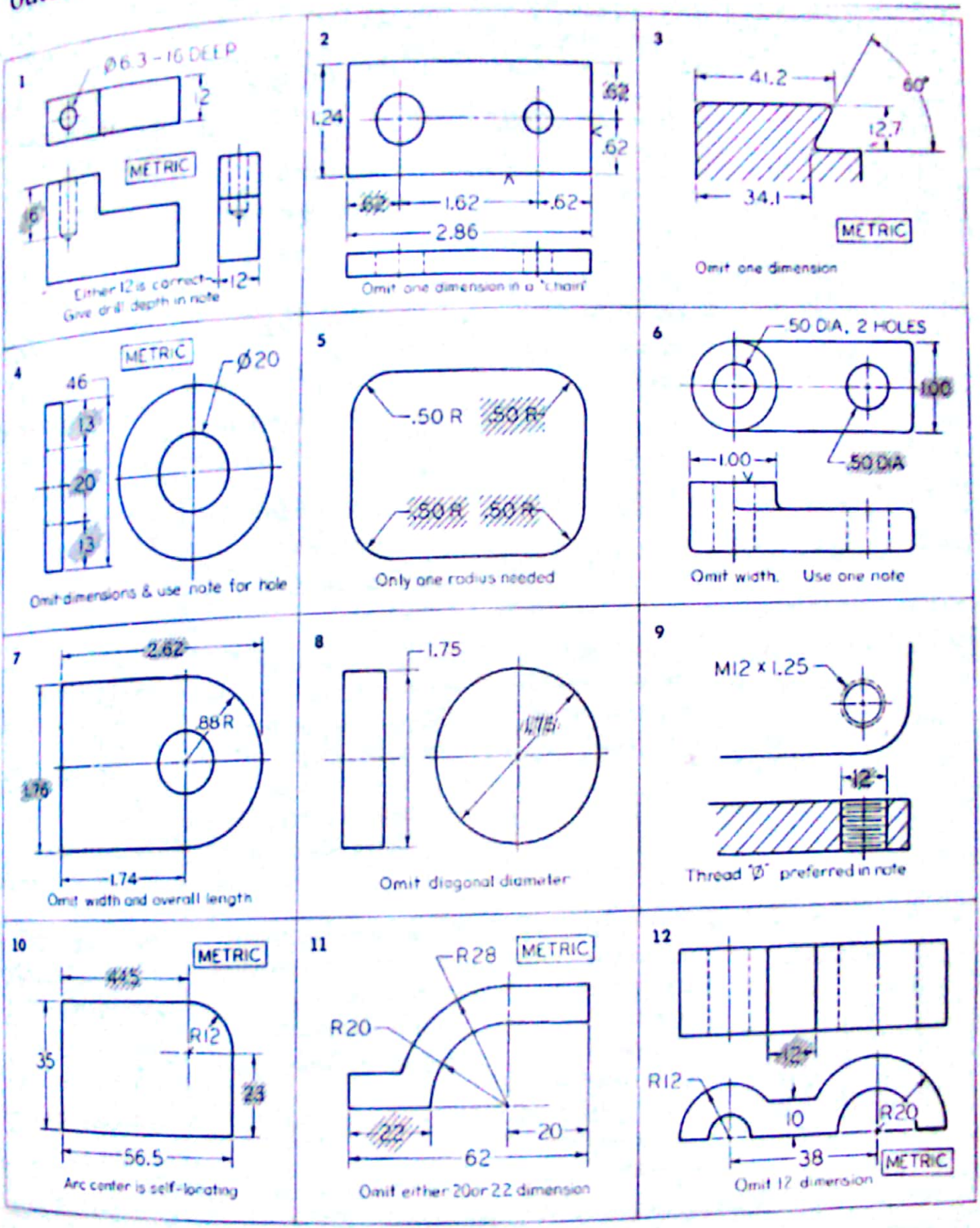
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Examples



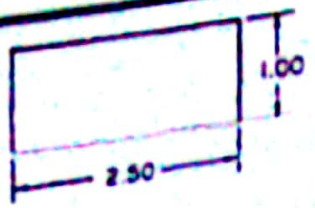
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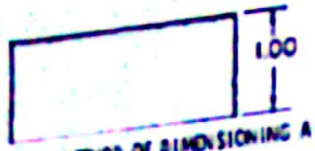
Note of Caution: While the following examples show good choices for placing dimensions, some of the actual notes are given using an outdated ANSI standard.



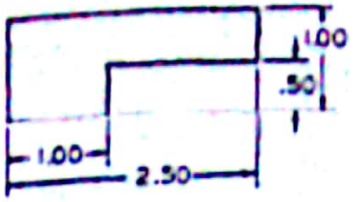
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DIMENSIONING WORKSHEET 1





THE METHOD OF DIMENSIONING A SIMPLE BLOCK.

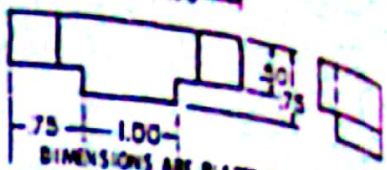




PLACEMENT OF DIMENSIONS ON A BLOCK WITH A NOTCH.

DIMENSIONING PRISMS

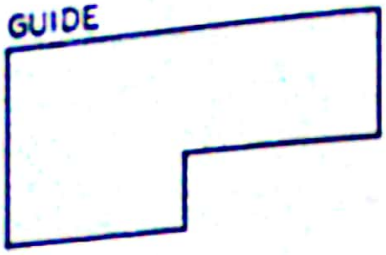




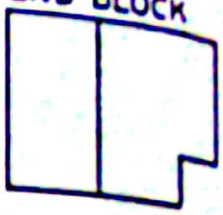
DIMENSIONS ARE PLACED ON THE MOST REPRESENTATIVE VIEWS.

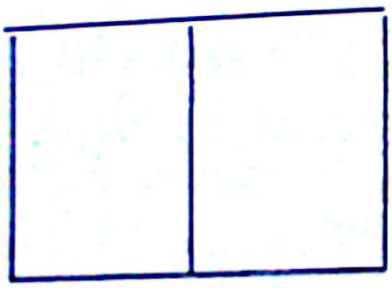
REQUIRED: DIMENSION THE FULL-SIZE PARTS. EITHER SKETCH OR USE INSTRUMENTS AS ASSIGNED.

1 GUIDE

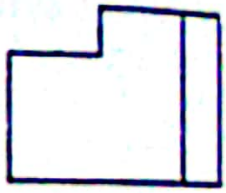


2 END BLOCK

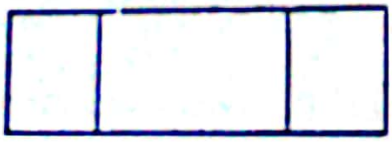




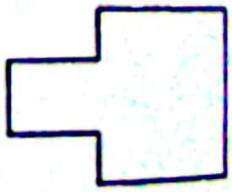


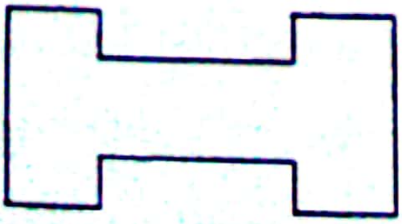


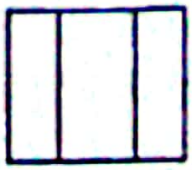
3 SEAT



4 TONGUE



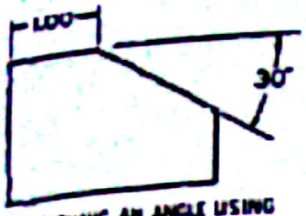




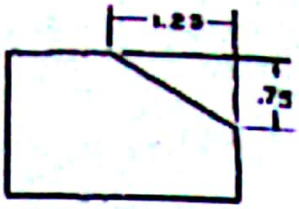


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DIMENSIONING WORKSHEET 2



DIMENSIONING AN ANGLE USING DEGREES.

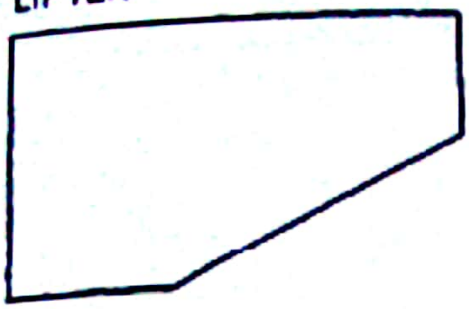


DIMENSIONING AN ANGLE USING COORDINATES.

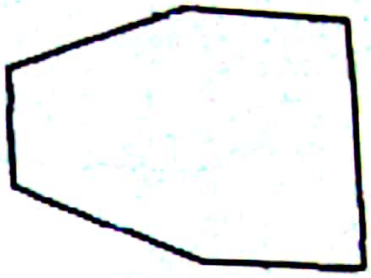
DIMENSIONING ANGLES

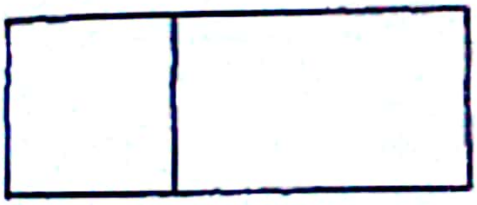
REQUIRED: DIMENSION THE FULL-SIZE PARTS BELOW USING APPROPRIATE METHODS AS ASSIGNED.

1 LIFTER



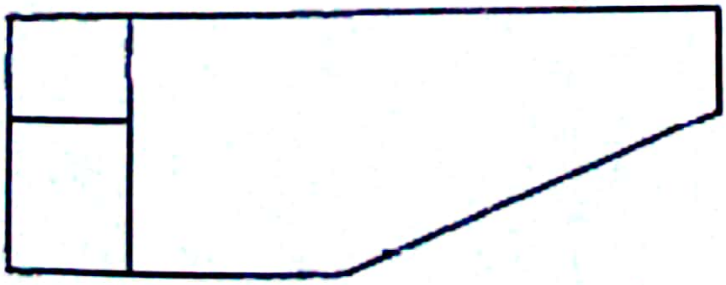
2 WEDGE

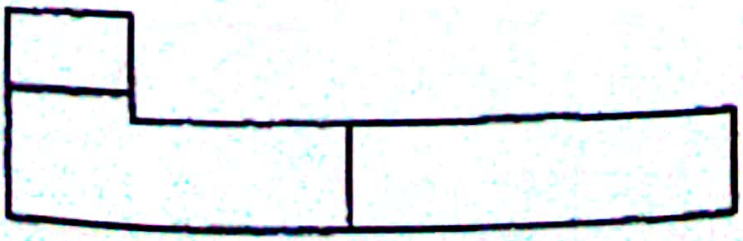


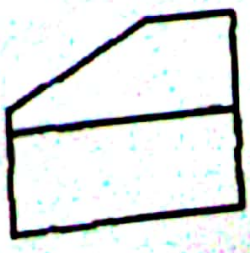




3 FIXTURE BASE

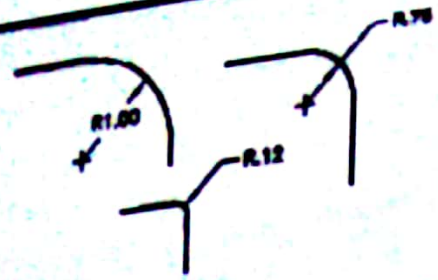






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DIMENSIONING WORKSHEET 3



NOTES

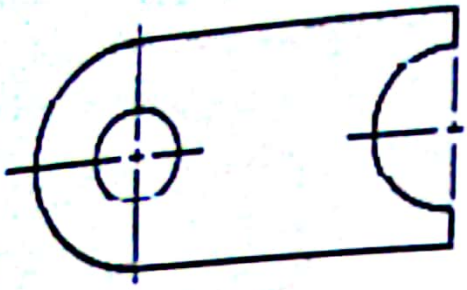
ALL FILLETS & ROUNDS R.25

FILLETS & ROUNDS R.25 UNLESS OTHERWISE SPECIFIED

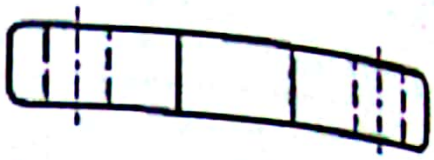
DIMENSIONING ARCS

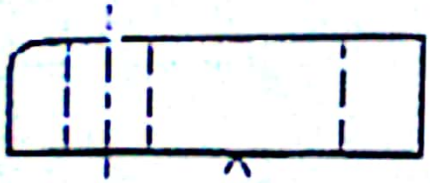
TYPICAL METHODS OF DIMENSIONING ARCS ARE SHOWN AT THE LEFT. NOTICE THAT A RADIUS IS USED WHEN THE ARC IS LESS THAN A FULL CIRCLE. NOTES CAN BE USED TO SPECIFY FILLETS AND ROUNDS TO REDUCE REPETITIVE DIMENSIONS.

