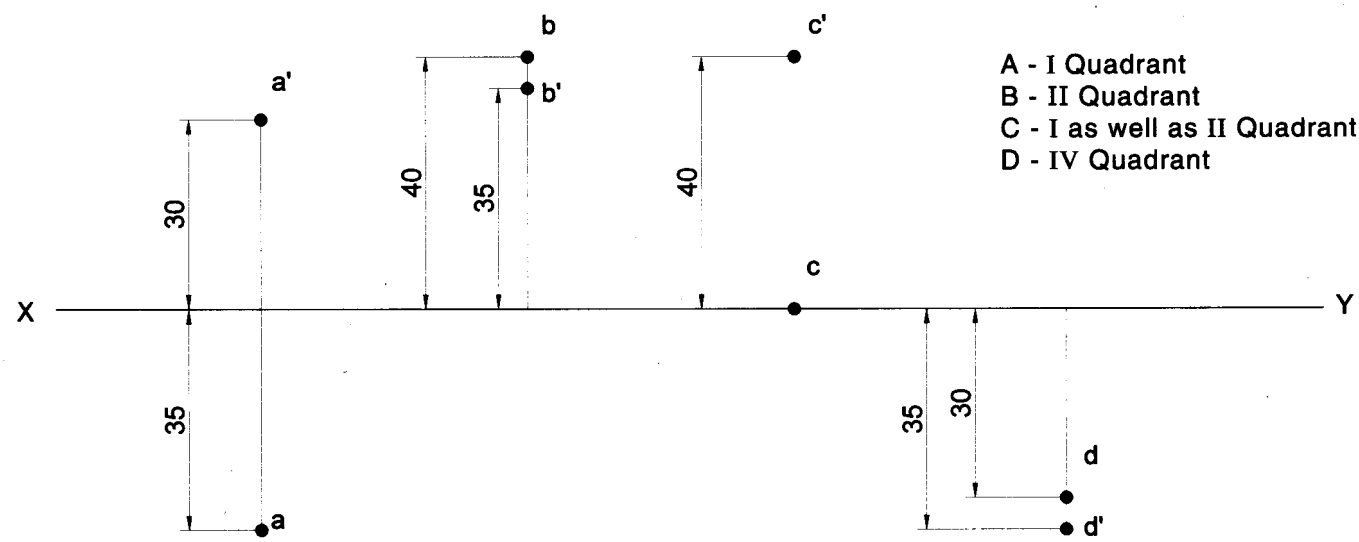
CHAPTER 1

PROJECTIONS OF POINTS

Problem 1 Draw the projections of the following Points on the same XY line, keeping convenient distance between each projectors. Name the Quadrants in which they lie.

A – 30 mm above HP & 35 mm in front of VP.
B – 35 mm above HP & 40 mm behind VP.
C – 40 mm above HP & on VP.
D – 35 mm below HP & 30 mm in front of VP.

Solution

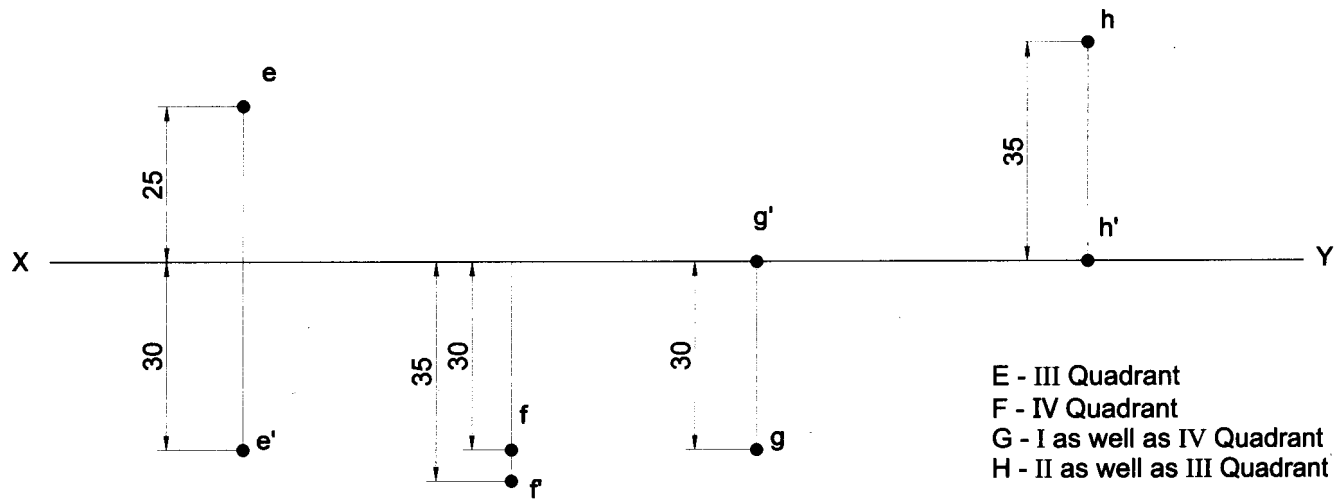


A - I Quadrant
B - II Quadrant
C - I as well as II Quadrant
D - IV Quadrant

Problem 2 Draw the projections of the following Points on the same XY line,Keeping convenient distance between each projectors. Name the Quadrants in which they lie.

E – 30 mm below HP & 25 mm behind VP.
F – 35 mm below HP & 30 mm in front of VP.
G – On HP & 30 mm in front of VP.
H - On HP & 35 mm behind VP.

Solution

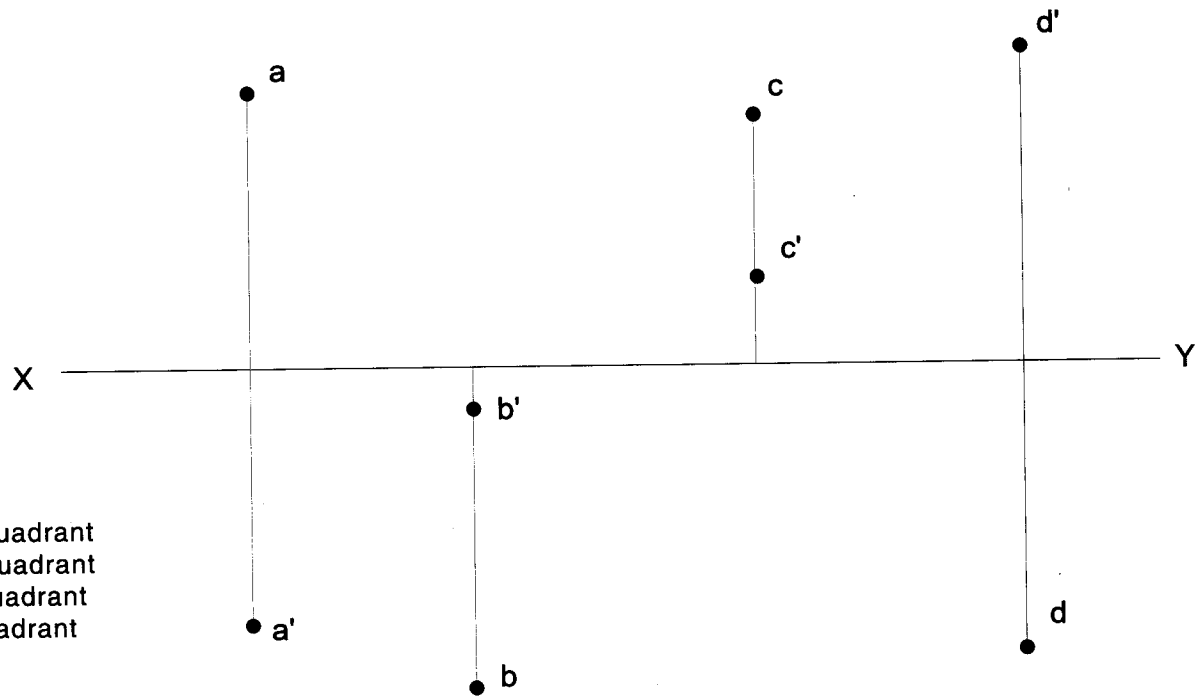


E - III Quadrant
F - IV Quadrant
G - I as well as IV Quadrant
H - II as well as III Quadrant

Problem 3 Draw and state the quadrants in which the following Points are located. Assume any distances.

A – Front view below XY line & Top view above XY line.
B – Front and Top views are below XY line.
C – Front and top views are above XY line.
D – Front view above XY line & top view below XY line.

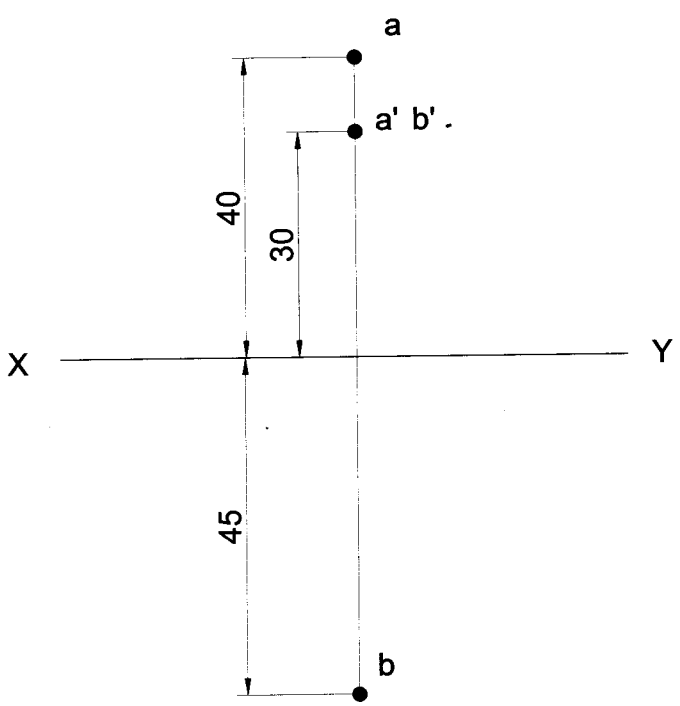
Solution



A - III Quadrant
B - IV Quadrant
C - II Quadrant
D - I Quadrant

Problem 4 A point 30mm above XY line is the front view of two points A&B .The top view of A is 40 mm behind VP & The top view of B is 45 mmin front of VP. Draw The projections of the points & state the quadrants in which the points are situated.

Solution

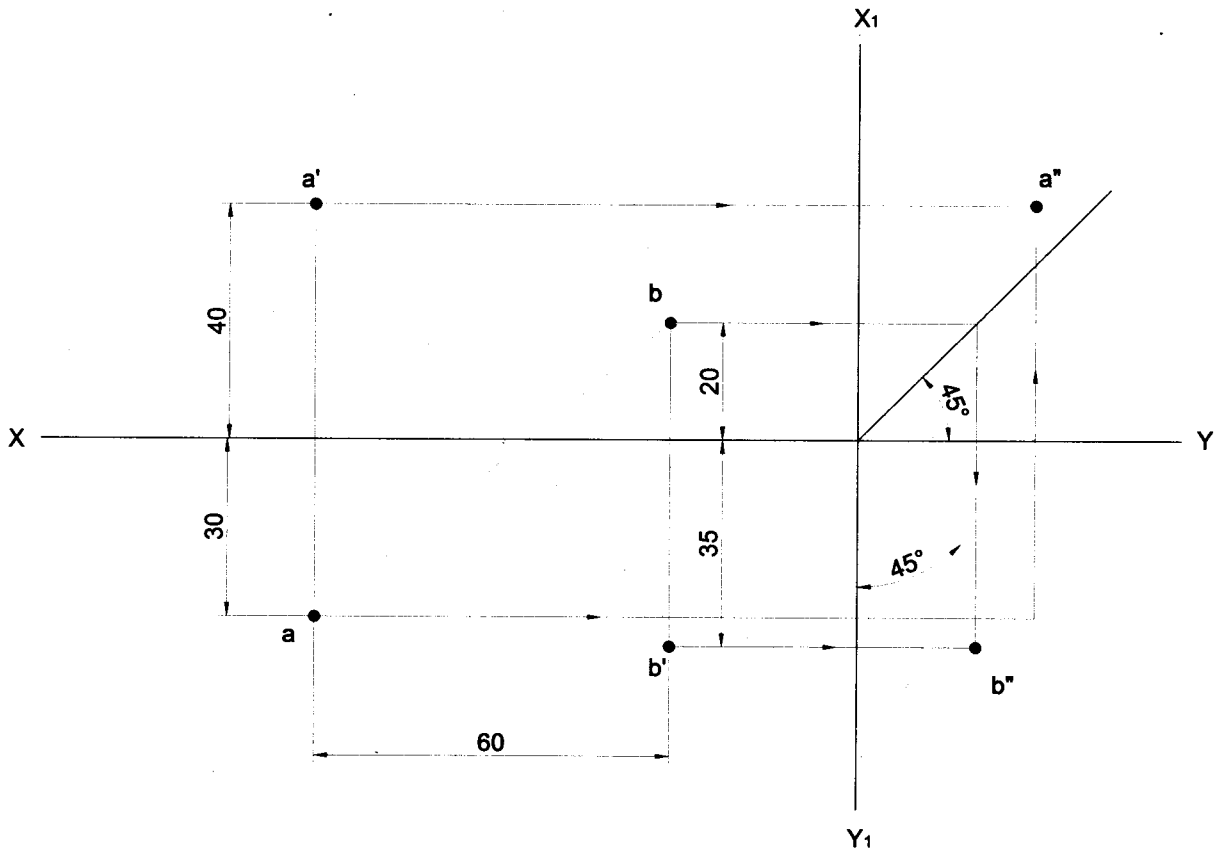


ANSWERS : **A is in II Q**

B is in I Q

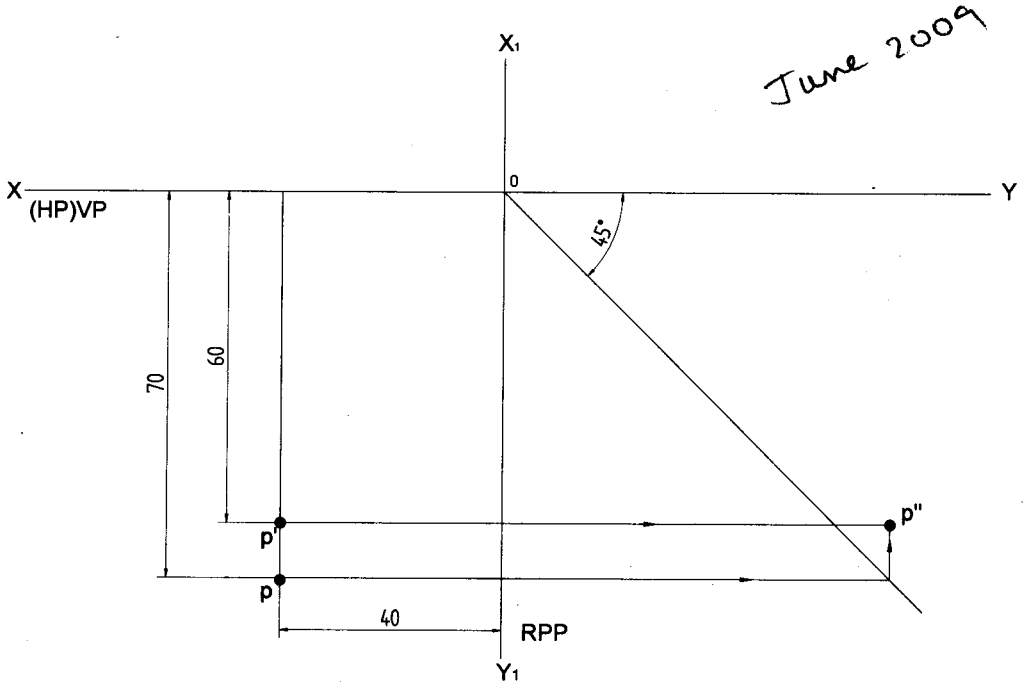
Problem 5 A point 'A' is 30 mm in front of VP and 40mm above HP. Another point B is 20 mm behind VP & 35 mm below HP. The horizontal distance between the points measured parallel to XY line is 60 mm . Draw the three projections of the points. Join their front and top views.

Solution



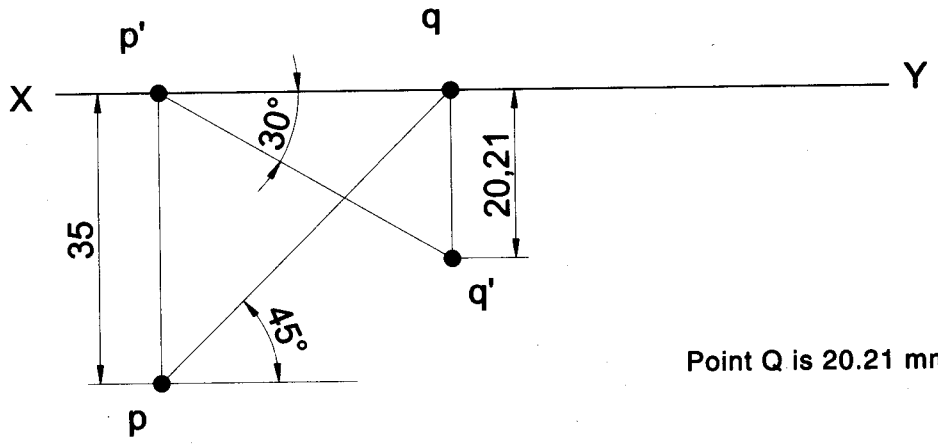
Problem 6 Draw all the three views of a point P lying 60 mm below HP, 70 mm infront of VP and 40 mm from the RPP. Also state the quadrant in which it lies.

Solution



Problem 7 A point P is on HP and 35 mm in front of VP. Another Point Q is on VP and below HP. The line Joining their front views makes an angle of 30 deg to XY line , while the line joining their top views makes an angle of 45 deg with XY line.Find the distance of the point Q from HP.

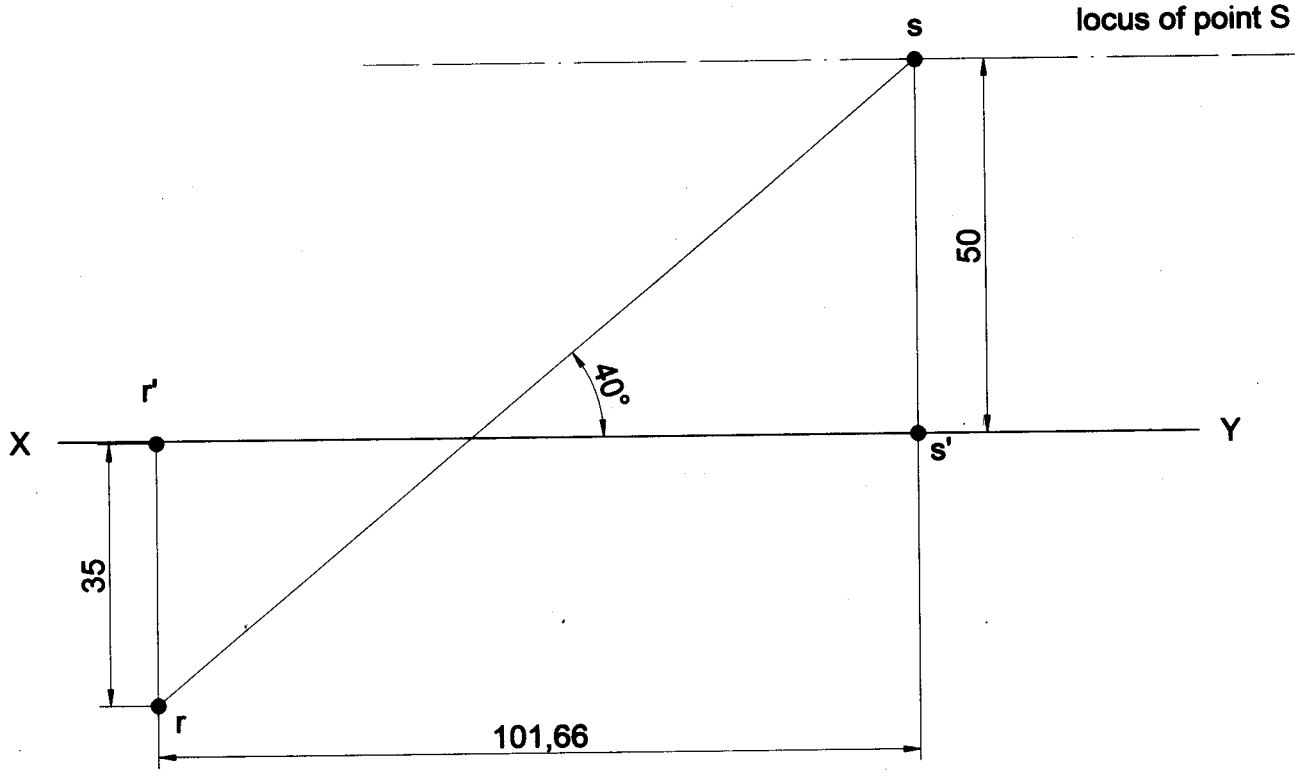
Solution



Point Q is 20.21 mm below HP

Problem 8 Two Points R and S are on HP. The point R is 35 mm in front of VP, while S is 50mm behind VP .The line joining their top views makes an angle of 40deg with XY. Find the horizontal distance between the two projectors.

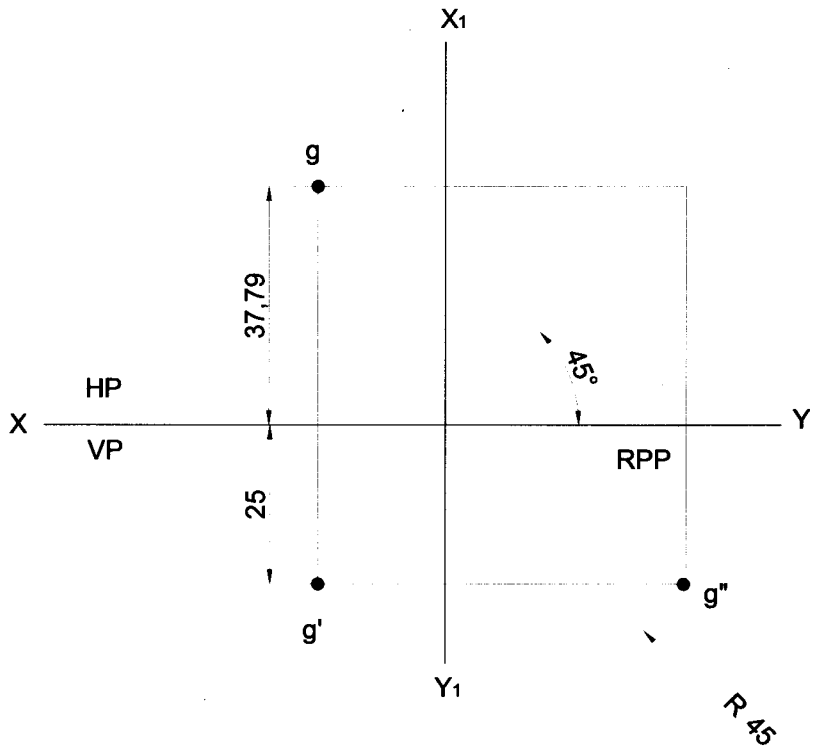
Solution



ANSWER : Distance b/w two projectors is 101.66 mm.

Problem 9 A point G is 25 mm below HP & is situated in the third quadrant. Its shortest distance from the intersection of XY and X1Y1 is 45 mm . Draw its projections and find its distance from VP.

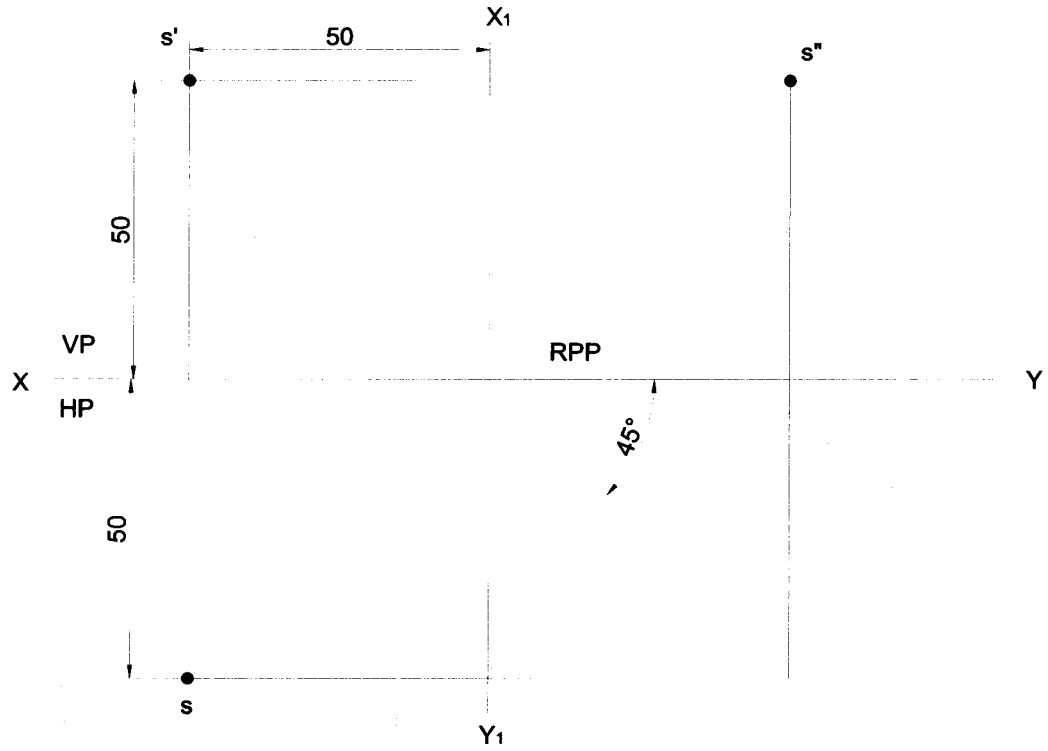
Solution



Point G is 37.79 mm behind VP

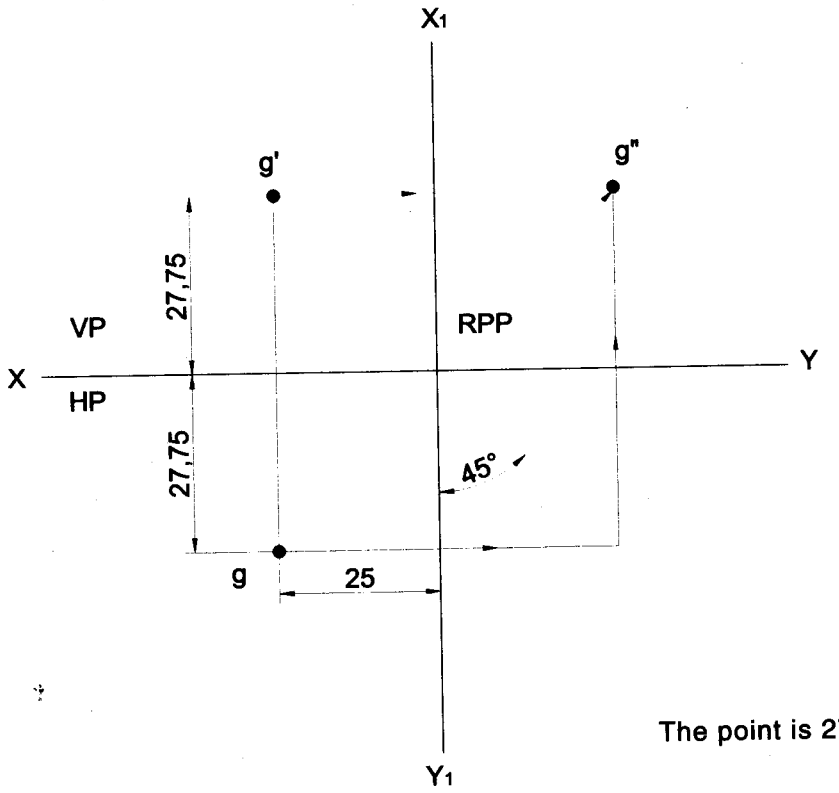
Problem 10 A point S is in the first quadrant and equidistant of 50 mm from all the three principal planes. Draw the projections of the point. Draw all the three views of the point.

Solution



Problem 11 Draw the projections of point G which is in first quadrant such that it is equidistant from HP & VP. The point is 25 mm from RPP. Determine its distances from HP&VP.

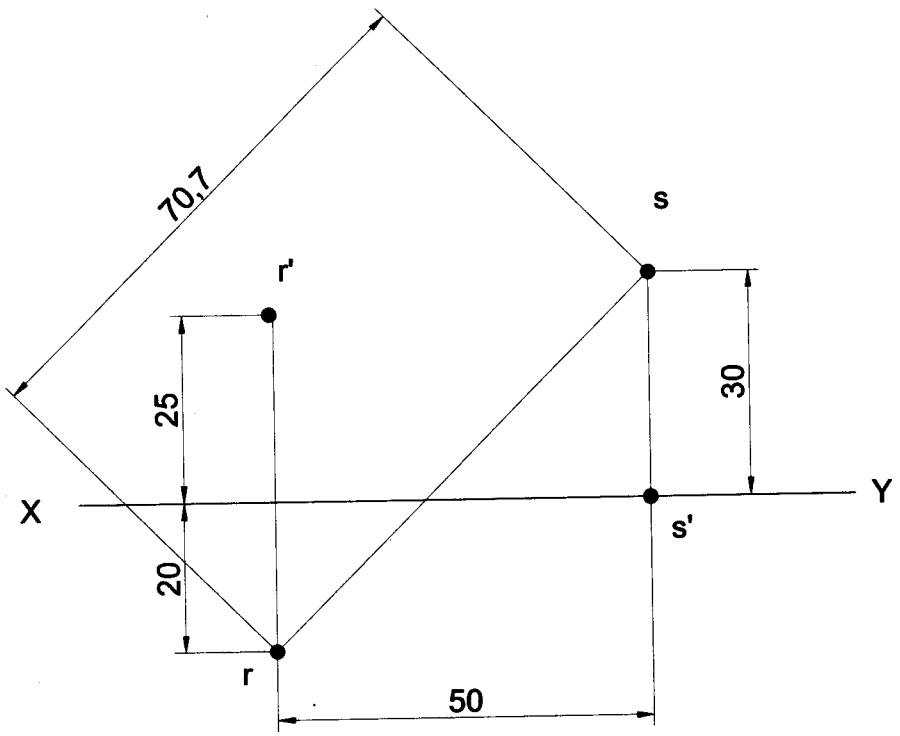
Solution



The point is 27.75 mm from VP and HP

Problem 12 A point R is 25 mm above HP & 20 mm in front of VP. Another point S is on HP and 30 mm behind VP. The distance between their projectors measured parallel to the line of intersection of VP and HP is 50mm. Find the distance between the top views of points R and S.

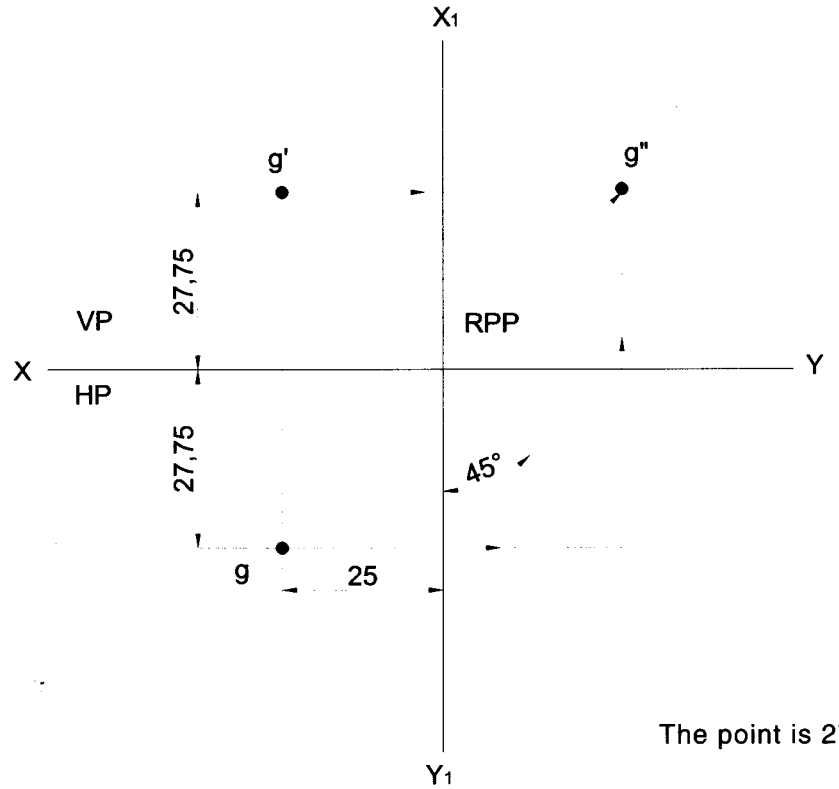
Solution



The Distance Between TVs of R and S is 70.7 mm

Problem 11 Draw the projections of point G which is in first quadrant such that it is equidistant from HP & VP. The point is 25 mm from RPP. Determine its distances from HP&VP.

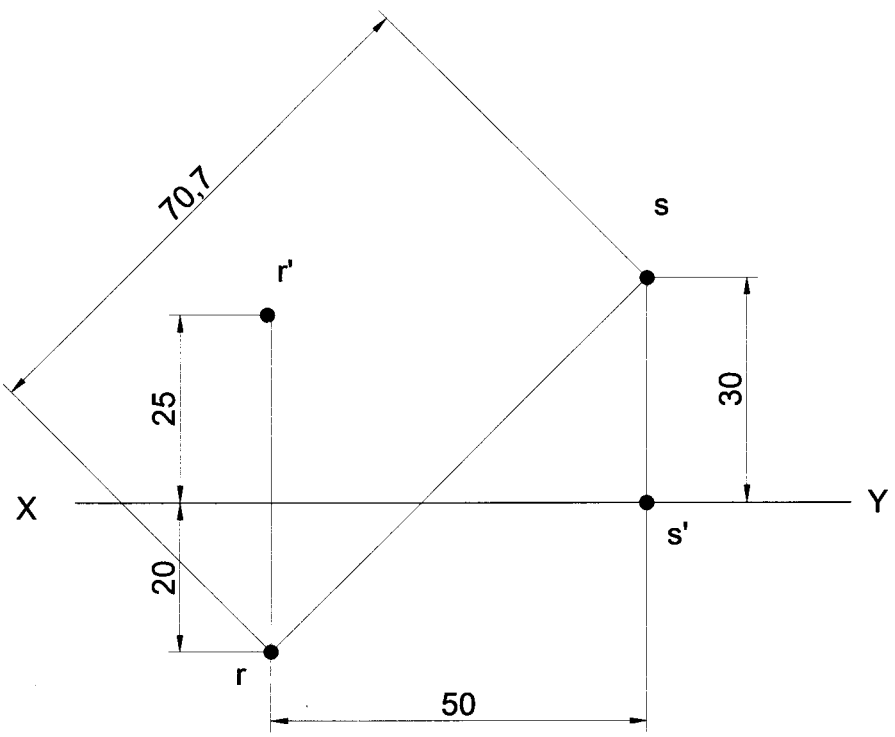
Solution



The point is 27.75 mm from VP and HP

Problem 12 A point R is 25 mm above HP & 20 mm in front of VP. Another point S is on HP and 30 mm behind VP. The distance between their projectors measured parallel to the line of intersection of VP and HP is 50mm. Find the distance between the top views of points R and S.

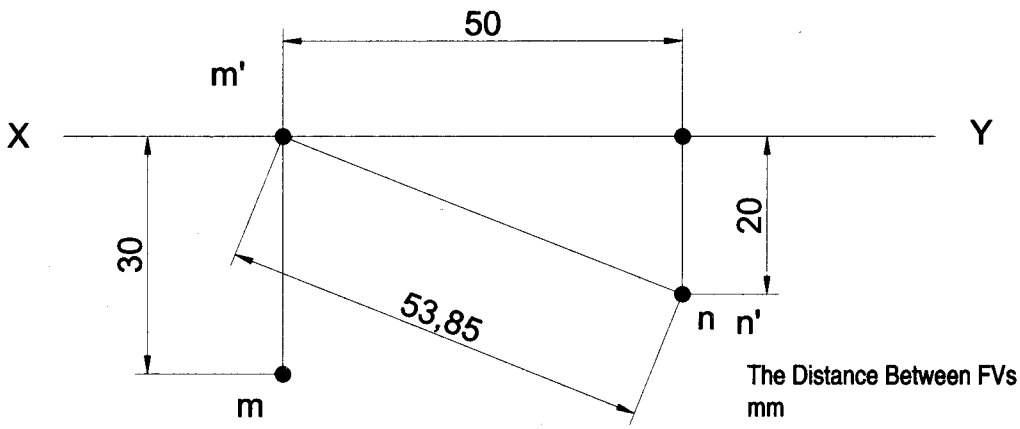
Solution



The Distance Between TVs of R and S is 70.7 mm

Problem 13 A point M is on HP & 30 mm in front of VP. Another point N is 20 mm below HP and 20 mm in front of VP. The distance between their projectors measured parallel to XY line is 50 mm. Find the distance between front views of the points M & N.

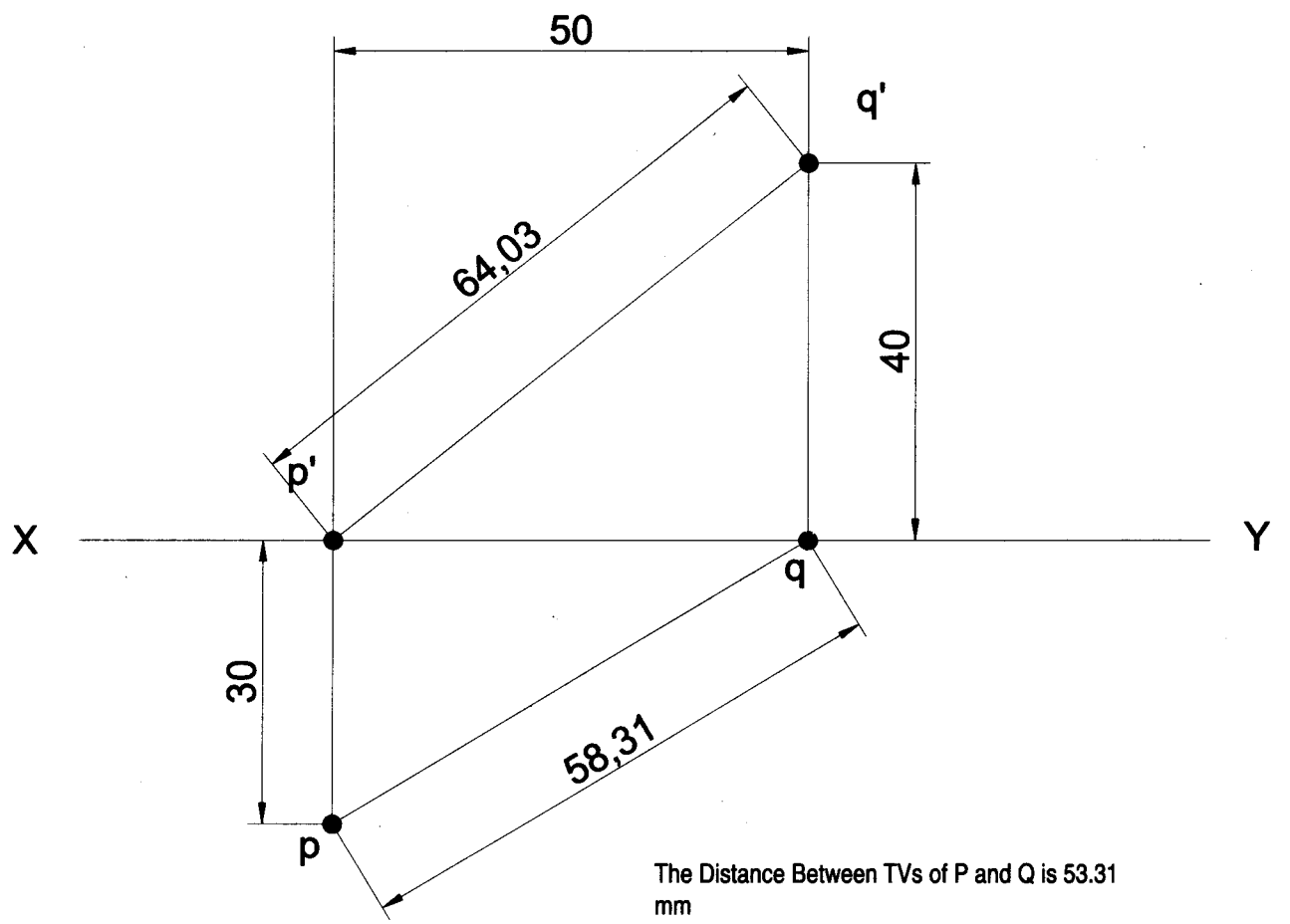
Solution



The Distance Between FVs of M and N is 53.85 mm

Problem 14 A point P is on HP and 30 mm in front of VP. Another point Q is on VP and 40 mm above HP. The distance between their projectors parallel to XY line is 50 mm. Find the distance between their front and top views of the points P and Q.

Solution

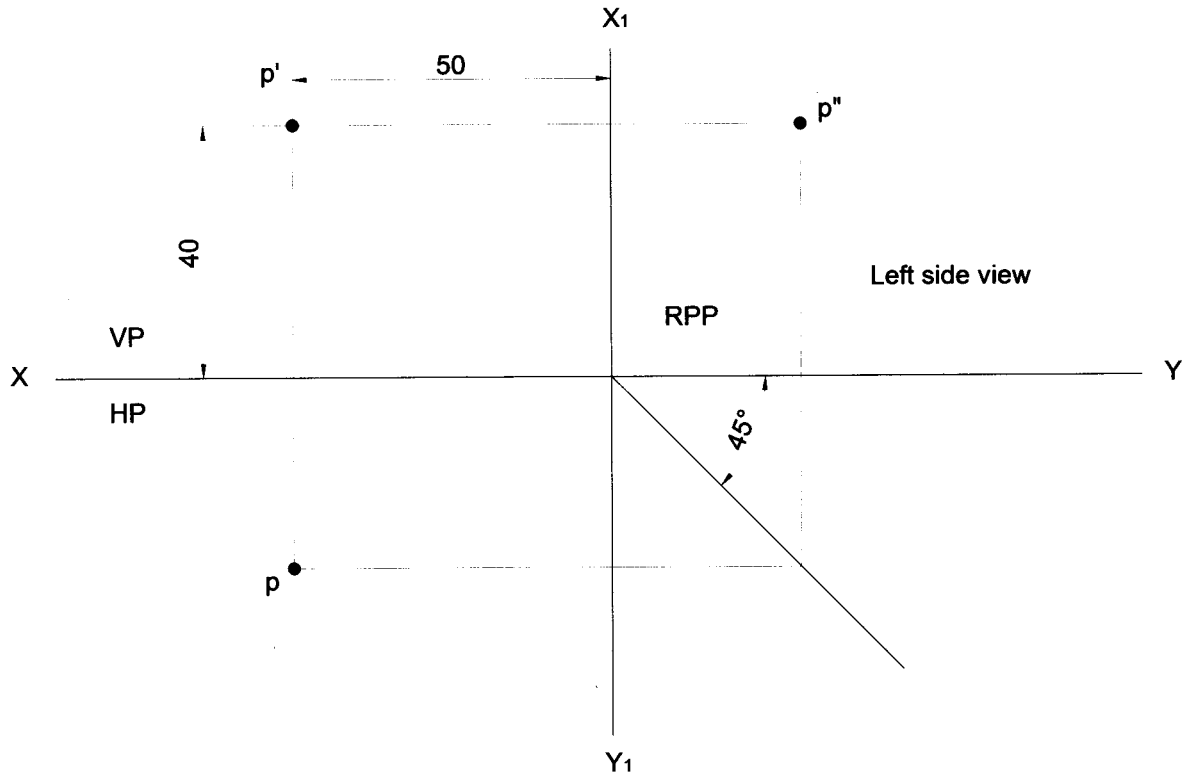


The Distance Between TVs of P and Q is 53.31 mm

The Distance Between FVs of P and Q is 64.03 mm

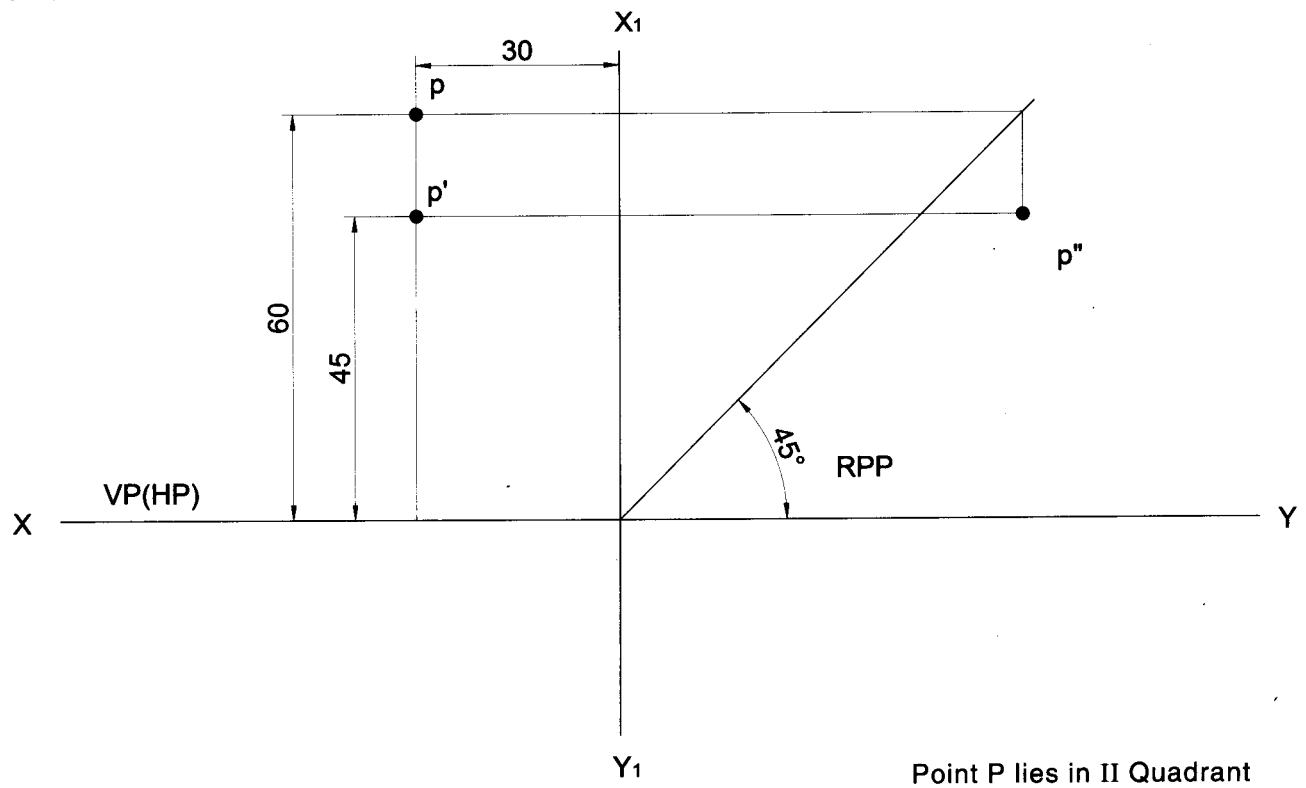
Problem 15 A point P is 30 mm in front of VP, 40 mm above HP and 50 mm from RPP. Draw its projections.

Solution



Problem 16 The point P is 45 mm above HP, 60 mm behind VP and 30 mm from RPP. Draw the three principles view of the point. Also state the quadrant in which it lies.

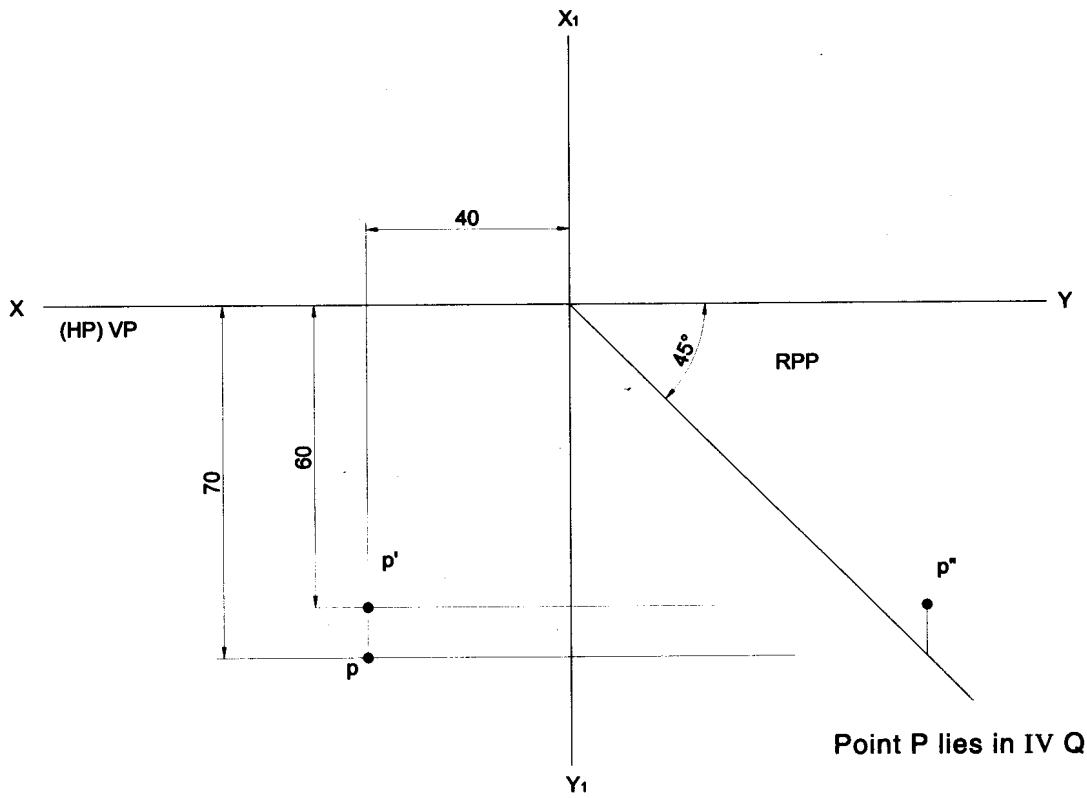
Solution



Point P lies in II Quadrant

Problem 17 Draw all the three views of a point P lying 60 mm below HP, 70 mm in front of VP and 40 mm from the RPP. Also state the quadrant in which it lies.

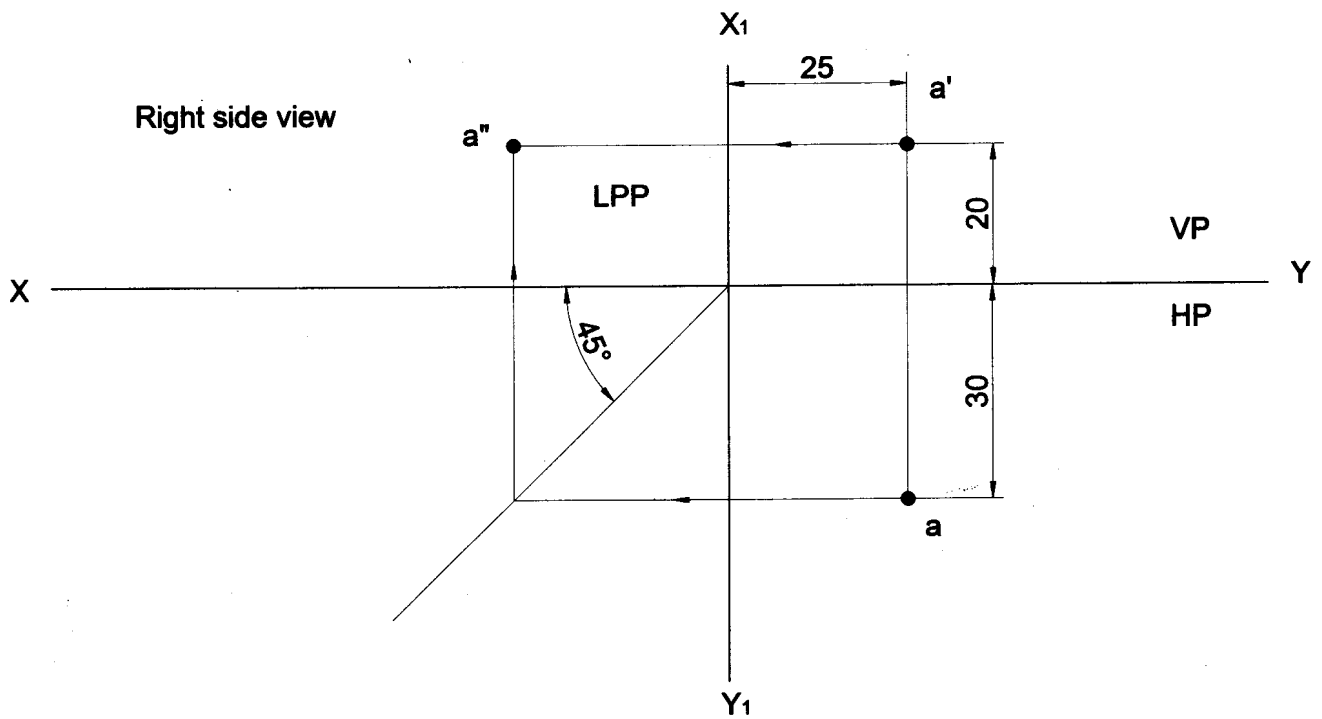
Solution



Point P lies in IV Quadrant

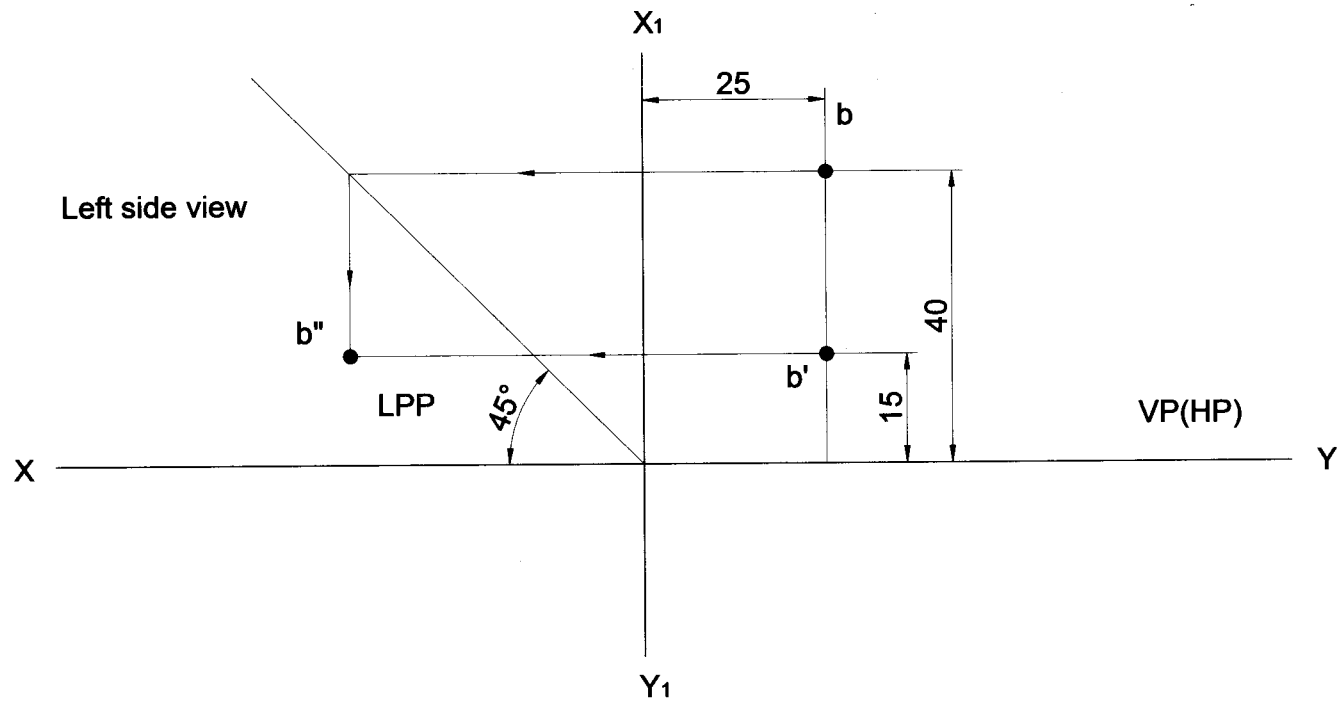
Problem 18 A point is 30 mm in front of VP 20 mm above HP & 25 mm in front / behind / from LPP. Draw its Projections and name the side view.

Solution



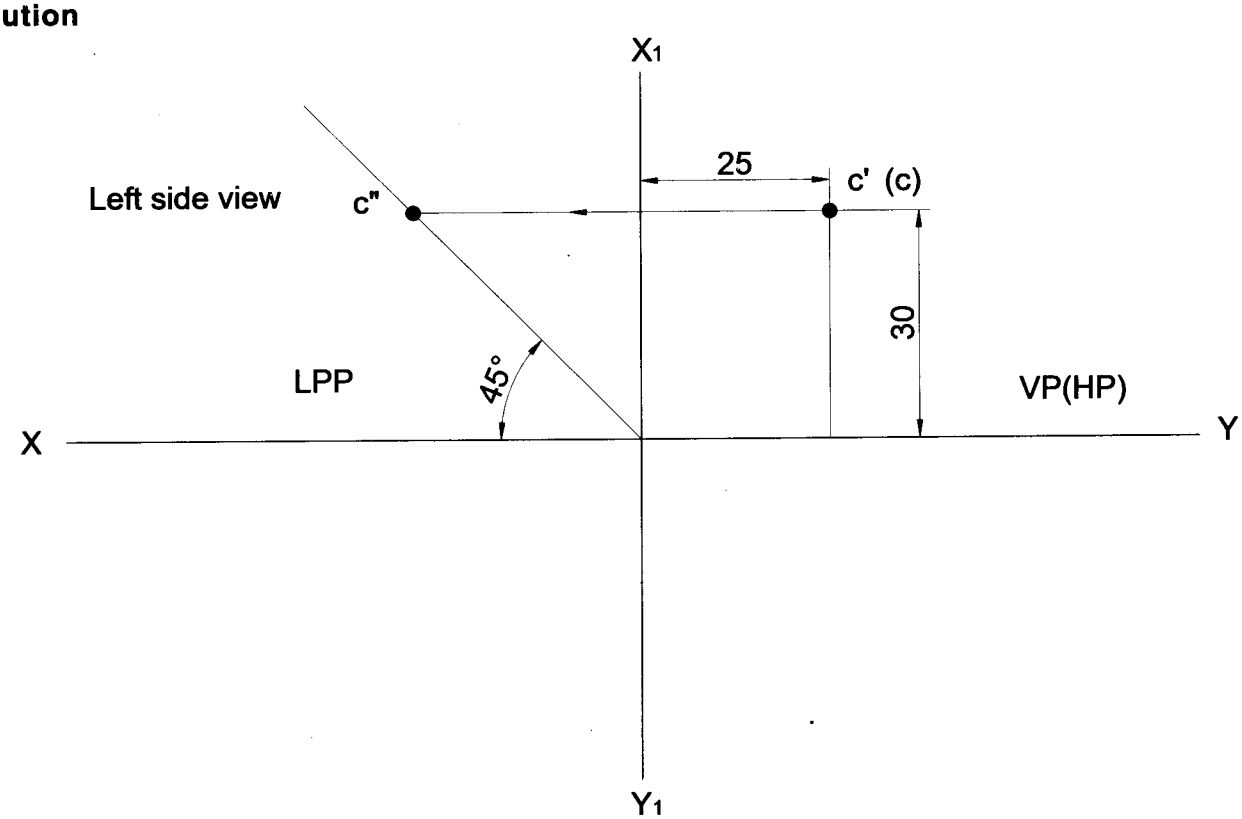
Problem 19 A point is 40 mm behind VP, 15 mm above HP and 25 mm in front / behind / from LPP .Draw its projections and name the side view.

Solution



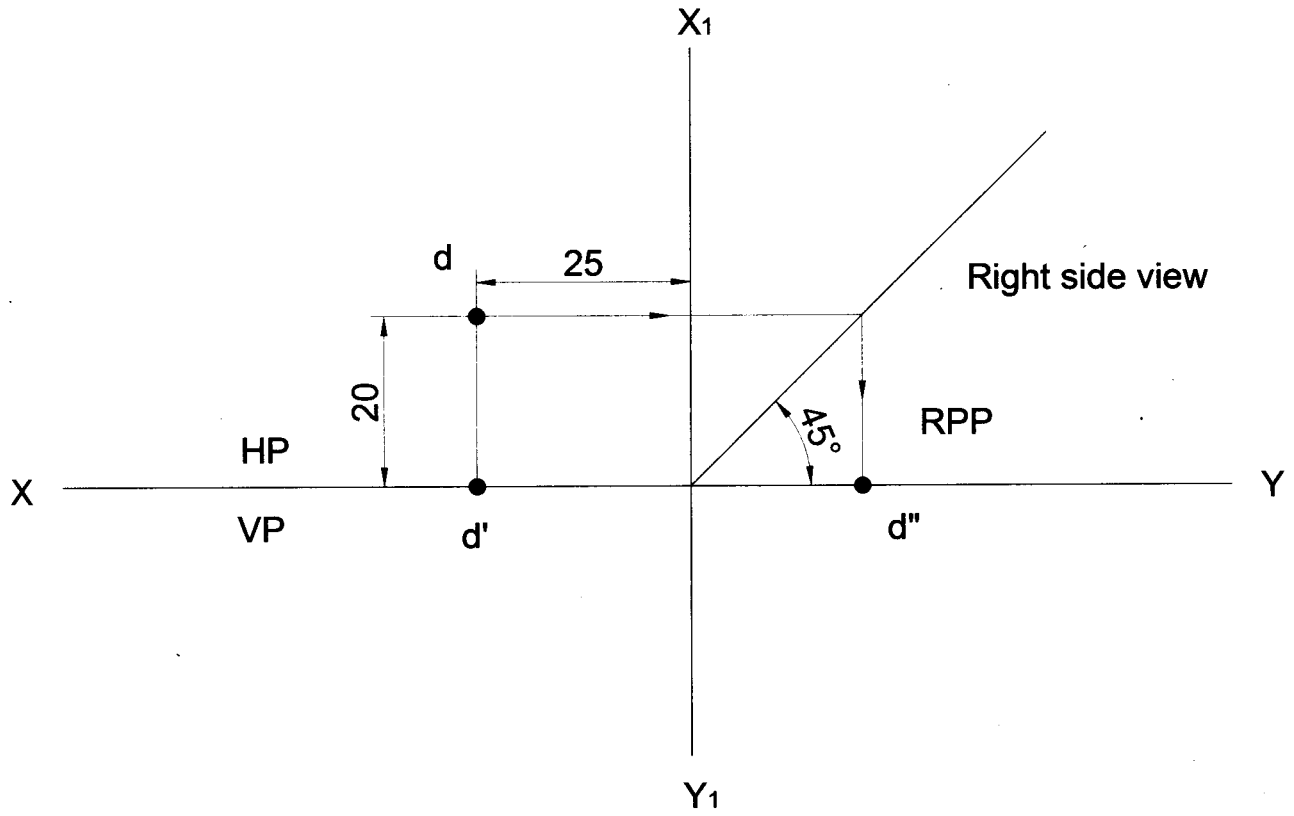
Problem 20 A point is 30 mm behind VP, 30 mm above HP and 25 mm in front / behind / from LPP. Draw its projections and name the side view.

Solution



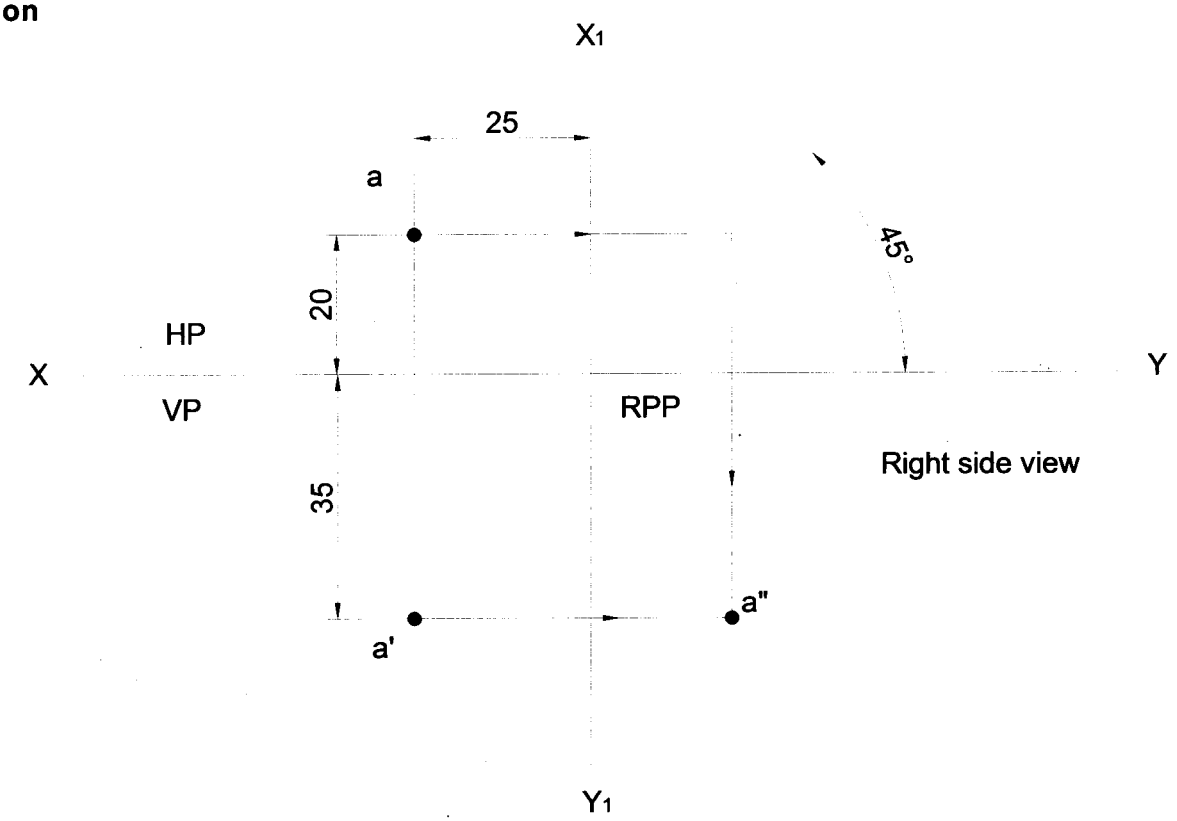
Problem 21 A point is lying on HP, 20 mm behind VP & 25 mm behind / in front / from RPP. Draw its projections and name the side view.

Solution



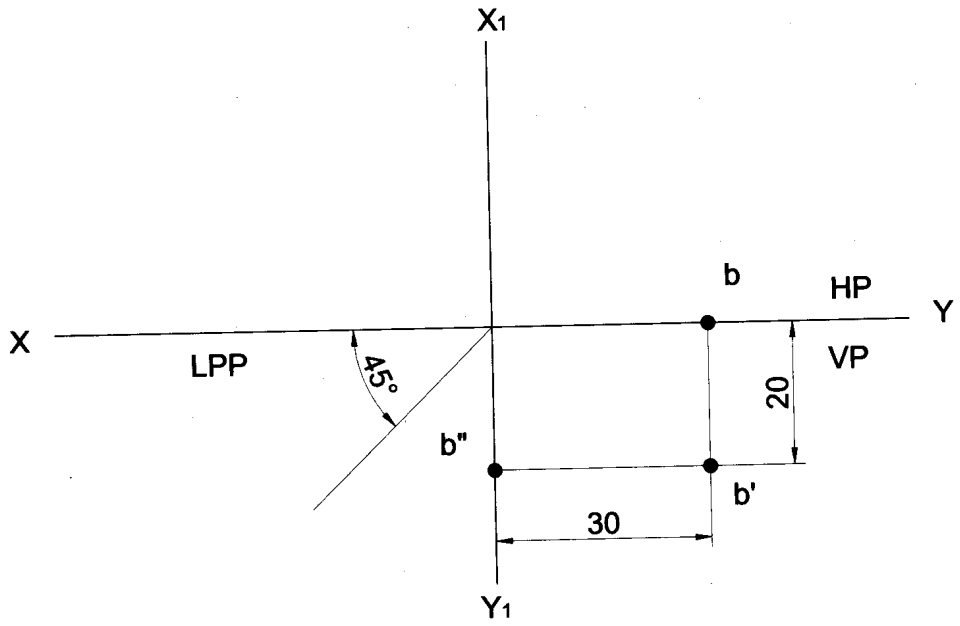
Problem 22 A point is 35 mm below HP, 20 mm behind VP & 25 mm behind / infront / from RPP. Draw its projections and name the side view.

Solution



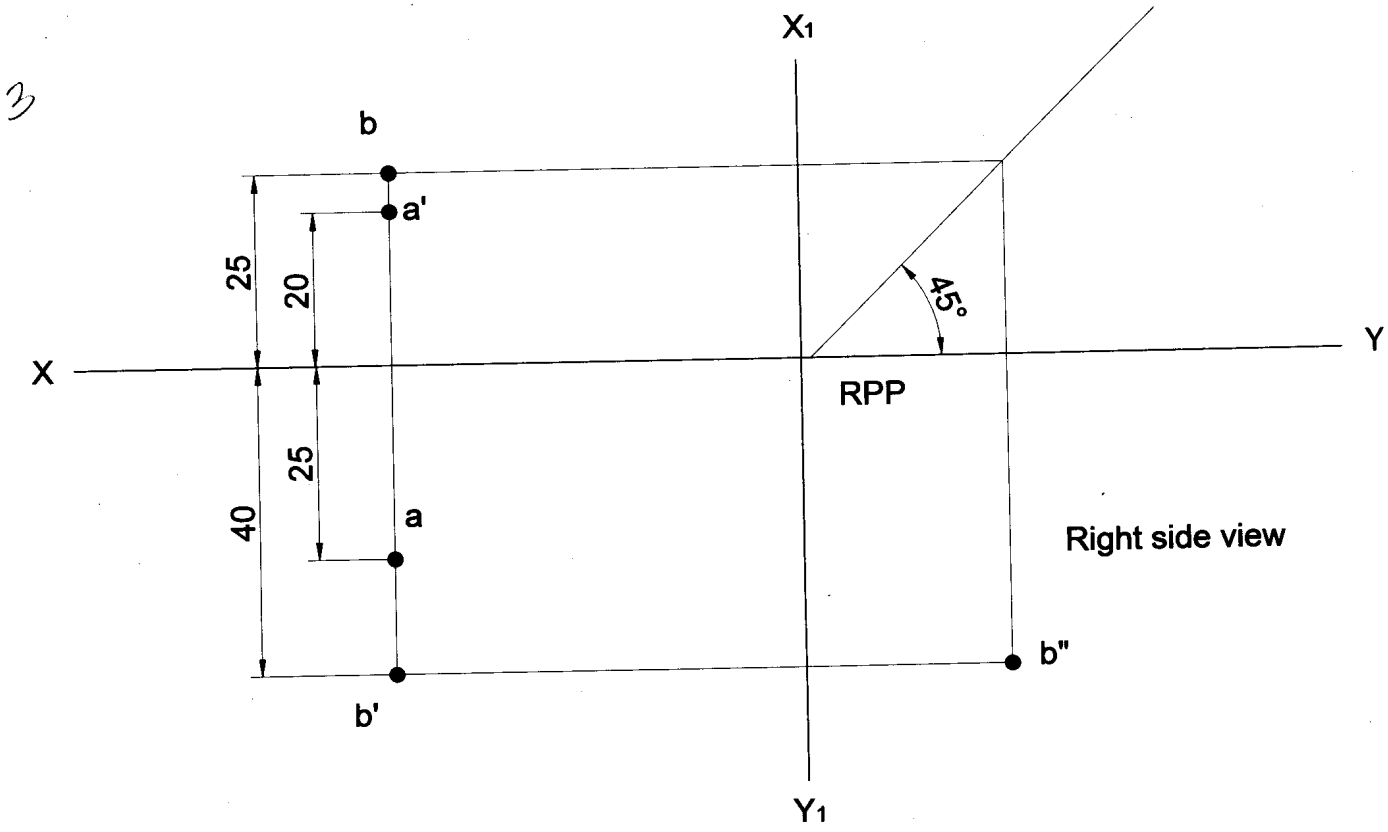
Problem 23 A point is lying on VP, 20 mm below HP & 30 mm behind / infront / from LPP. Draw its projections and name the side view.

Solution



Problem 24 A point A is 20 mm above HP & 25 mm in front of VP. Another point B is 25 mm behind VP and 40 mm below HP. Draw their projections when the distance between their projectors parallel to XY line is zero mm. Add the right side view only to point B.

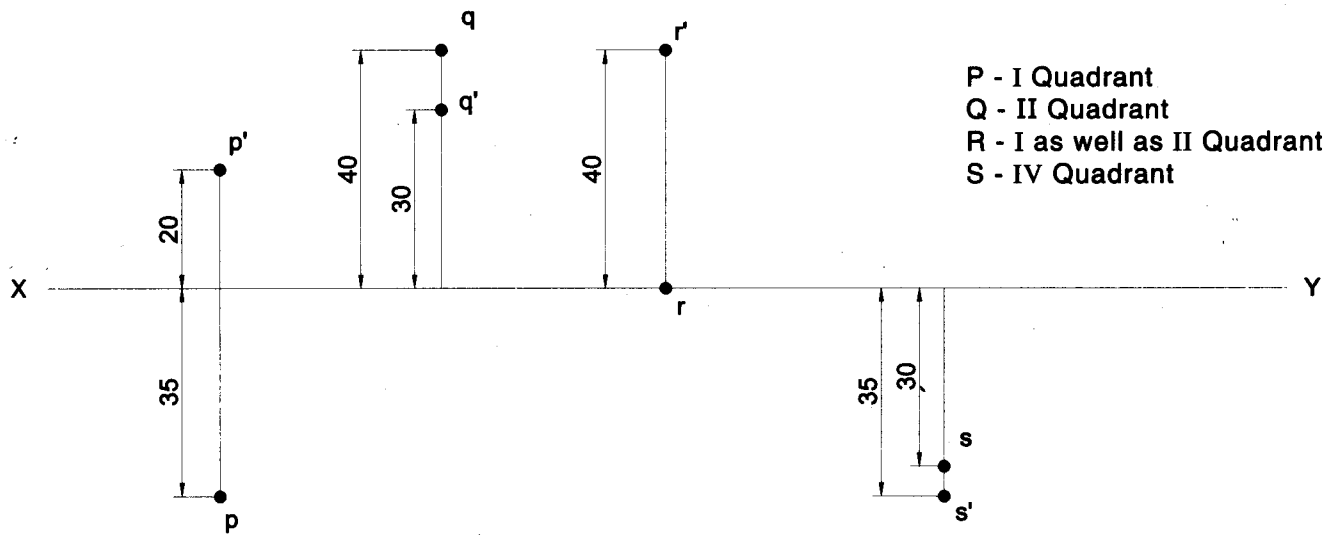
Solution



Problem 25 Draw the projections of the following Points on the same XY line, keeping convenient distance between each projectors. Name the Quadrants in which they lie.

P – 20 mm above HP & 35 mm in front of VP.
Q – 30 mm above HP & 40 mm behind VP.
R – 40 mm above HP & on VP.
S – 35 mm below HP & 30 mm in front of VP.

Solution

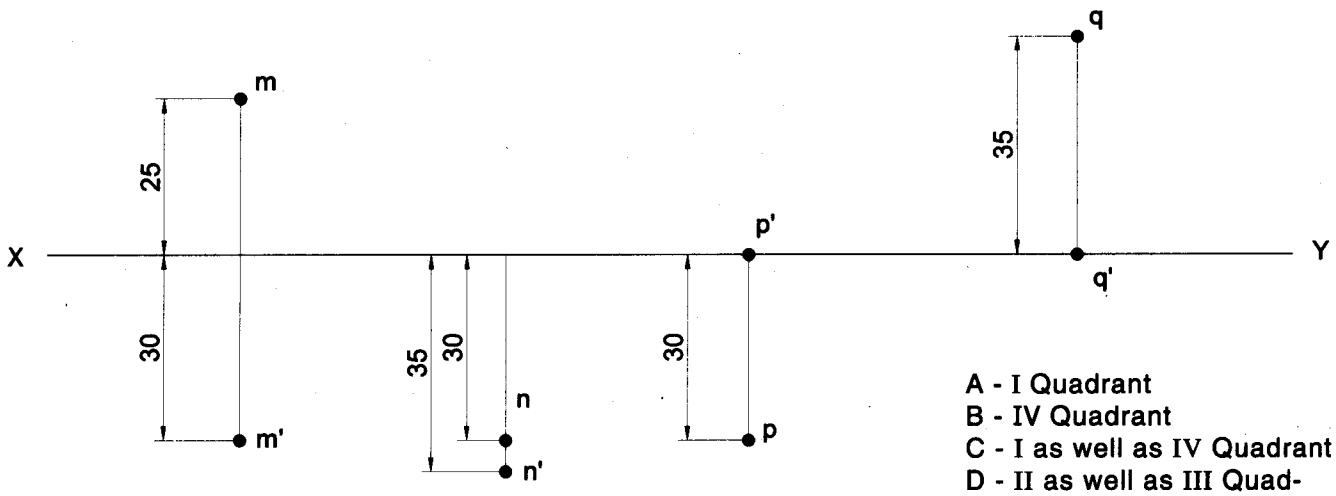


P - I Quadrant
Q - II Quadrant
R - I as well as II Quadrant
S - IV Quadrant

Problem 26 Draw the projections of the following Points on the same XY line, Keeping convenient distance between each projectors. Name the Quadrants in which they lie.

M – 30 mm below HP & 25 mm behind VP.
N – 35 mm below HP & 30 mm in front of VP.
P – on HP & 30 mm in front of VP.
Q – on HP & 35 mm behind of VP.