1

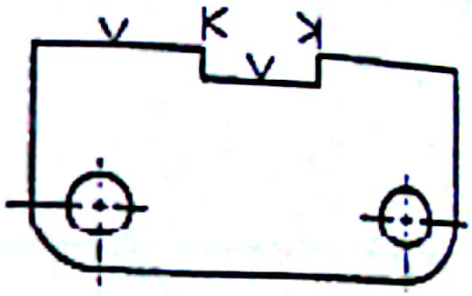


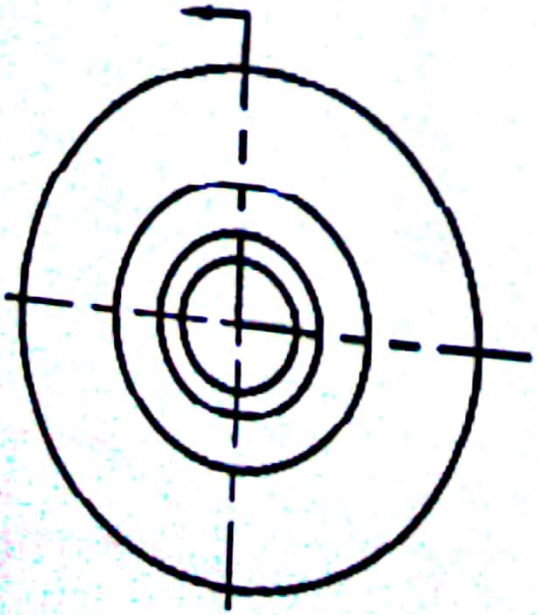
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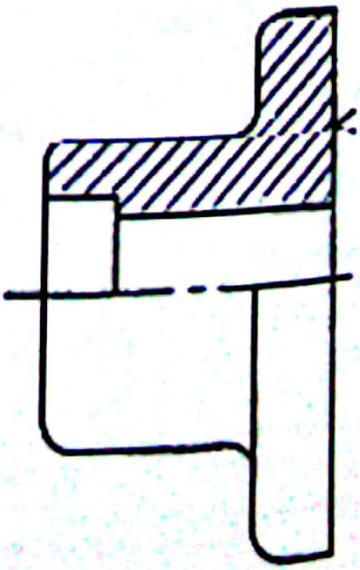




3



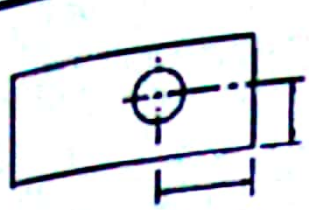




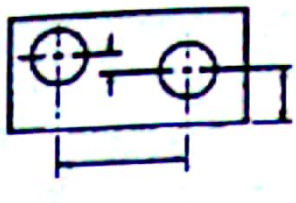
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DIMENSIONING WORKSHEET 4

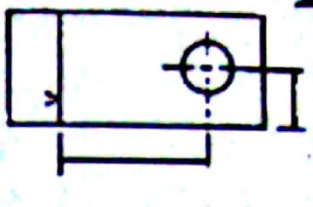
LOCATION DIMENSIONS



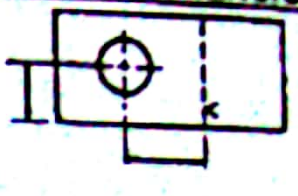
HOLES SHOULD BE LOCATED IN THE CIRCULAR VIEW WITH TWO DIMENSIONS.



HOLES SHOULD BE LOCATED FROM CENTER TO CENTER WHEN MORE THAN ONE HOLE IS GIVEN.



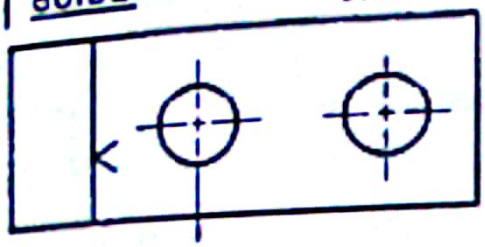
HOLES SHOULD BE LOCATED FROM FINISHED SURFACES FOR GREATER ACCURACY.

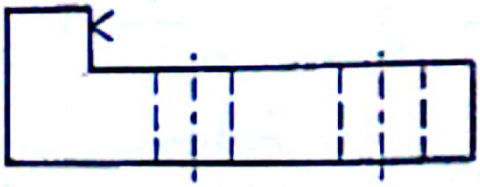


HOLES SHOULD BE LOCATED FROM FINISHED SURFACES EVEN IF THE SURFACE IS HIDDEN.

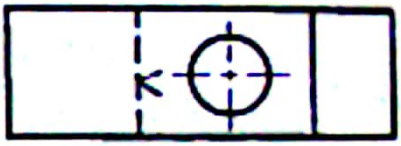
COMPLETELY DIMENSION THE FULL-SIZE PARTS BELOW. LOCATION AND SIZE DIMENSIONS.

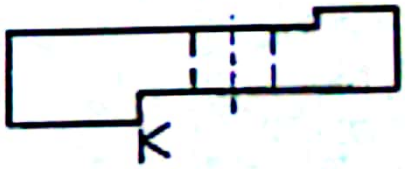
1 GUIDE



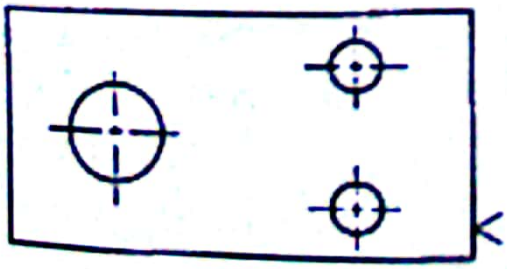


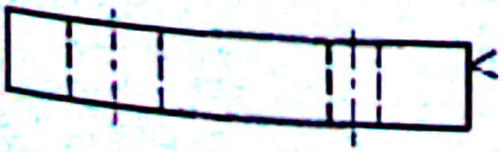
2 ADAPTER



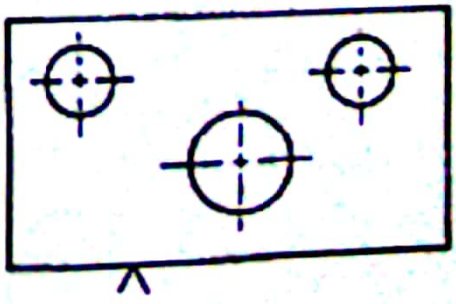


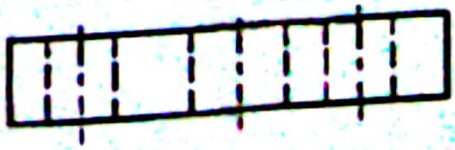
3 FLANGE





4 CASE

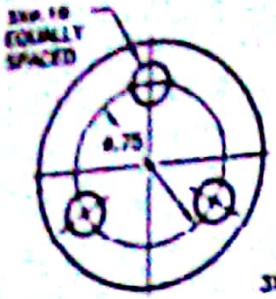




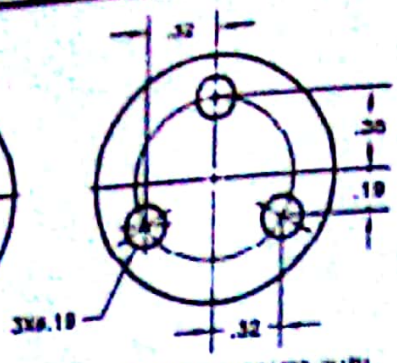
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DIMENSIONING WORKSHEET 5

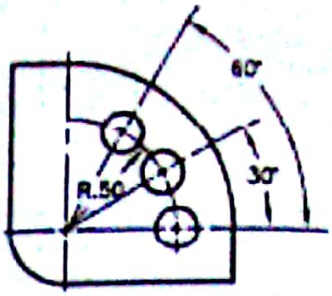
LOCATION DIMENSIONS



HOLES CAN BE LOCATED BY DIMENSIONING THE CIRCLE OF CENTERS AND WITH A NOTE.



HOLES CAN BE LOCATED WITH COORDINATE DIMENSIONS FROM THE CENTER LINES.



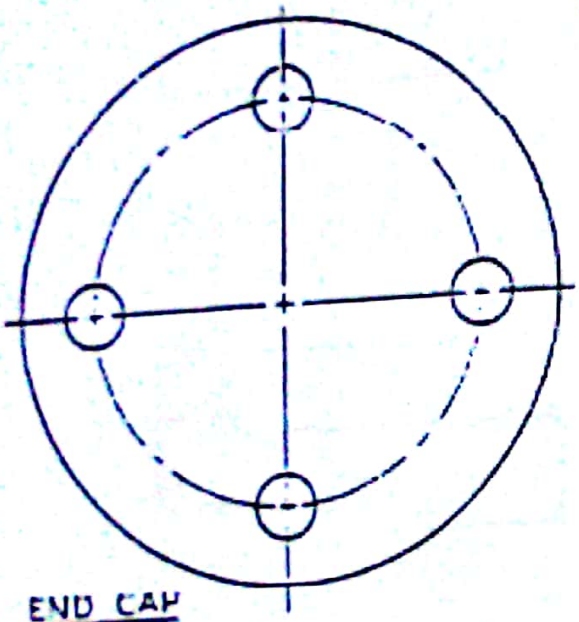
HOLES CAN BE LOCATED WITH ANGULAR DIMENSIONS AND THE RADIUS FROM A POLE POINT.



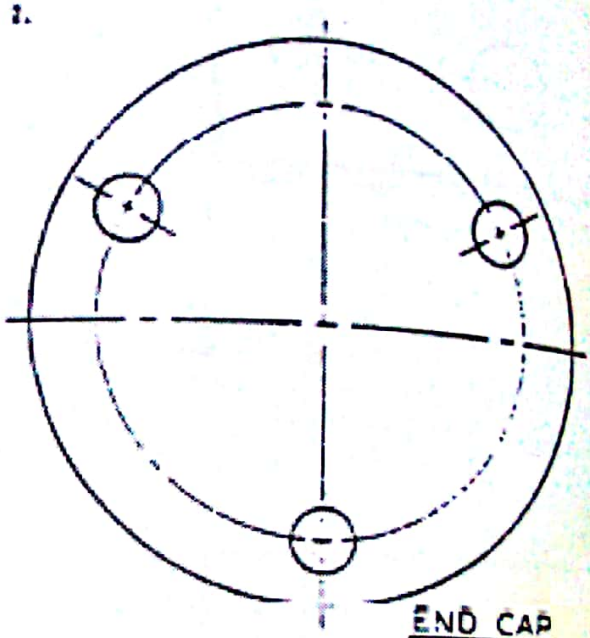
2

1

LOCATE THE HOLES USING THE CIRCLE OF CENTERS METHOD FOR PROBLEM 1 AND THE COORDINATE METHOD FOR PROBLEM 2. GIVE HOLE NOTES.

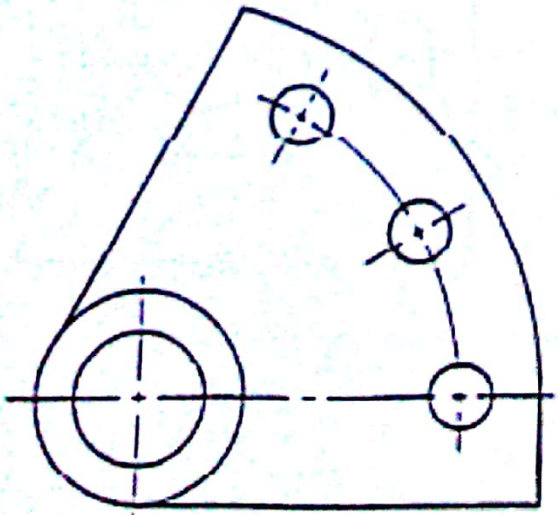


END CAP
HALF SIZE

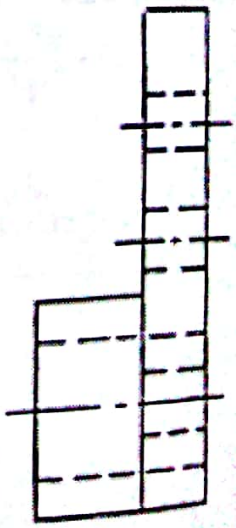


END CAP
HALF SIZE

3 COMPLETELY DIMENSION THE PART BELOW.

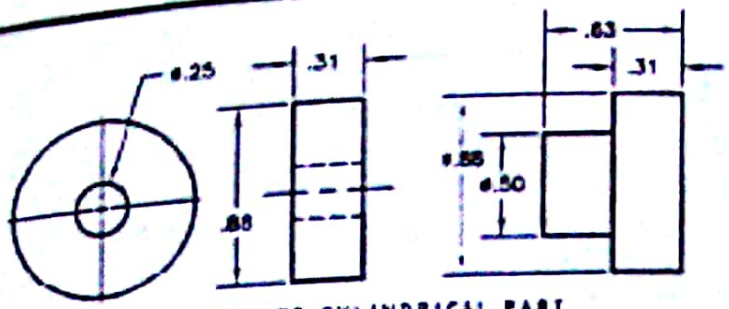


SHAFT BRACKET HALF SIZE



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DIMENSIONING WORKSHEET 6



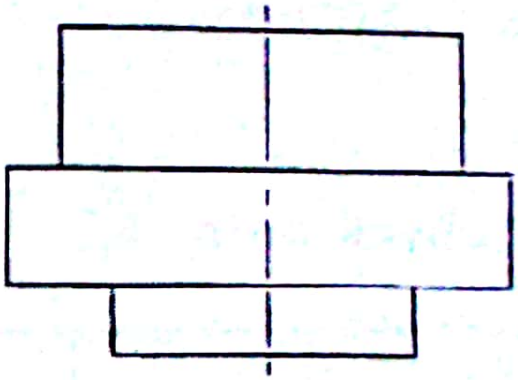
1 DIMENSION THE FULL-SIZE CYLINDRICAL PART BELOW. THE TOP VIEW IS A HALF VIEW.



DIMENSIONING CYLINDERS

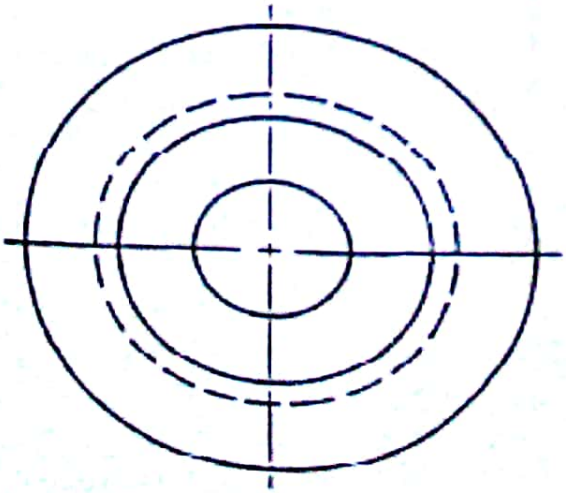
EXAMPLES OF DIMENSIONED CYLINDERS ARE SHOWN AT THE LEFT. DIMENSIONS ARE PLACED ON THE RECTANGULAR VIEW USING DIAMETERS INSTEAD OF RADII. SMALL HOLES ARE DIMENSIONED WITH A NOTE IN THE CIRCULAR VIEW. THE CIRCULAR VIEW CAN BE OMITTED WHEN DIMENSIONING CYLINDERS IF "DIA" IS PLACED AFTER EACH DIMENSIONED DIAMETER IN THE RECTANGULAR VIEW.

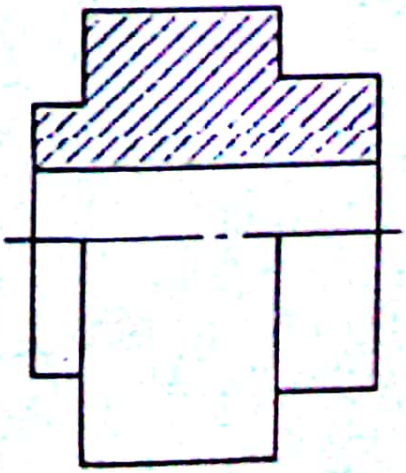
2 DIMENSION THE FULL-SIZE CYLINDRICAL PART. THE CIRCULAR VIEW HAS BEEN OMITTED.