Solution

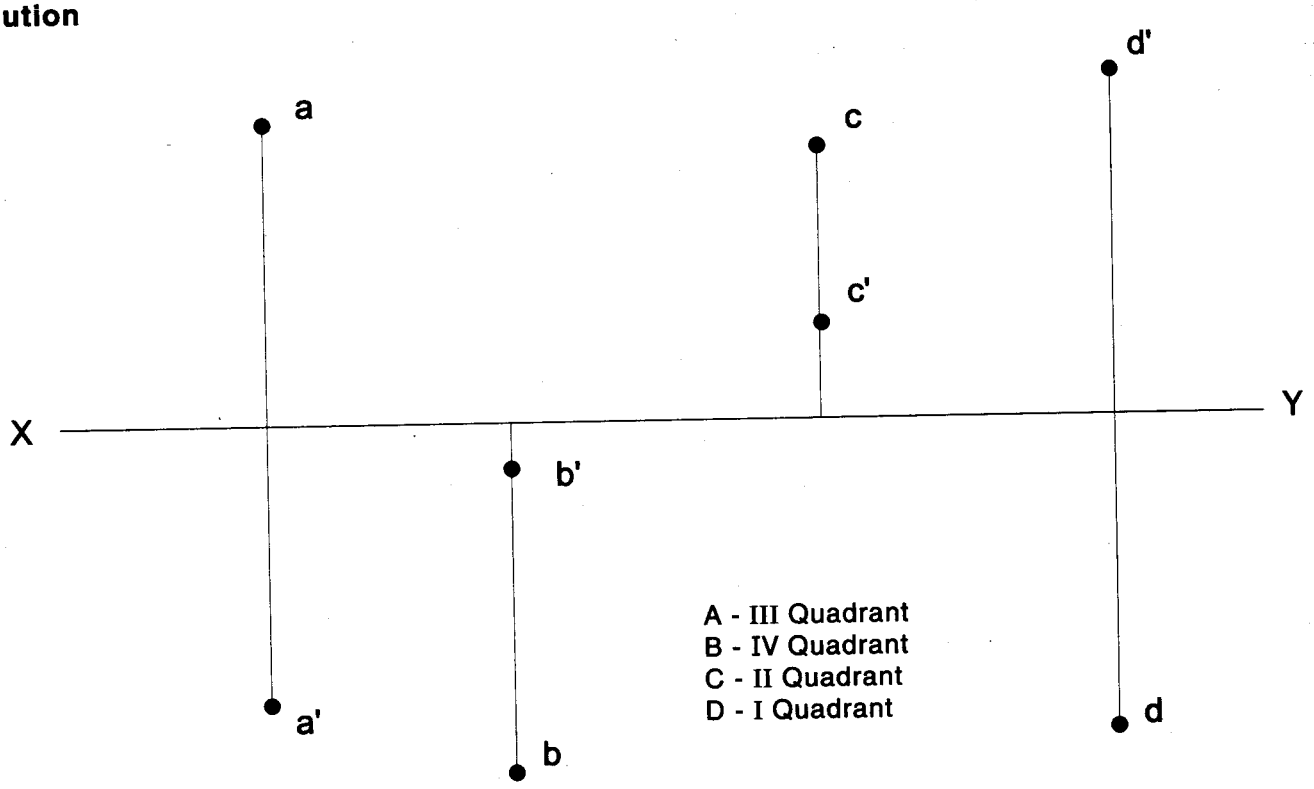


A - I Quadrant
B - IV Quadrant
C - I as well as IV Quadrant
D - II as well as III Quadrant

Problem 27 State the quadrants in which the following Points are located. Assume any distances

A – Front view below XY & top view above XY line.
B – Front and top views are below XY line.
C – Front and top views are above XY line.
D – Front view above XY & top view below XY line.

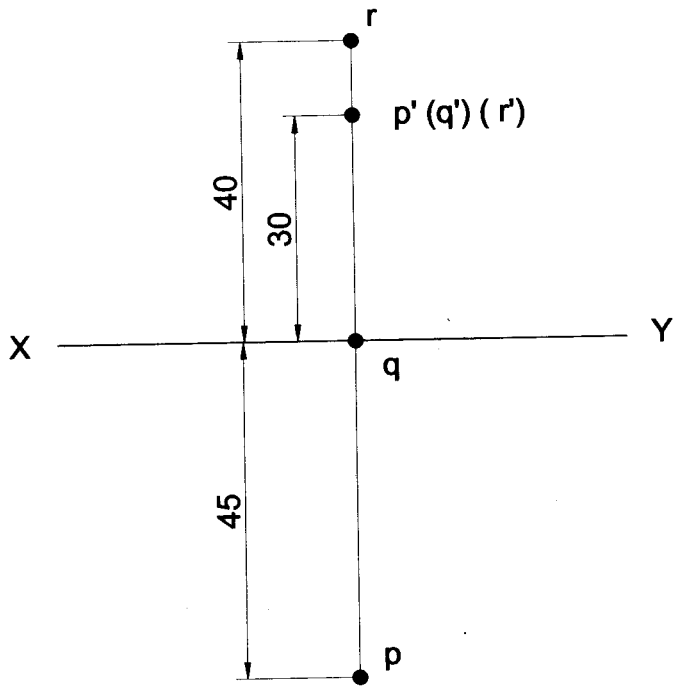
Solution



A - III Quadrant
B - IV Quadrant
C - II Quadrant
D - I Quadrant

Problem 28 A point 30 mm above XY line is the front view of three points P,Q and R. The top view of R is 40 mm behind VP, the top view of Q is on XY line and top view of point P is 45 mm in front of VP. Draw the projections of the points & state the quadrants in which the points are situated.

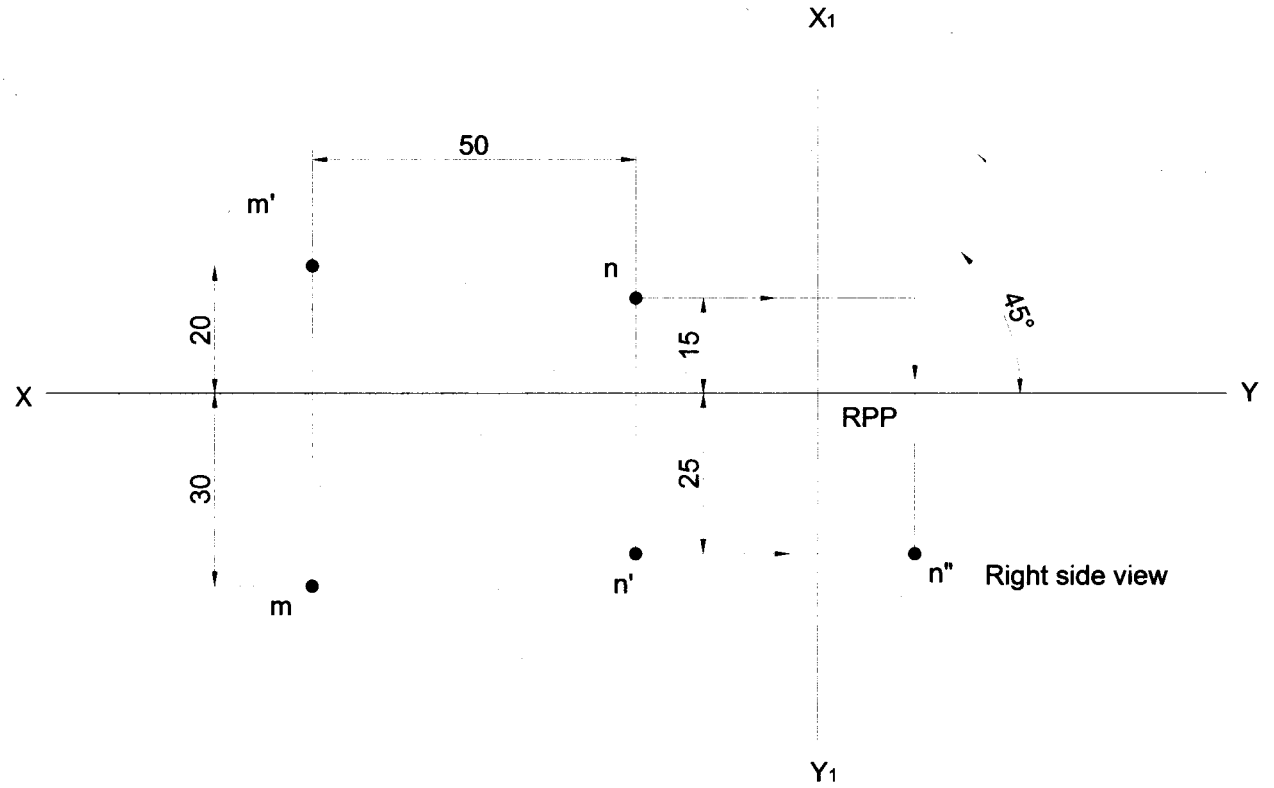
Solution



P - I Quadrant
Q - I as well as II Quadrant
R - II Quadrant

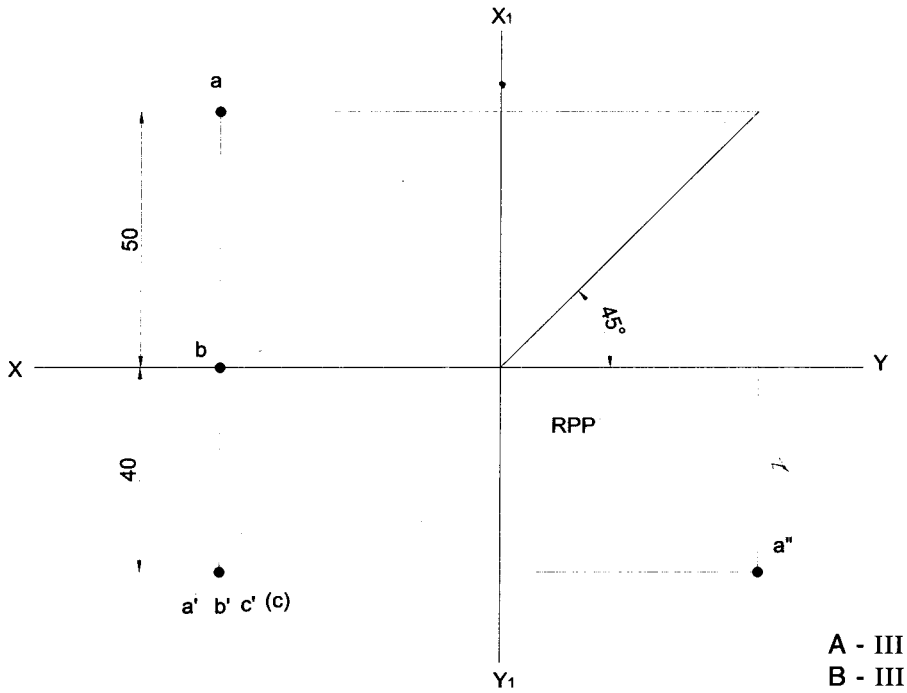
Problem 29 A point 'M' is 30 mm in front of VP and 20 mm above HP. another point N in 15 mm behind VP & 25mm below HP. The horizontal distance between the points parallel to XY line is 50 mm . Draw the projections of the points M & N and Join their front and top views. Draw the right side view for the point N only.

Solution



Problem 30 The common point 40 mm below XY line represents not only the front views of three points A, B and C but also the top view of point C. The top view of point B is lies on XY line and top view of point A lies 50 mm above it. Draw the projections of the points and add the right side view to the point A only. Also state in which quadrants the points lie.

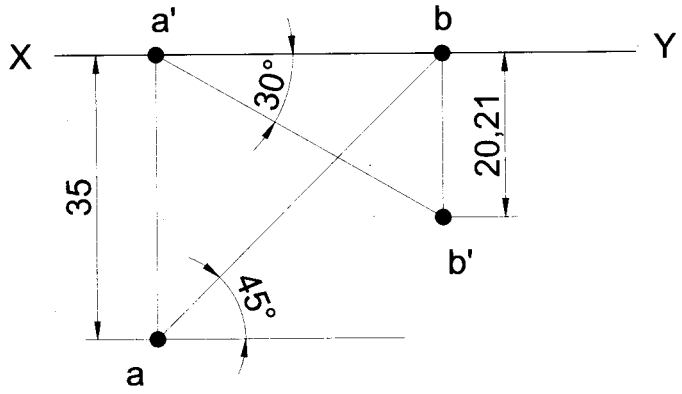
Solution



A - III Quadrant
B - III as well as IV Quadrant
C - IV Quadrant

Problem 31 A point A is on HP and 35 mm in front of VP. Another Point B is on VP and below HP. The line Joining their front views makes an angle of 30 deg to XY line while the line joining their top views makes an angle 45 deg with XY line. Find the distance of the point B from HP.

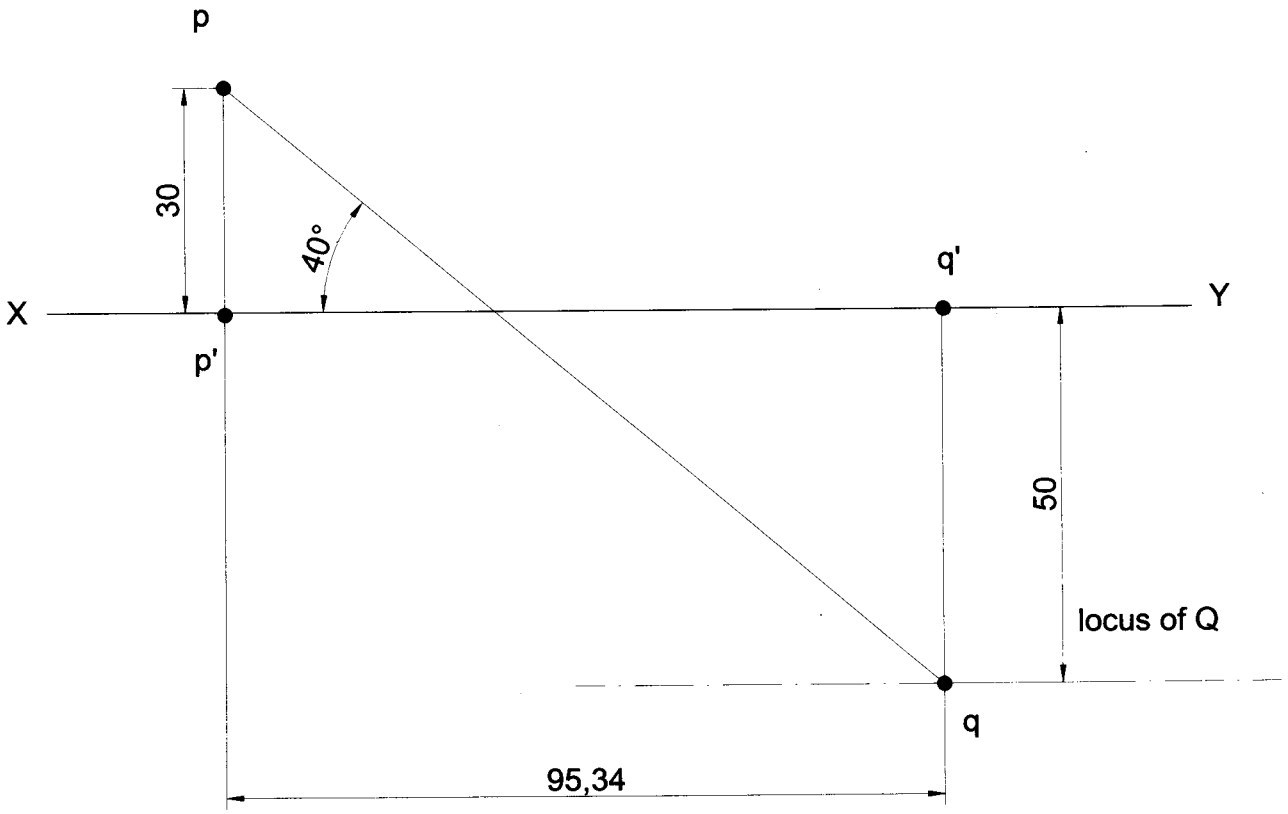
Solution



Point B is 20.21 mm below HP

Problem 32 Two Points P and Q are on HP. The point P is 30 mm behind VP, while Q is 50 mm in front of VP .The line joining their top views makes an angle of 40deg with XY. Find the horizontal distance between their projectors parallel to XY line.

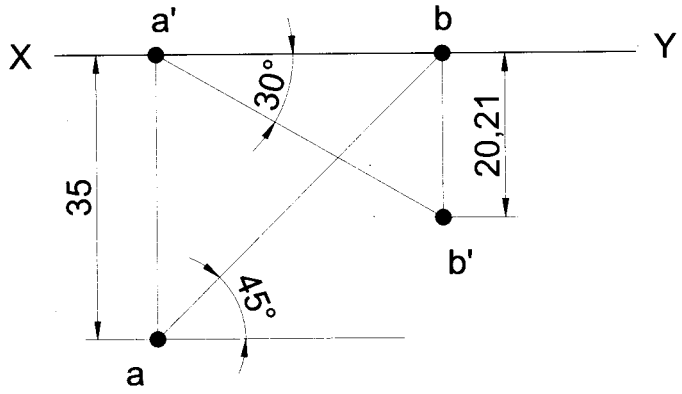
Solution



Distance Between Two Projector is 95.34 mm

Problem 31 A point A is on HP and 35 mm in front of VP. Another Point B is on VP and below HP. The line Joining their front views makes an angle of 30 deg to XY line while the line joining their top views makes an angle 45 deg with XY line. Find the distance of the point B from HP.

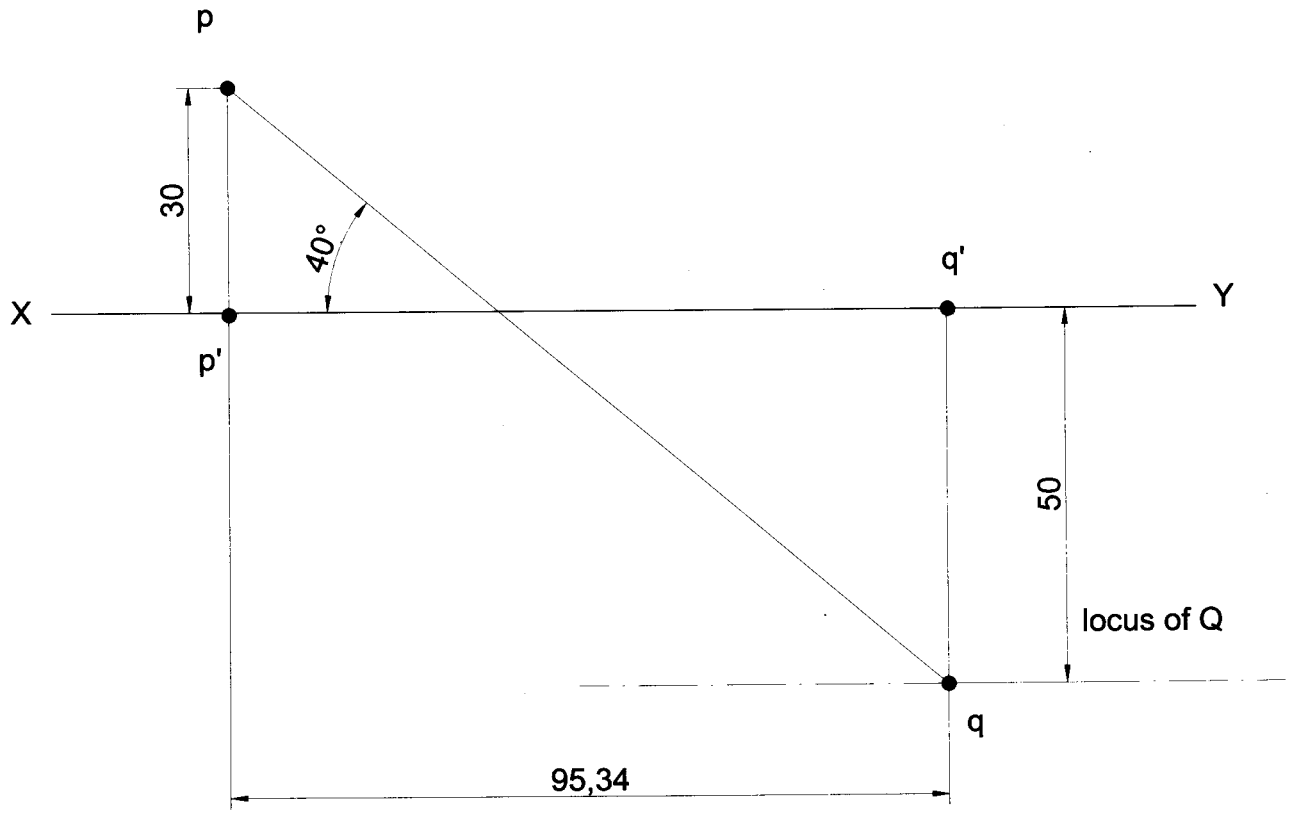
Solution



Point B is 20.21 mm below HP

Problem 32 Two Points P and Q are on HP. The point P is 30 mm behind VP, while Q is 50 mm in front of VP .The line joining their top views makes an angle of 40deg with XY. Find the horizontal distance between their projectors parallel to XY line.

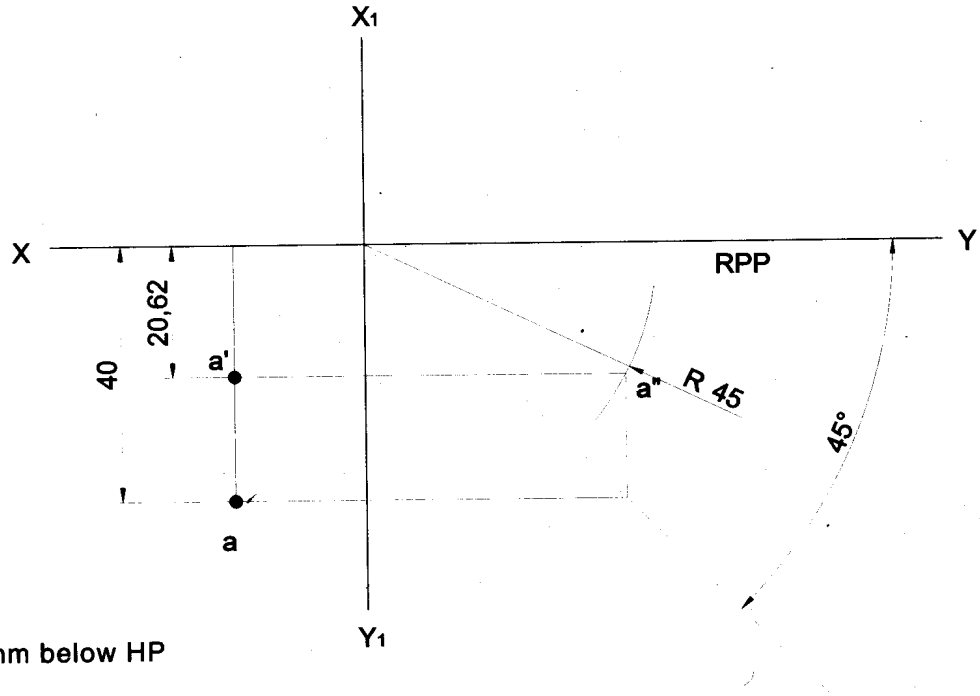
Solution



Distance Between Two Projector is 95.34 mm

Problem 33 A point A is 40 mm in front of VP and is situated in the fourth quadrant. its shortest distance from the intersection of XY and X!Y1 is 45 mm . Draw its projections. Also find its distance from HP.

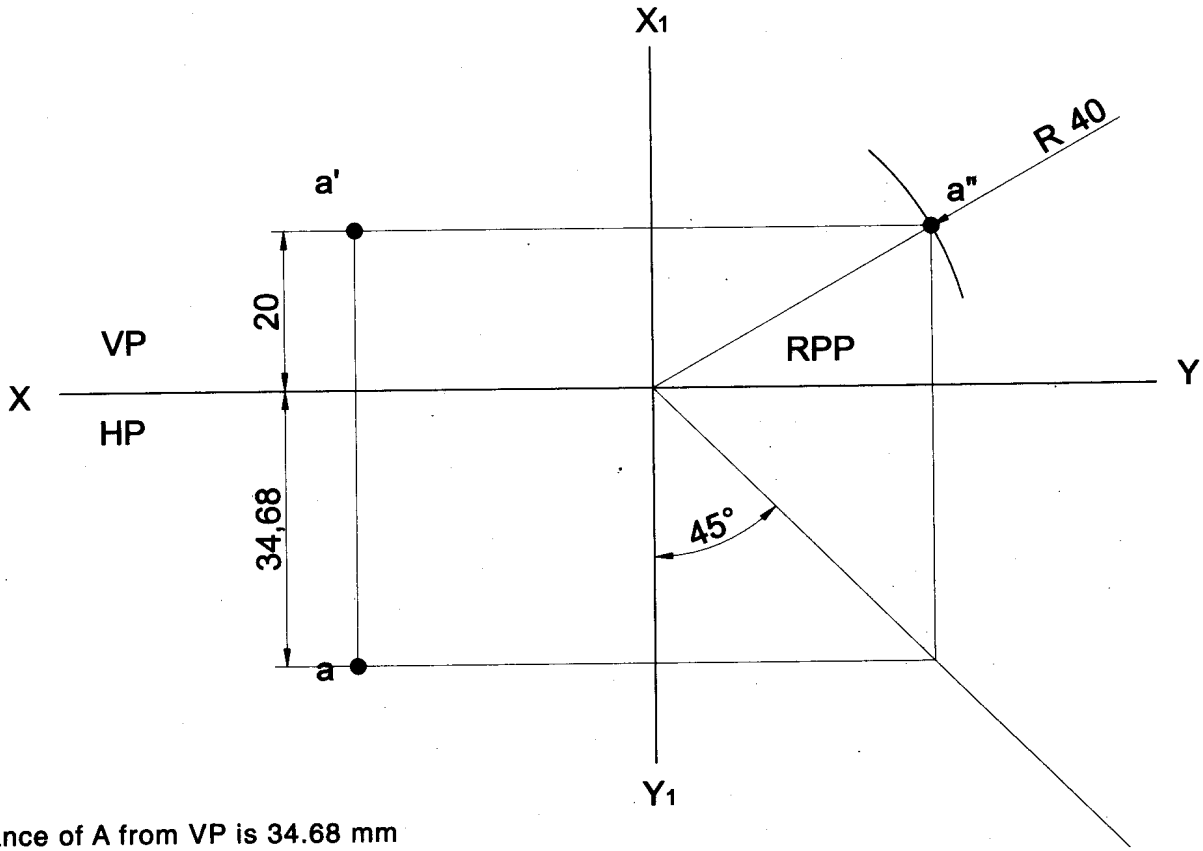
Solution



Point A is 20.62 mm below HP

Problem 34 A point A is 20 mm above HP and in the first quadrant. Its shortest distance from the XY line is 40 mm .Draw the projections. Determine its distance from VP.

Solution

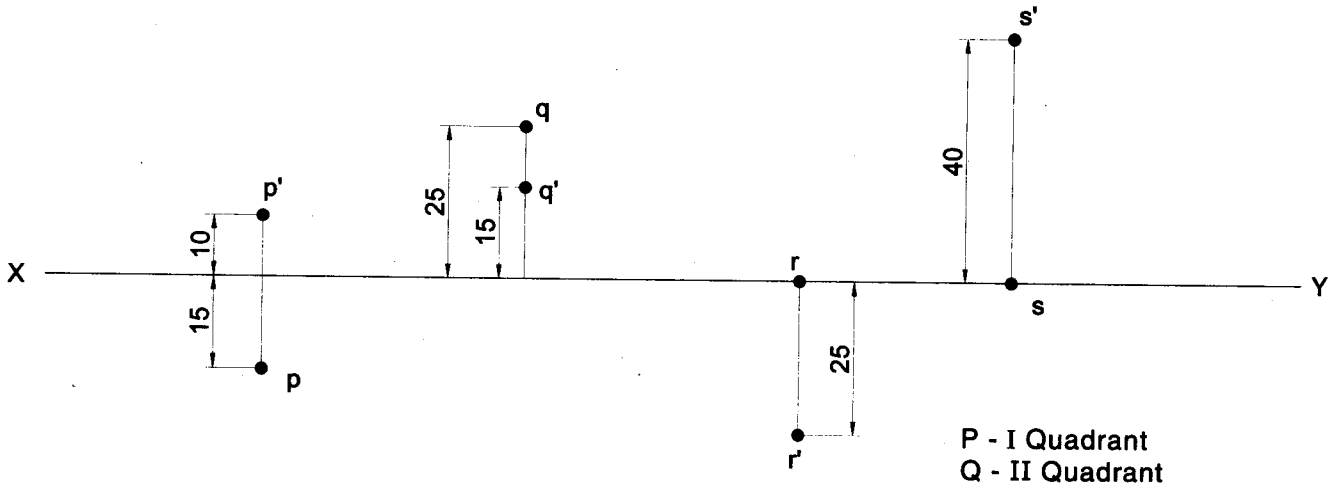


Distance of A from VP is 34.68 mm

Problem 35 Draw the projections of the following Points on the same XY line, keeping convenient distance b tween each projectors and state the quadrants in which they lie.

P – 10 mm above HP & 15 mm in front of VP.
Q – 15 mm above HP & 25 mm behind VP.
R – 25 mm below HP & in VP.
S – 40 mm above HP & in VP.

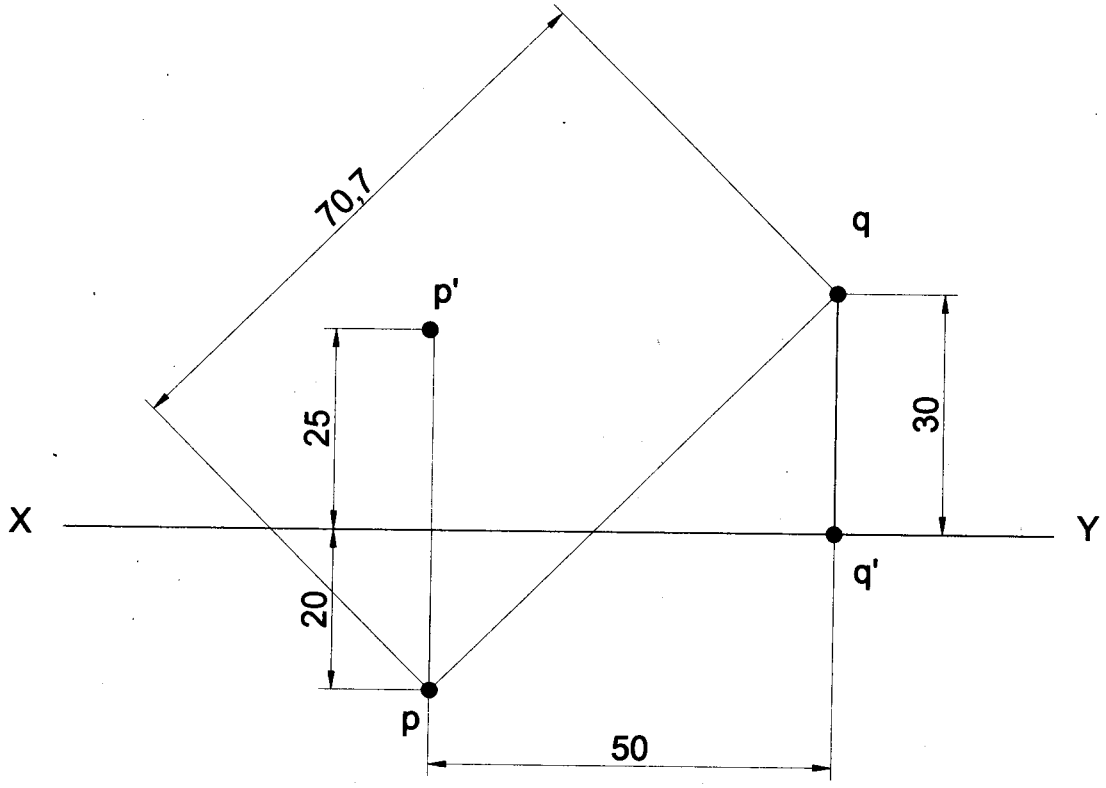
Solution



P - I Quadrant
Q - II Quadrant
R - III as well as IV Quadrant
S - I as well as II Quadrant

Problem 36 A point P is 25 mm above HP & 20 mm in front of VP. Another point Q is on HP and 30 mm behind VP The distance between their projectors measured parallel to the line of intersection of VP and HP is 50mm. Find the distance between the top views of points P and Q.

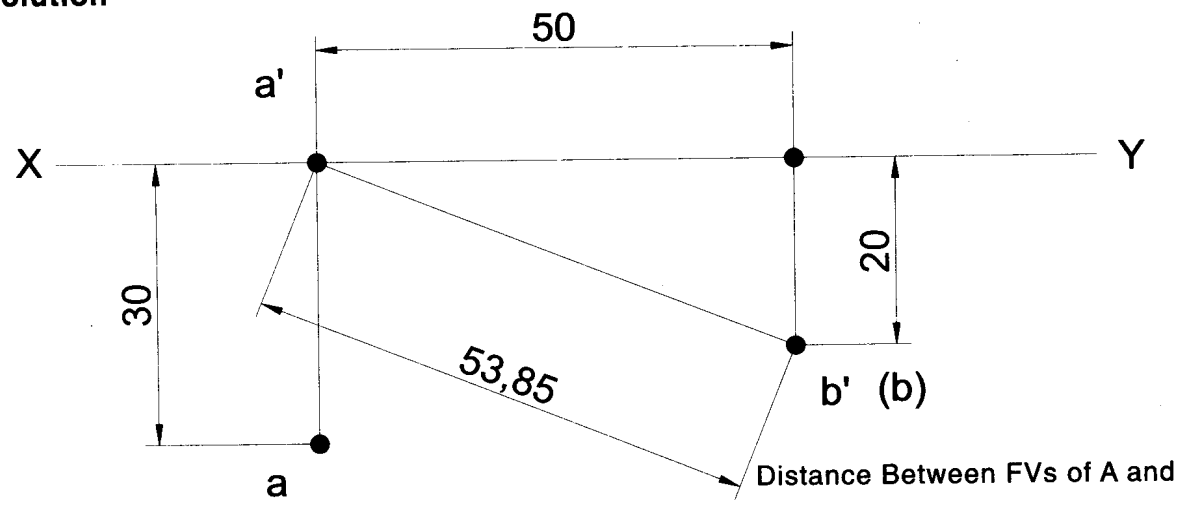
Solution



Distance Between TVs of P and Q is 70.7 mm

Problem 37 A point A is on HP & 30 mm in front of VP. Another point B is 20 mm below HP and 20 mm in front of VP. The distance between their projectors measured parallel to XY line is 50 mm. Find the distance between the front views of the points A & B.

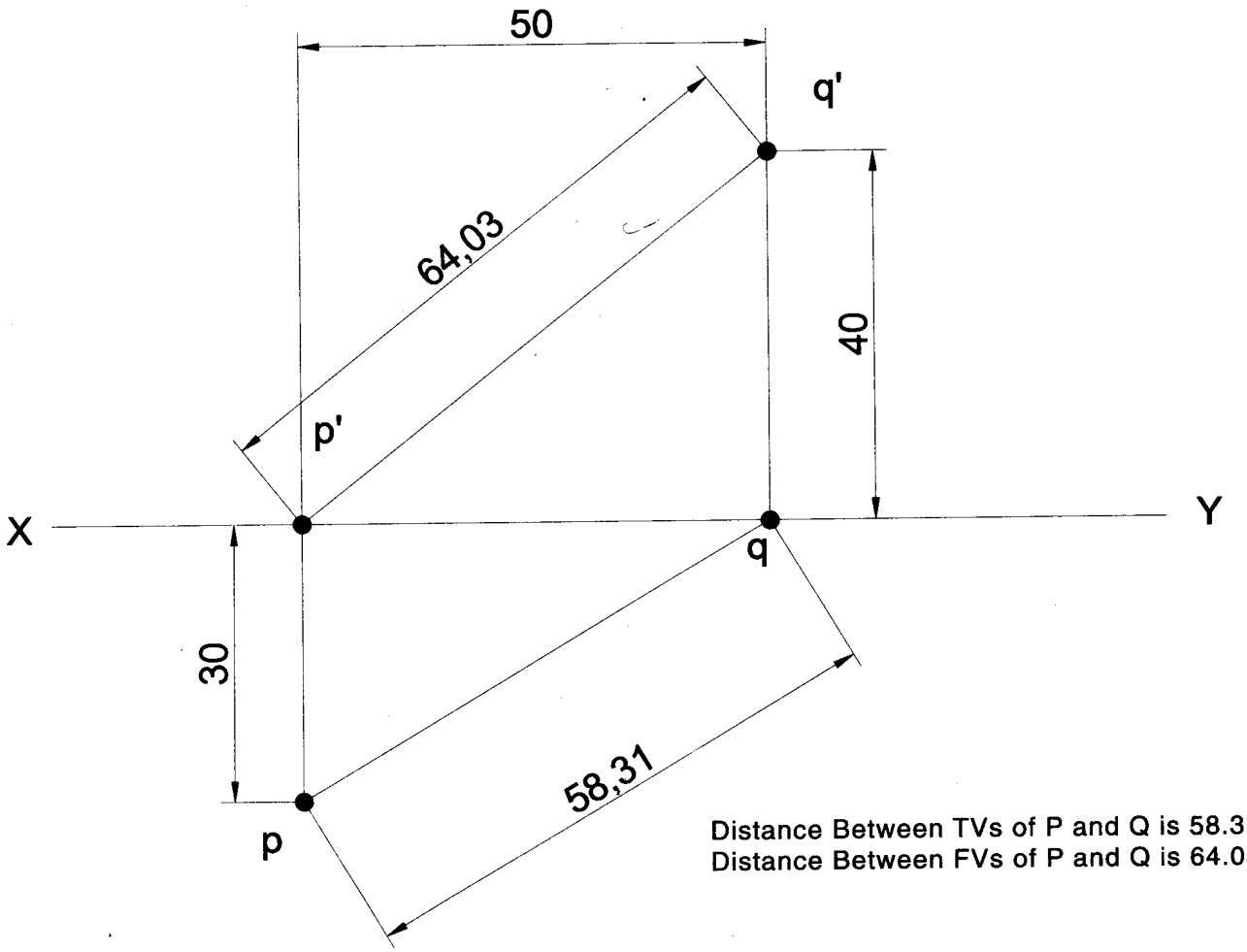
Solution



Distance Between FVs of A and B is 53.85 mm

Problem 38 A point P is on HP and 30 mm in front of VP. Another point Q is on VP and 40 mm above HP. The distance between their projectors parallel to XY line is 50mm. Find the distance between their front and top views of the points P and Q.

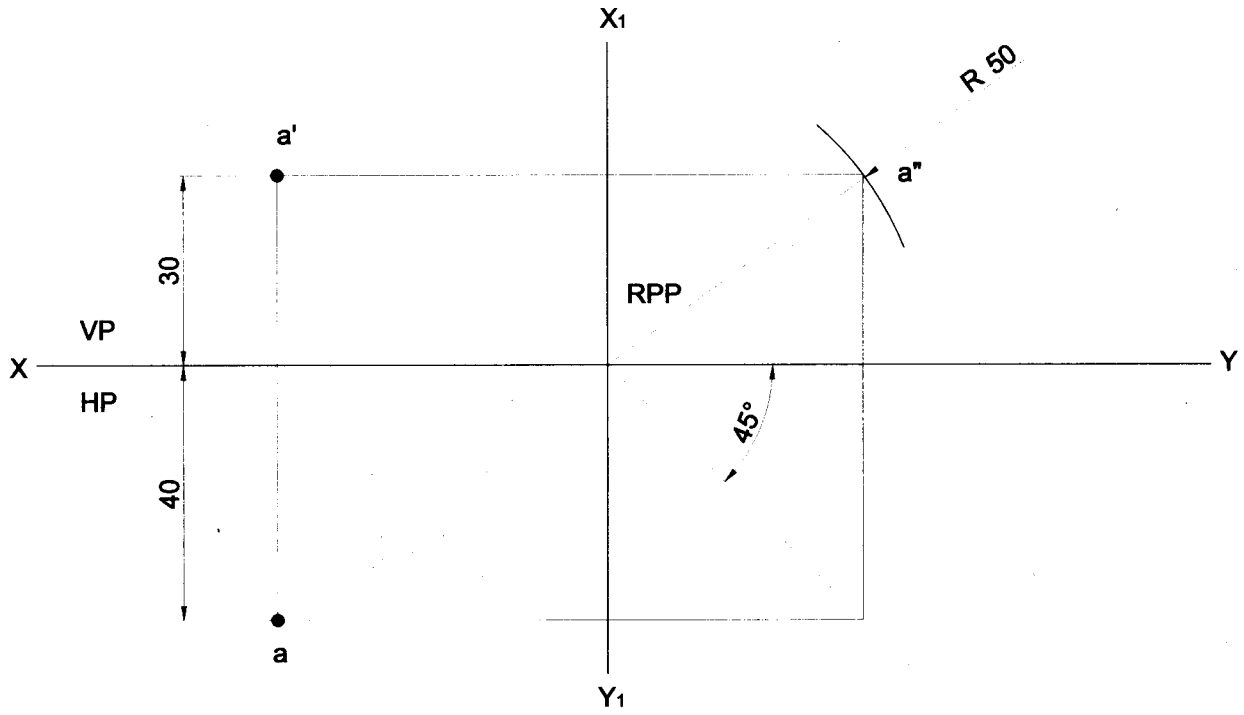
Solution



Distance Between TVs of P and Q is 58.31 mm
Distance Between FVs of P and Q is 64.03 mm

Problem 39 Draw the projections of a point A lying 30 mm above HP and in first quadrant, if its shortest distance from the line of intersection of HP and VP is 50 mm. Also find the distance of the point from VP.