3 DIMENSION THE FULL-SIZE CYLINDRICAL PART SHOWN IN THE HALF SECTION.

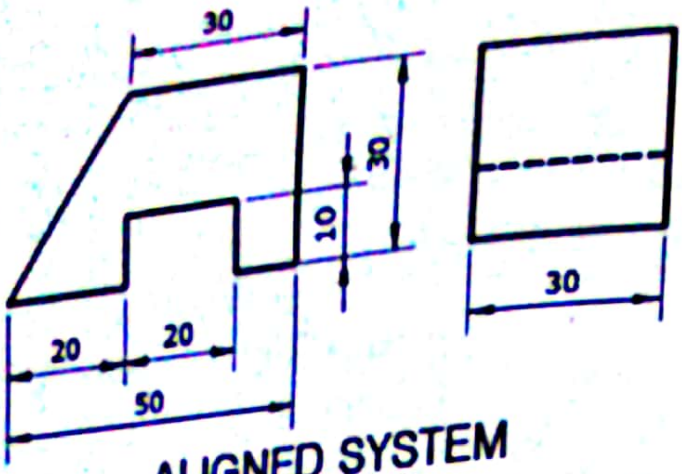




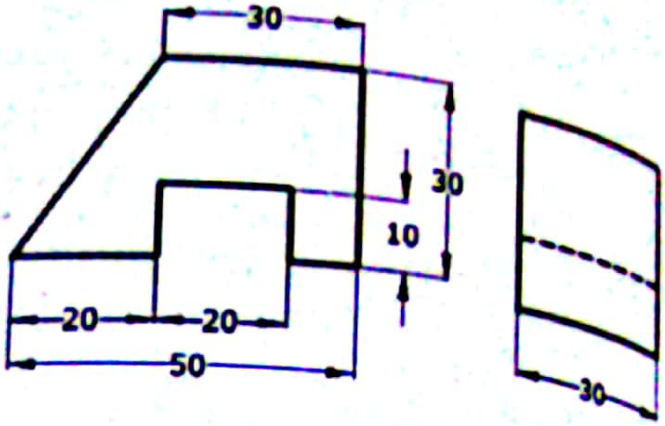
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Answer key for the question in the textbook

Solution for check point 4.1

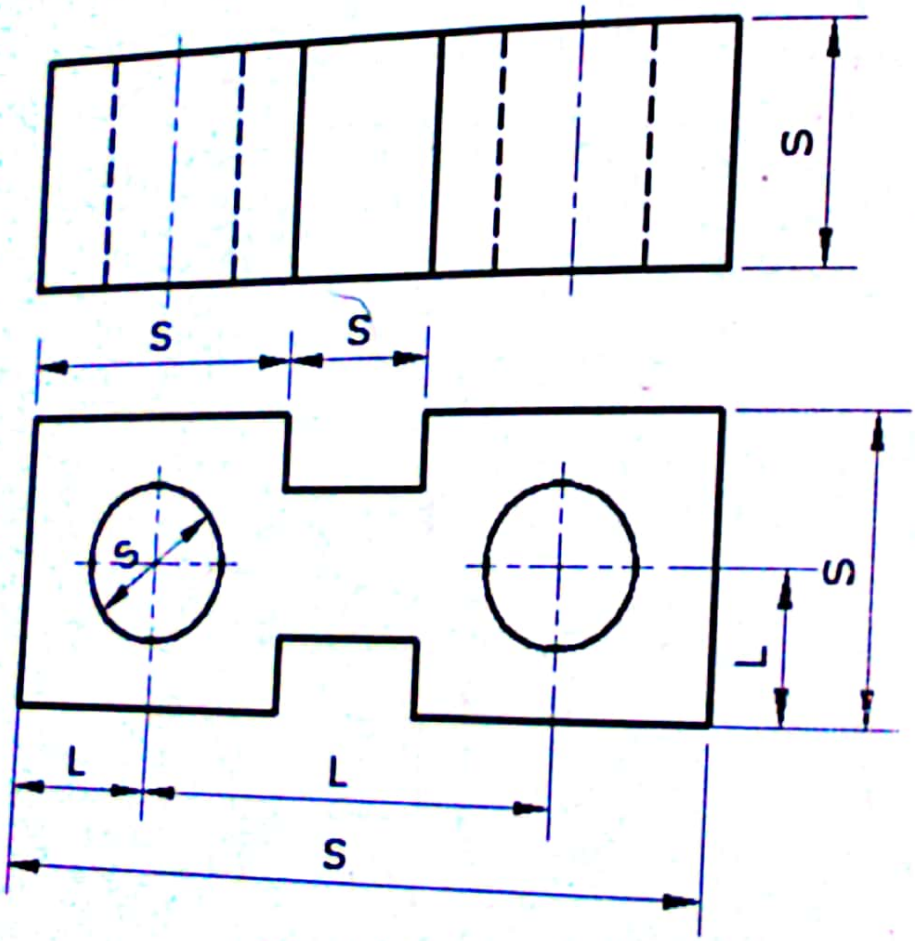


ALIGNED SYSTEM



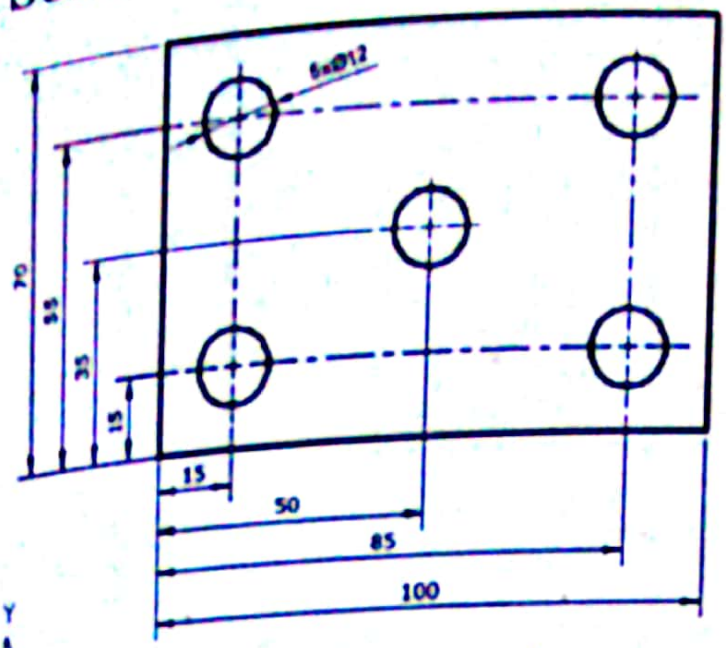
UNIDIRECTIONAL SYSTEM

Solution for check point 4.2

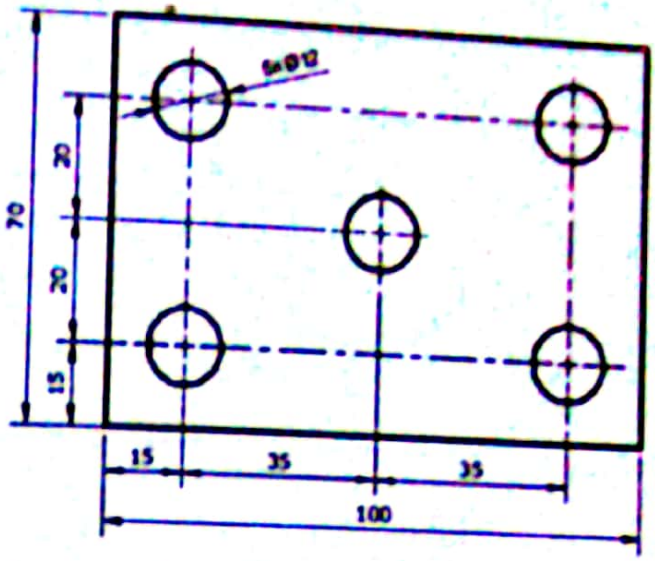


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Solution for check point 4.3

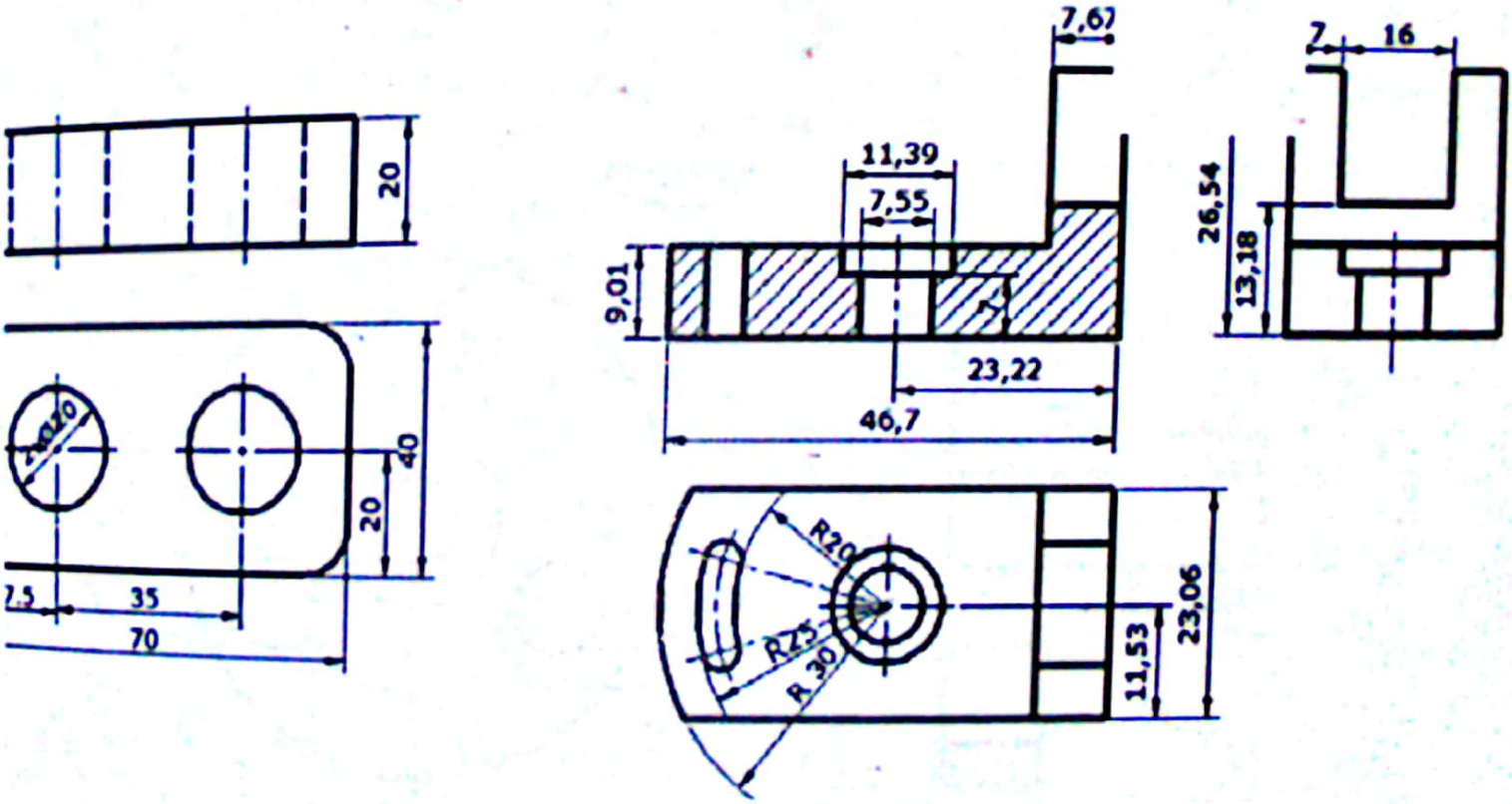


Parallel dimensioning



Chain dimensioning

Solution for exercise 1

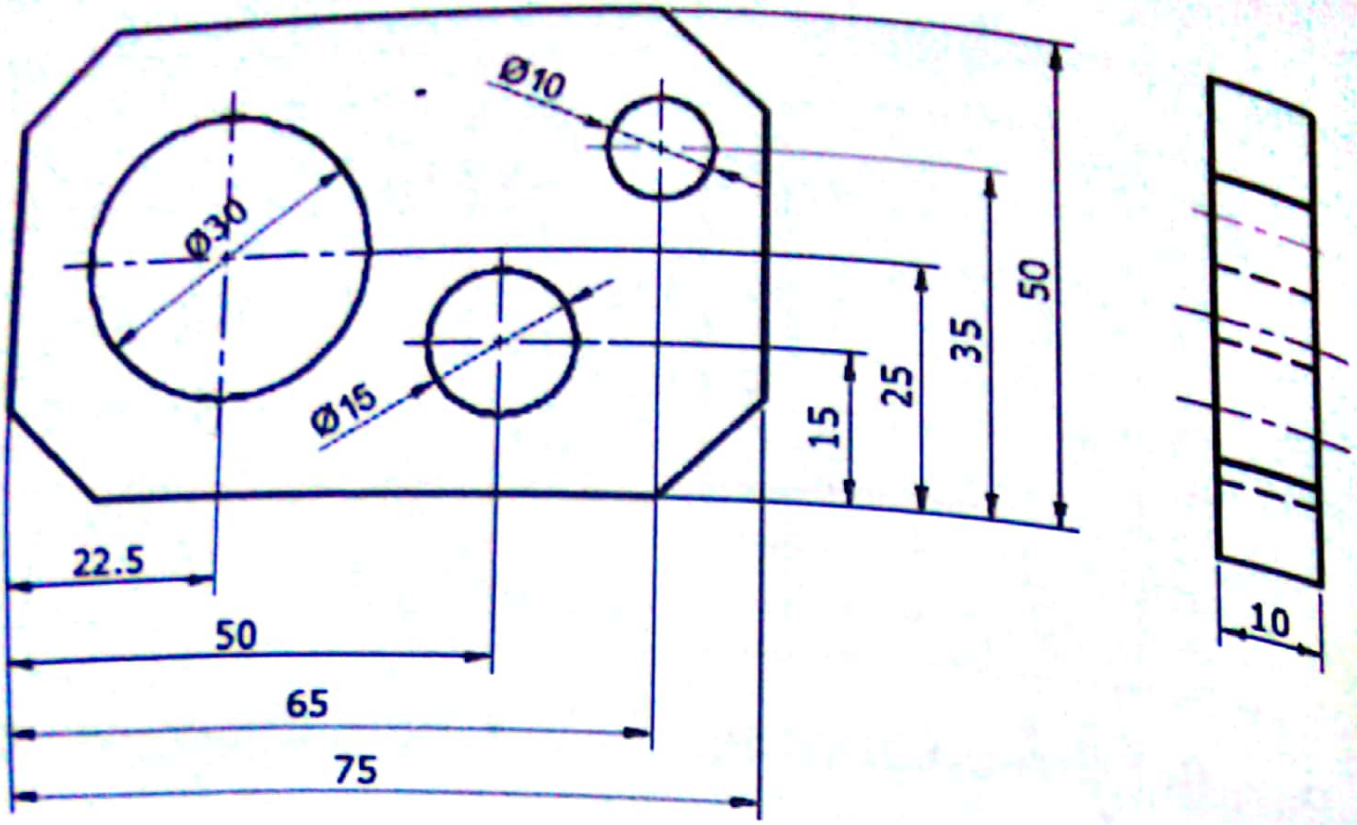


A

ALL ROUNDS R 10

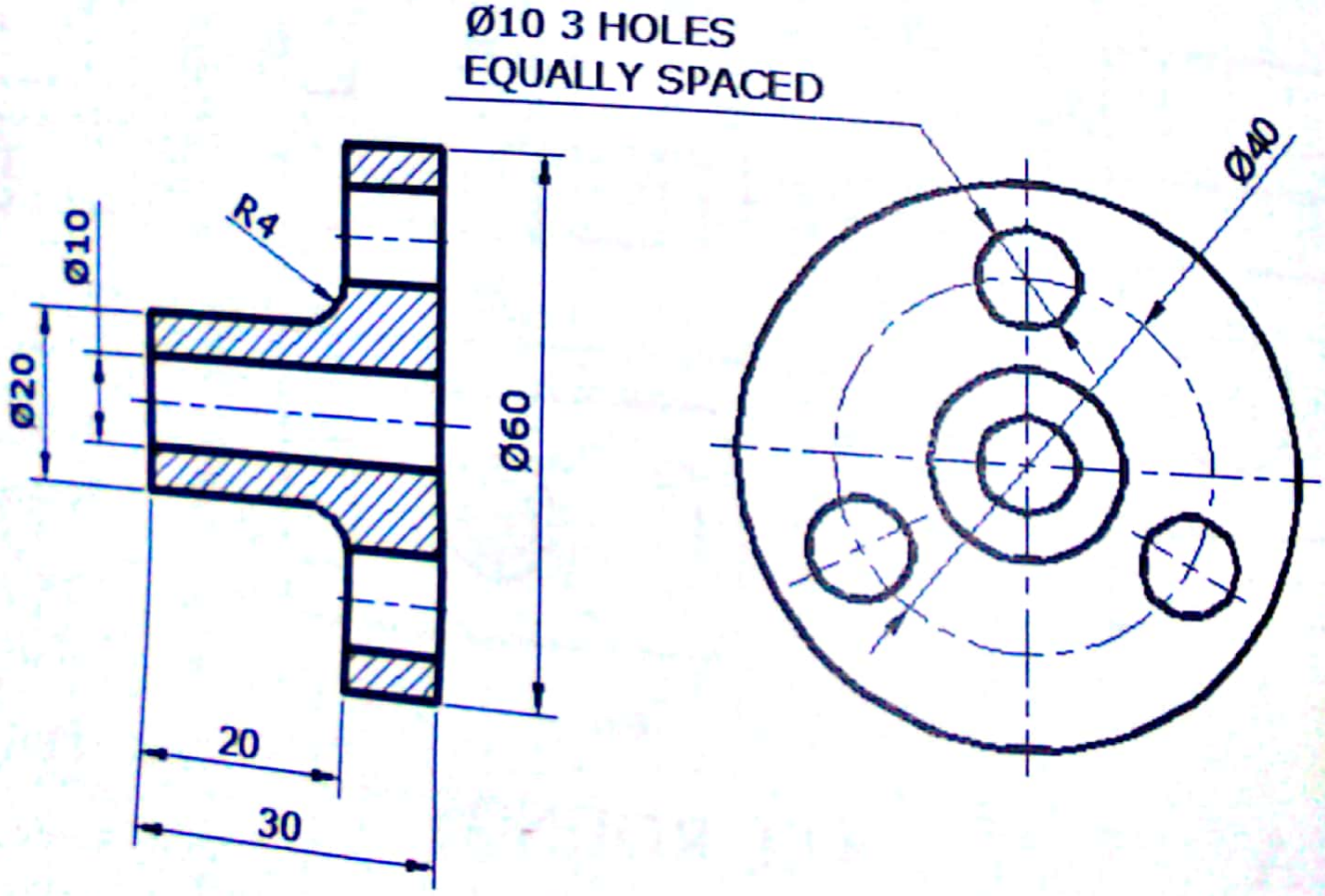
B

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ALL CHAMERS 10X45°

C



D

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UNIT 5

DEVELOPMENT AND INTERSECTION

Total Periods: 21

Unit Outcome

At the end of this unit, students should be able to:

- ✓ Understand the principles and advantage of development and intersection;
- ✓ Recognize the types of hems and joints for different kinds of sheet metal job;
- ✓ Form different 3D models by using surface development in the real world application.

Unit Overview

Many objects, such as cardboard and metal boxes, tin cans, funnels, cake pans, furnace pipes, elbows, ducts, and roof gutters, are made from flat sheet materials that, when folded, formed or rolled, will take the shape of an object. Since a definite shape and size are desired, a regular orthographic drawing of the object is made first, then a development drawing is made to show the complete surface laid out in a flat plane. So this unit exposes students to the analytical drawing techniques required for surface layouts and geometric developments.

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praised and their achievements recognized. They should be encouraged to continue working hard and not become complacent.

Answer key for the question in the textbook

Solution for check point 5.1

a) Define three of the basic geometric elements.

Line is one generated by a point moving according to a law which may be expressed by a geometric description or by an algebraic equation.

Surface is a two dimensional geometrical figure, which may be generated by a motion of either straight or curved line.

Solid is a three dimensional representation of an object which may be generated by bounding plane surfaces or revolving of a plane figure about an axis.

b) Write types of surfaces that are developable and non developable.

Single curved surface are developable but warped surface and Double curved surfaces are nondevelopable.

c) List three types of hems and joints.

Single, double and wired edge hems are three types of hems; single, double and rolled edge flanges, lap, plain flat, groved, single, double and standard seams are joints.

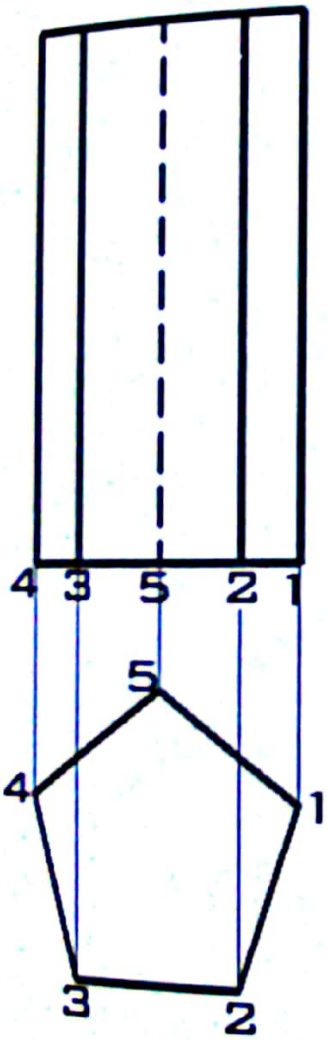
d) What is development?

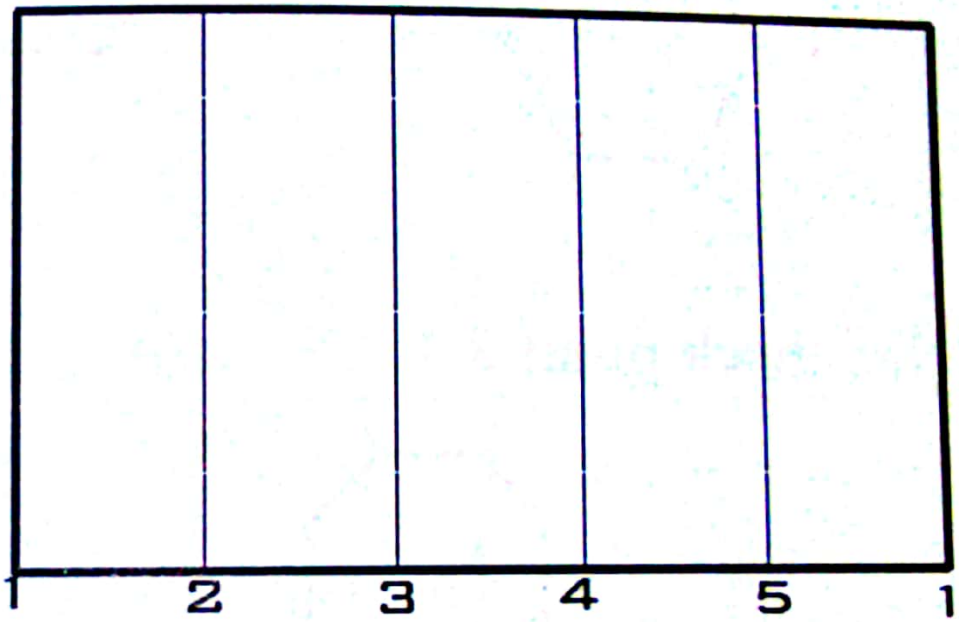
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e) List the methods of pattern development you know.

There are three types of pattern development: Parallel method, radial line methode and triangular methode of which we will see only the first two methods.