Solution

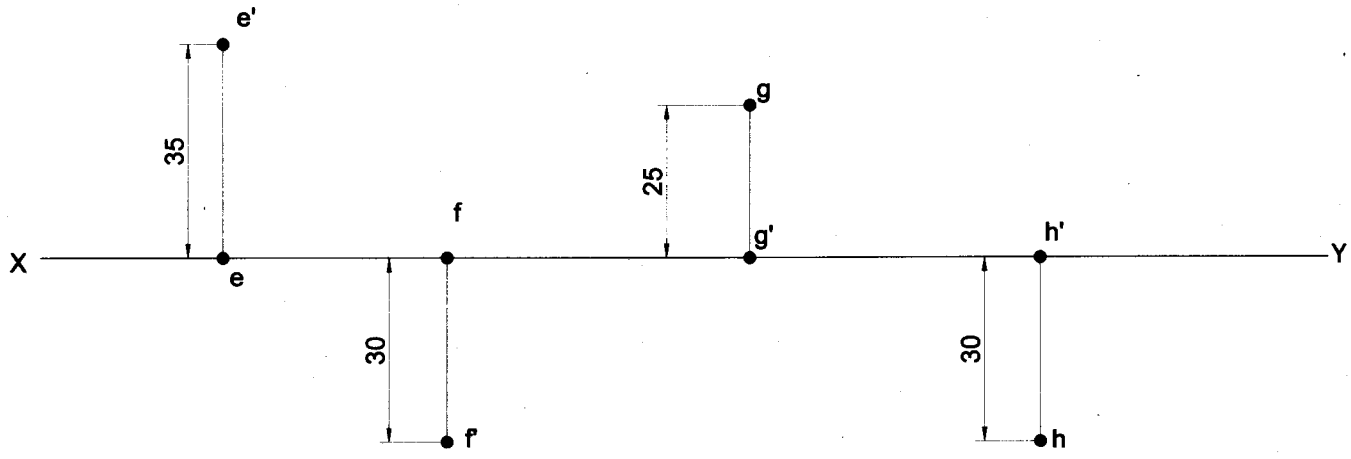


Distance of A from VP is 40 mm

Problem 40 Draw the projections of the following points on the same reference XY line and state the quadrants in which they lie.

E – 35 mm above HP & on VP
F – 30 mm below HP & on VP
G – On HP & 25 mm behind VP
H – On HP & 30 mm in front of VP

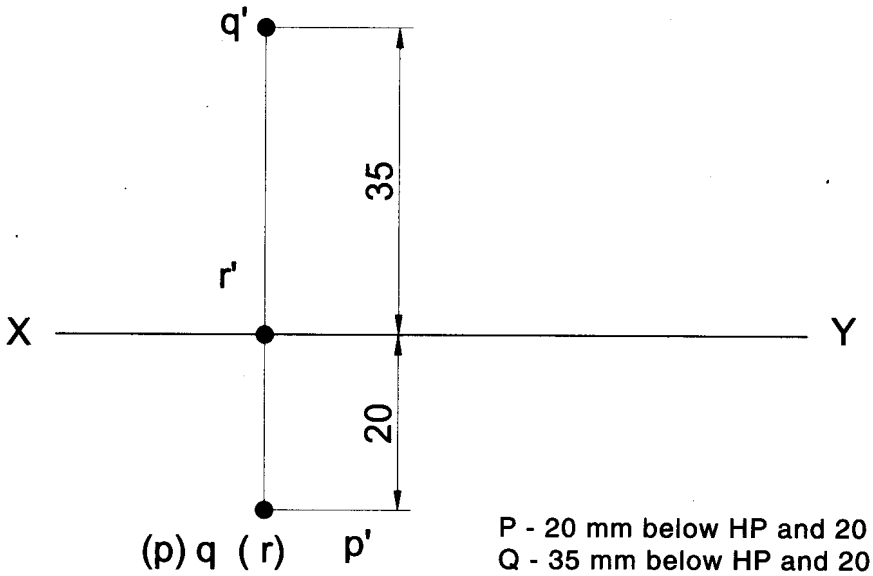
Solution



E - I as well as II Quadrant
F - III as well as IV Quadrant
G - II as well as III Quadrant
H - I as well as IV Quadrant

Problem 41 A point 20 mm below the reference XY line is the top view of three points P, Q & R. P is 20 mm below HP, Q is 35 mm above HP and R is on HP. Draw the projections of the three points and state their positions & quadrants in which they are situated.

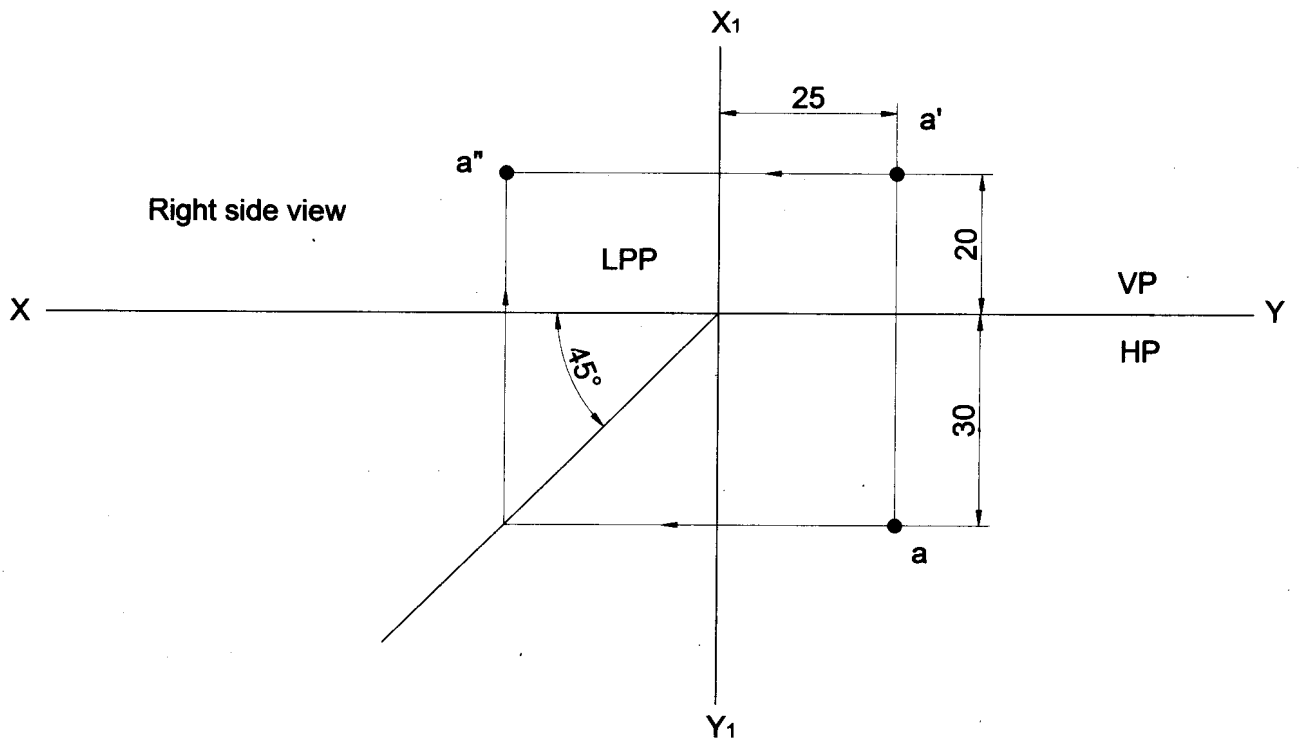
Solution



P - 20 mm below HP and 20 mm infront of VP, IV Quadrant
Q - 35 mm below HP and 20 mm infront of VP, I Quadrant
R - on HP and 20 mm infront of VP, laswell as IV Quadrant

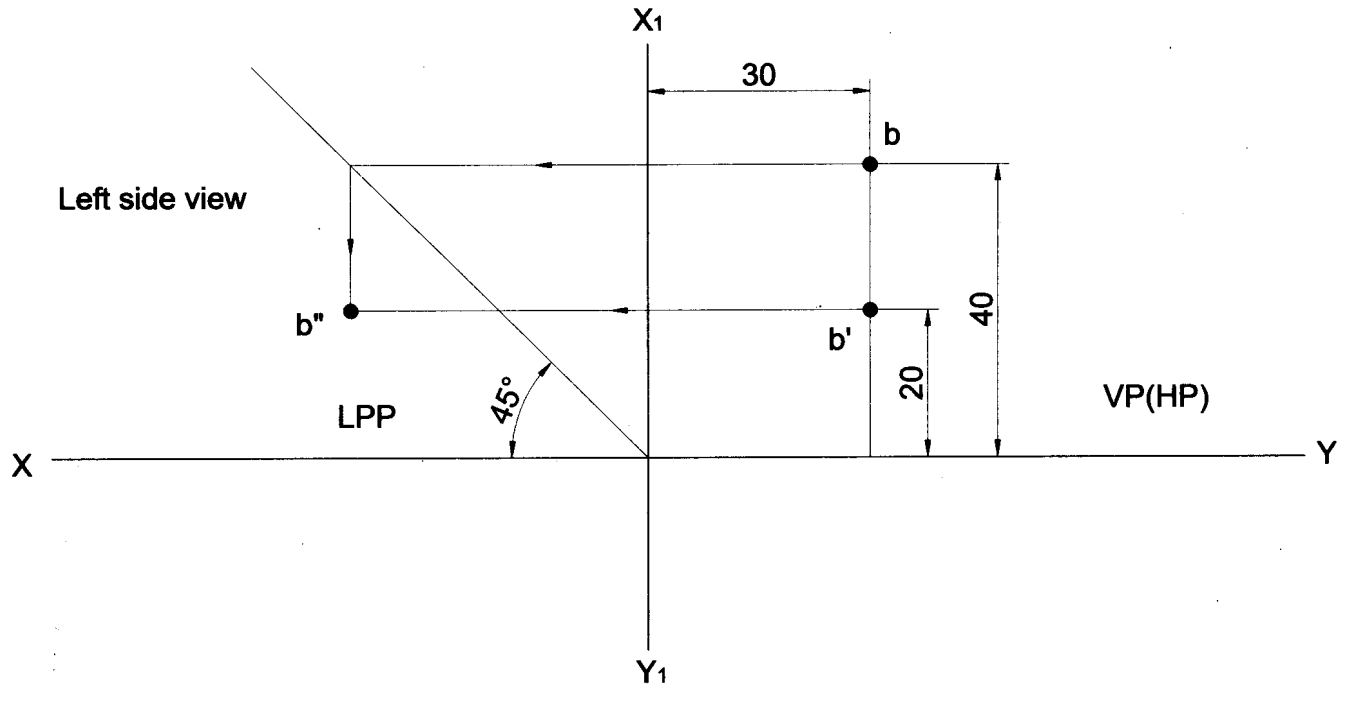
Problem 42 A point is 30 mm in front of VP, 20 mm above HP & 25 mm in front / behind / from LPP. Draw its Projections and name the side view.

Solution



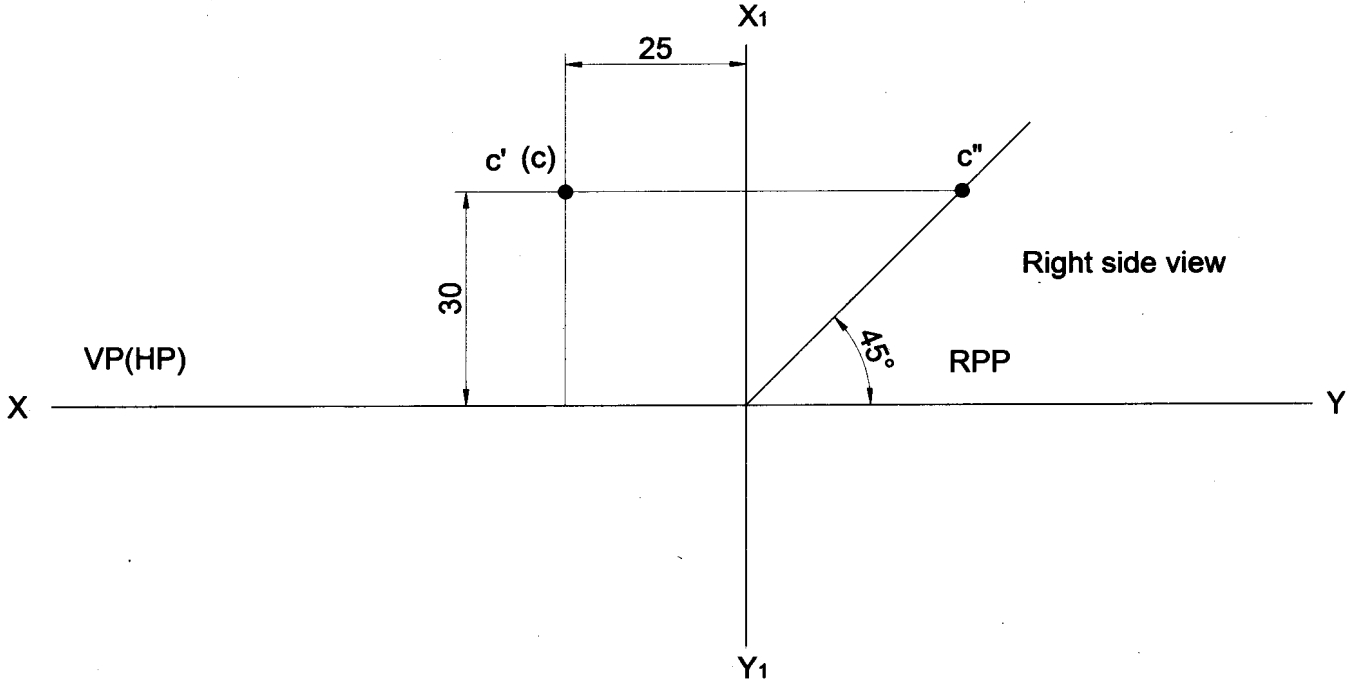
Problem 43 A point is 40 mm behind VP, 20 mm above HP and 30 mm in front / behind / from LPP.Draw its projections and name the side view.

Solution



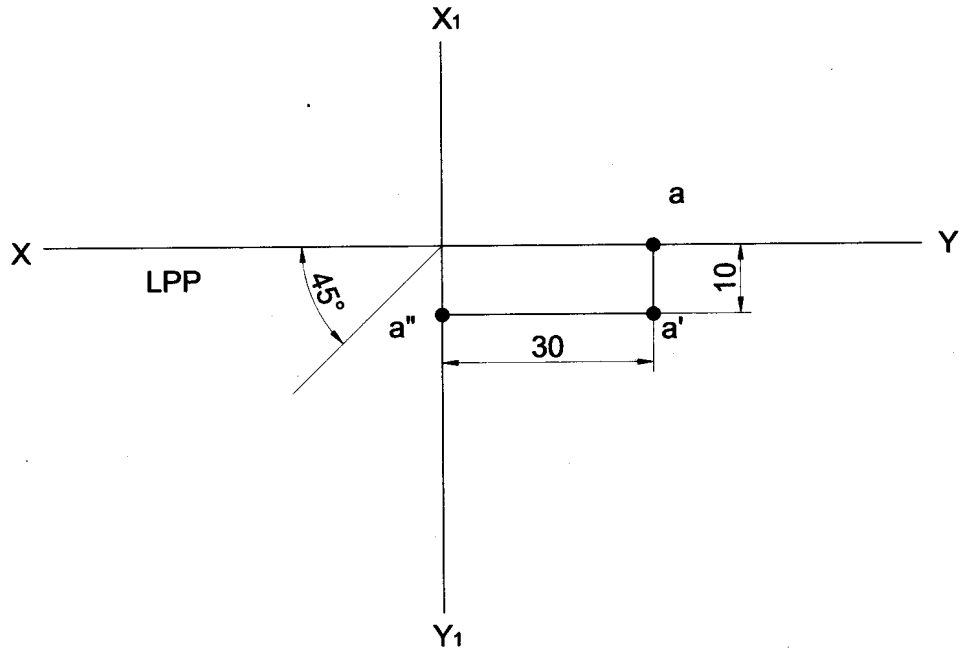
Problem 44 A point is 30 mm behind VP, 30 mm above HP and 25 mm in front / behind / from RPP. Draw its projections and name the side views.

Solution



Problem 45 A point is lying on VP, 10 mm below HP & 30 mm behind / in front / from LPP. Draw its projections and name the side view.

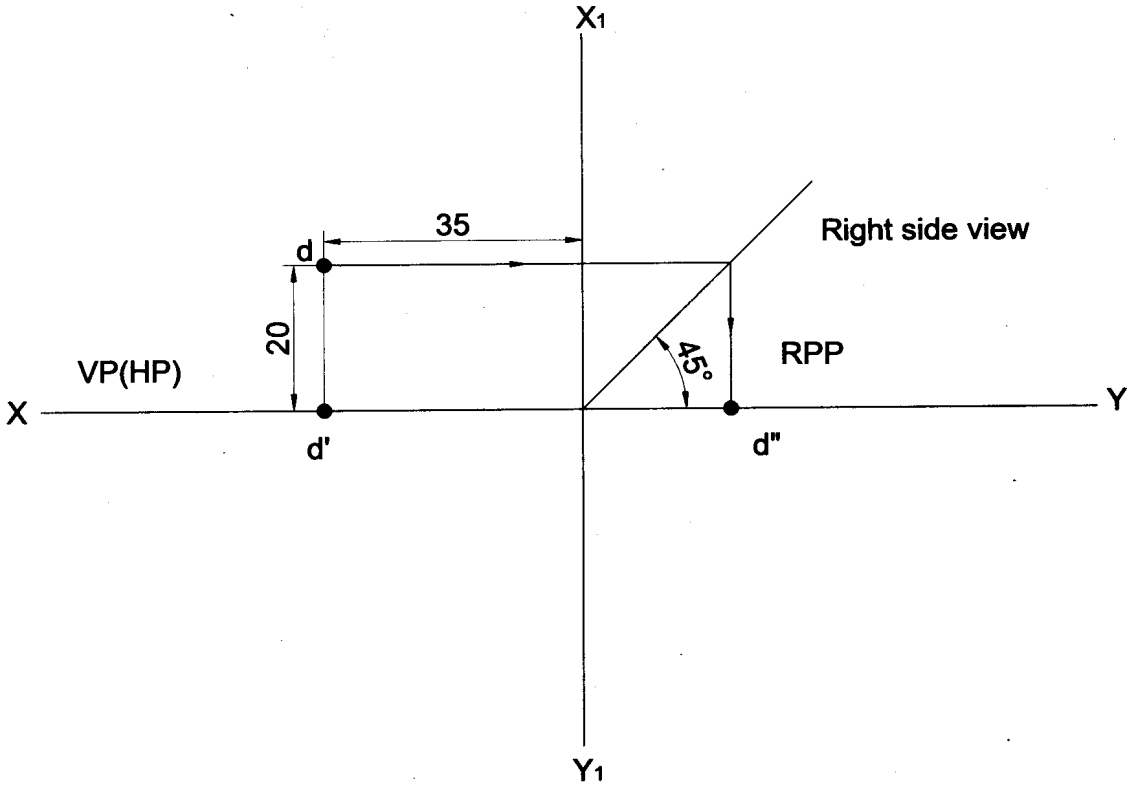
Solution



Choice 1 : Treating the point is in III Quadrant, it is left side view
Choice 2 : Treating the point is in IV Quadrant, it is right side view

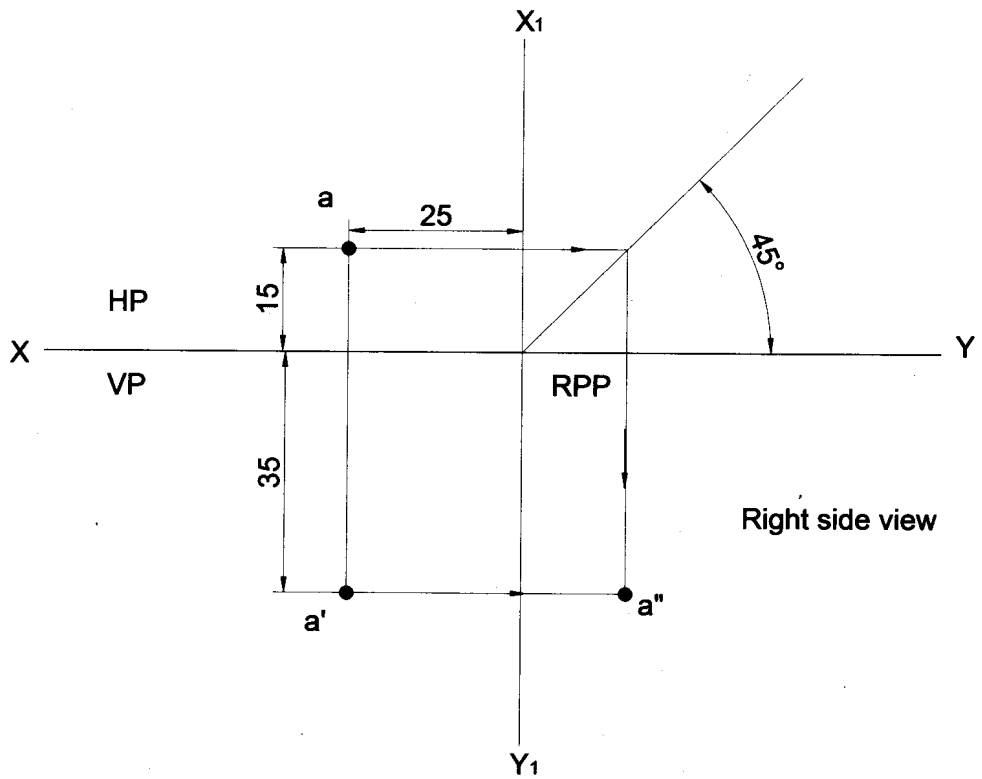
Problem 46 A point is lying on HP, 20 mm behind VP & 35 mm behind / in front / from RPP. Draw its projections and name the side view.

Solution



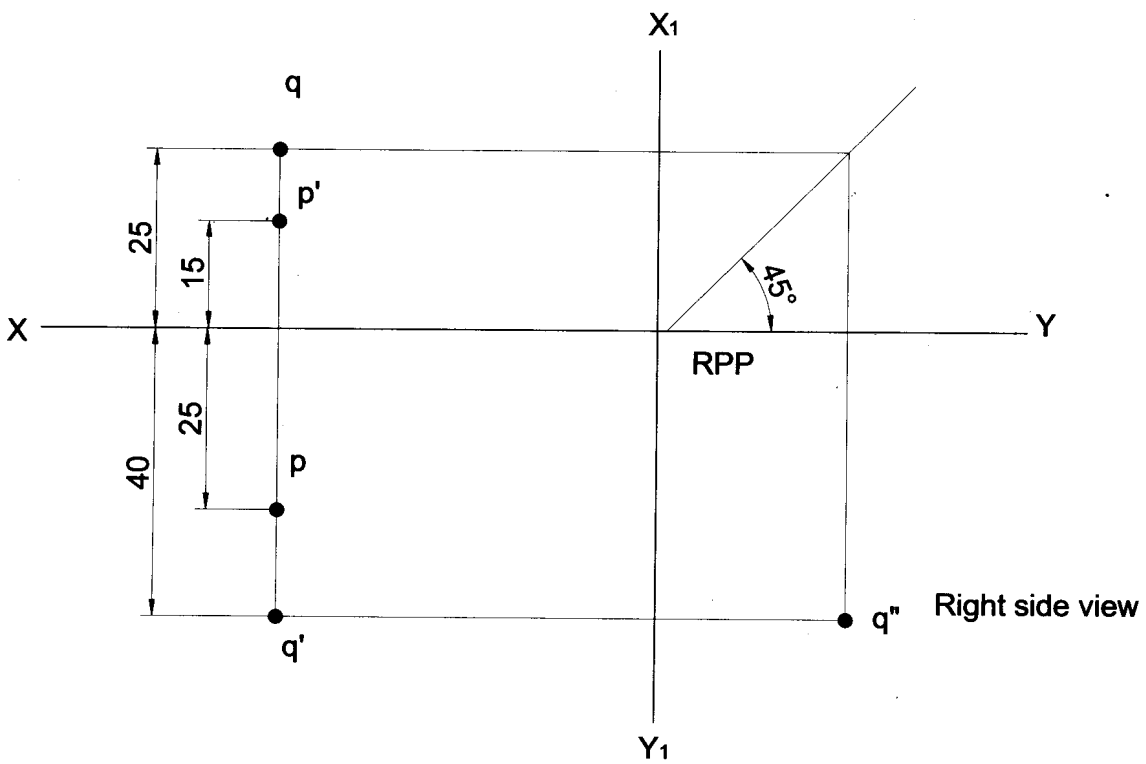
Problem 47 A point is 35 mm below HP, 15 mm behind VP & 25 mm behind / in front / from RPP. Draw its projections and name the side view.

Solution



Problem 48 A point P is 15 mm above HP & 25 mm in front of VP. Another point Q is 25 mm behind VP and 40 mm below HP. Draw their projections when the distance between their projectors parallel to XY line is zero mm. Add the right side view only to point Q.

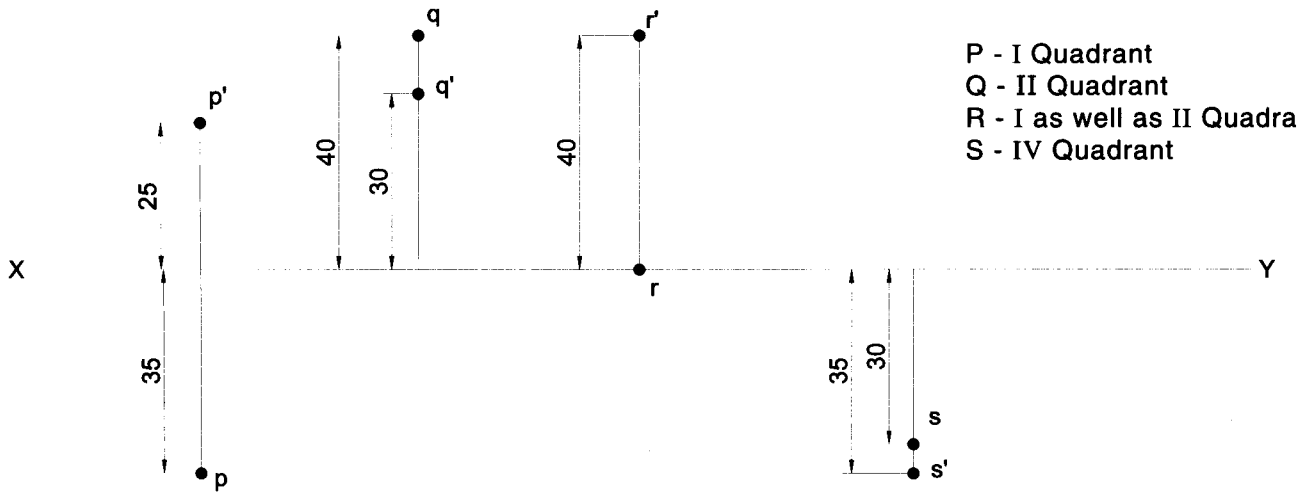
Solution



Problem 49 Draw the projections of the following Points on the same XY line, keeping convenient distance between each projectors. Also state the quadrant in which they lie.

P – 25 mm above HP & 35 mm in front of VP.
Q – 30 mm above HP & 40 mm behind VP.
R – 40 mm above HP & on VP.
S – 35 mm below HP & 30 mm in front of VP.

Solution

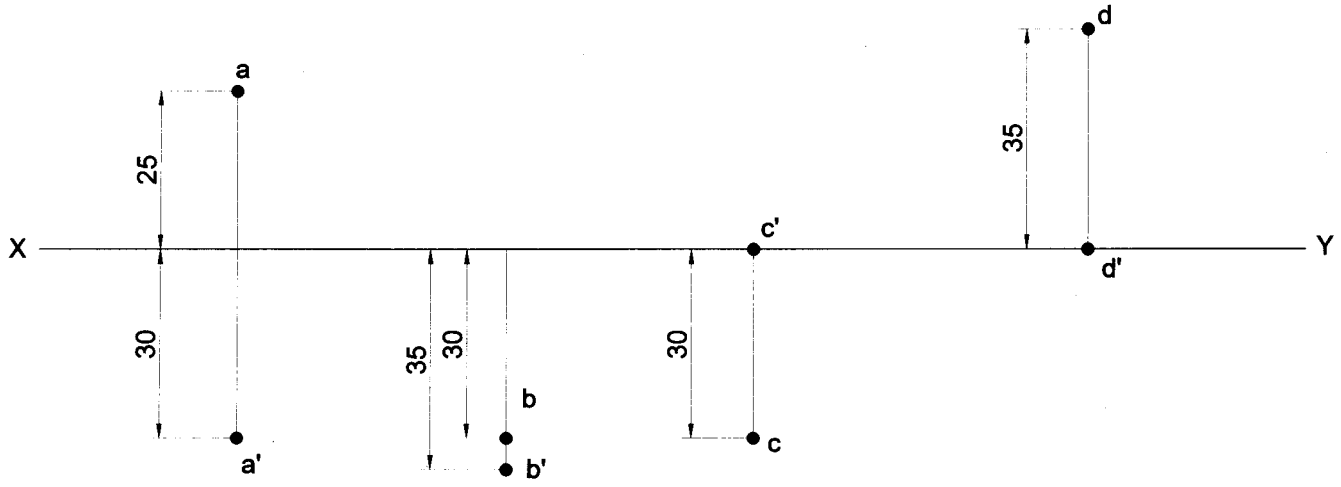


P - I Quadrant
Q - II Quadrant
R - I as well as II Quadrant
S - IV Quadrant

Problem 50 Draw the projections of the following Points on the same XY line, Keeping convenient distance between the projectors. Also state the quadrants in which they lie .

A – 30 mm below HP & 25 mm behind VP.
B – 35 mm below HP & 30 mm in front of VP.
C – on HP & 30 mm in front of VP.
D – on HP & 35 mm behind of VP.

Solution



A - III Quadrant
B - IV Quadrant
C - I as well as IV Quadrant
D - II as well as III Quadrant

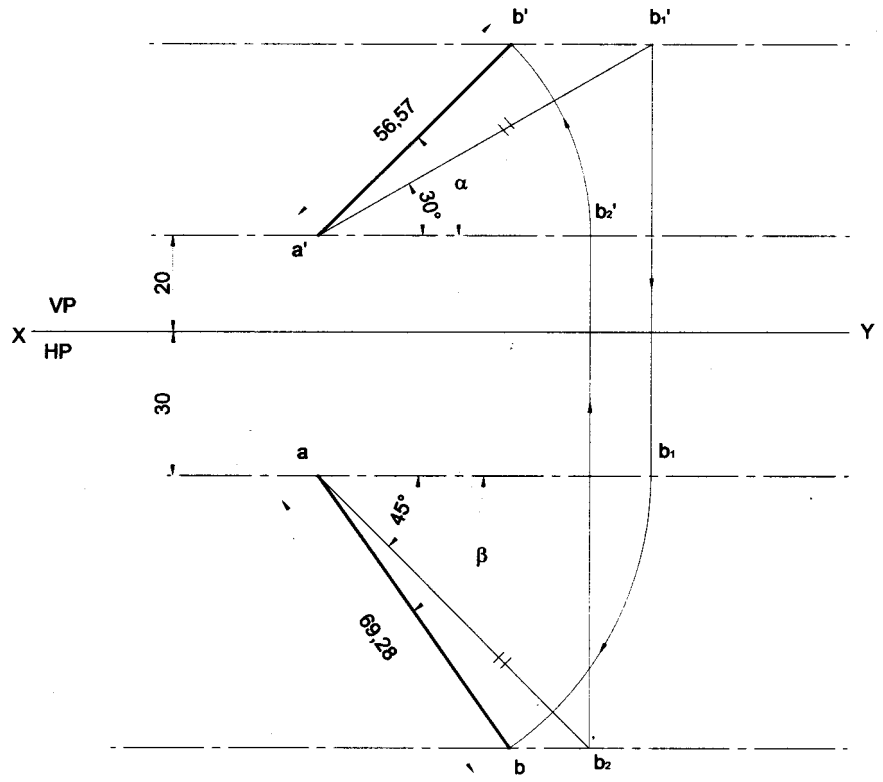
CONTENTS

CHAPTER 2

PROJECTIONS OF LINES

Problem 1 A line AB 80 mm long has its end A 20 mm above the HP and 30 mm infront of VP. It is inclined at 30° to HP and 45° to VP. Draw the projections of the line and find apparent lengths and apparent inclinations.

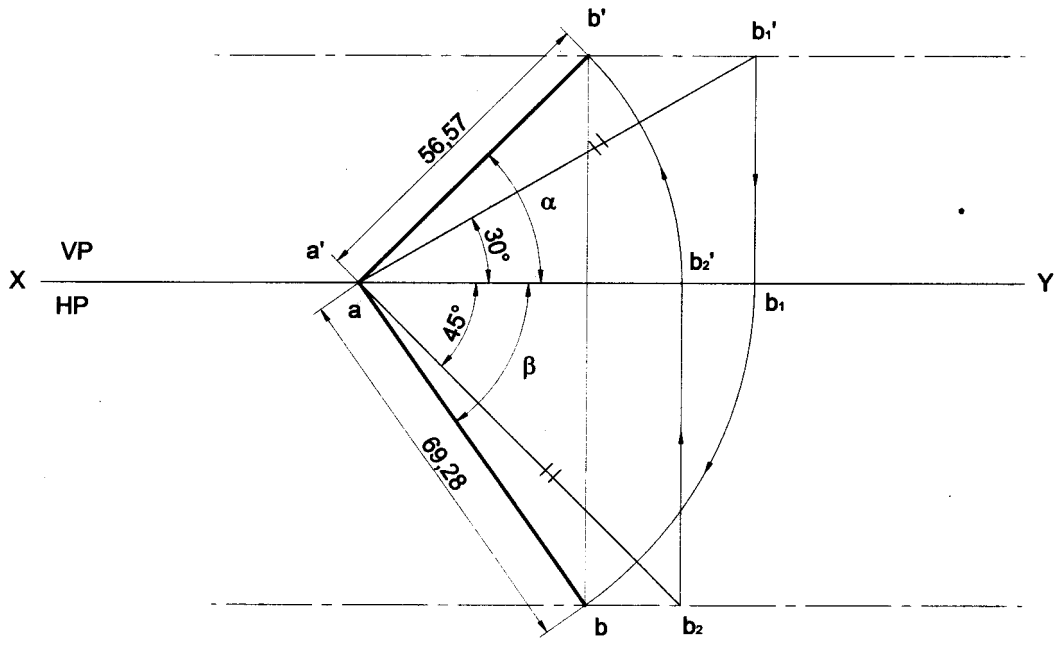
Solution



ANSWERS :
β = 55°
a'b' = 57
ab = 69

Problem 2 A line AB 80 mm long is inclined to HP at 30° and inclined to VP at 45°. Draw front and top views of line and determine their lengths. Also measure the perpendicular distance of end B from both HP and VP.

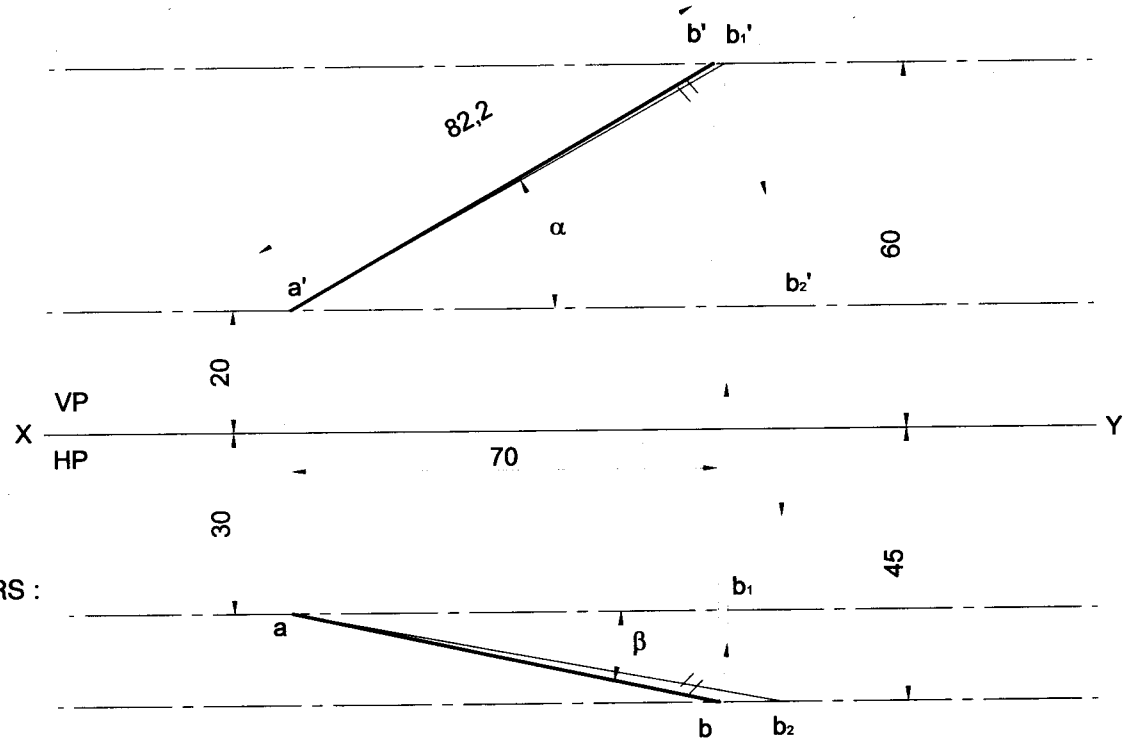
Solution



ANSWERS :
α = 45°
β = 55°
a'b' = 57
ab = 69

Problem 3 A line AB has its end A 20 mm above the HP and 30 mm infront of the VP. The other end B is 60 mm above the HP. The distance between end projectors is 70 mm. draw its projections. Determine the true length and apparent inclinations.

Solution



ANSWERS :

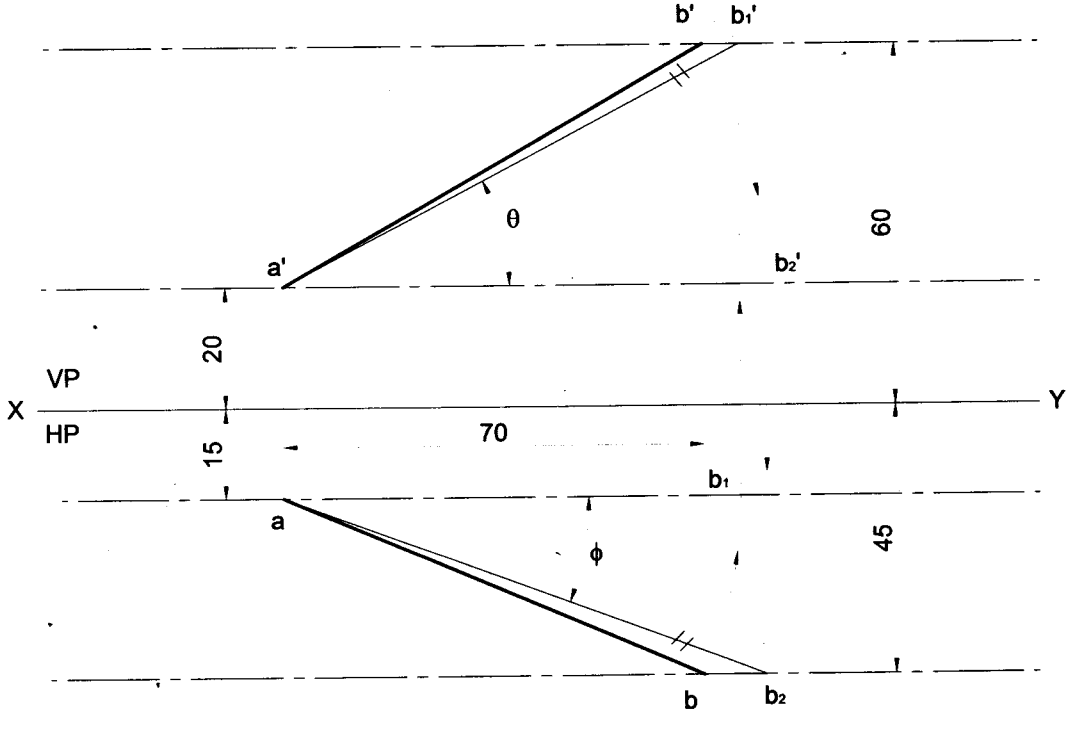
$\alpha = 30^0$

$\beta = 12^0$

a'b' = 82

Problem 4 A line AB has its end A 20 mm above the HP and 15 mm infront of the VP. The other end B is 60 mm above the HP. The distance between end projectors is 70 mm. draw its projections. Determine the apparent lengths and true inclinations.