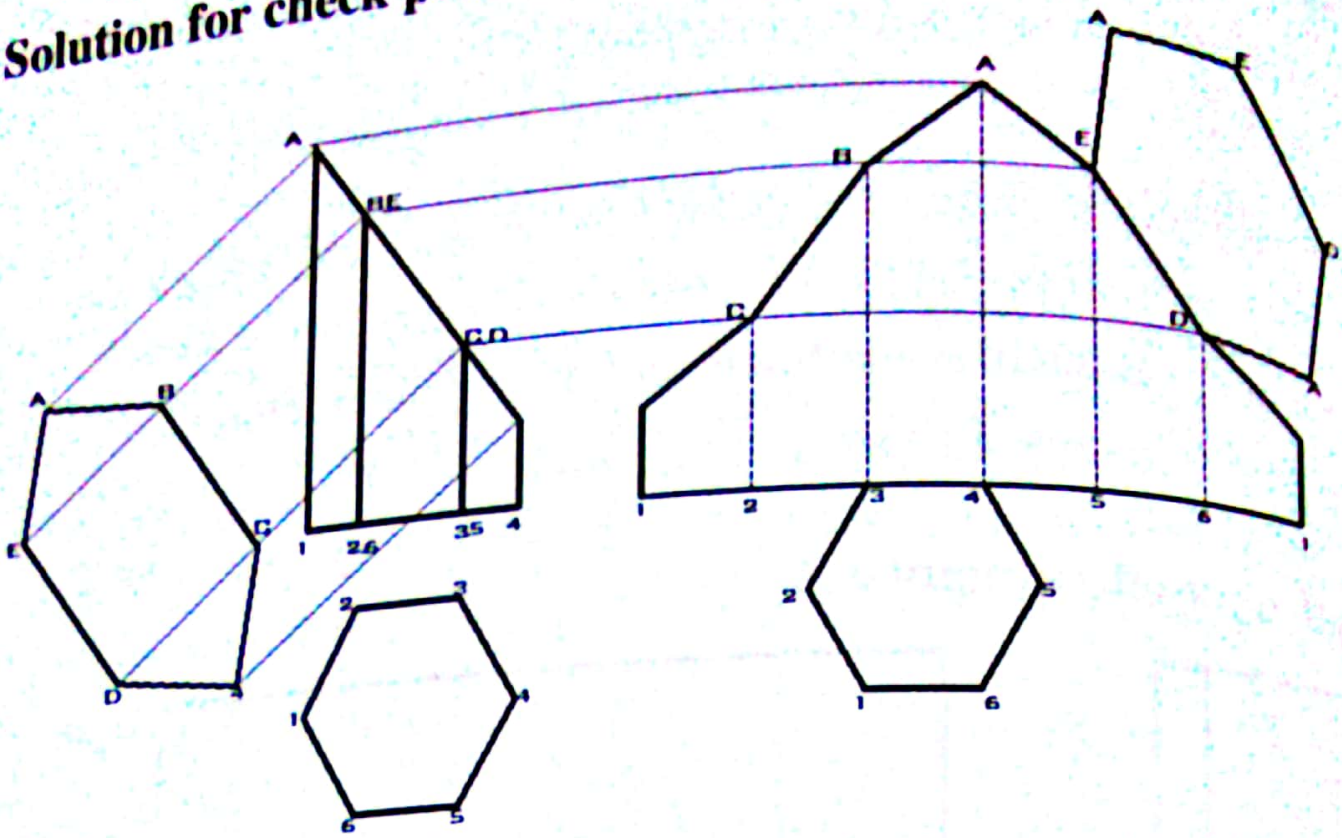
Solution for check point 5.2



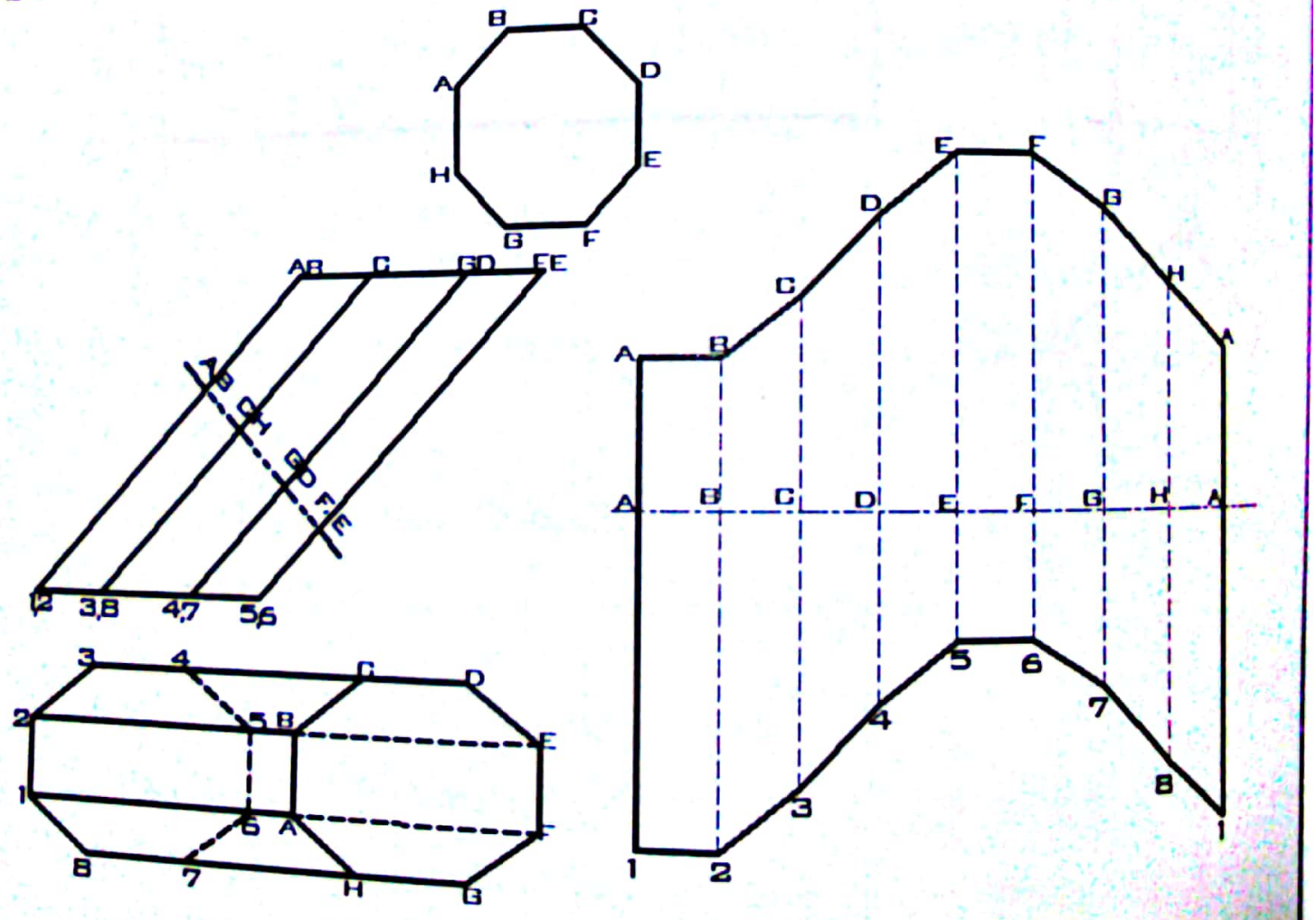


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Solution for check point 5.3

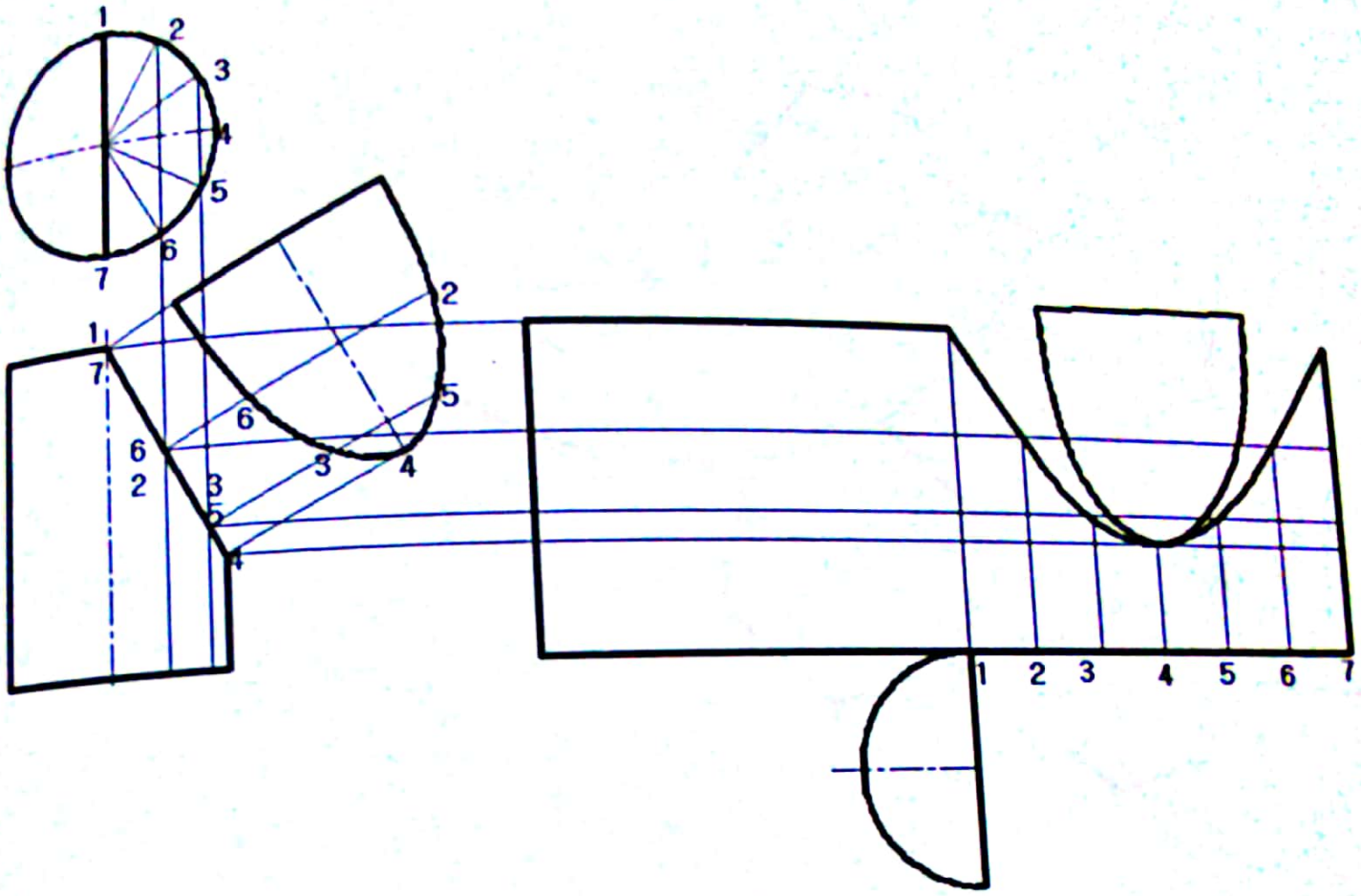


Solution for check point 5.4

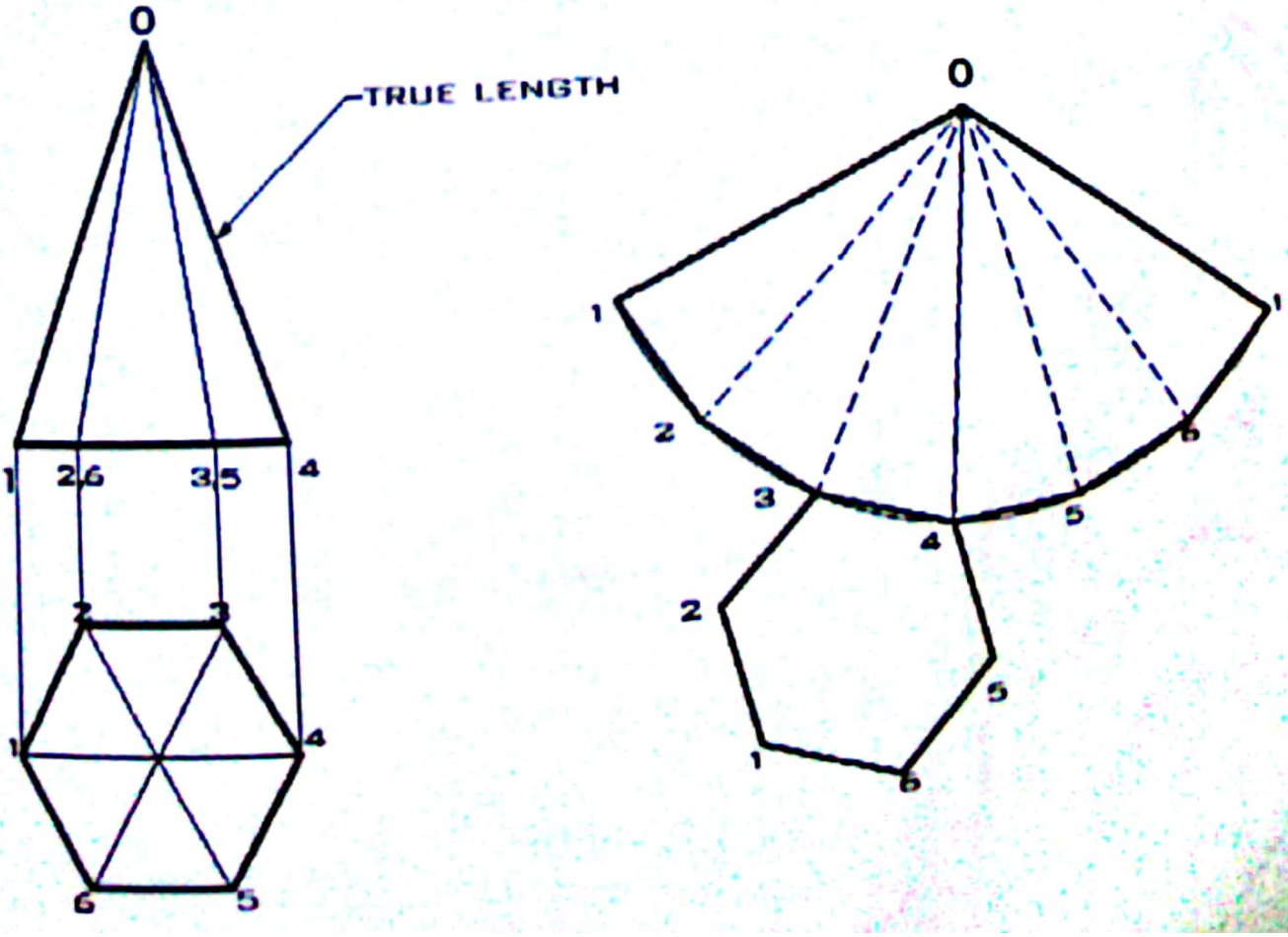


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Solution for check point 5.5

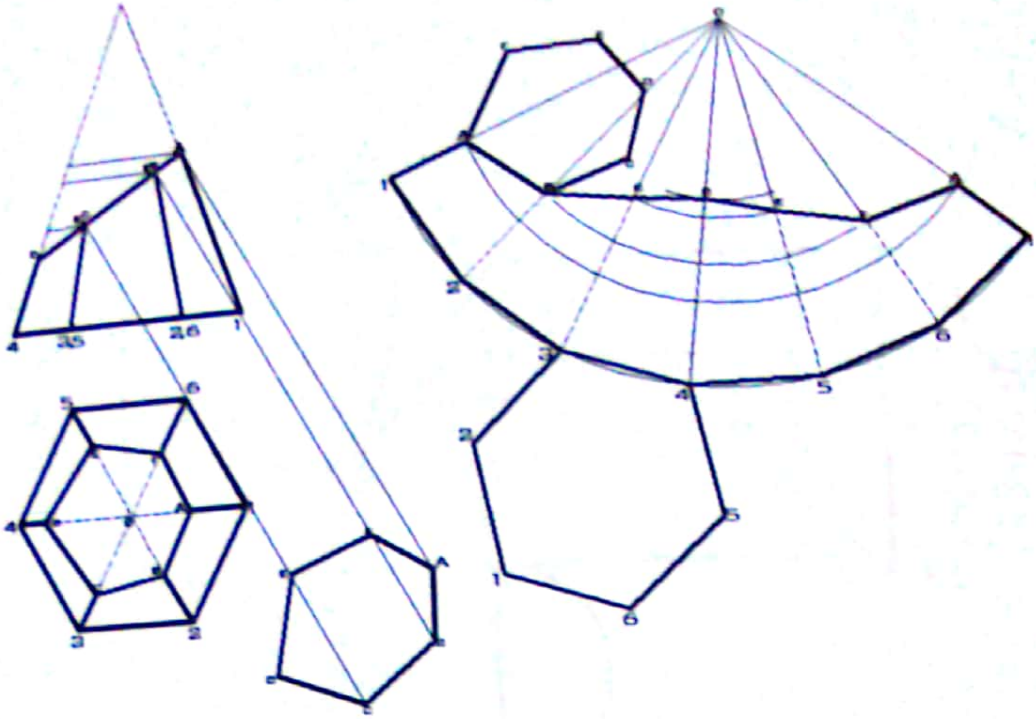


Solution for check point 5.6

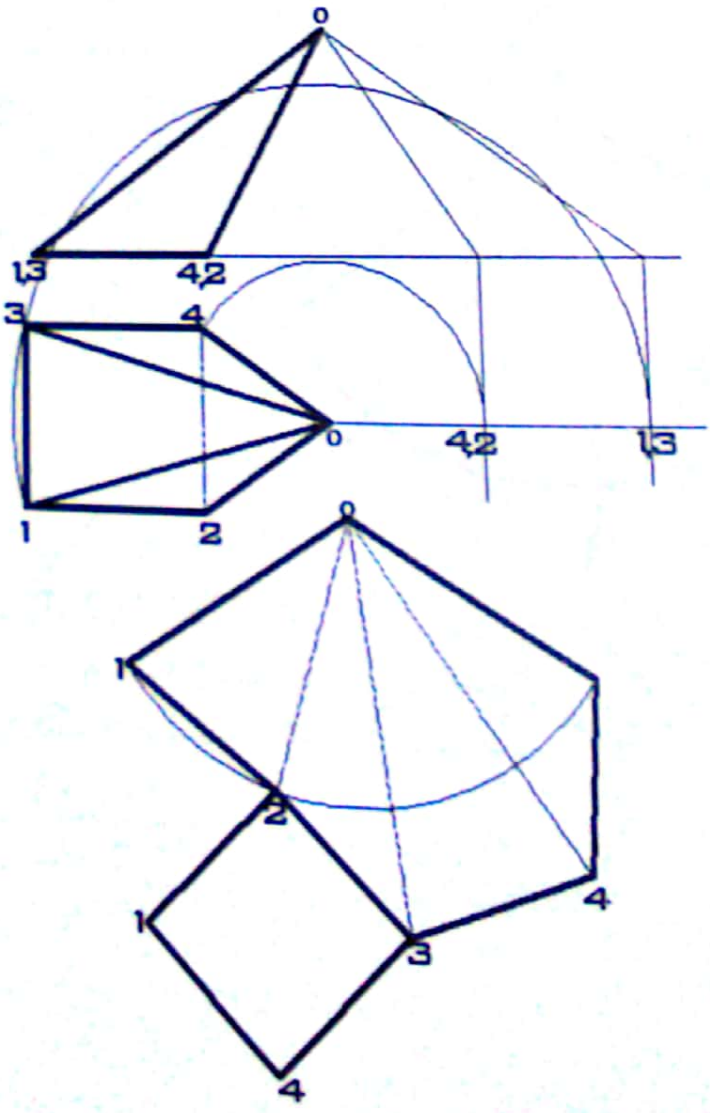


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Solution for check point 5.7