Solution



ANSWERS :

$\theta = 28^0$

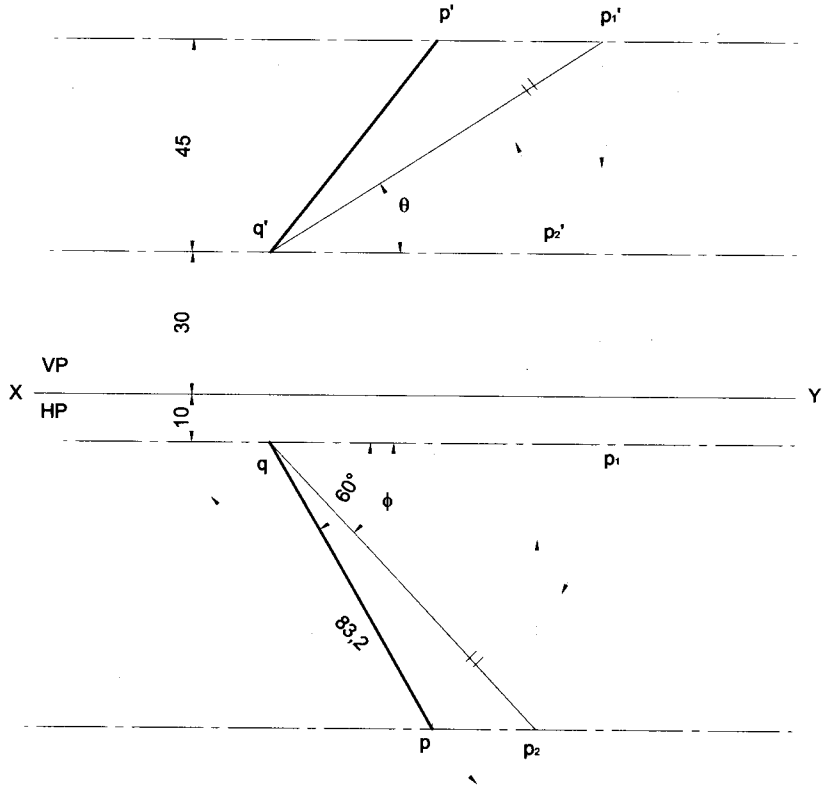
$\phi = 20^0$

a'b' = 81

ab = 76

Problem 5 The top view PQ of a straight line is 70 mm and makes an angle of 60° with XY line. The end Q is 10 mm infront of VP and 30 mm above the HP. The difference between the distances of P and Q above the HP is 45 mm. draw the projections. Determine its true length and true inclinations with HP and VP.

Solution



ANSWERS :

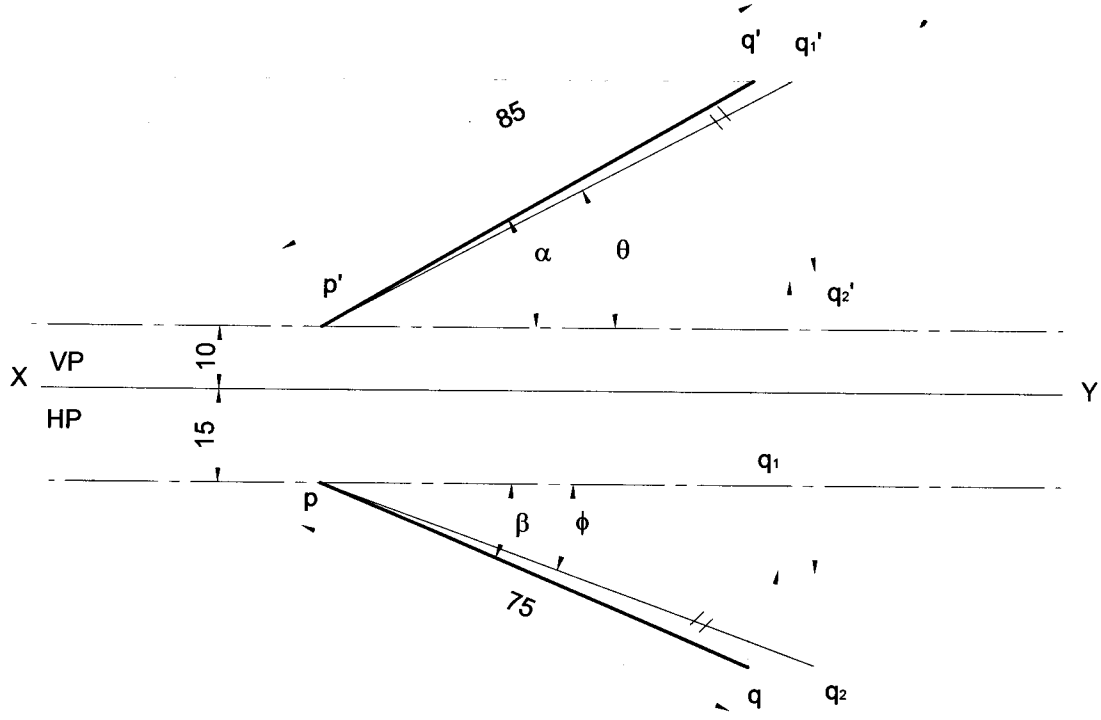
$\theta = 33^0$

$\phi = 47^0$

$qp_2 = 83$

Problem 6 A line PQ 85 mm long has its end P 10 mm above the HP and 15 mm infront of the VP. The top view and front view of line PQ are 75 mm and 80 mm respectively. Draw its projections. Also determine the true and apparent inclinations of the line.

Solution



ANSWERS :

$\theta = 28^0$

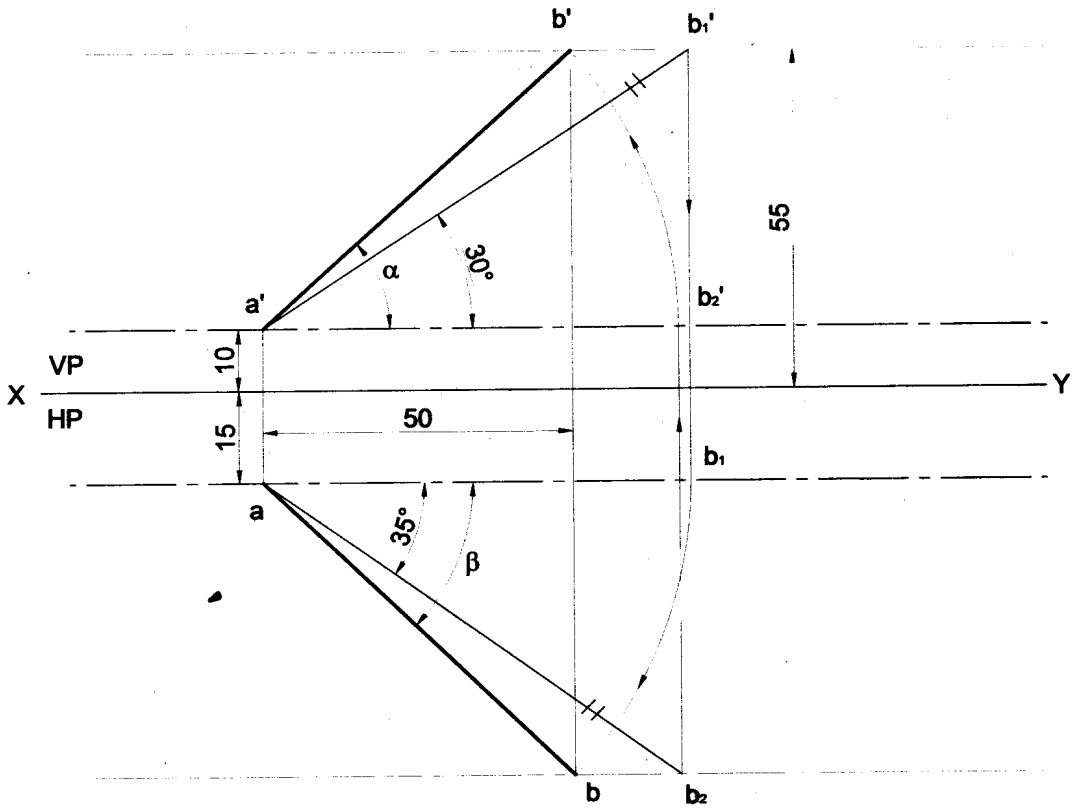
$\phi = 20^0$

$\alpha = 30^0$

$\beta = 23^0$

Problem 7 A line has its end A 10 mm above HP and 15 mm infront of VP. The end B is 55 mm above HP and line is inclined at 30° to HP and 35° to VP. The distance between the end projectors is 50 mm. draw the projections of the line. Determine the true length of the line and its inclination with VP.

Solution



ANSWERS :

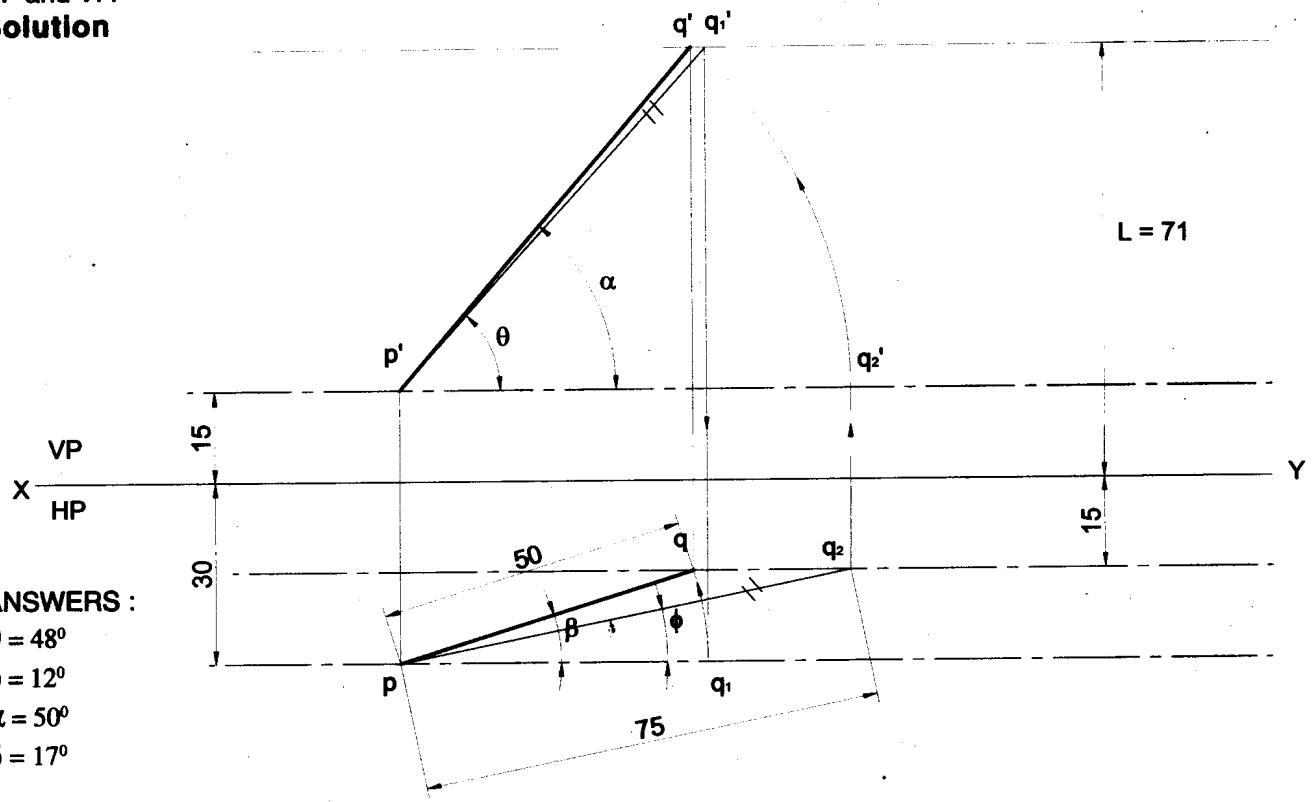
$\alpha = 42^0$

$\beta = 44^0$

TL = 80

Problem 8 The top view of a line 75 mm long measures 50 mm. the end P is 30 mm infront of VP and 15 mm above HP. The end Q is 15 mm infront of VP and above HP. Draw the projections of the line and find its true inclinations with HP and VP.

Solution



ANSWERS :

$\theta = 48^0$

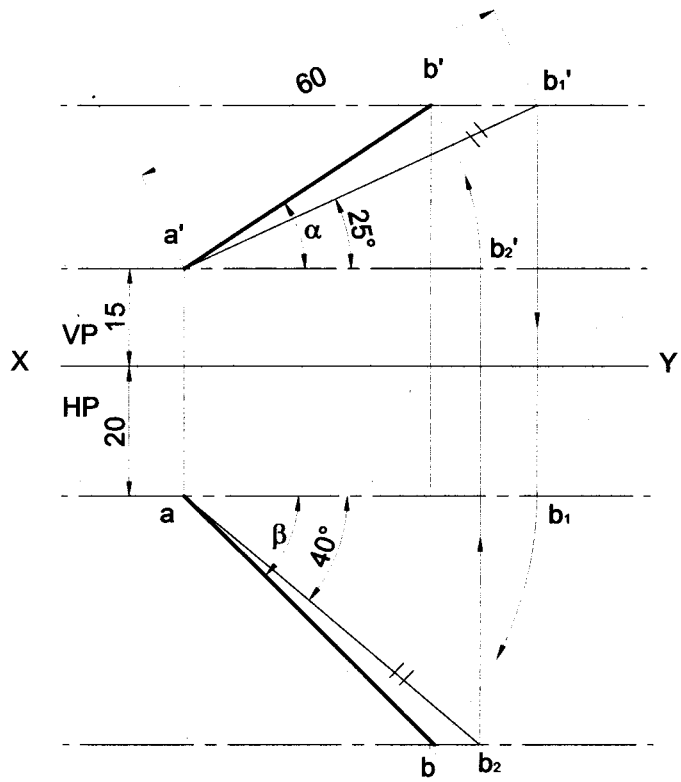
$\phi = 12^0$

$\alpha = 50^0$

$\beta = 17^0$

Problem 9 A line AB 60 mm long has one of its extremities 20 mm infornt of VP and 15 mm above HP. The line is inclined at 25° to HP and 40° to VP. Draw its top and front views.

Solution

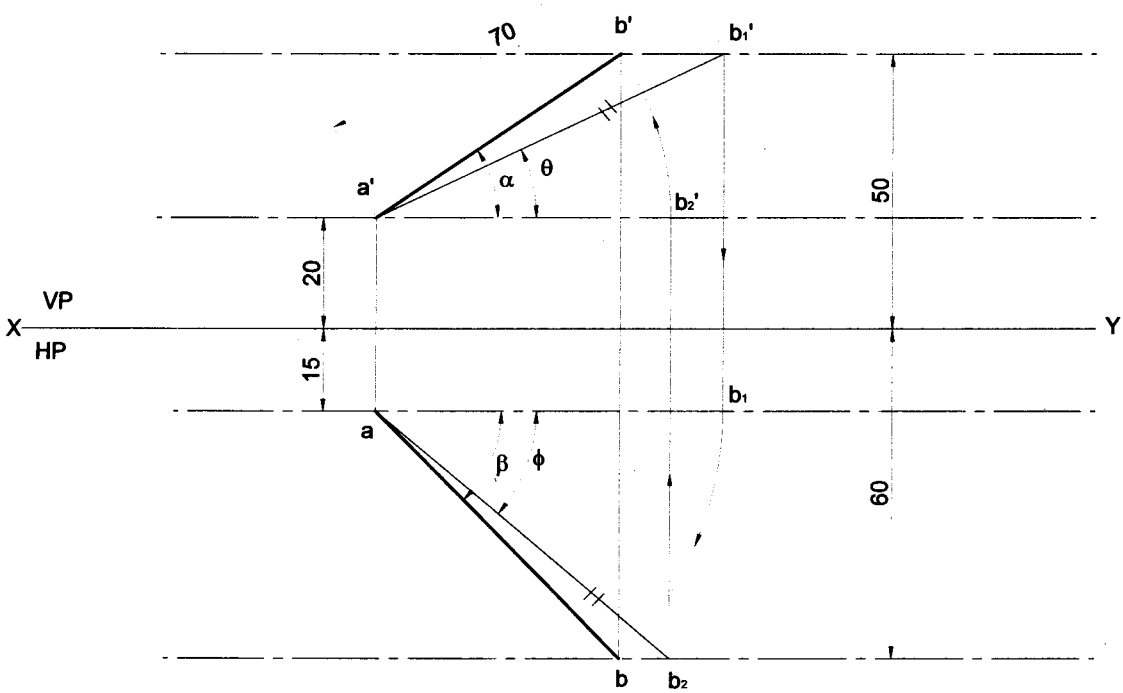


ANSWERS :
$\alpha = 34^0$
$\beta = 45^0$
a'b' = 46
ab = 56

Problem 10 A line AB measuring 70 mm has its end A 15 infront of VP and 20 mm above HP and the other end B is 60 infront of VP and 50 mm above HP. Draw the projections of the line and find the inclinations of the line with both the reference planes of projection.

Solution

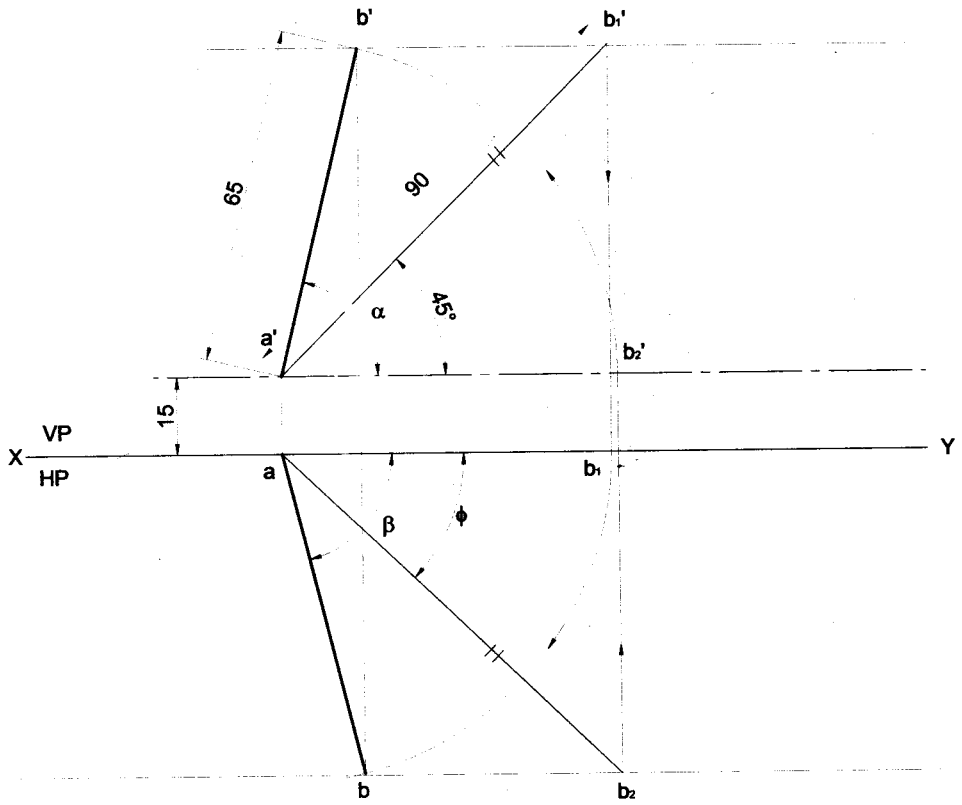
June 2009



ANSWERS :
$\theta = 25^0$
$\phi = 40^0$
$\alpha = 34^0$
$\beta = 45^0$

Problem 11 The front view of a 90 mm long line which is inclined at 45° to the XY line, measures 65 mm. End A is 15 mm above the XY line and is in VP. Draw the projections of the line and find is inclinations with HP and VP.

Solution



ANSWERS :

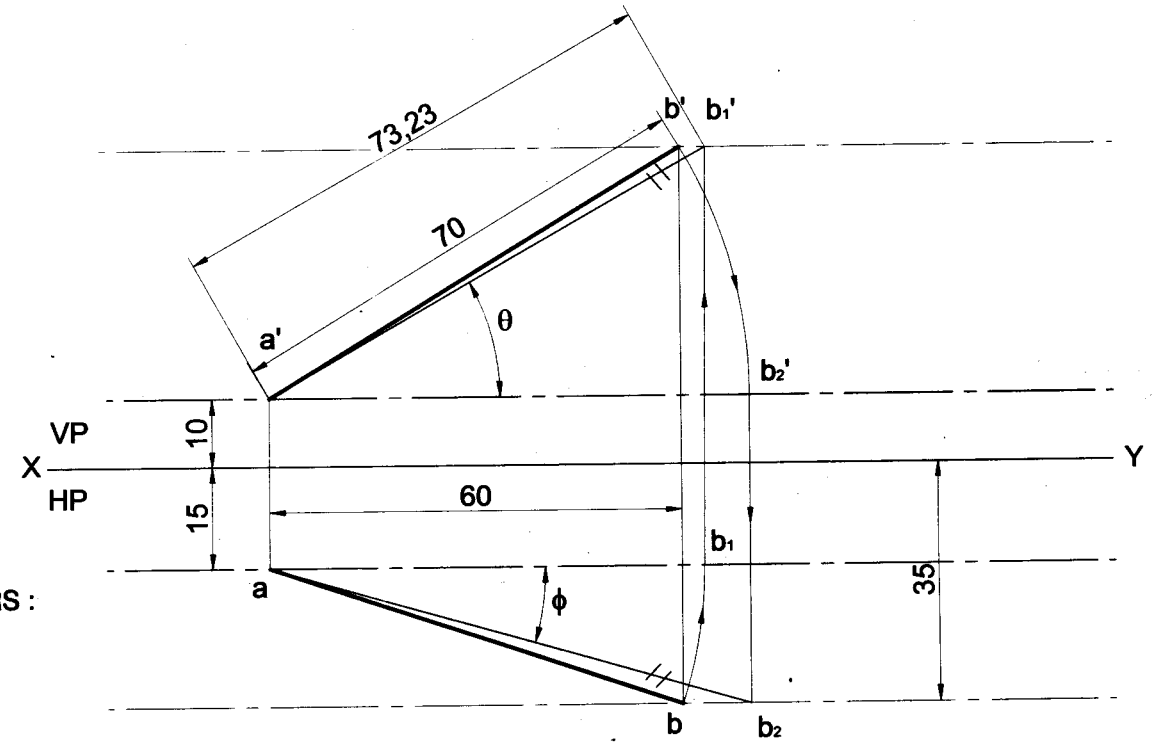
$\phi = 43^0$

$\alpha = 76^0$

$\beta = 76^0$

Problem 12 The distance between the end projectors through the end points of a line AB is 60 mm. The end A is 10 mm above HP and 15 mm infront of VP. The end B is 35 mm infront of VP. The line AB appears 70 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP and VP.

Solution



ANSWERS :

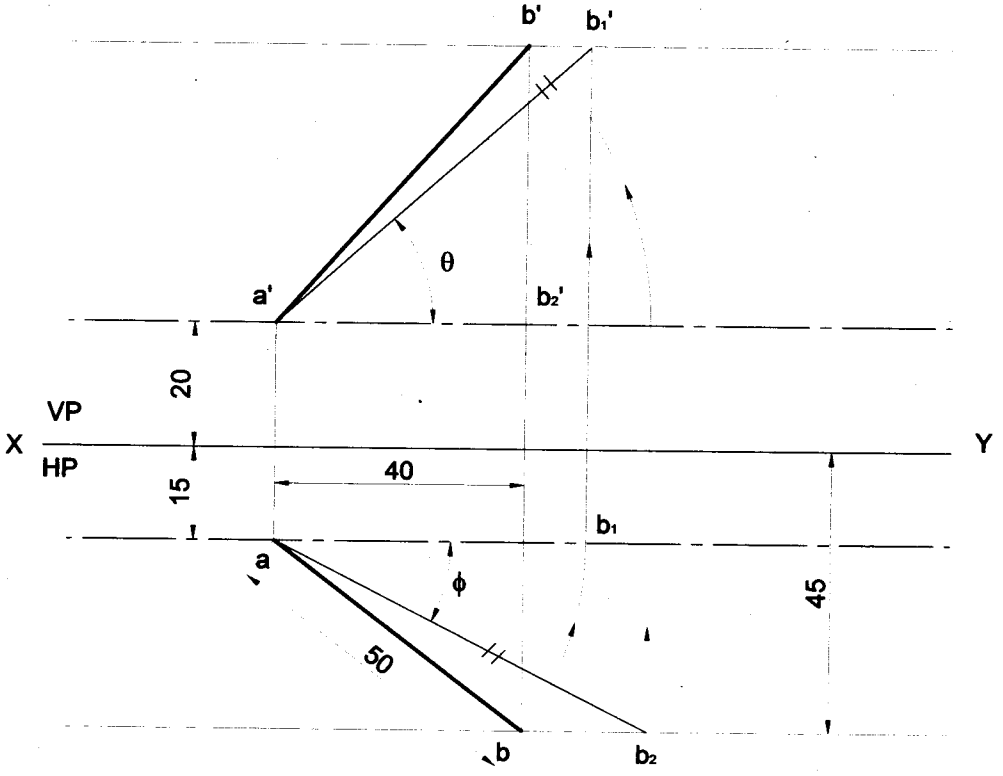
$\theta = 29^0$

$\phi = 16^0$

TL = 73

Problem 13 The distance between the end projectors through the end points of a line AB is 40 mm. The end A is 20 mm above HP and 15 mm in front VP. The end B is 45 mm infront of VP. The line AB appears 50 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP and VP.

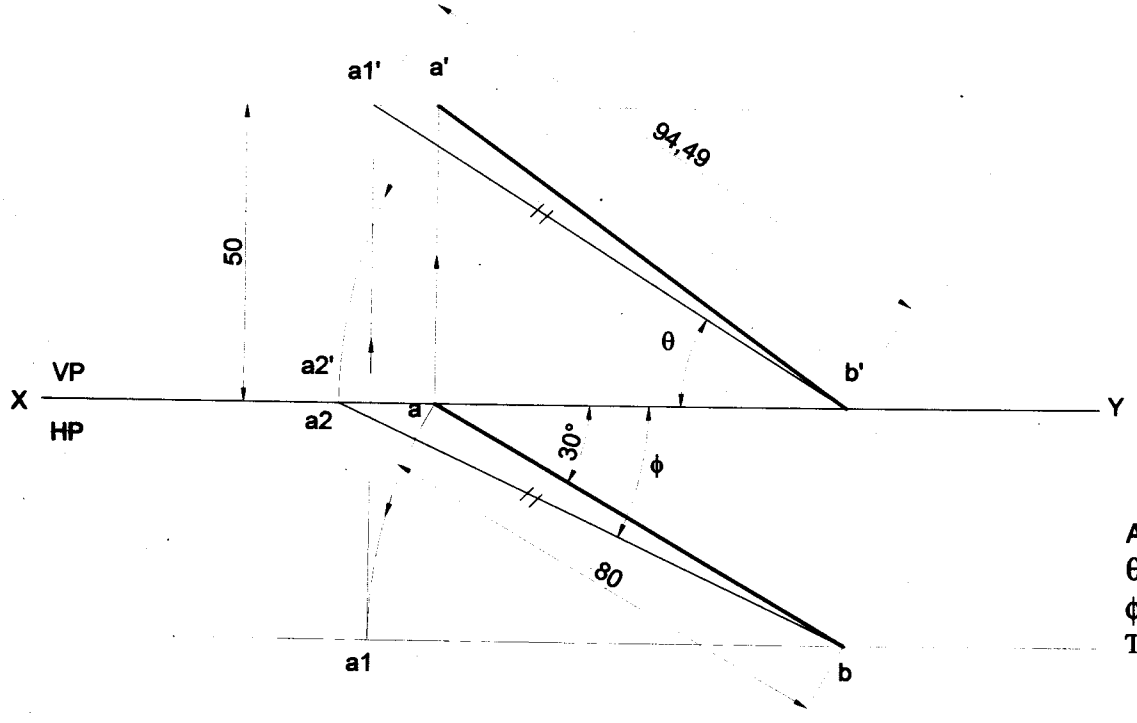
Solution



ANSWERS :
$\theta = 42^0$
$\phi = 27^0$
TL = 67

Problem 14 The point B of a line AB is on the horizontal plane, the top view of the line makes an angle of 30° with XY line, being 80 mm. The point A is on the vertical plane and 50 mm above the horizontal plane. Draw the top and front views of the line and obtain the true length of the line. Also find the inclinations of the line with the two planes.

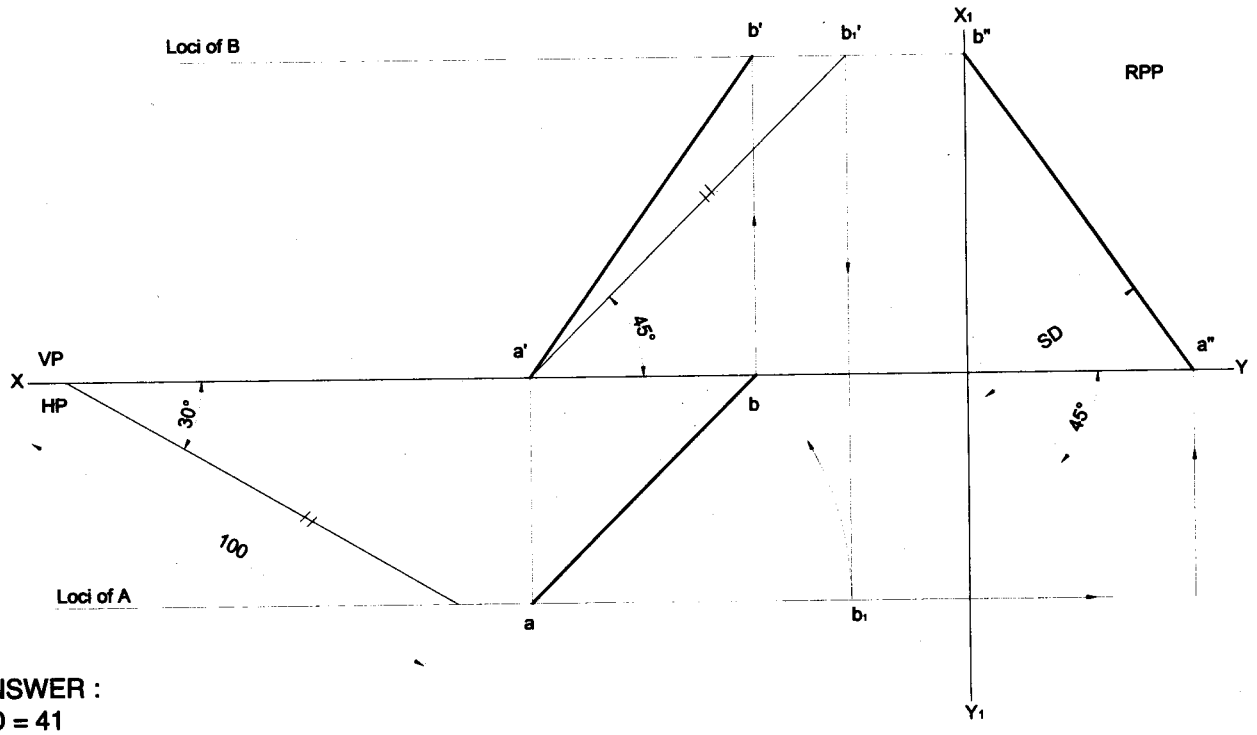
Solution



ANSWERS :
$\theta = 25^0$
$\phi = 32^0$
TL = 95

Problem 15 Draw the projections of a straight line AB, 100 mm long, inclined at 45° to HP and 30° to VP. The end A is in HP and the end B is in VP. Find the shortest distance between the straight line AB and the line of intersection of planes of projection.

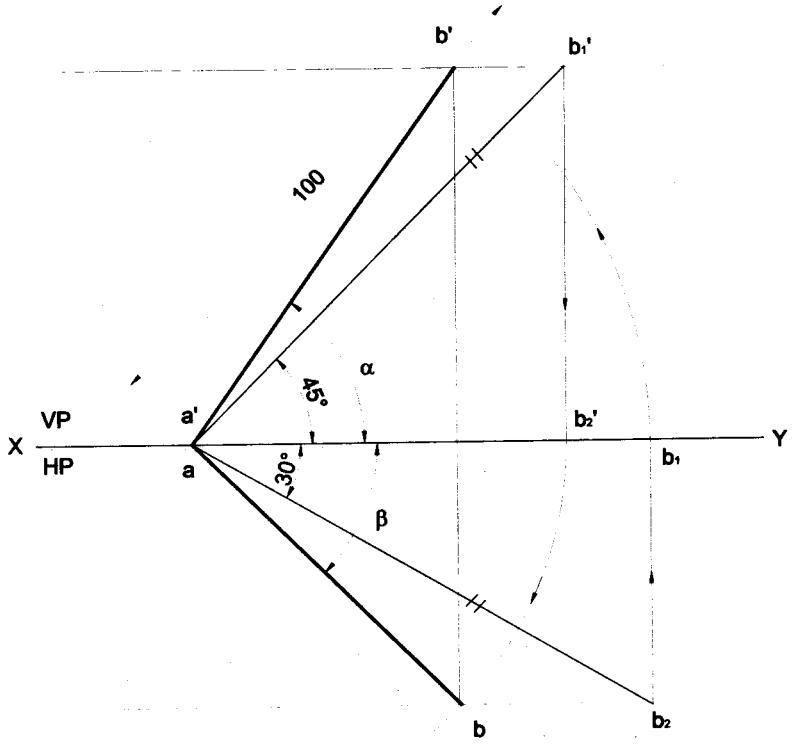
Solution



ANSWER :
SD = 41

Problem 16 A line AB 100 mm long is inclined to HP at 45° and inclined to VP at 30°. Draw front and top views of line and determine their lengths. Also determine the perpendicular distance of end Q from both HP and VP.

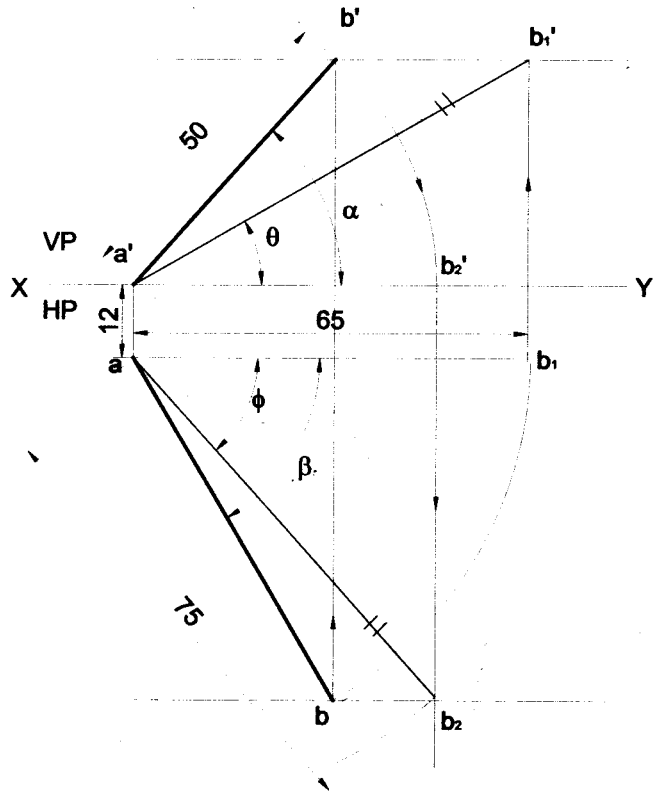
Solution



ANSWERS :
$\alpha = 55^0$
$\beta = 65^0$
a'b' = 87
ab = 71
b'b' = 71
$b_1b_2 = 50$

Problem 17 The top view of a 75 mm long line AB measures 65 mm, while the front view is 50 mm. Its one end A is in the H.P and 12 mm in front of the V.P. Draw the projections of AB and determine its inclinations with the H.P. and the V.P.

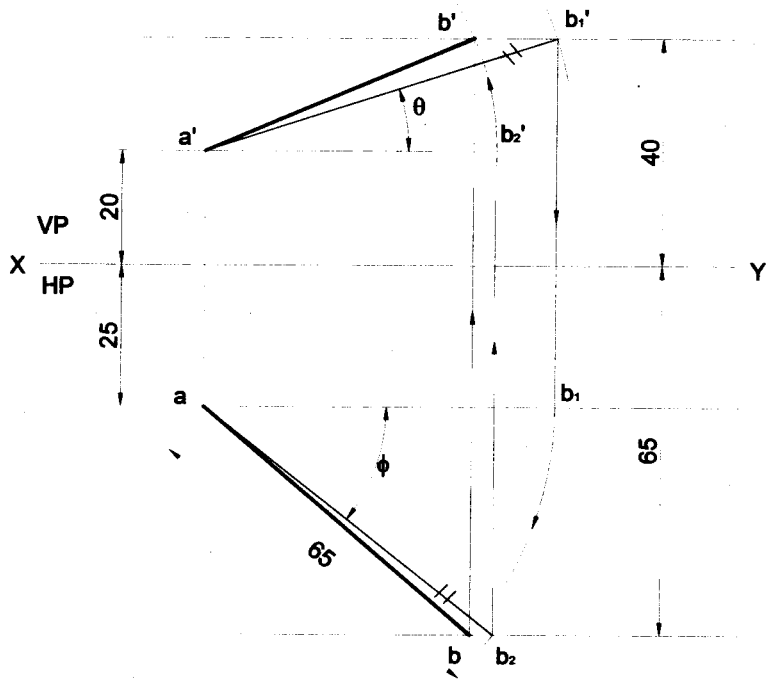
Solution



ANSWERS :
$\theta = 30^0$
$\phi = 48^0$
$\alpha = 48^0$
$\beta = 60^0$

Problem 18 A line AB, 65 mm long, has its end A 20 mm above the H.P and 25 mm in front of the V.P The end B is 40 mm above the H.P. and 65 mm in front of the V.P. Draw the projections of AB and show its inclinations with the H.P. and the V.P.

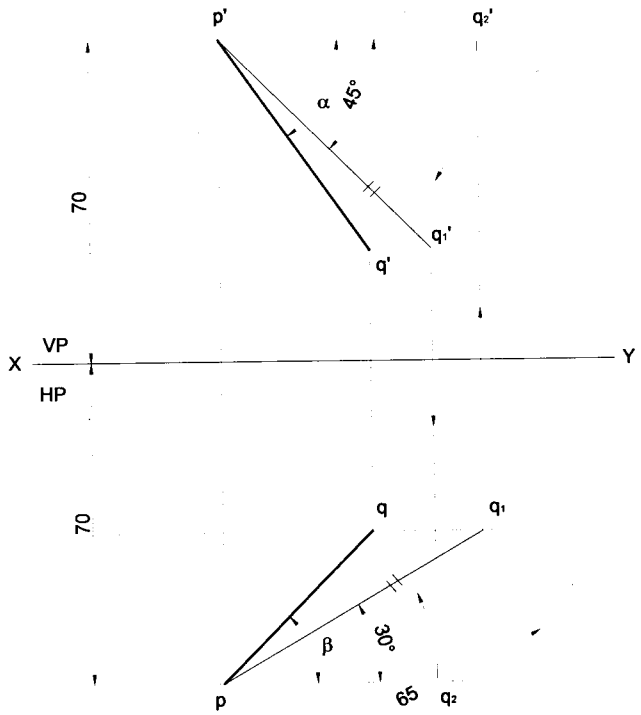
Solution



ANSWERS :
$\theta = 10^0$
$\phi = 38^0$

Problem 19 A straight line PQ, 65 mm long, is inclined at 45° to HP and 30° VP. The point P is 70 mm from both the reference planes and the point Q is towards the reference planes. Draw the projections.