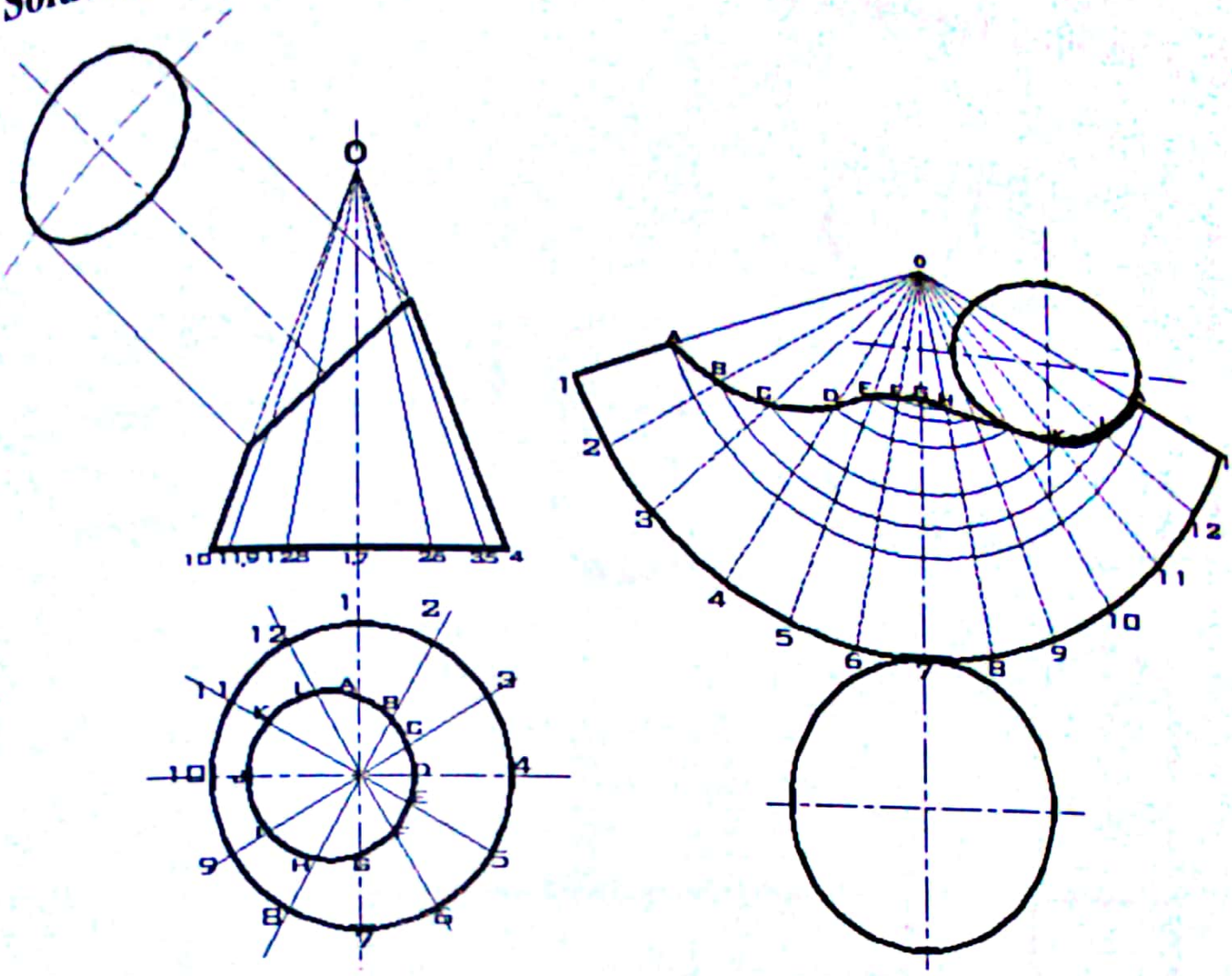


Solution for check point 5.8

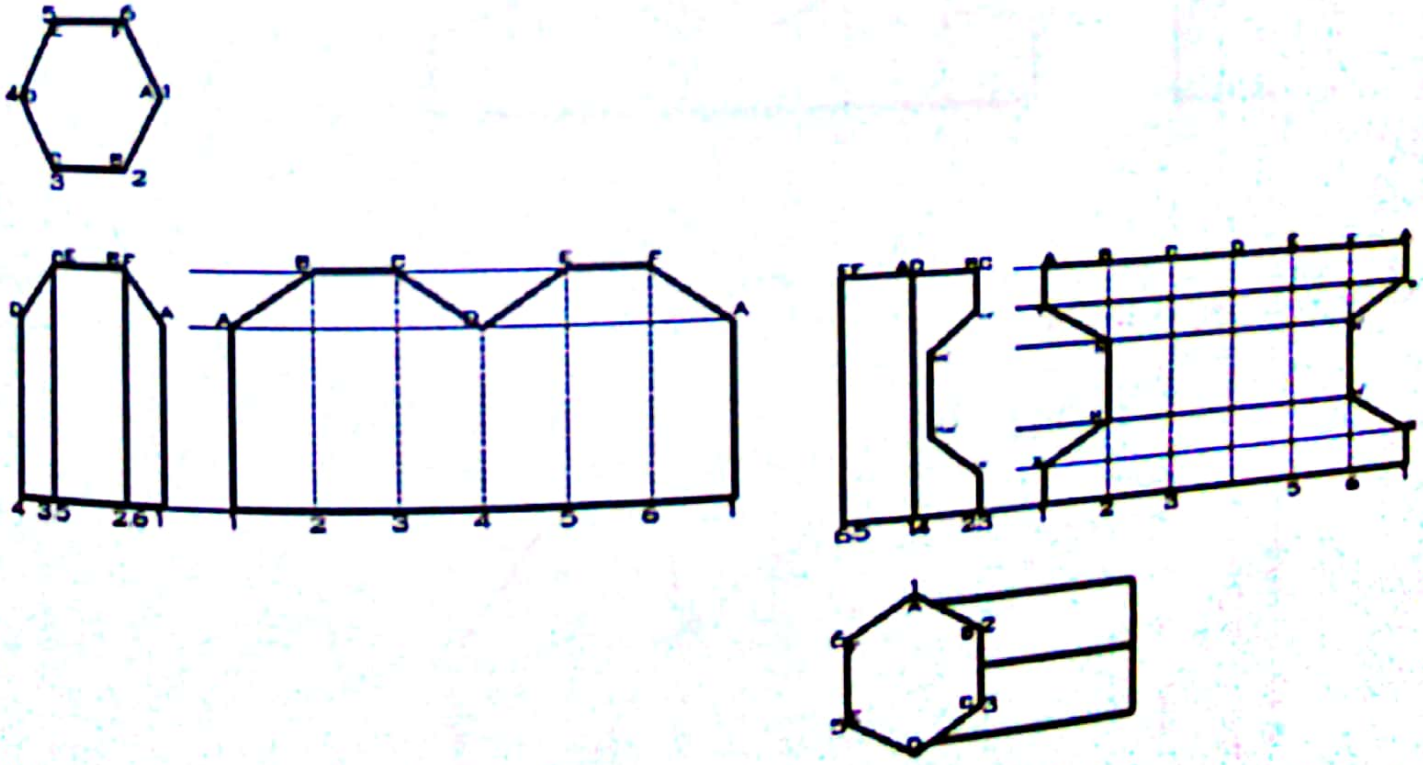


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Solution for check point 5.9

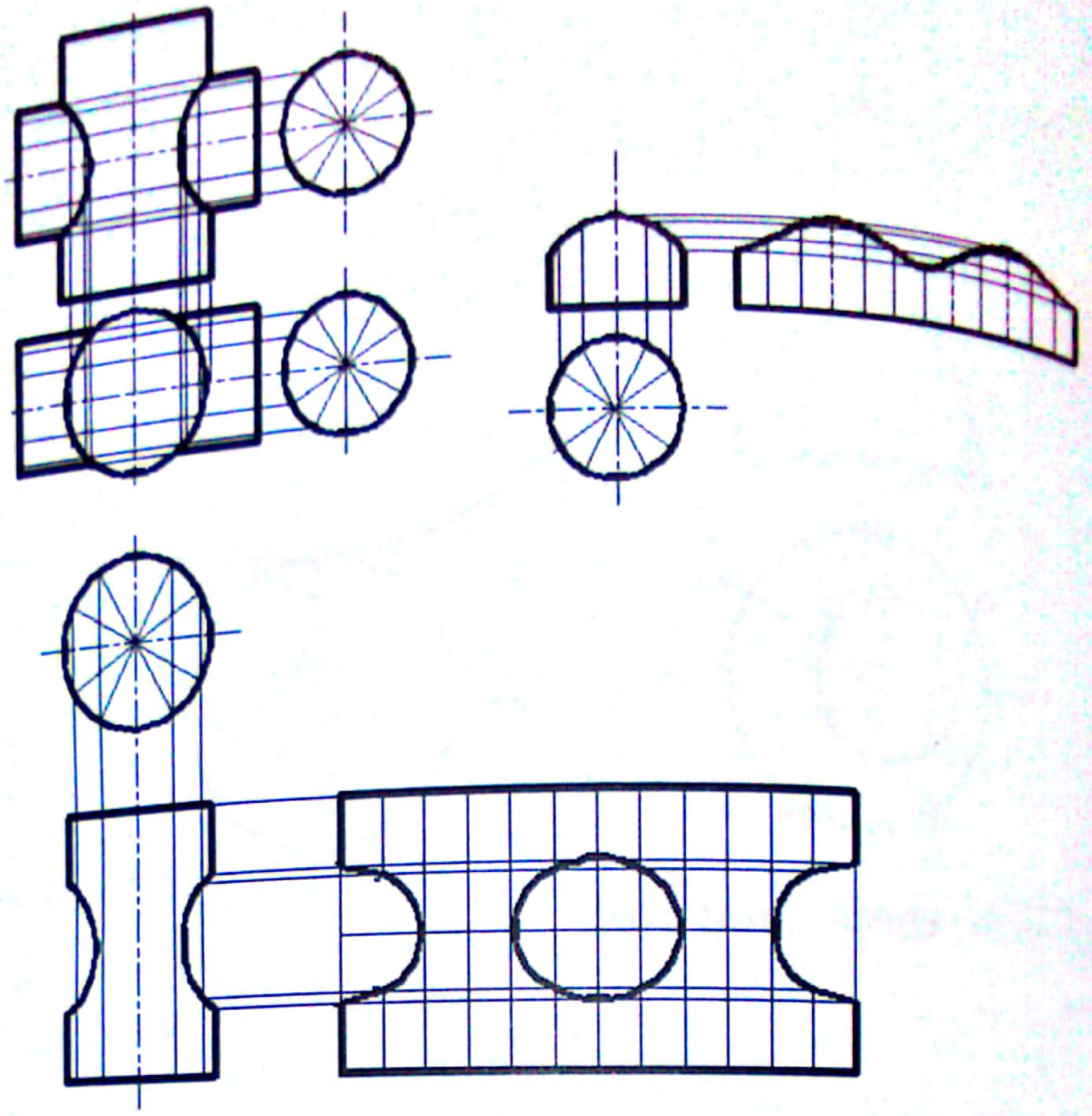


\Solution for check point 5.10



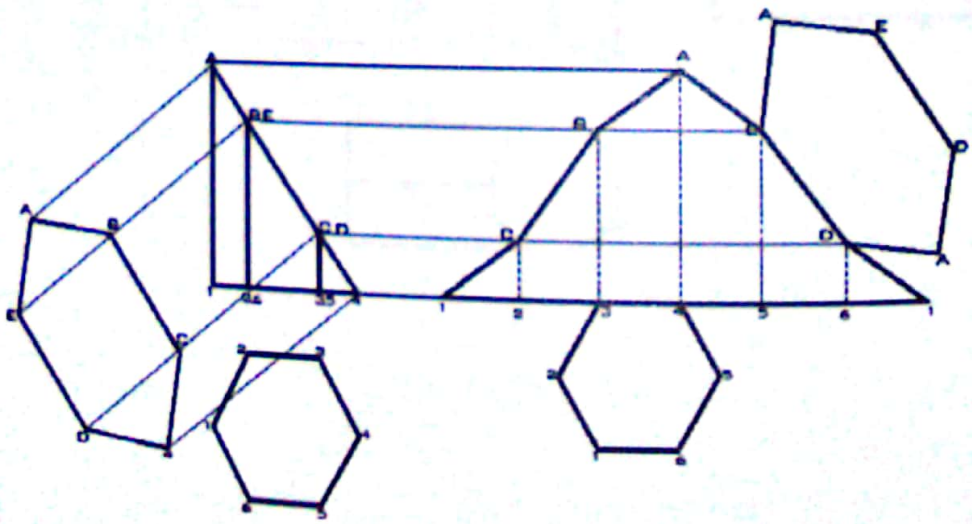
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Solution for check point 5.11