Solution



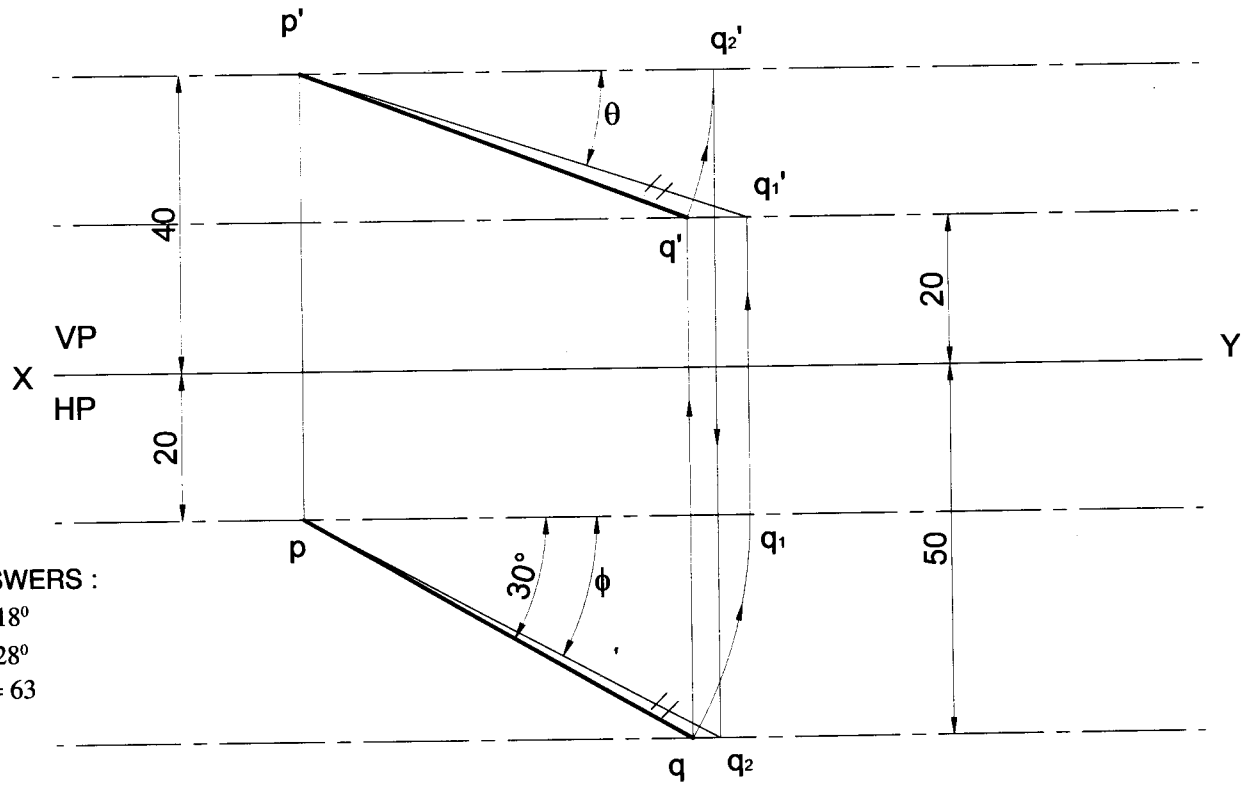
ANSWERS :

$\alpha = 55^0$

$\beta = 45^0$

Problem 20 A point P is 40 mm above HP and 20 mm infront of VP another point Q is 20 mm above HP and 50 mm infront of VP. The top view of line PQ is inclined at 30° to XY. Draw the projections.

Solution



ANSWERS :

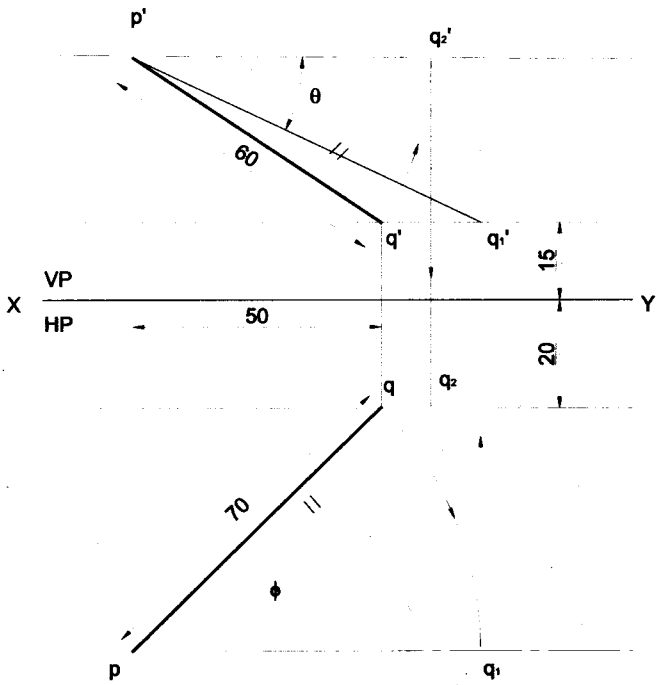
$\theta = 18^0$

$\phi = 28^0$

TL = 63

Problem 21 The top view of a line PQ is 70 mm and front view is 60 mm long. The end Q is nearer to both HP and VP than the end P and is 15 above HP and 20 mm infront of VP. Draw the projections of the line if the distance between projectors is 50 mm.

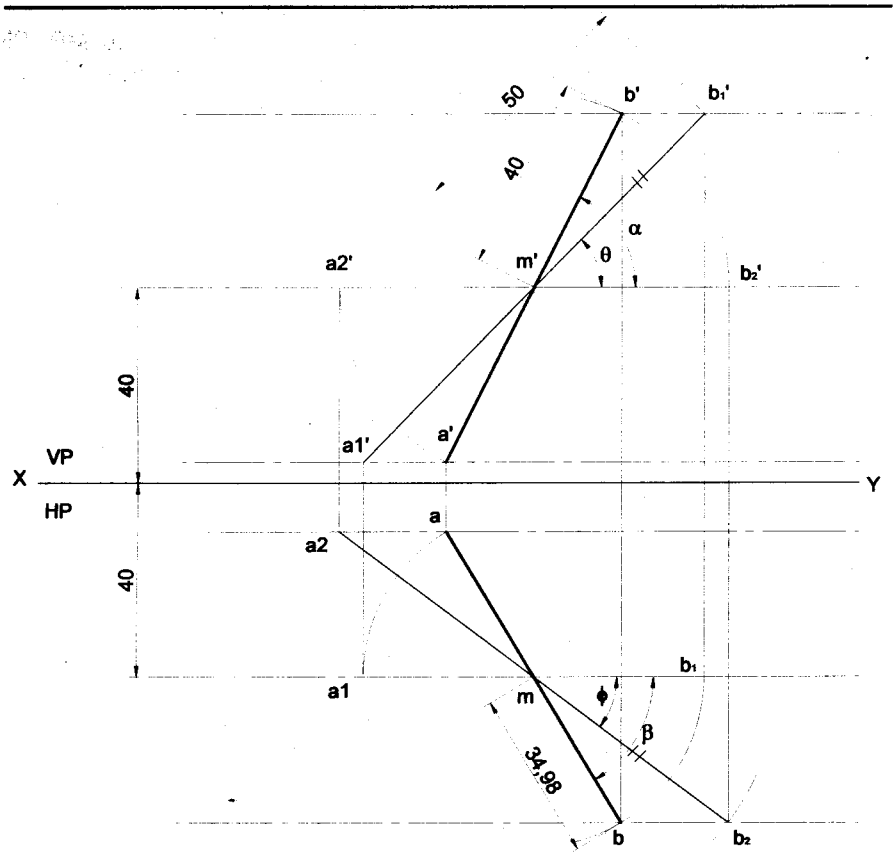
Solution



ANSWERS :
$\theta = 25^0$
$\phi = 40^0$

Problem 22 A line AB 100 mm long measures 80 mm in front view and 70 mm in top view the mid point M of the line is 40 mm from both HP and VP. Draw its projections. Find its inclinations.

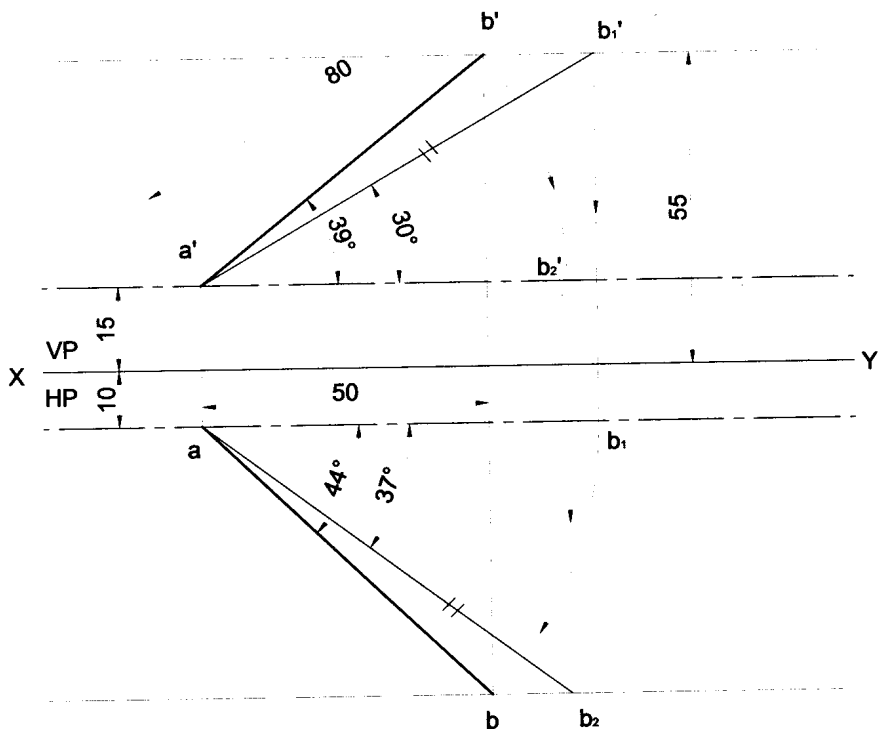
Solution



ANSWERS :
$\theta = 46^0$
$\phi = 37^0$
$\alpha = 63^0$
$\beta = 59^0$

Problem 23 A line has its end A 15 mm above HP and 10 mm infront of VP. The end B is 55mm above HP and the line is inclined at 30° to HP. The distance between the end projectors is 50 mm. draw the projections of the line and determine the true length of the line and its inclinations with VP.

Solution



ANSWERS :

$\phi = 37^0$

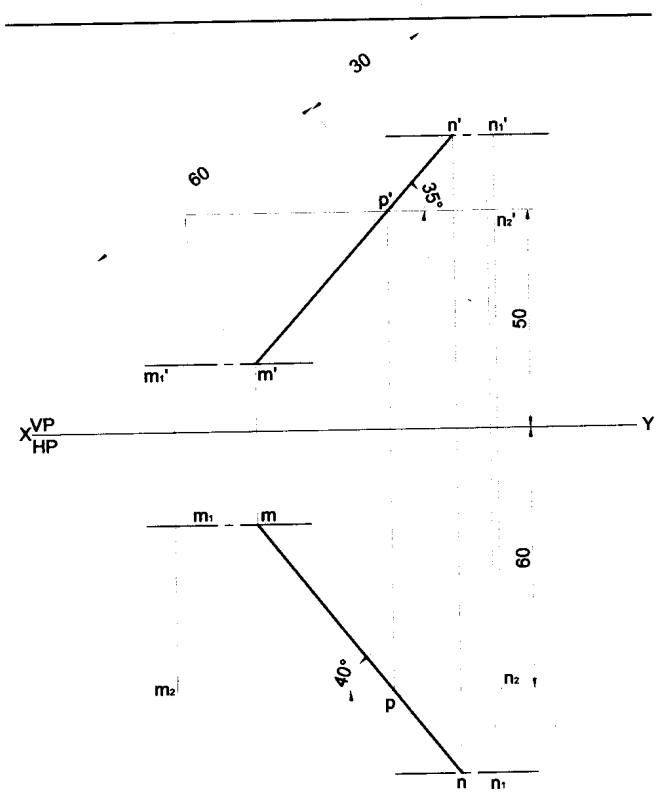
$\alpha = 39^0$

$\beta = 44^0$

TL = 80

Problem 24 A line MN 90 mm long has a point P on it which divides the line in the ration 2:1, i.e. MP : PN = 2:1. this point P is 50 mm above HP and 60 mm in front of VP. The line is inclined at 35° to HP and 40° to VP. Draw the projection of the line. Find the distance between end projector and the position of the ends of the line with HP and VP.

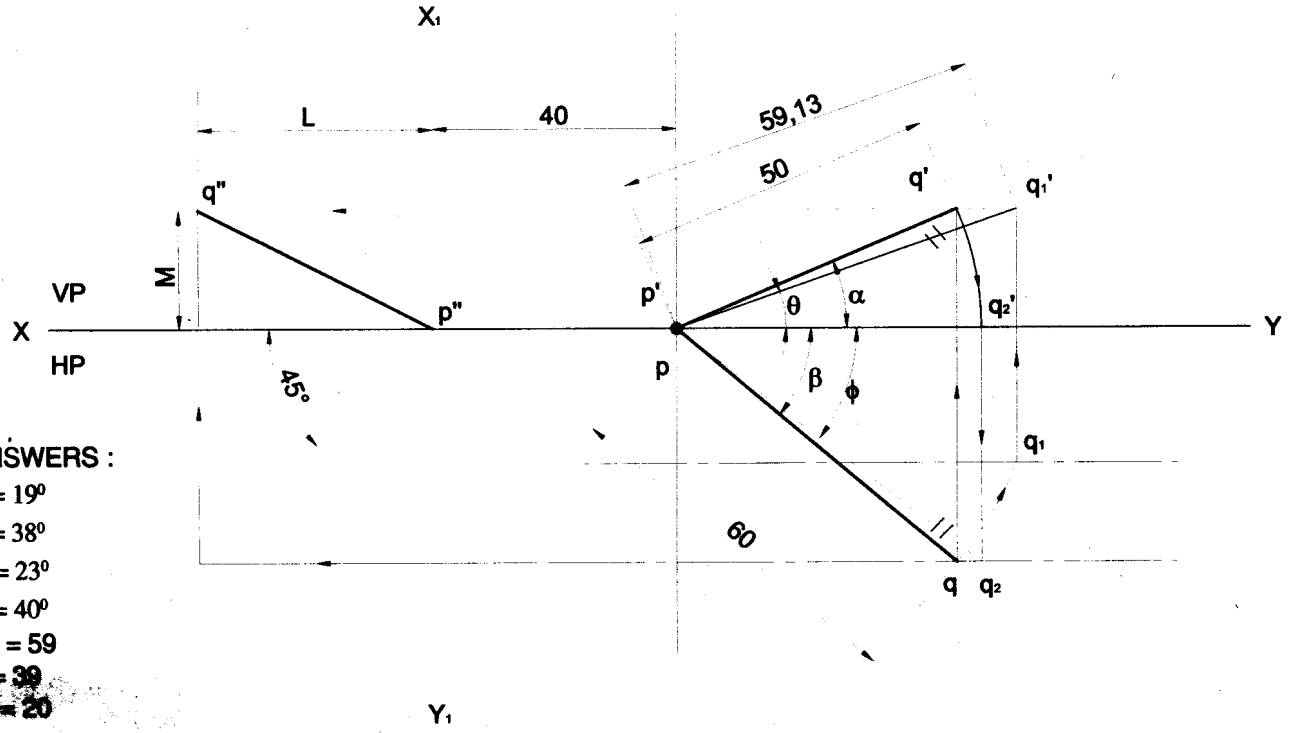
Solution



Problem 25 A straight line PQ inclined at 40° to VP has pq = 60 mm and p'q' = 50 mm. The end *P* is both in HP and VP, and 40 mm to the right of left profile plane

a) Draw the projections of the straight line PQ.
b) Find the true length and true inclination with HP.
c) Draw the profile view of the straight line.
d) Find the position of the end Q with HP and VP.

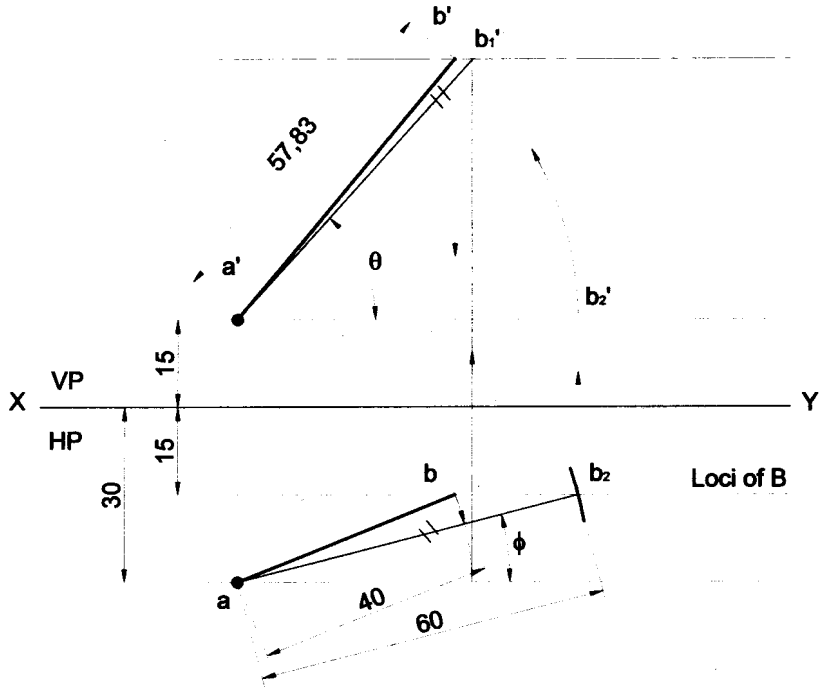
Solution



ANSWERS :
θ = 19°
ϕ = 38°
α = 23°
β = 40°
TL = 59
L = 39
M = 20

Problem 26 A line has one end 30 mm in front of VP and 15 mm above HP and the other end is 15 mm in front of VP and is above HP. Length of the line is 60 mm. Top view of the line is 40 mm long. Draw the two views of the line and obtain the inclination of the line with HP and VP.

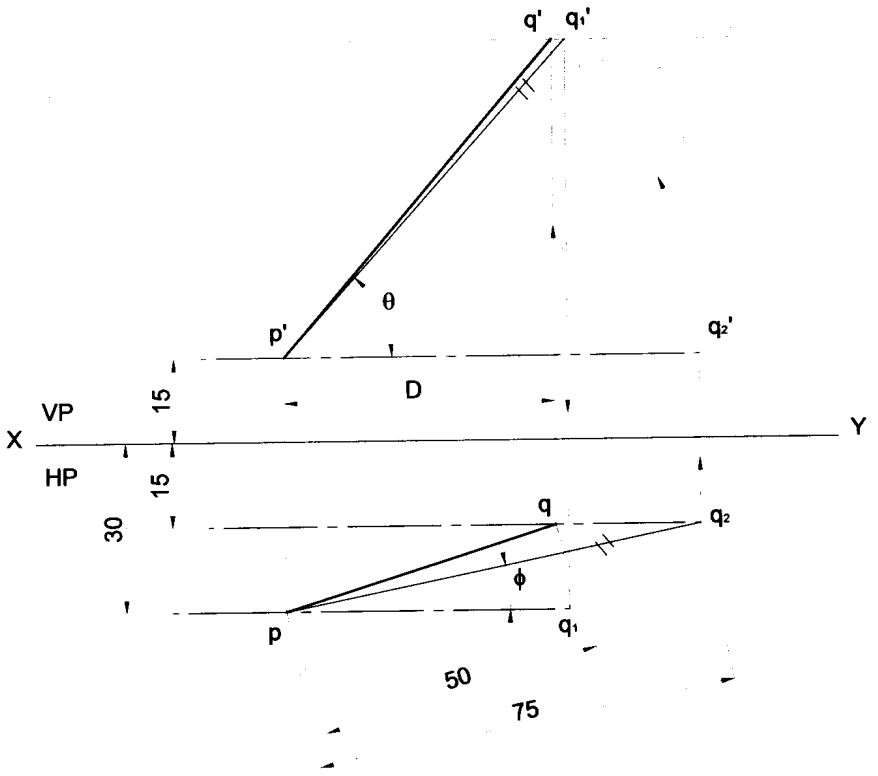
Solution



ANSWERS :
θ = 48°
ϕ = 14°

Problem 27 The top view of line PQ 75 mm long measures 50 mm. The end P is 30 mm in front of VP and 15 mm above HP. The end Q is 15 mm in front of VP and above HP. Draw the Projections of the line and find its true inclinations with HP and VP. Find the length of front view and distance between the end Projectors.

Solution



ANSWERS :

$\theta = 12^0$

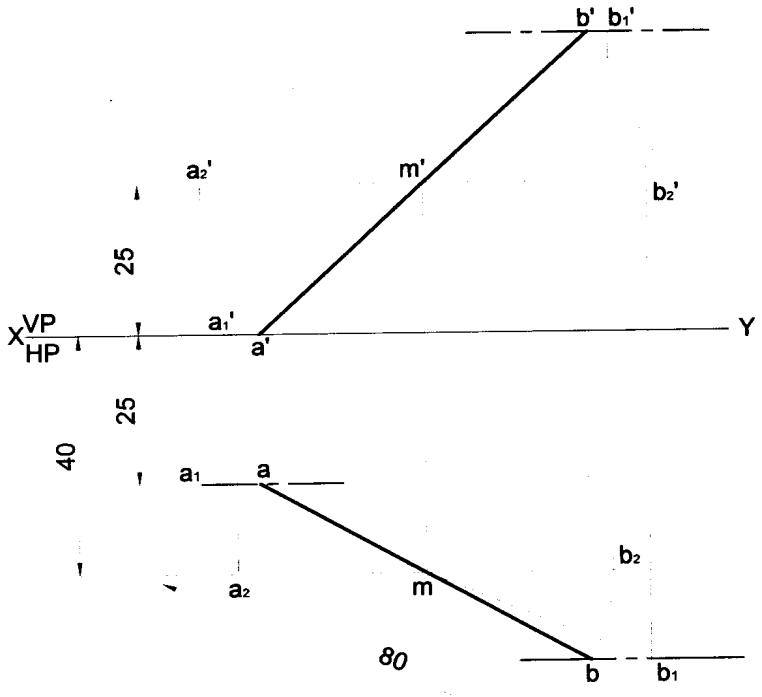
$\phi = 48^0$

D = 48

p'q' = 73

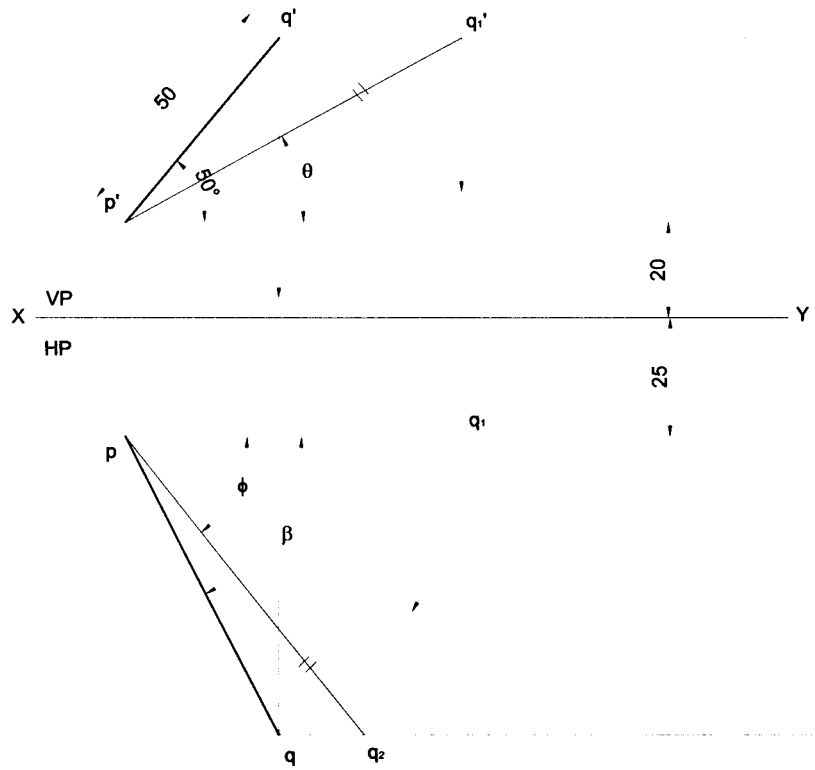
Problem 28 A straight line AB measuring 80 mm long has the end A in the HP and 25 mm in front of the VP. Its mid point M is 25 mm above the HP and 40 mm in front of the VP. Draw the projections of the line and determine the inclination of the line with HP and VP.

Solution



Problem 29 The front view of the line PQ 80 mm long measures 50 mm and it is inclined to XY (reference line) at 50^0. One end of the line P is 20 mm above the HP and 25 mm in front of the VP. Draw the front view and top view of the line and find the inclinations of the line with HP and VP.

Solution



ANSWERS :

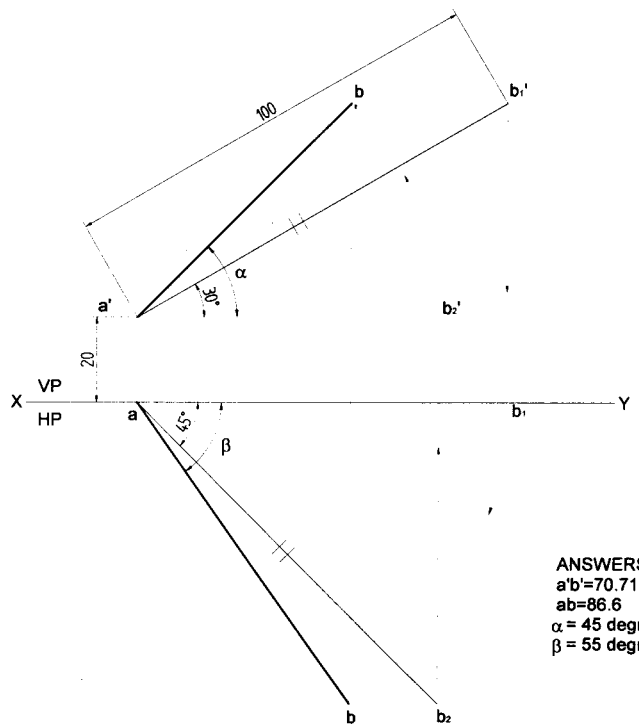
$\theta = 29^0$

$\phi = 51^0$

$\beta = 63^0$

Problem 30 Draw the projections of a line AB 100 mm long inclined at 45^0 to VP and 30^0 to HP. One end of the line is 20 mm above the HP and in the VP. Also determine the apparent length and inclinations.

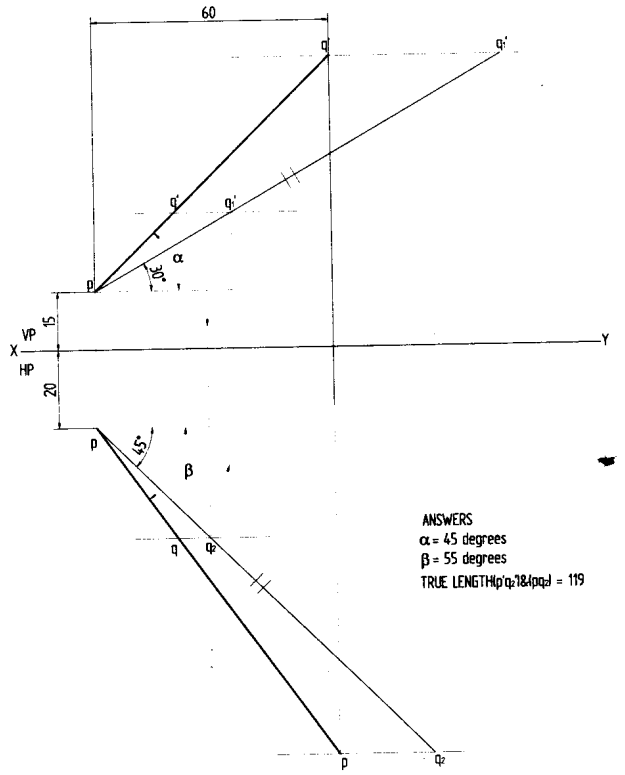
Solution



ANSWERS
a'b'=70.71
ab=86.6
α = 45 degrees
β = 55 degrees

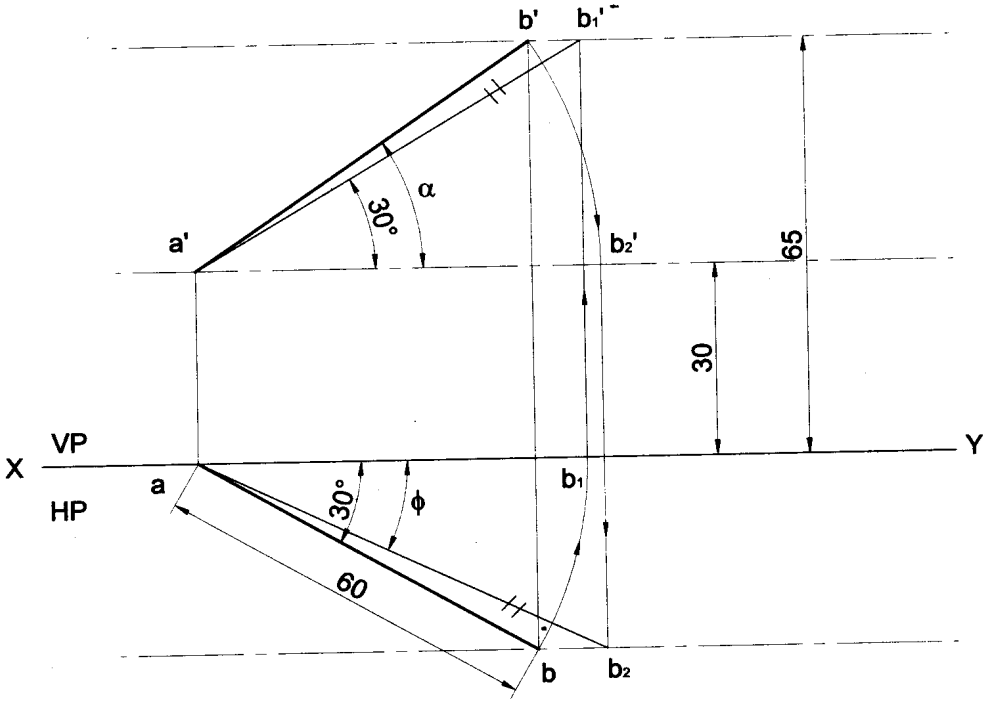
Problem 31 Draw the projections of a line PQ and find its true length and inclinations when the line is inclined at 30^0 to the HP and 45^0 to the VP. The line is having one of its ends 15 mm above HP and 20 mm in front of VP. The distance between the end projectors on the XY line is 60 mm.

Solution



Problem 32 The top view ab of a straight line AB is 60 mm long and makes an angle of 30^0 with the XY line. The end A is in VP and 30 mm above HP. The end B is 65 mm above HP. Draw the projections of the line AB and determine i) length of the front view ii) its true length and true inclinations with the reference planes.

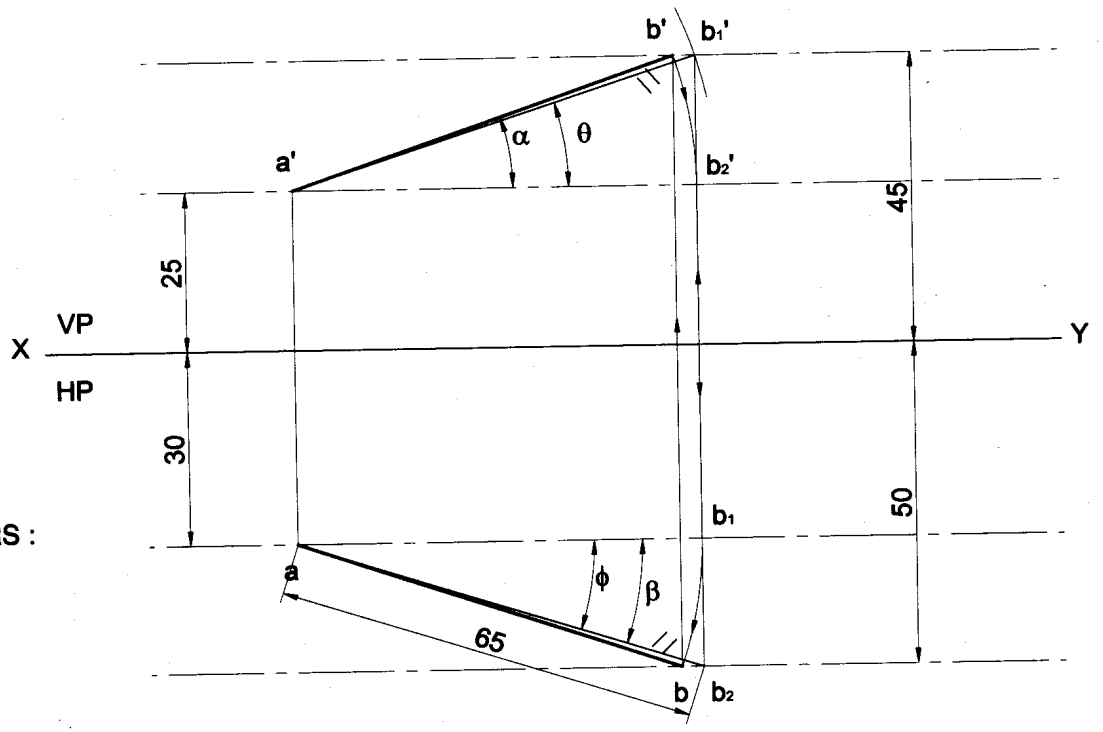
Solution



ANSWERS :
$\theta = 30^0$
$\phi = 26^0$
$\alpha = 34^0$
TL = 69
a'b' = 63

Problem 33 A line AB 65 mm long, has its end A 25 mm above HP and 30 mm in front of VP. The other end is 45 mm above HP and 50 mm in front of VP. Draw the projections and determine its inclinations.

Solution



ANSWERS :

$\theta = 18^0$

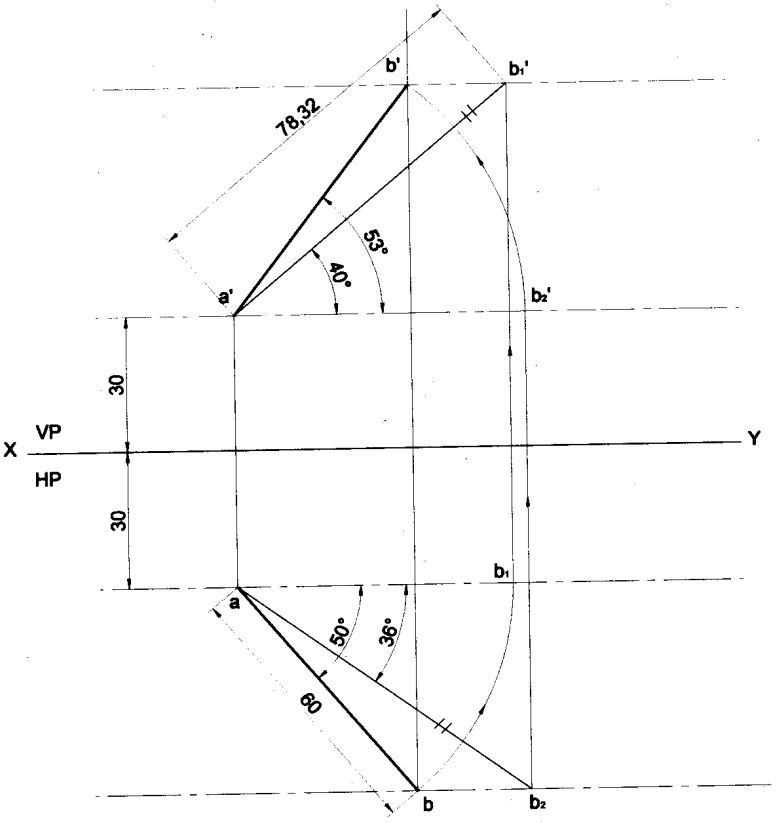
$\phi = 17^0$

$\alpha = 19^0$

$\beta = 18^0$

Problem 34 One end of a line is 30 mm in front of VP and 30 mm above HP. The line is inclined at 40^0 to HP and its top view measuring 60 mm, is inclined at 50^0 to XY. Draw the projections of the line and determine true length and inclination with VP.

Solution



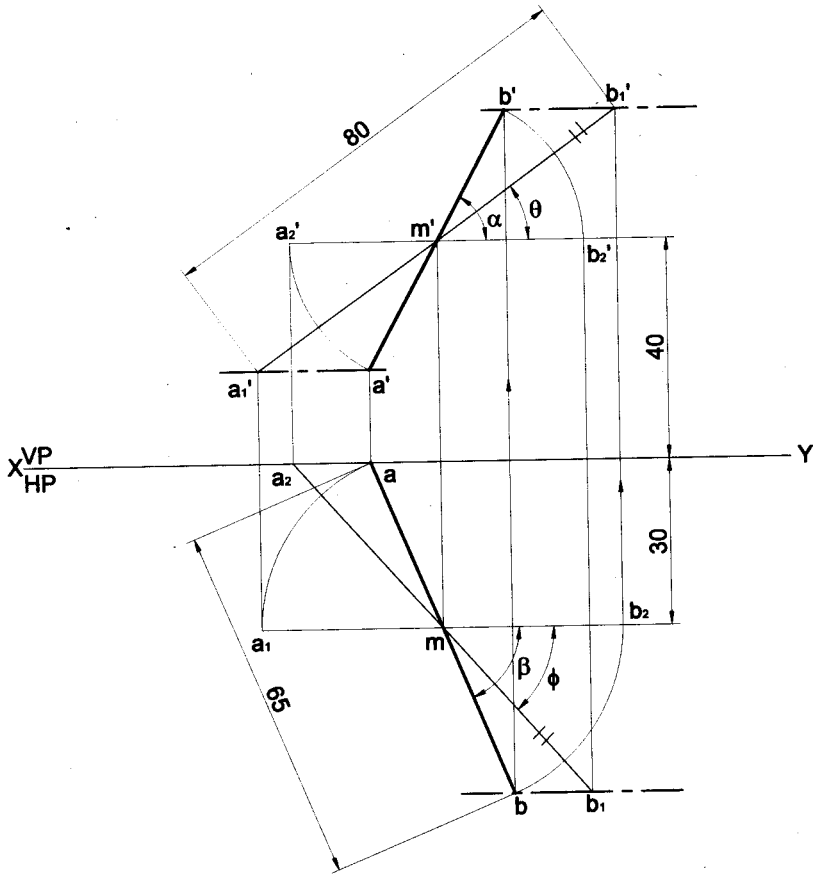
ANSWERS :

$\phi = 36^0$

TL = 78

Problem 35 The top view of the line AB 80 mm long, measures 65 mm. The mid point of the line is 60 mm in front of VP and 70 mm above HP. The point A is in the VP. Draw its projections and find its inclinations.