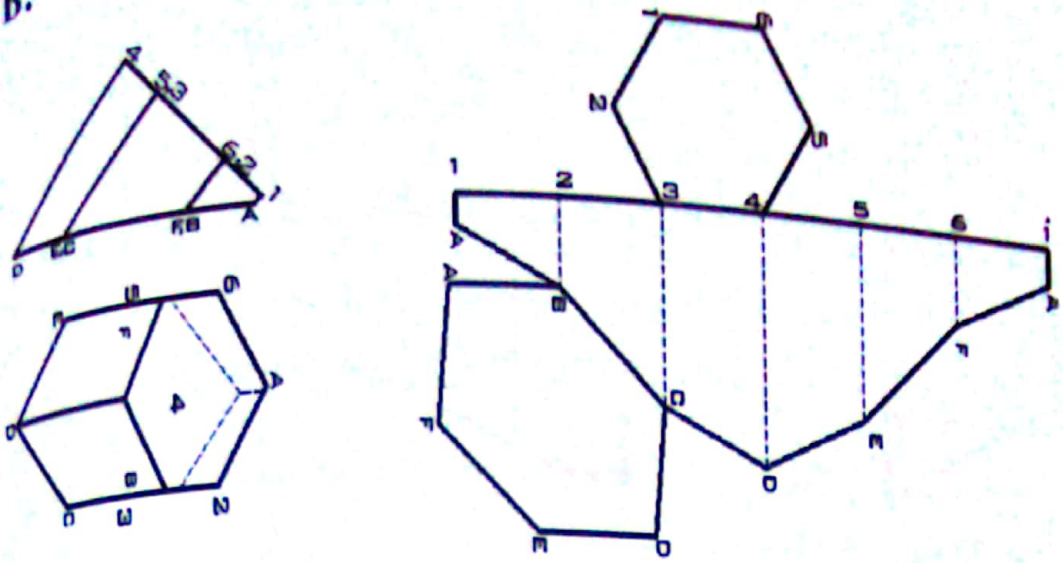
Solution for exercise 1

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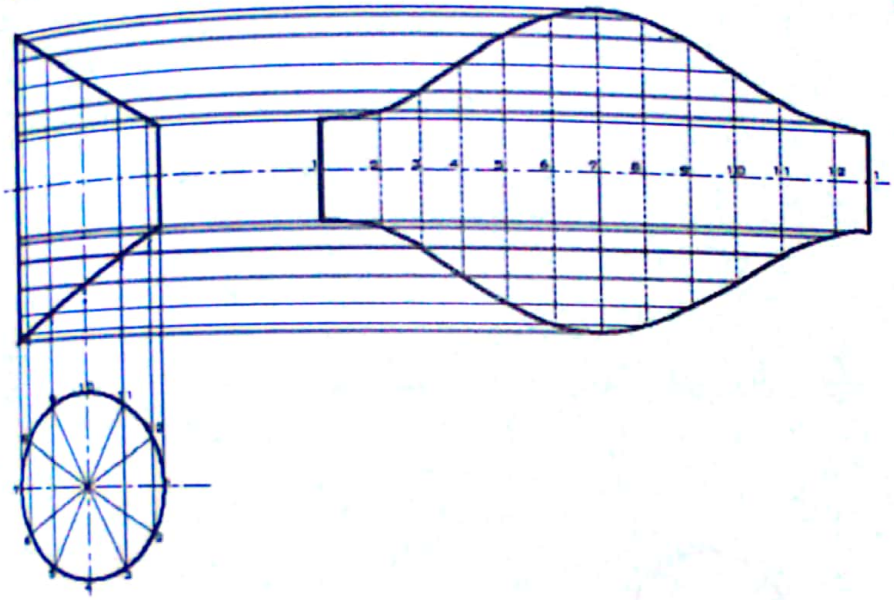


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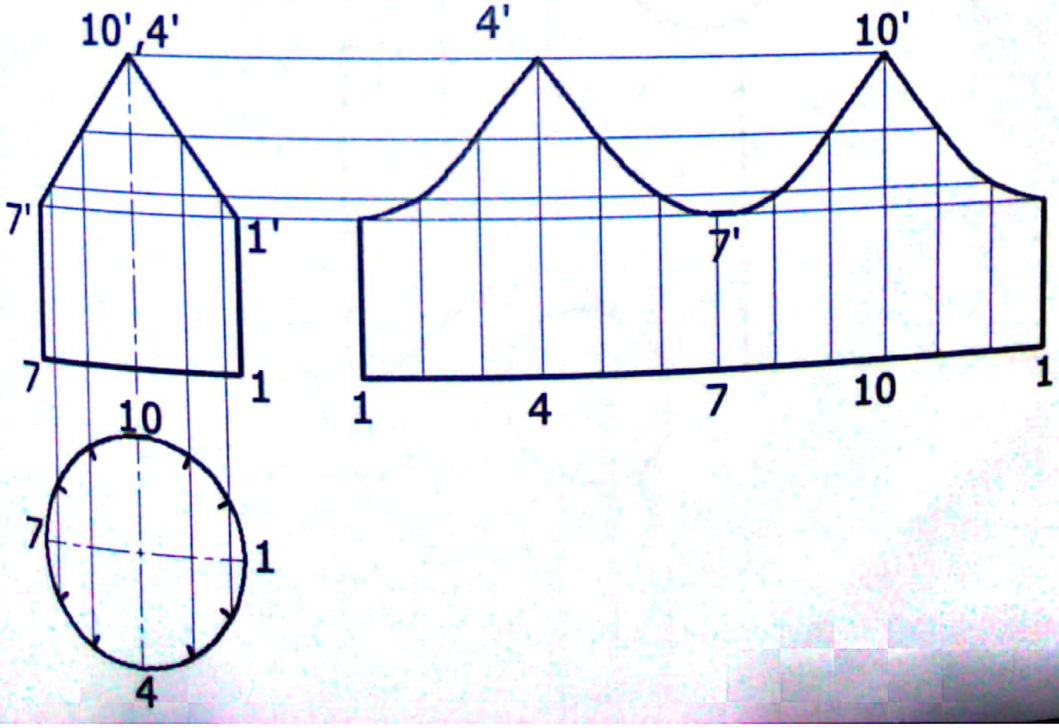
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C.

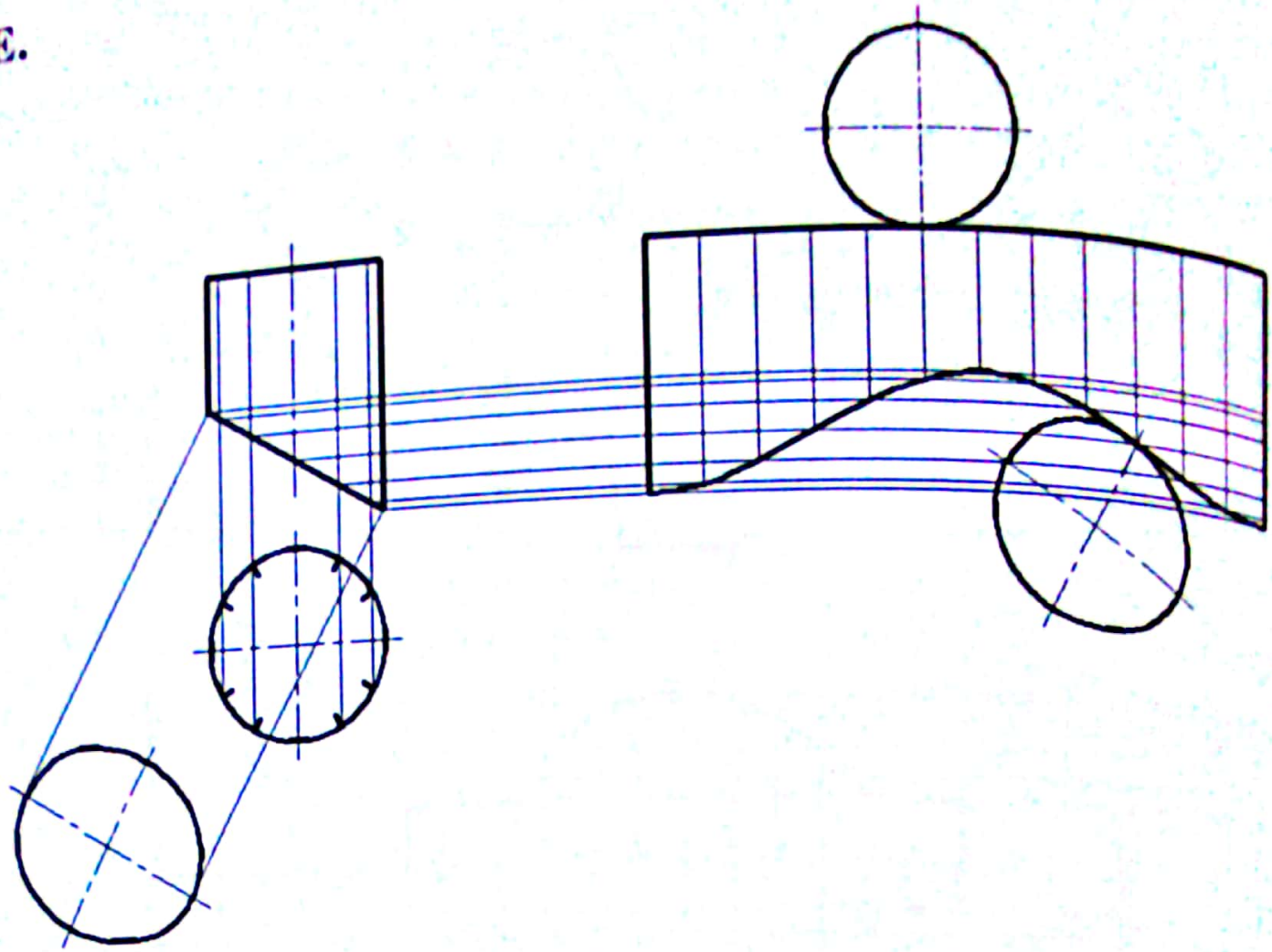


D.

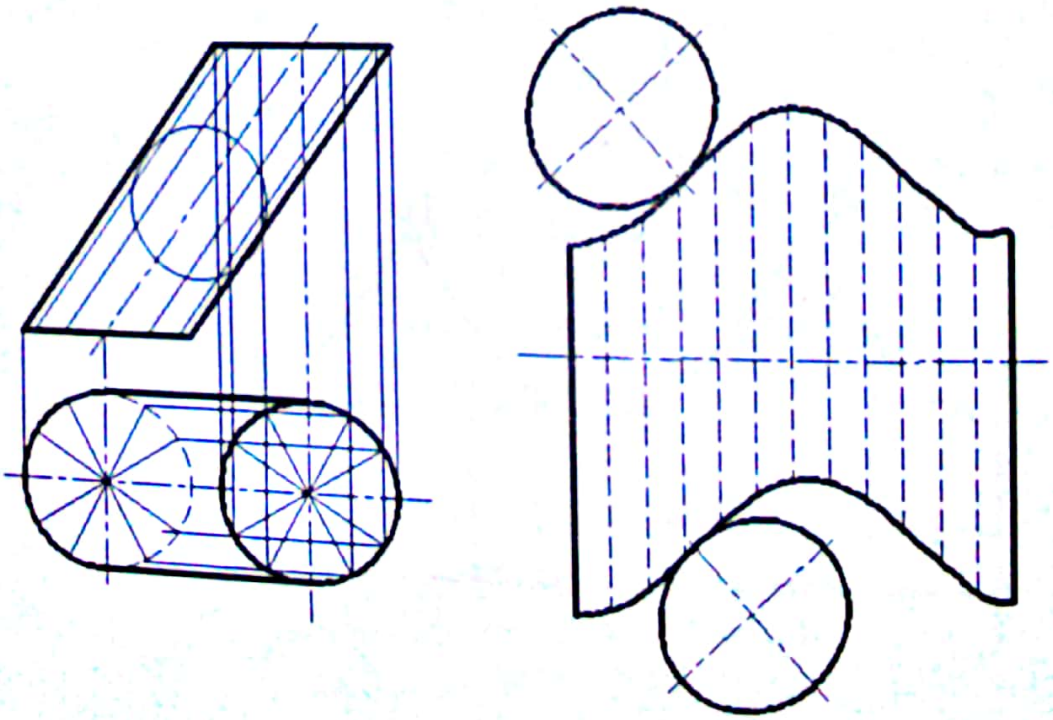


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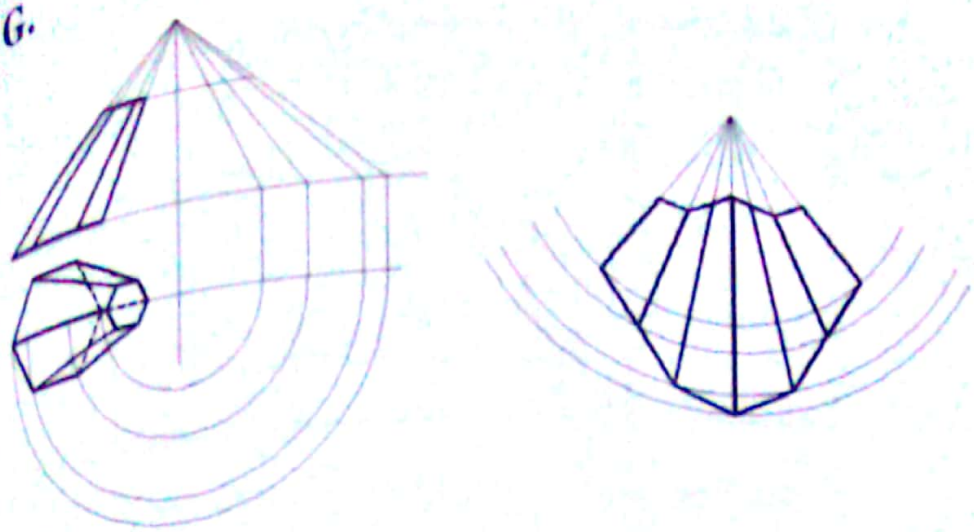


F.