Solution



ANSWERS :

$\theta = 36^0$

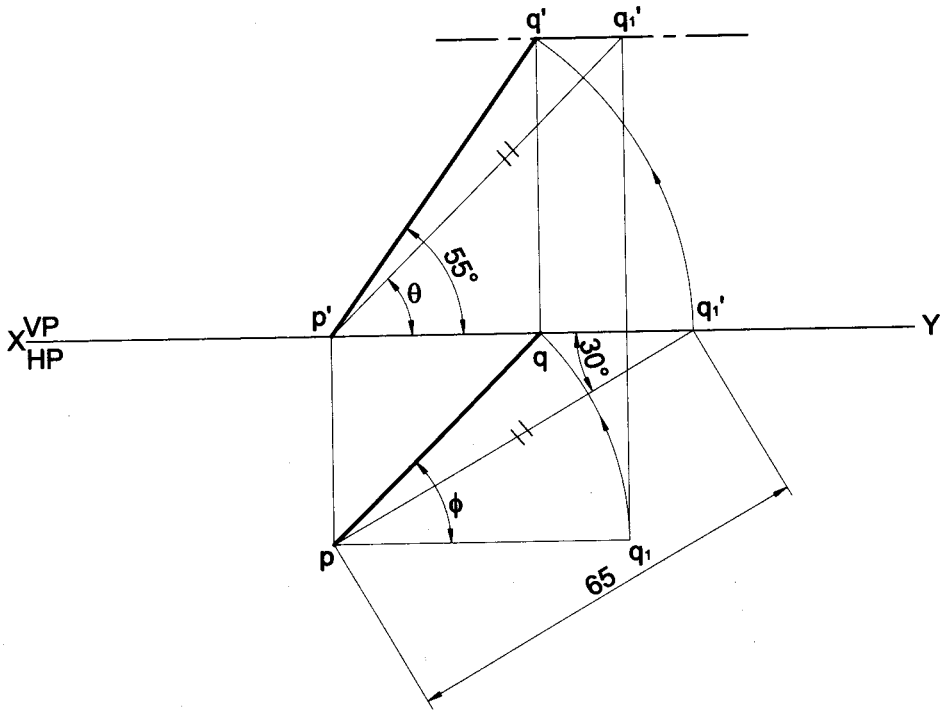
$\phi = 49^0$

$\alpha = 62^0$

$\beta = 67^0$

Problem 36 A straight line PQ is inclined at 45° to HP and 30° to VP. The point P is in HP and the point Q is in VP. The length of the straight line is 65 mm. draw the projections of the straight line AB.

Solution



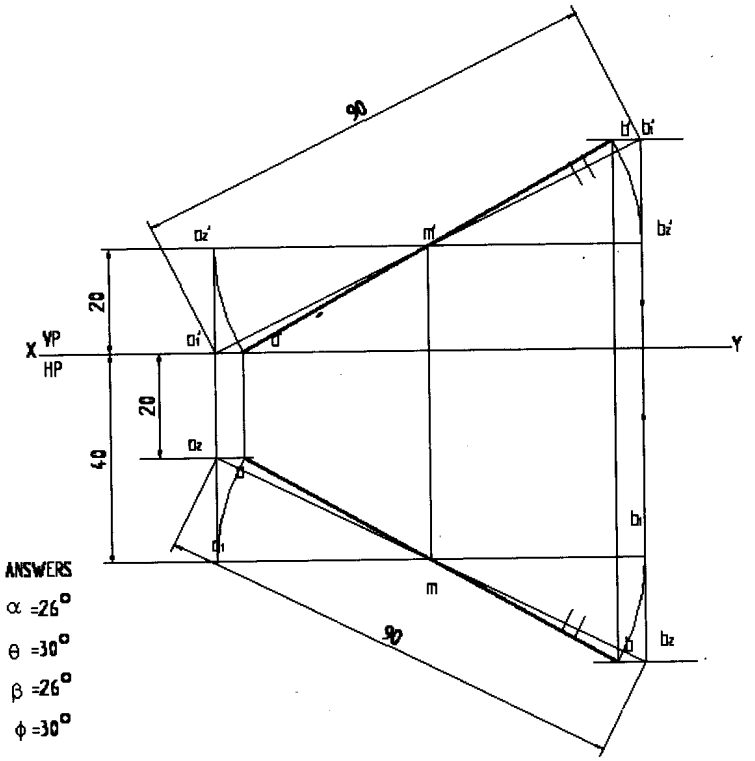
ANSWERS :

$\theta = 36^0$

$\phi = 49^0$

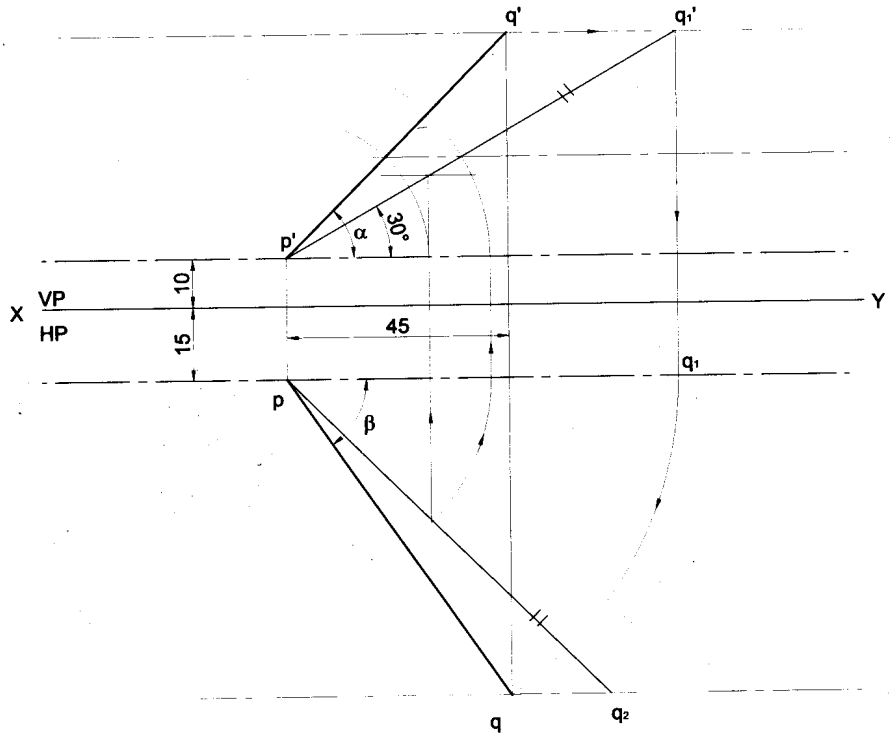
Problem 37 Draw the projections of a line AB 90 mm long and find its true and apparent inclinations with HP and VP, when its end A is on HP and 20 mm in front of VP. Its midpoint M is 20 mm above the HP and 40 mm in front of the VP.

Solution



Problem 38 A line PQ is inclined to both HP and VP by 30° and 45° respectively. one of its ends P is at a distance of 10 mm from HP and 15 mm from VP. The distance between the end projectors is 45 mm. Draw the top, front and right side views of the line. Determine the true length of the line and the distances of the end Q from VP and HP.

Solution



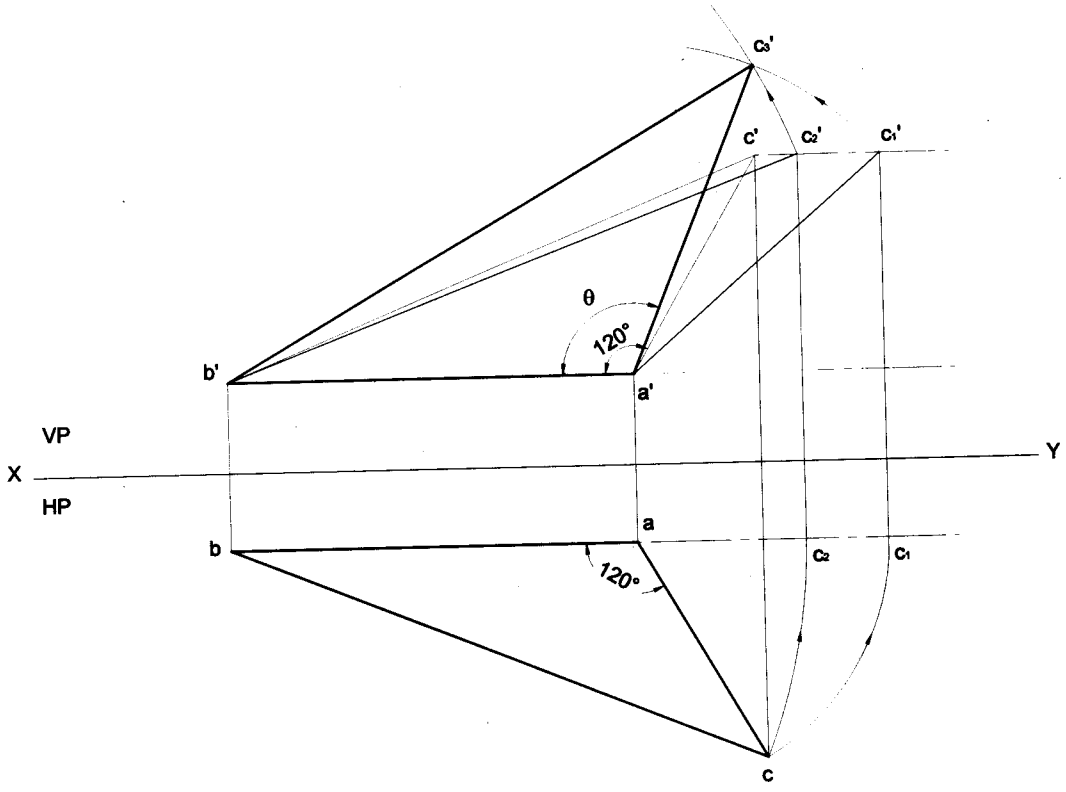
ANSWERS :

$\alpha = 46^0$

$\beta = 55^0$

Problem 39 Two lines AB and AC make an angle of 120° between them in their front view and top view. AB is parallel to both the HP and the VP. Determine the real angle between AB and AC.

Solution

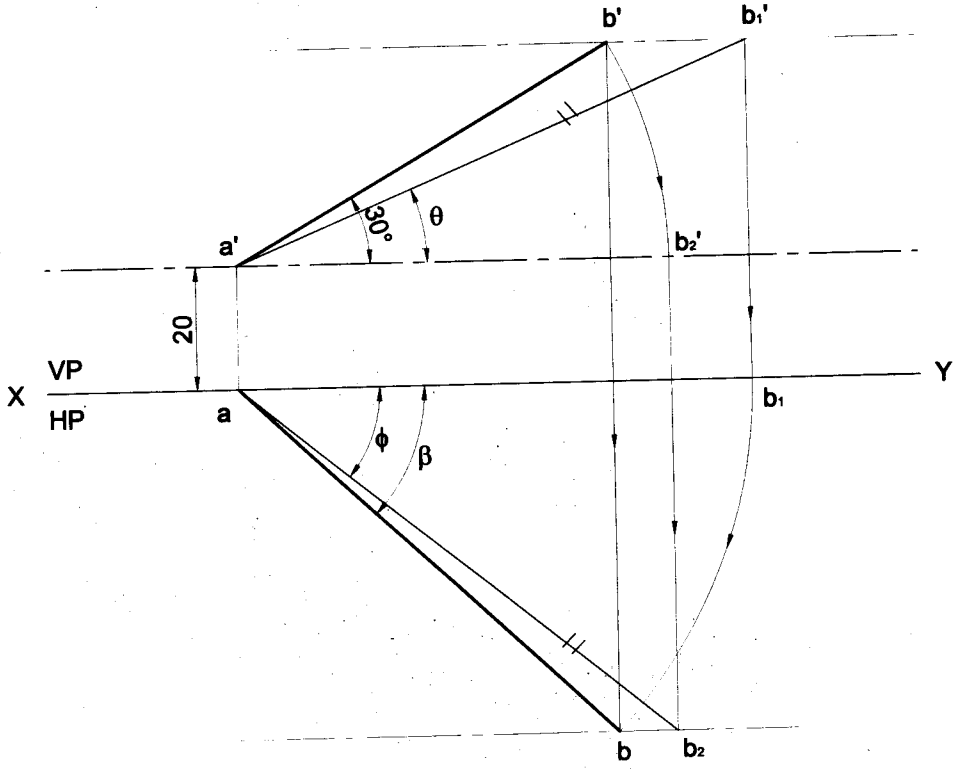


ANSWER :

$\theta = 112^0$

Problem 40 The elevation of a line AB 90 mm long, is inclined at 30° to HP and measures 70 mm. The end A is 20 mm above HP and is in VP. Draw the projections of the line and find its inclination with VP.

Solution



ANSWERS :

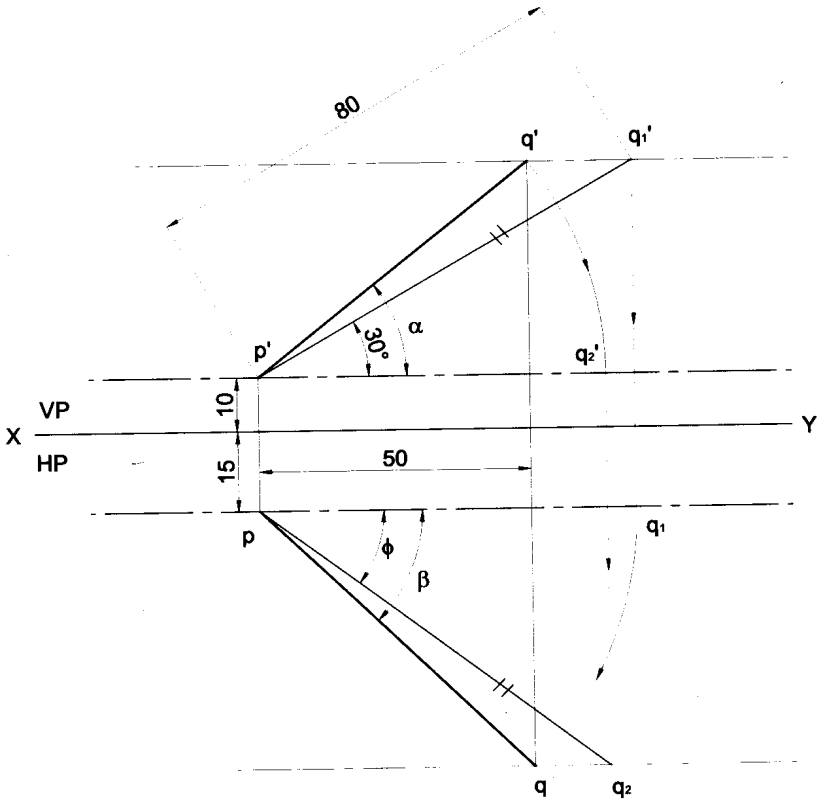
$\theta = 23^0$

$\phi = 39^0$

$\beta = 43^0$

Problem 41 A line PQ measures 80 mm in length. The point P is above HP and infront of VP by 20 mm and 30 mm respectively. The distance between the end projectors is 50 mm. the line is inclined to VP by 30°. Draw the projections of the line and specify its true inclination with HP.

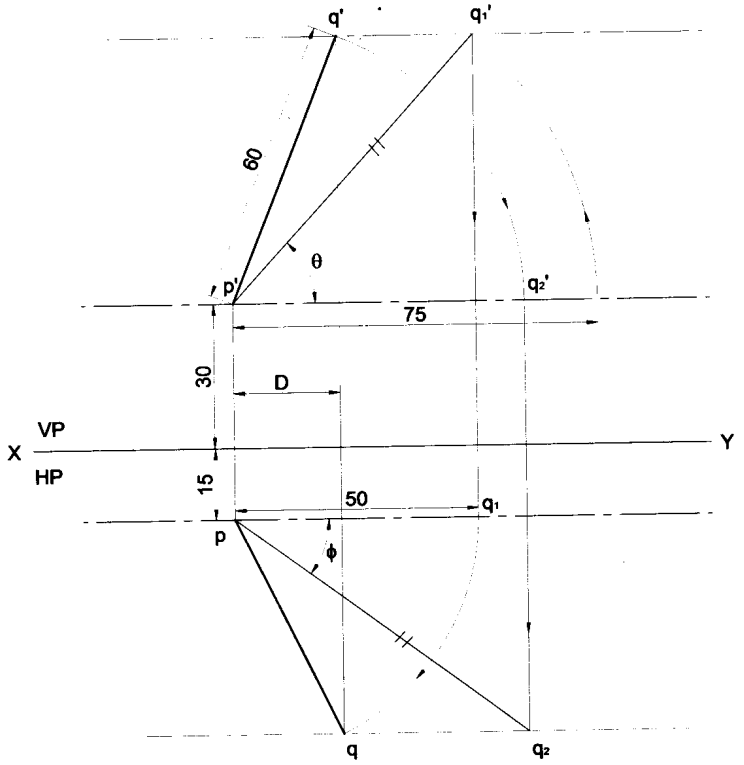
Solution



ANSWERS :
$\phi = 37^0$
$\alpha = 39^0$
$\beta = 44^0$

Problem 42 The top view of a line PQ 75 mm long measures 50 mm and the front view measures 60 mm. The end P is 30 mm above HP and 15 mm infont of VP . Draw the projections of the line and find its true inclinations with HP and VP. Find length of front view and distance between the end projectors.

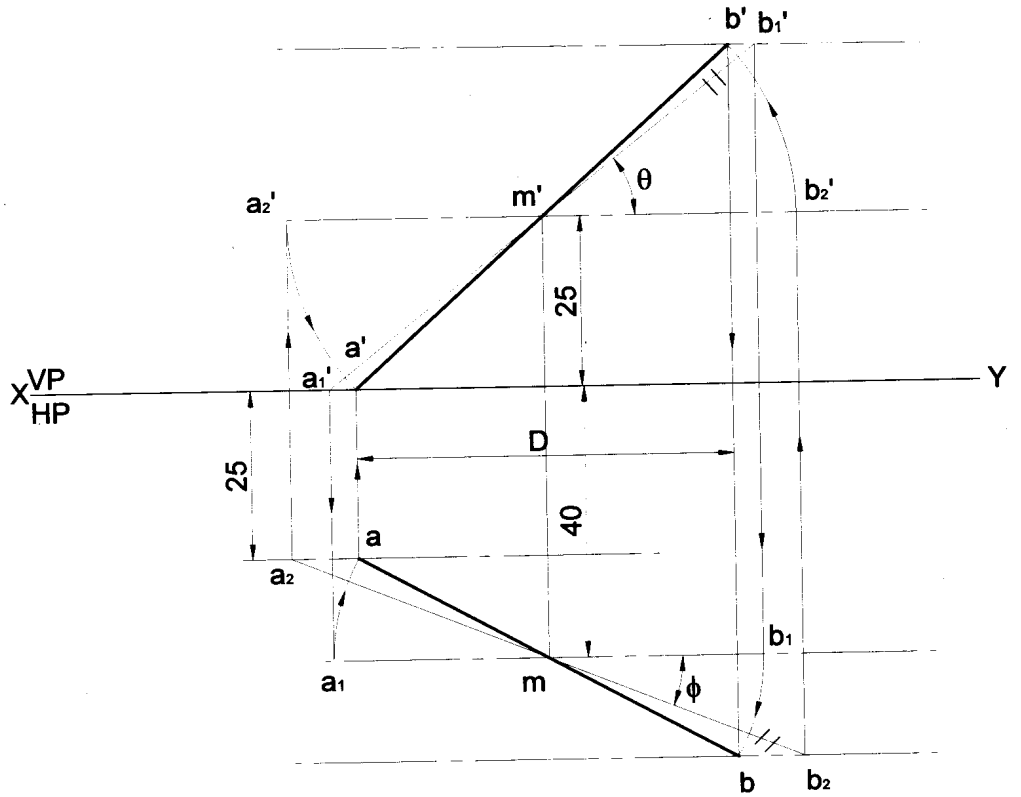
Solution



ANSWERS :
$\theta = 48^0$
$\phi = 37^0$
D = 22

Problem 43 A straight line AB measuring 80 mm long has the end A in the HP and 25 mm infront of the VP. Its mid point M is 25 mm above HP and 40 mm infront of the VP. Draw the views of the line and determine the inclination of the line with HP and VP and also find distance between end projectors.

Solution



ANSWERS :

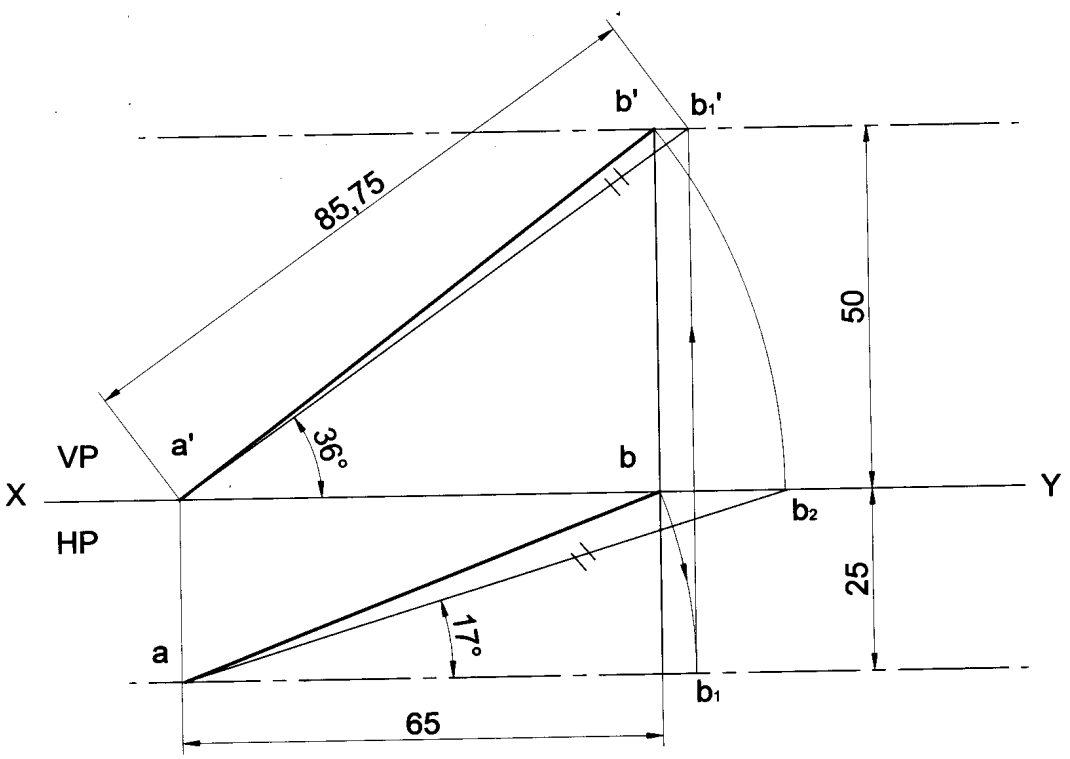
$\theta = 39^0$

$\phi = 22^0$

D = 55

Problem 44 The end A of a line AB is in HP and 25mm in front of VP. The end B is 25 mm infront of VP and 50mm above HP. The distance between the end projectors when measured parallel to the line of intersection of HP & VP is 65mm. Draw the projections of the line AB and determine its true length and true inclinations with HP & VP.

Solution



ANSWERS :

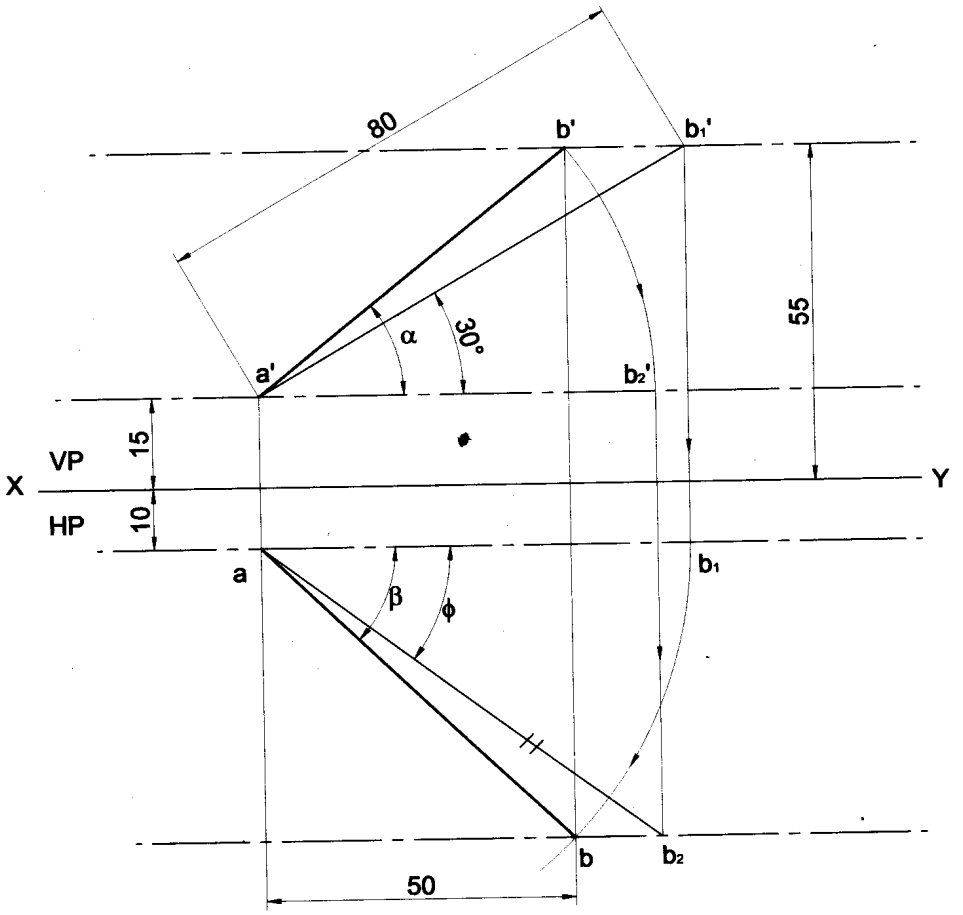
$\theta = 36^0$

$\phi = 17^0$

TL = 86

Problem 45 A line has its end A, 15mm from HP & 10 mm from VP. The end B is 55mm from HP and the line is inclined at 30° to HP. The distance between the end projectors is 50mm. Draw the projections of the line. Determine the true length of the line and its inclination with VP.

Solution



ANSWERS :

$\theta = 28^0$

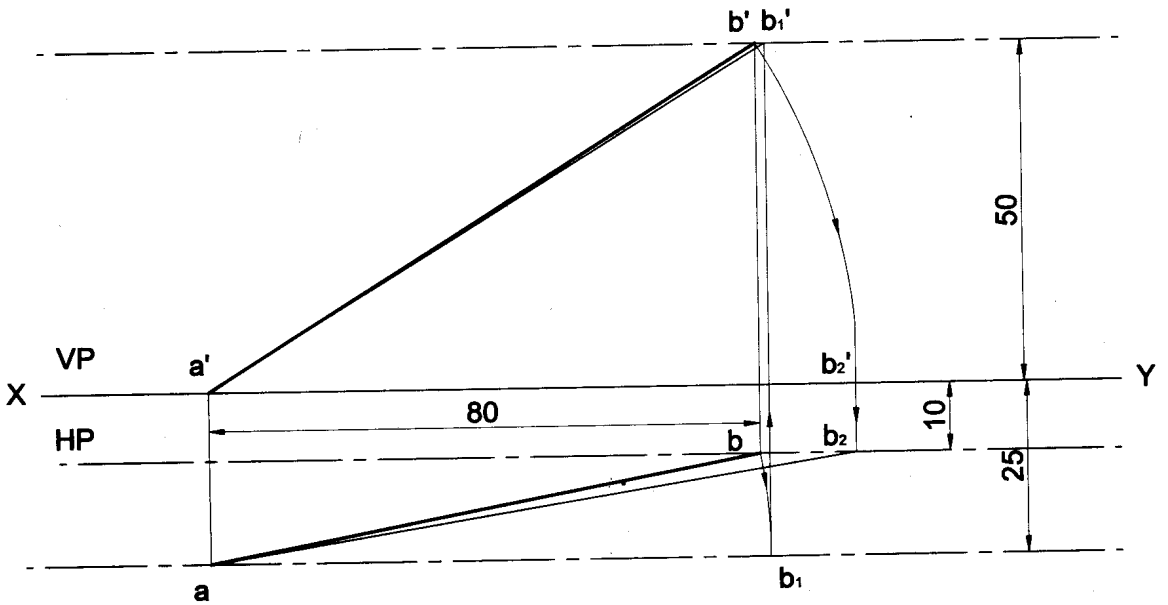
$\phi = 37^0$

$\alpha = 39^0$

$\beta = 44^0$

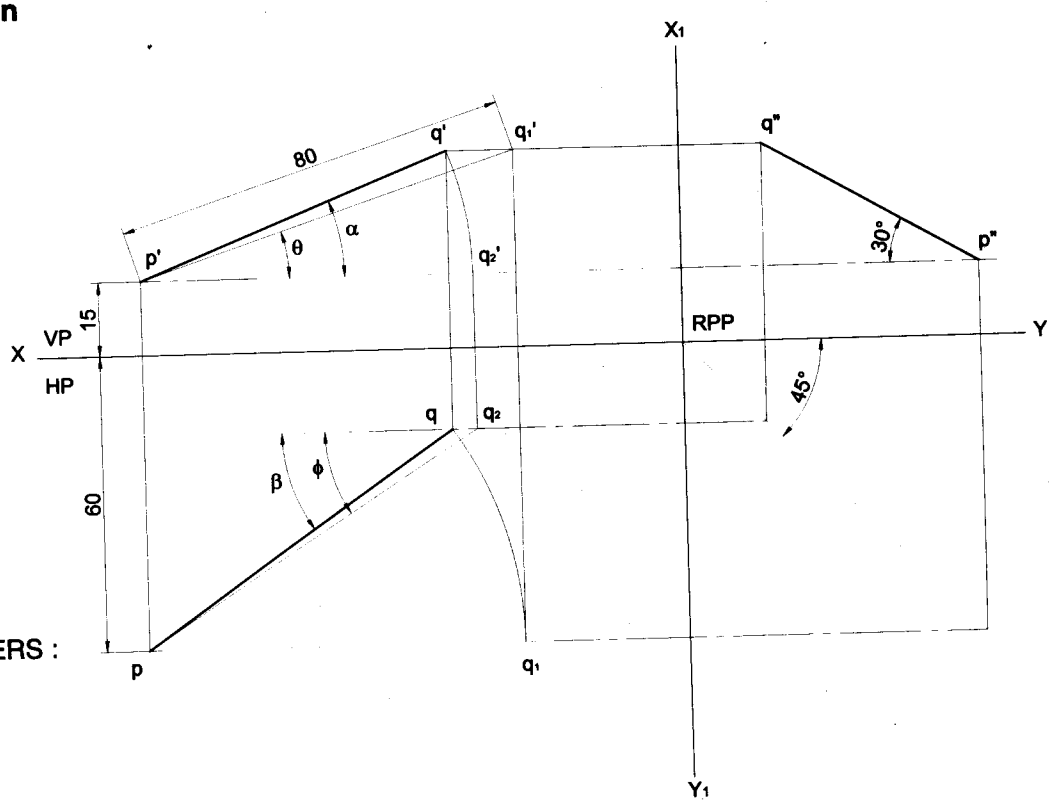
Problem 46 The end A of a line AB is in HP and 25mm in front of VP. The end B is 10 mm in front of VP and 50mm above HP. The distance between the end projectors when measured parallel to the line of intersection of HP & VP is 80 mm. Draw the projections of the line AB and determine its true length and true inclinations with HP & VP.

Solution



Problem 47 A straight line PQ 80 mm long appears to a length of 50 mm and inclined at 300 to xy line in its top view Draw its projections when its end point P is 15 mm above HP and 60 mm infront VP. Point Q is nearer to VP than P.

Solution



ANSWERS :

$\theta = 18^0$

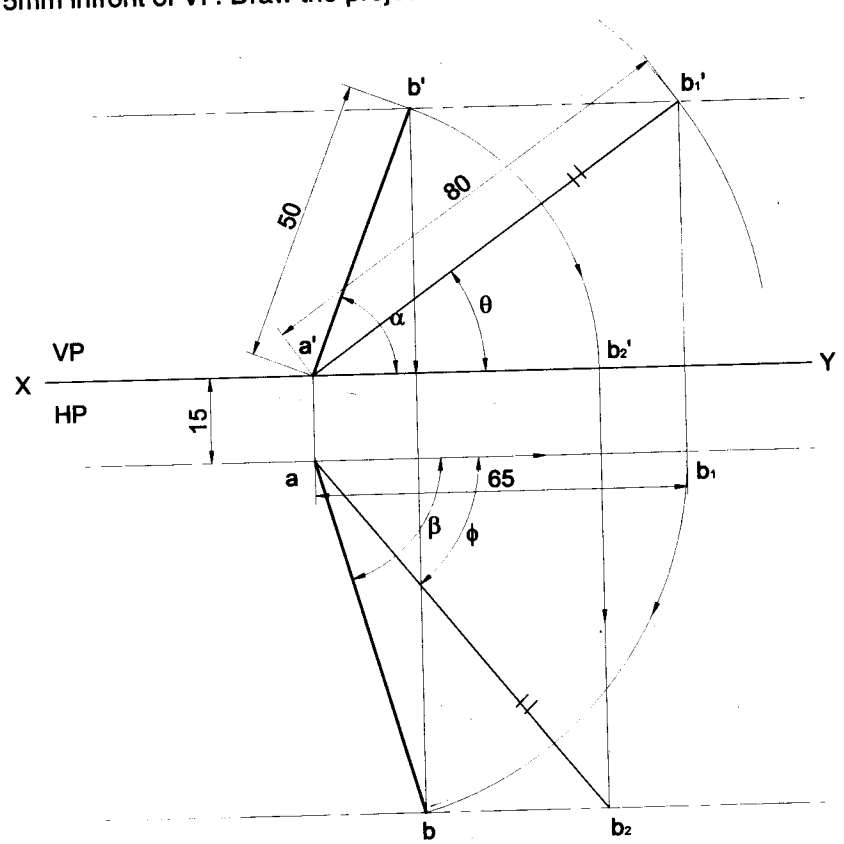
$\phi = 33^0$

$\alpha = 22^0$

$\beta = 35^0$

Problem 48 The top view of a line AB, 80mm long measures 65mm and the length of the front view is 50mm. The end A is on HP and 15mm infront of VP. Draw the projections

Solution



ANSWERS :

$\theta = 36^0$

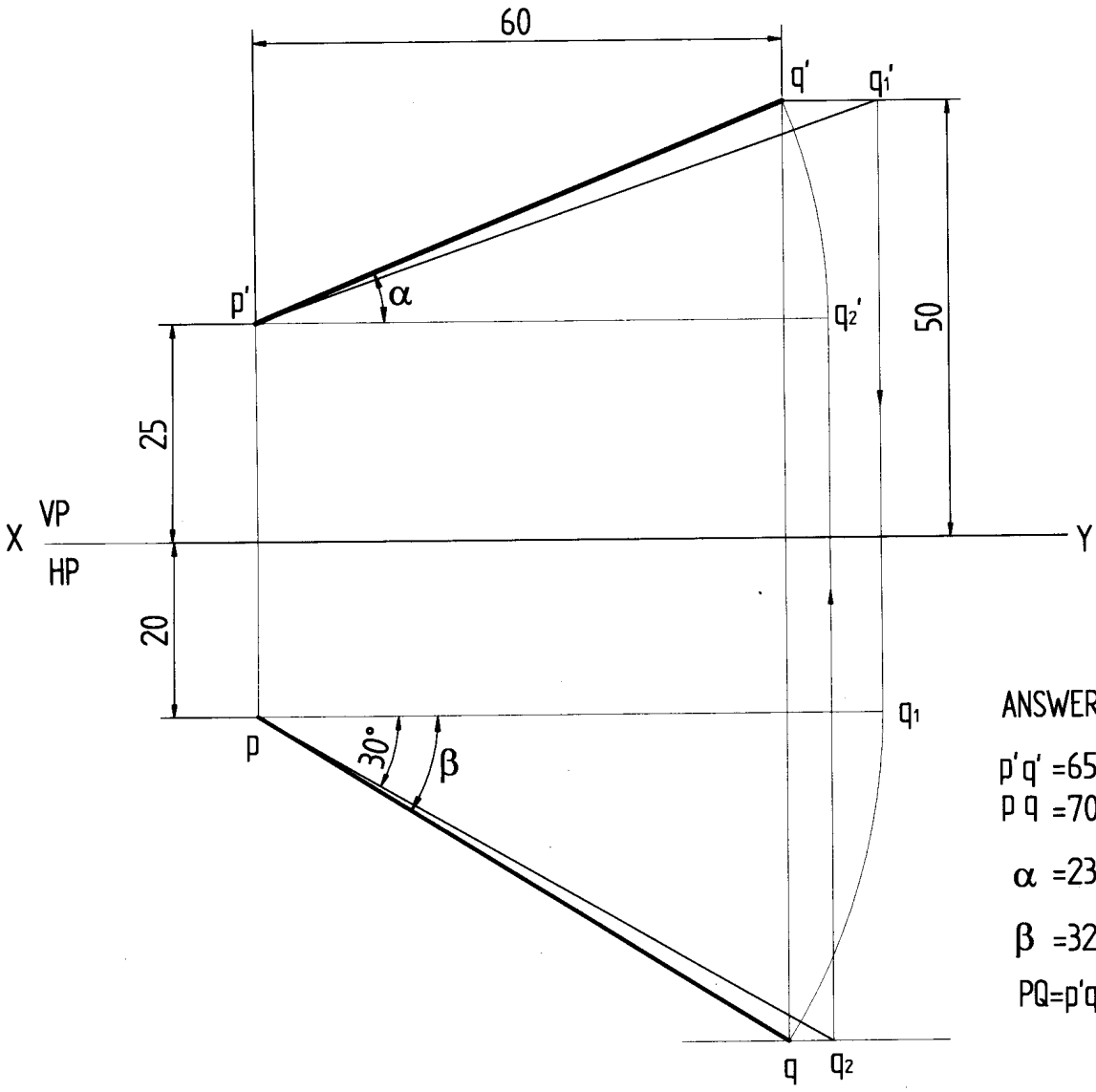
$\phi = 51^0$

$\alpha = 69^0$

$\beta = 74^0$

Problem 49 Draw the projections of a line PQ and find its apparent lengths, true length and true inclination with HP when the line PQ has its end P 25 mm above HP and 20 mm infront of VP. The distance between the end projectors of the line when measured parallel to the line of intersection of the HP and VP is 60 mm. The end Q is 50 mm above the HP and the line is inclined at 30^0 to the VP.