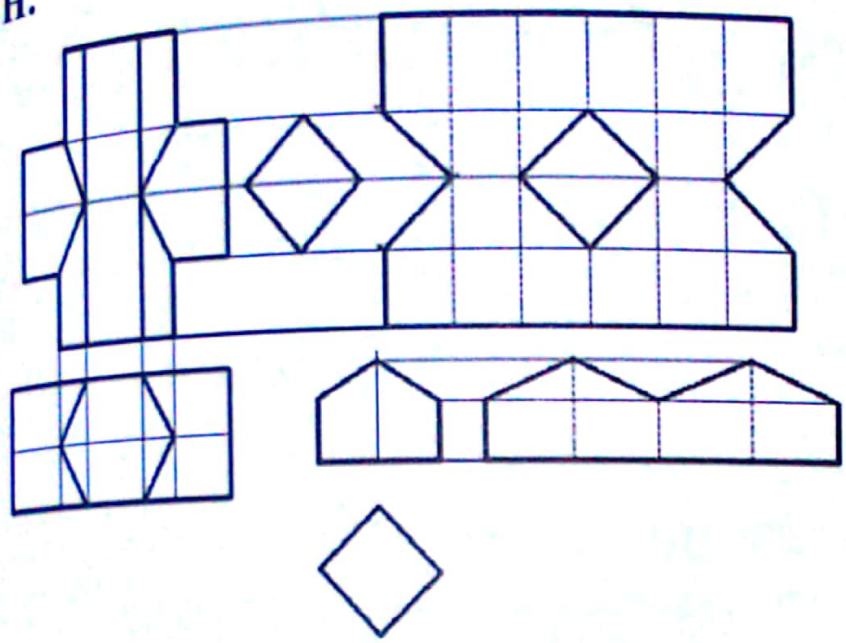


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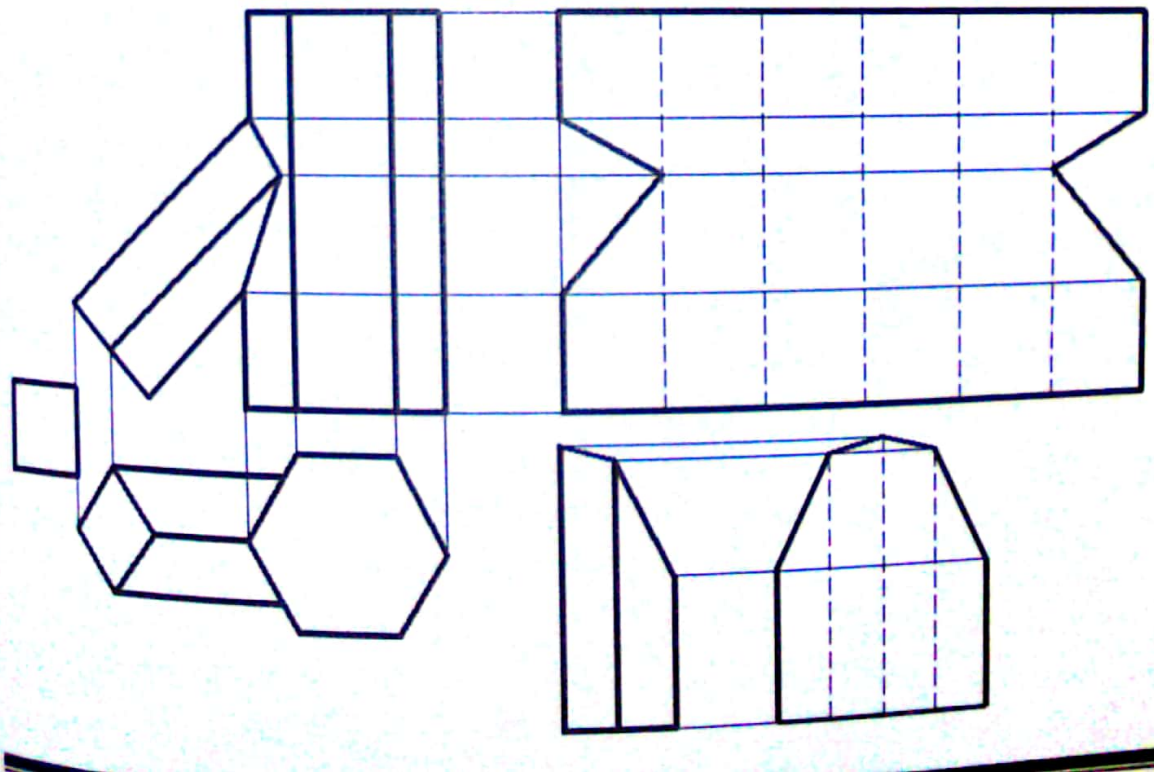
G.



H.

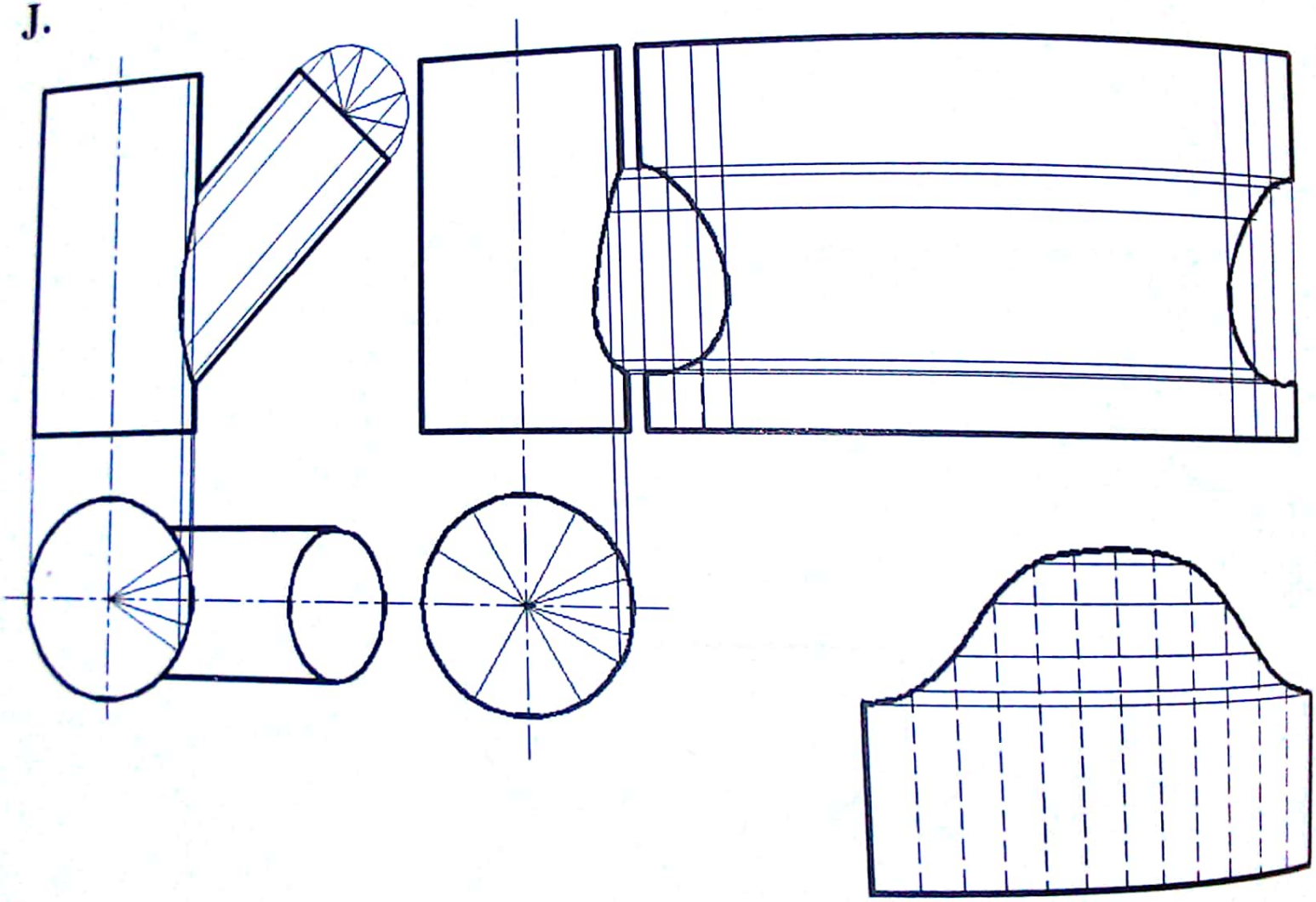


I.



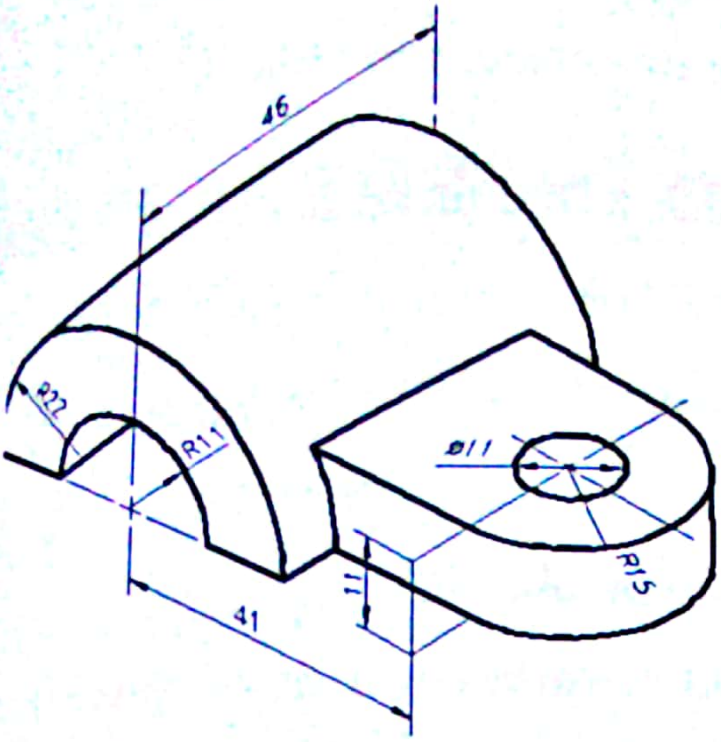
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J.

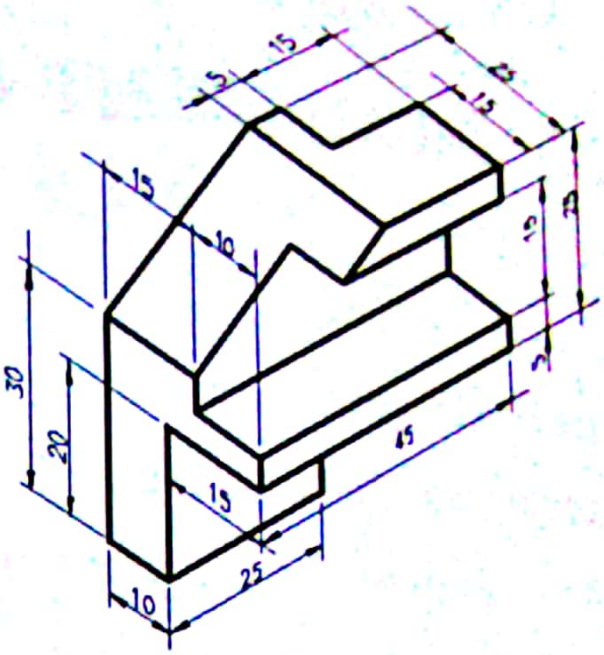


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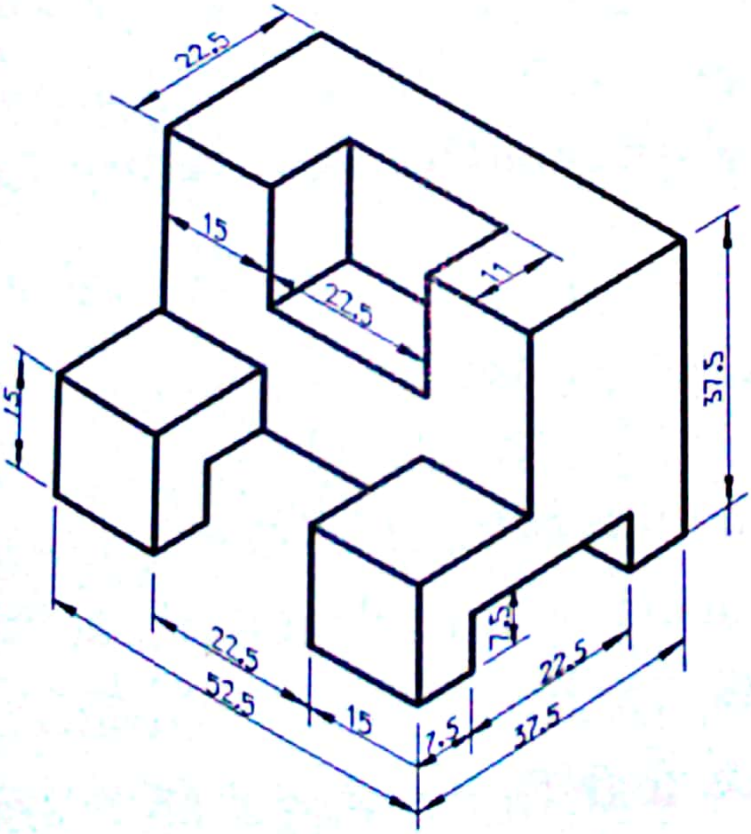
Solution for exercise 2



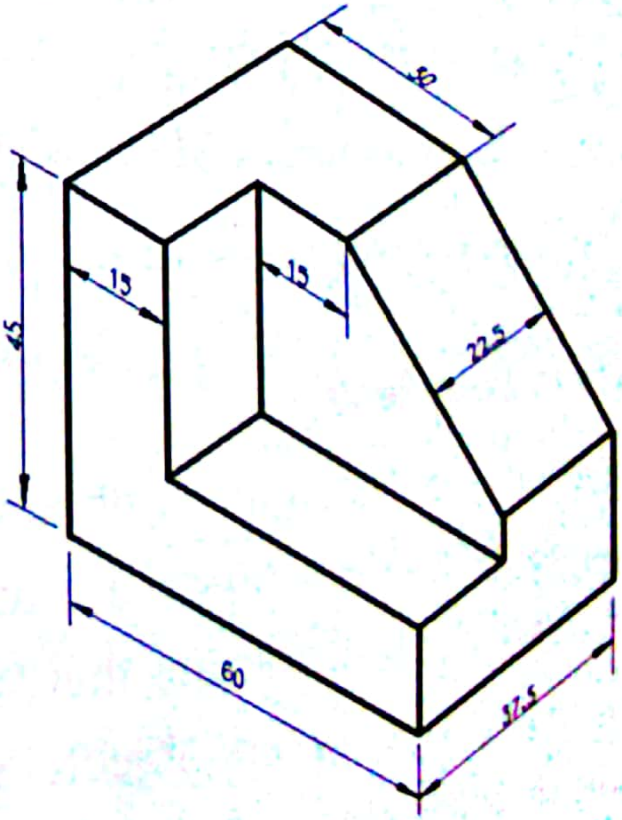
A



B



C



D

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