Solution



ANSWER

p'q' =65

p q =70.77

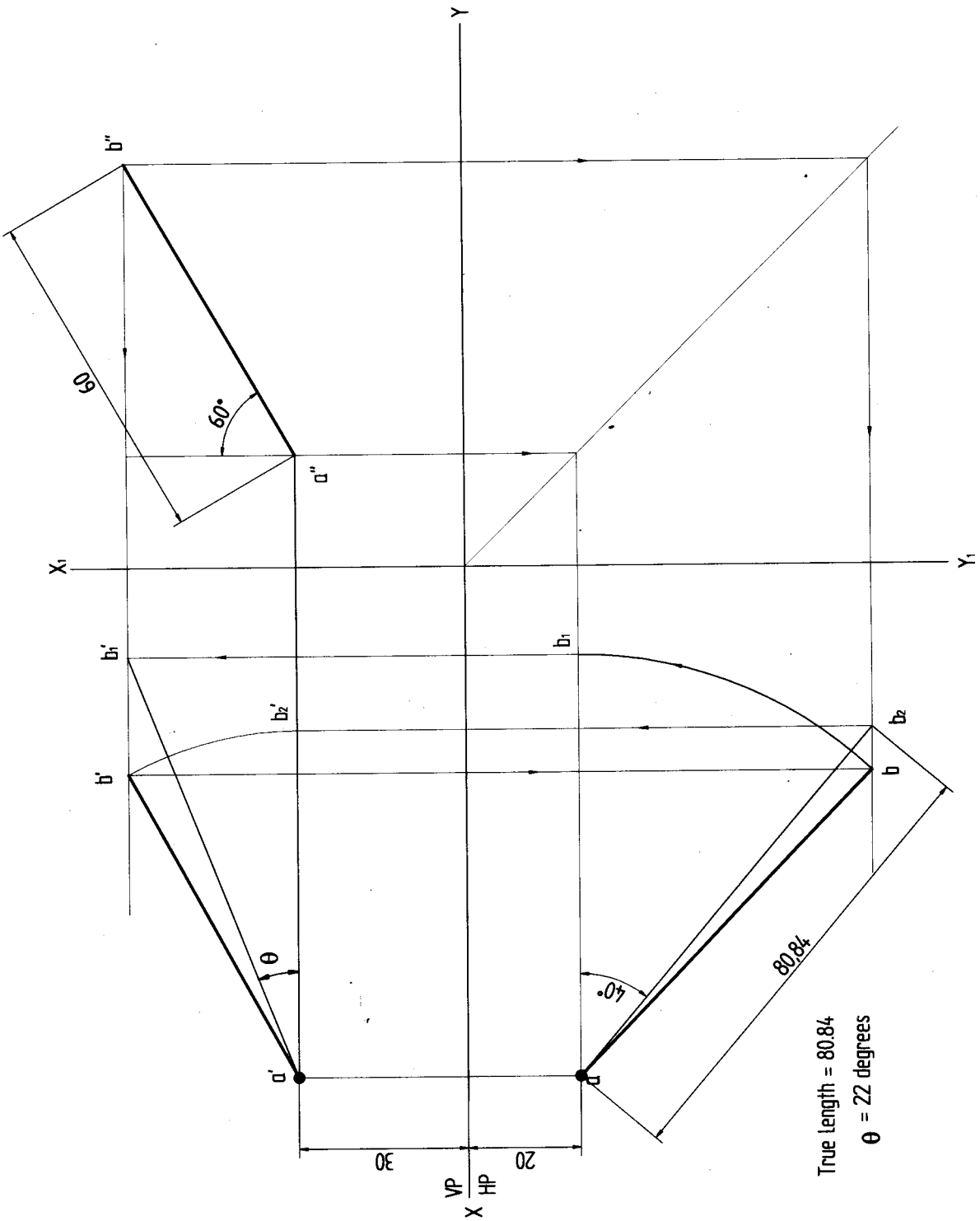
α =23°

β =32°

PQ=p'q1'=pq2=75.06

Problem 50 Find the true length and true inclination of a line AB with HP having one of its ends 20 mm in front of VP and 30 mm above the HP. The line is inclined at 40^0 to VP and the right side view of the line is 60 mm long and inclined at 60^0 to the X1Y1 line. Draw all the three views of the line.

Solution

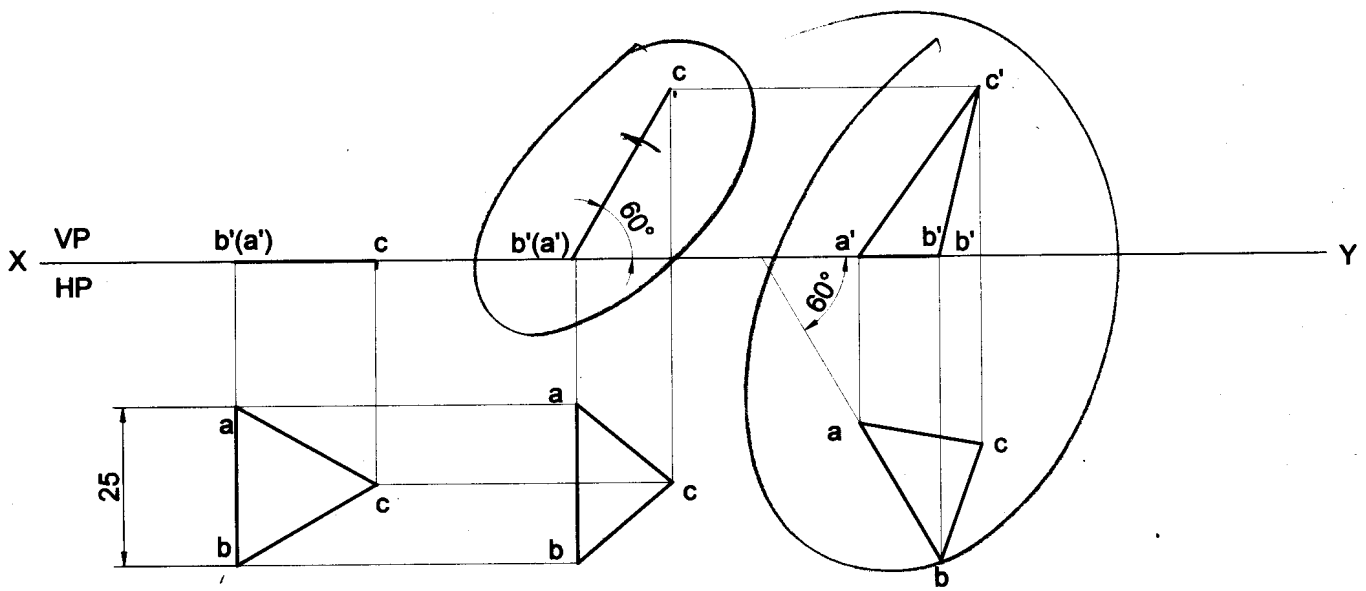


CHAPTER 3

PROJECTIONS OF PLANE SURFACES

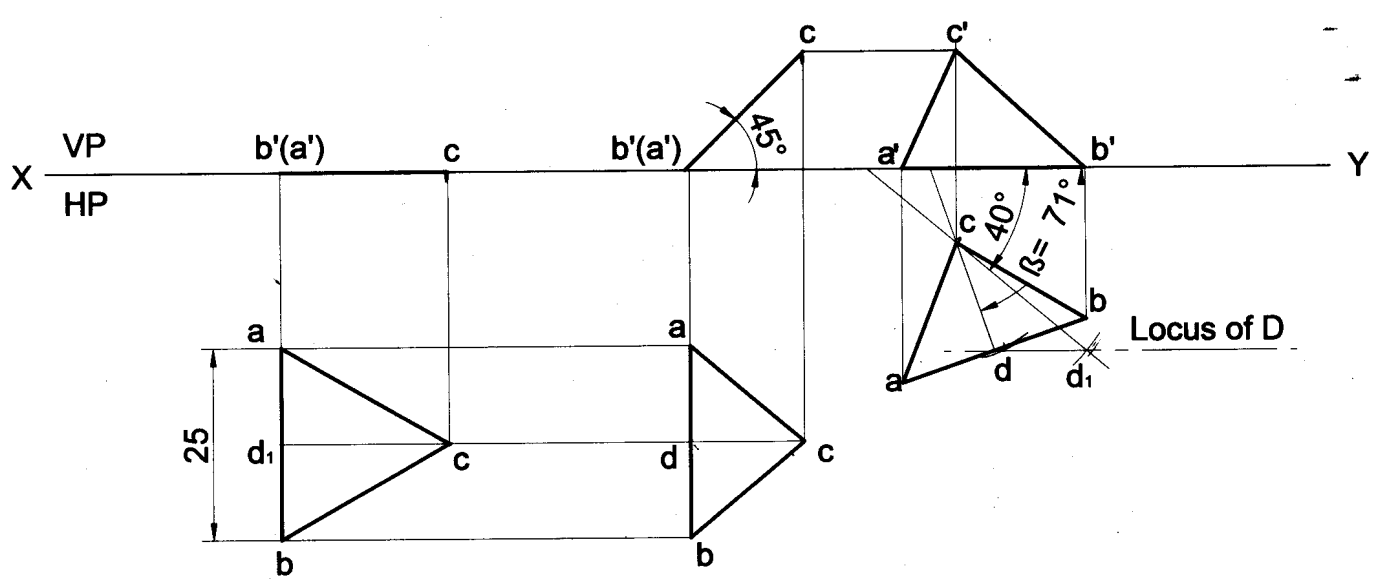
Problem 1 An equilateral triangular lamina of 25mm side lies with one of its edges on HP such that the surface of the lamina is inclined to HP at 60°. The edge on which it rests is inclined to VP at 60°. Draw the projections.

Solution



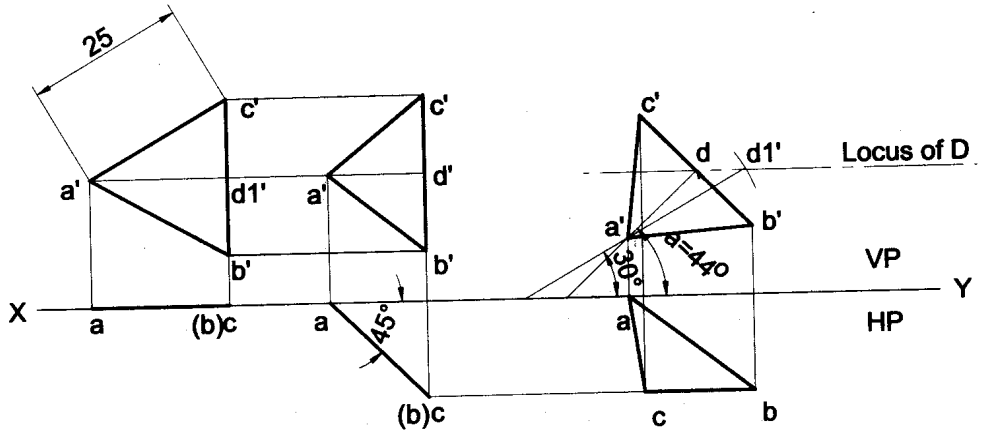
Problem 2 An equilateral triangular lamia of 25mm side lies on one of its sides on HP. The lamina makes 45° with HP and one of its medians is inclined at 40° to VP. Draw its projections.

Solution



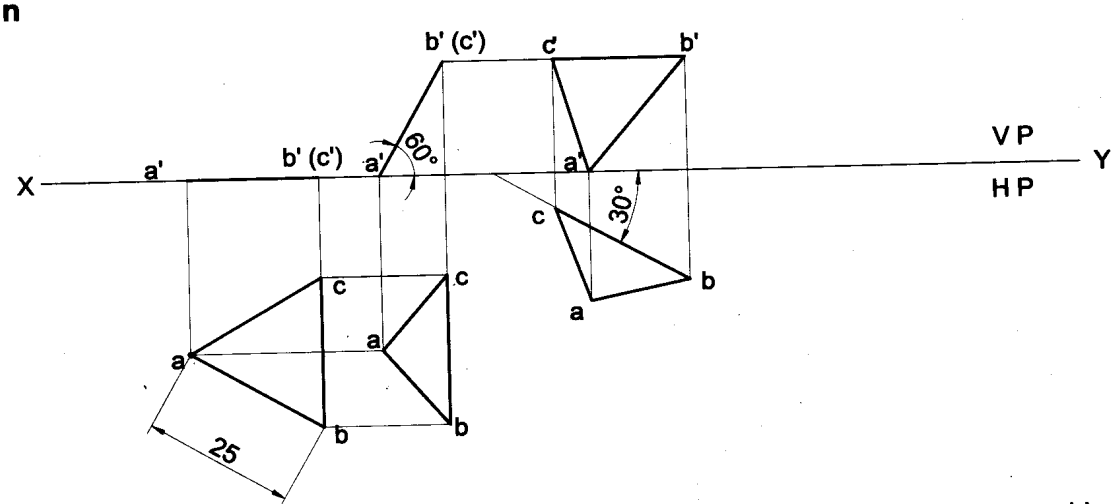
Problem 3 A triangular lamina of 25mm sides rests on one of its corners on VP such that the median passing through the corner on which it rests is inclined at 30° to HP and 45° to VP. Draw its projections.

Solution



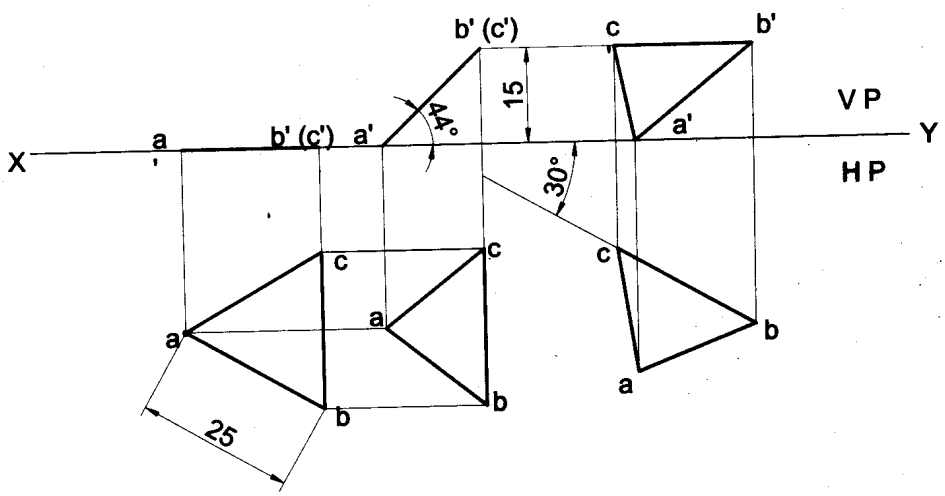
Problem 4 A triangular plane figure of sides 25mm is resting on HP with one of its corners, such that the surface of the lamina makes an angle of 60° with HP. If the side opposite to the corner on which the lamina rests makes an angle of 30° with VP, draw the top and front views in this position.

Solution



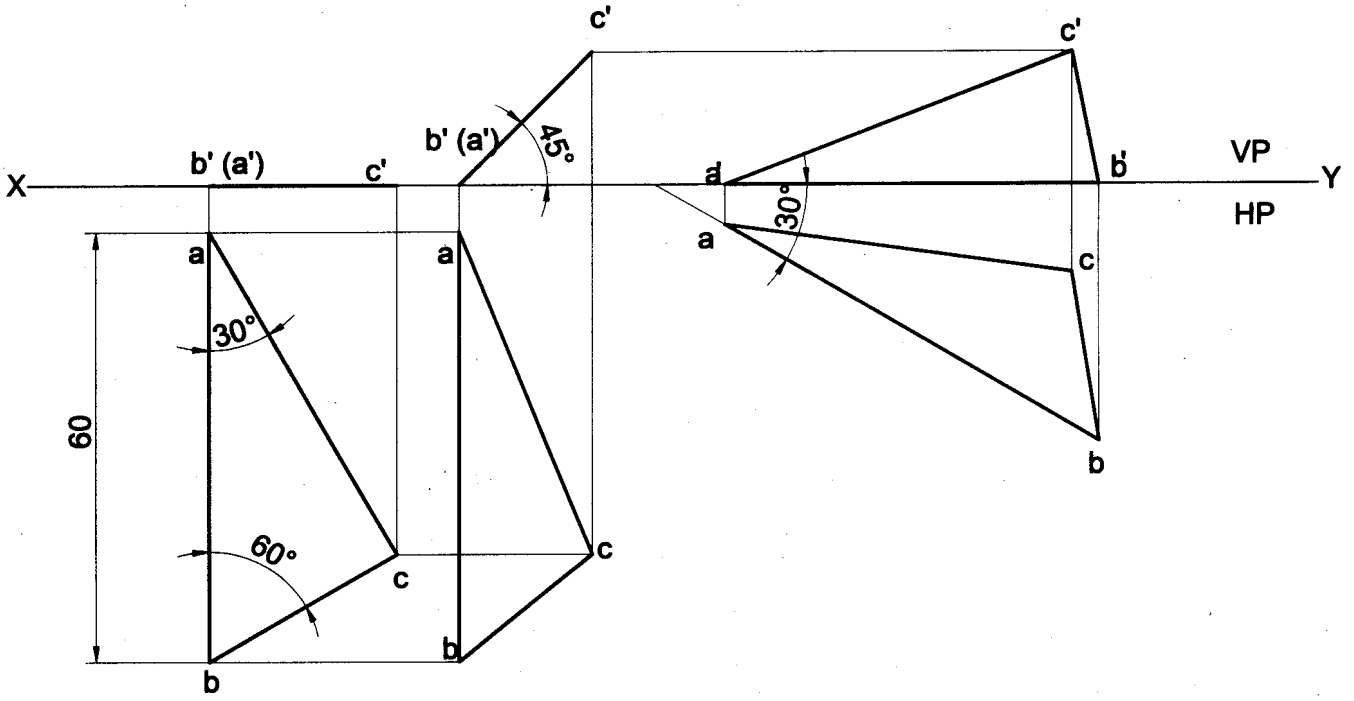
Problem 5 A triangular plane lamina of sides 25mm is resting on HP with one of its corners touching it, such that the side opposite to the corner on which it rests is 15mm above HP and makes an angle of 30° with VP. Draw the top and front views in this position. Also determine the inclination of the lamina to the reference plane.

Solution



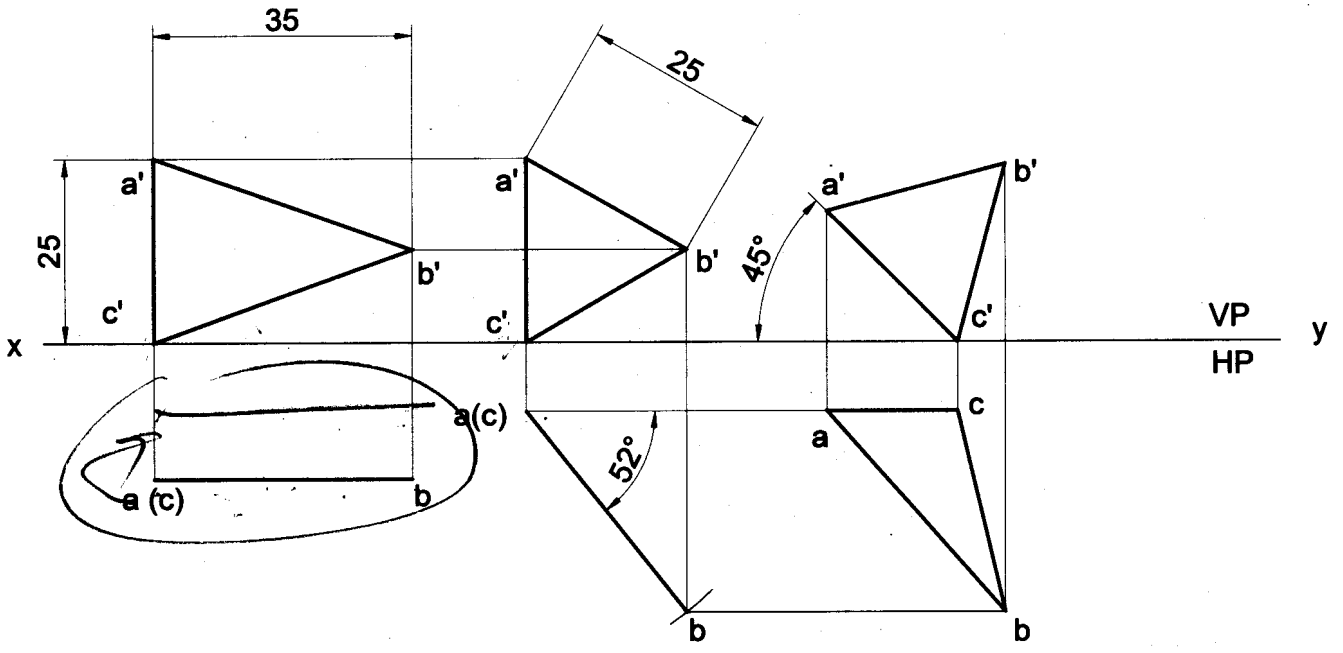
Problem 6 A 30°-60° setsquare of 60mm longest side is so kept such that the longest side is in HP, making an angle of 30° with VP. The set square itself is inclined at 45° to HP. Draw the projections of the setsquare.

Solution



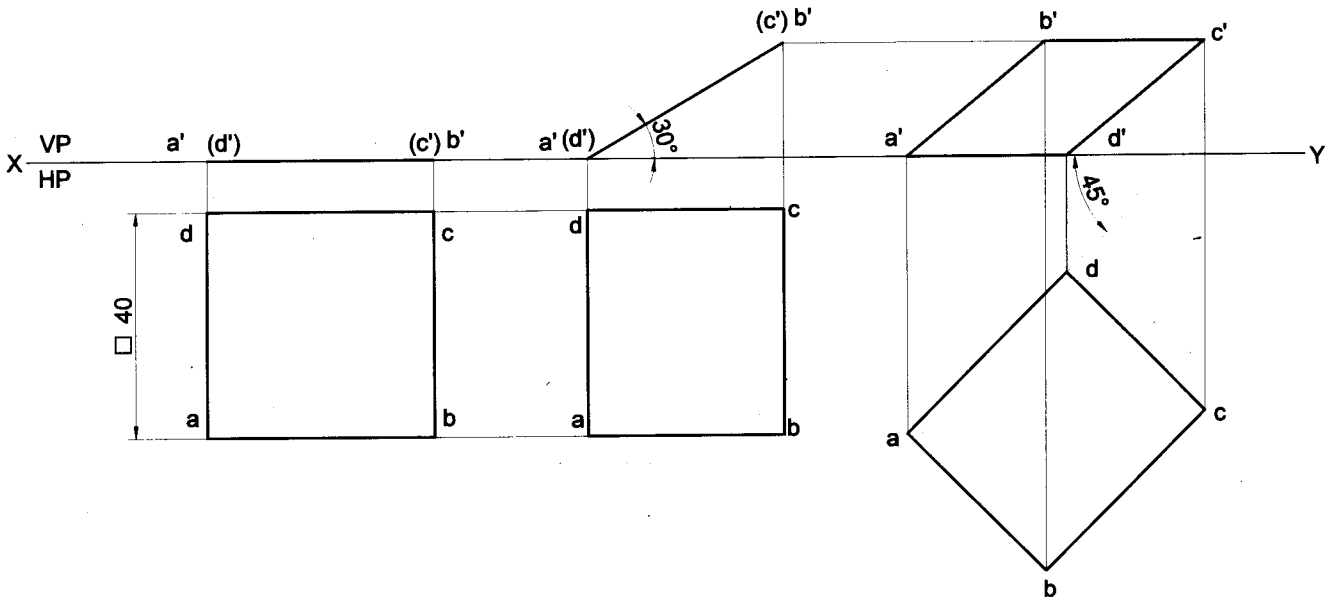
Problem 7 An isosceles triangular plate of negligible thickness has base 25mm long and altitude 35mm. It is so placed on HP such that in the front view it is seen as an equilateral triangle of 25mm sides with the side that is parallel to VP is inclined at 45° to HP. Draw its top and front views. Also determine the inclination of the plate with the reference plane.

Solution



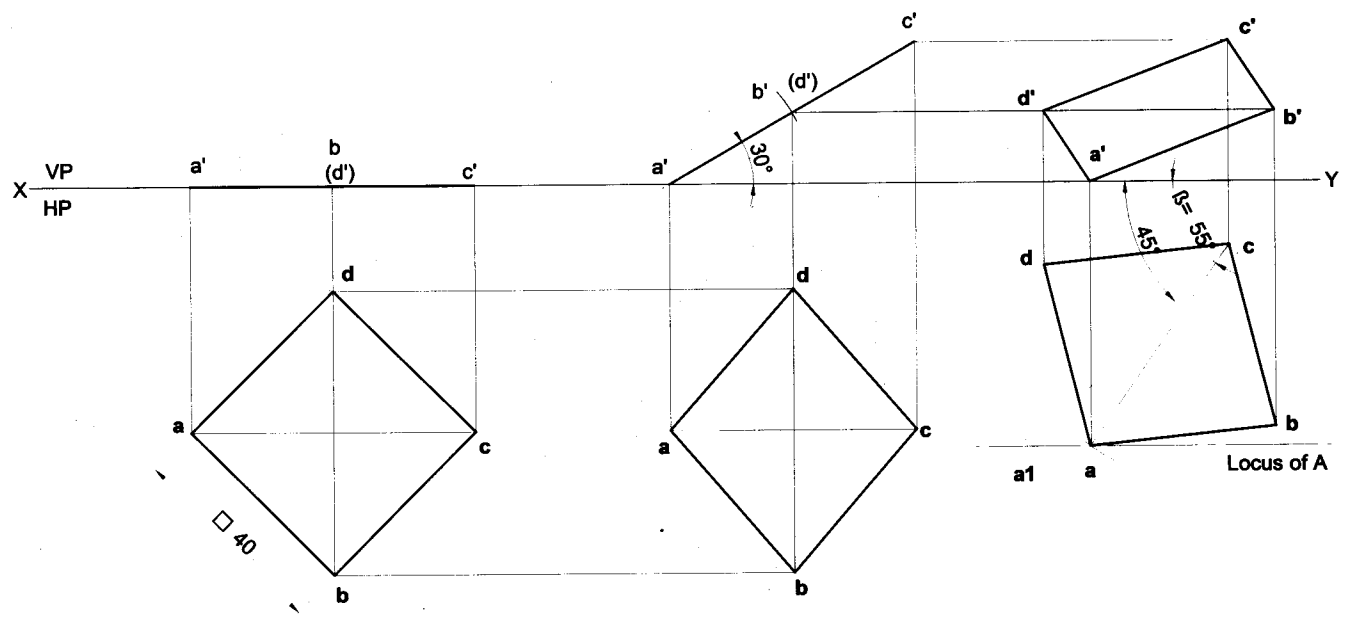
Problem 8 A square lamina of 40mm side rests on one of its sides on HP. The lamina makes 30° to HP and the side on which it rests makes 45° to VP. Draw its projections.

Solution



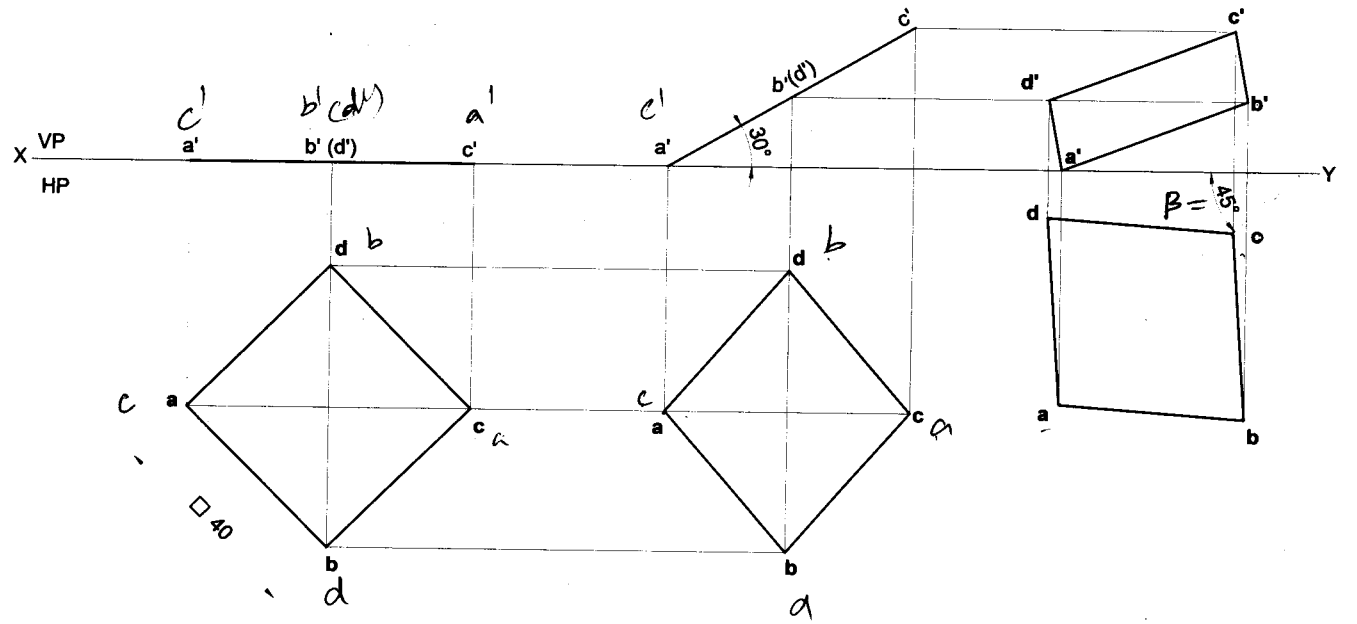
Problem 9 A square plate of 30mm sides rests on HP such that one of the diagonals is inclined at 30°to HP and 45° to VP. Draw its projections.

Solution



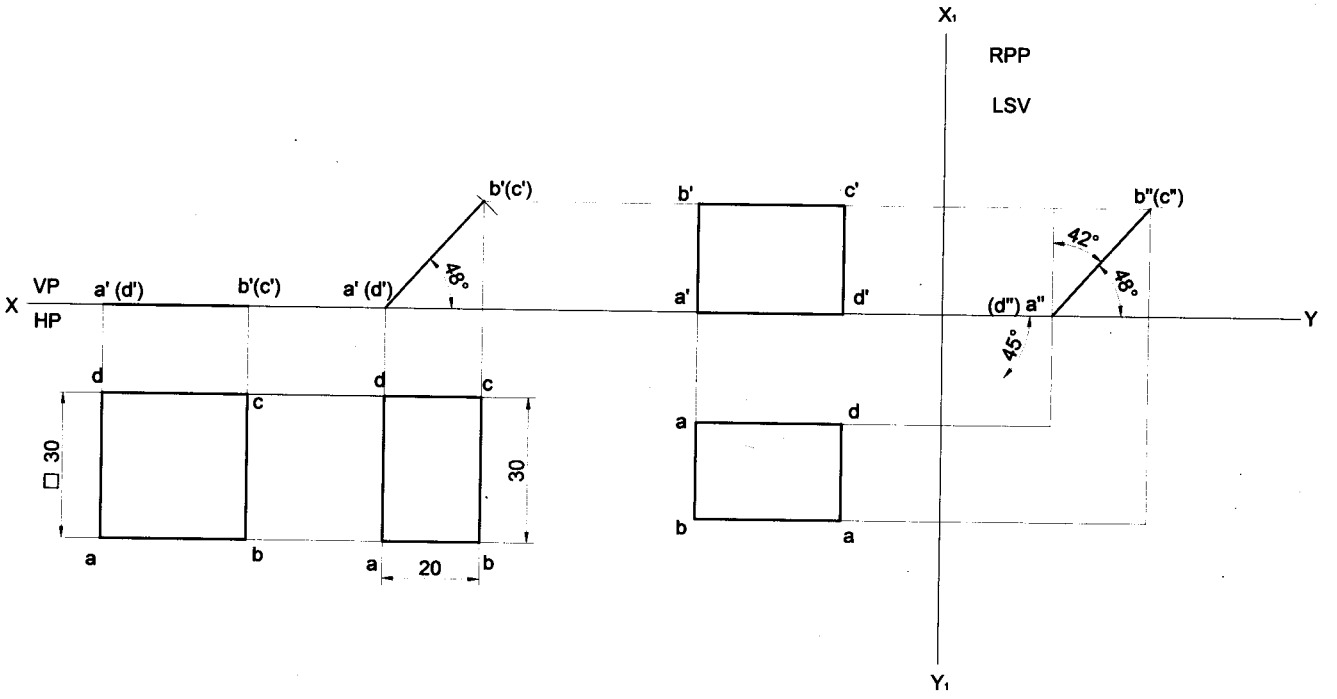
Problem 10 A square lamia ABCD of 40mm side rests on corner C such that the diagonal AC appears to be at 45°to VP. The two sides BC and CD containing the corner C make equal inclinations with HP. The surface of the lamina makes 30° with HP. Draw its top and front views.

Solution



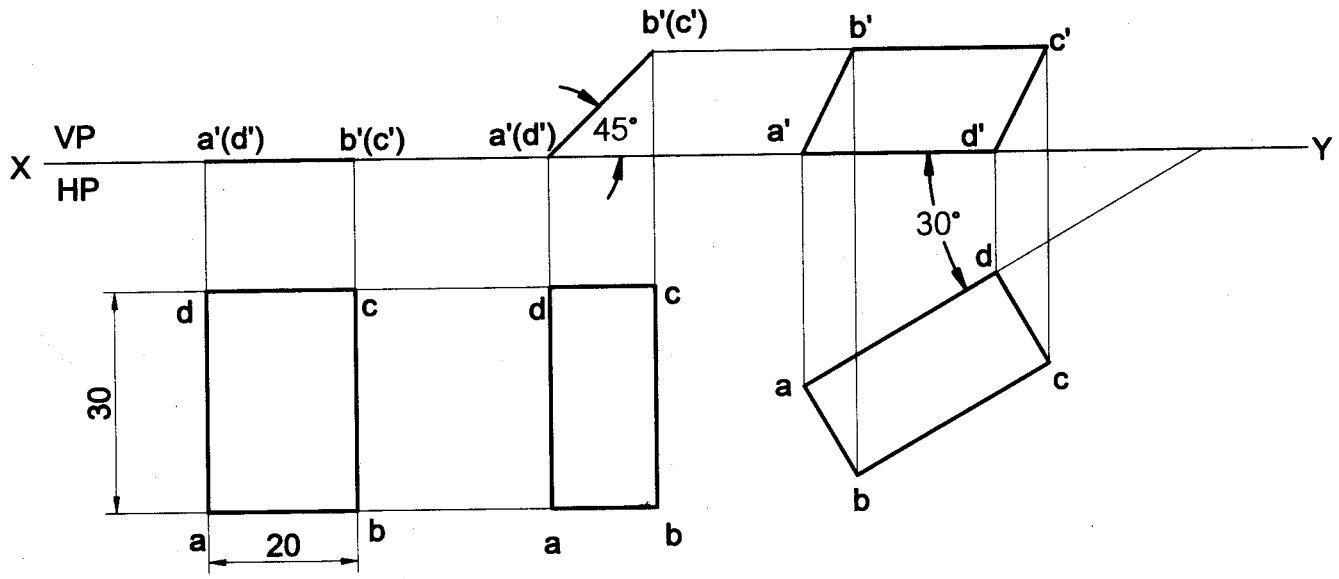
Problem 11 The top view of a square lamia of side 30mm is a rectangle of sides 30mm x 20mm with the longer side of the rectangle being parallel to both HP and VP. Draw the top and front views of the square lamina. What is the inclination of the surface of the lamina with HP and VP?

Solution



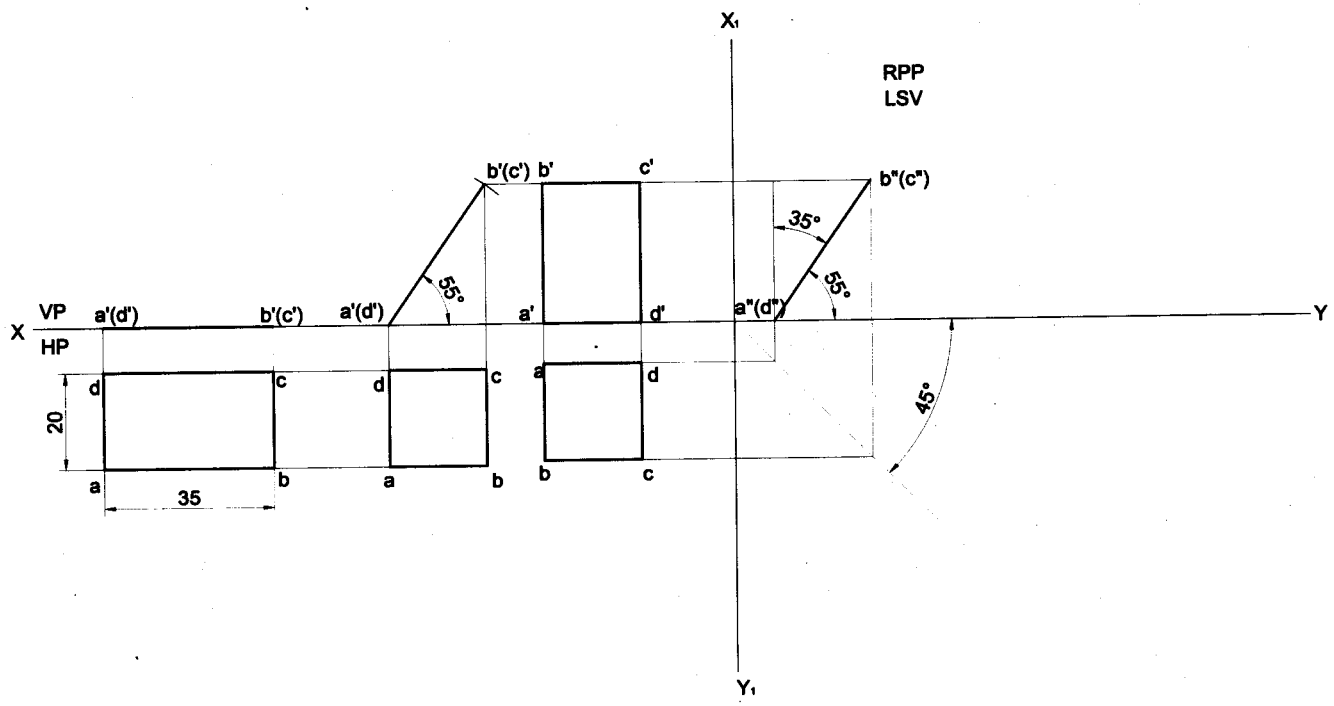
Problem 12 A rectangular lamina of sides 20mm x 30mm rests on HP on one of its longer edges. The lamina is tilted about the edge on which it rests till its plane surface is inclined t HP at 45°. The edge on which it rests is inclined at 30° to VP. Draw the projections of the lamina.

Solution



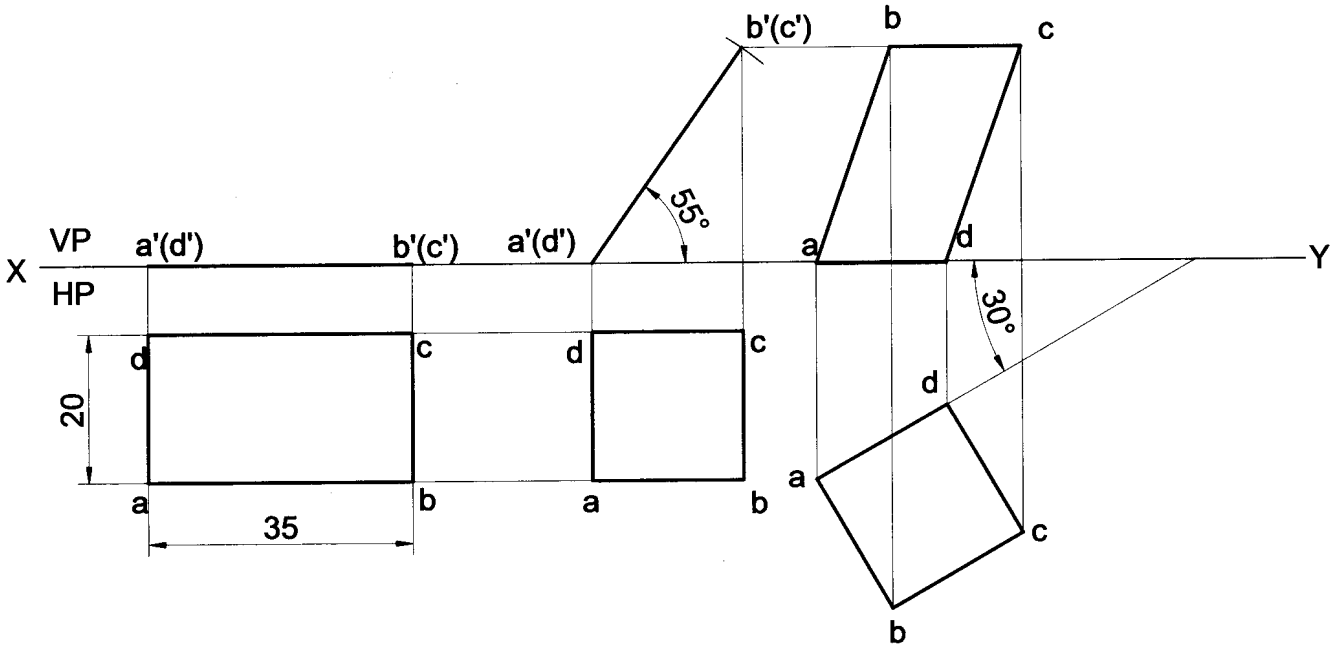
Problem 13 A rectangular lamina of 35mm x 20mm rests on HP on one of its shorter edges. The lamina is rotated about the edge on which it rests till it appears as a square in the top view. The edge on which the lamina rests being parallel to both HP and VP. Draw its projections and find its inclinations to HP and VP.

Solution



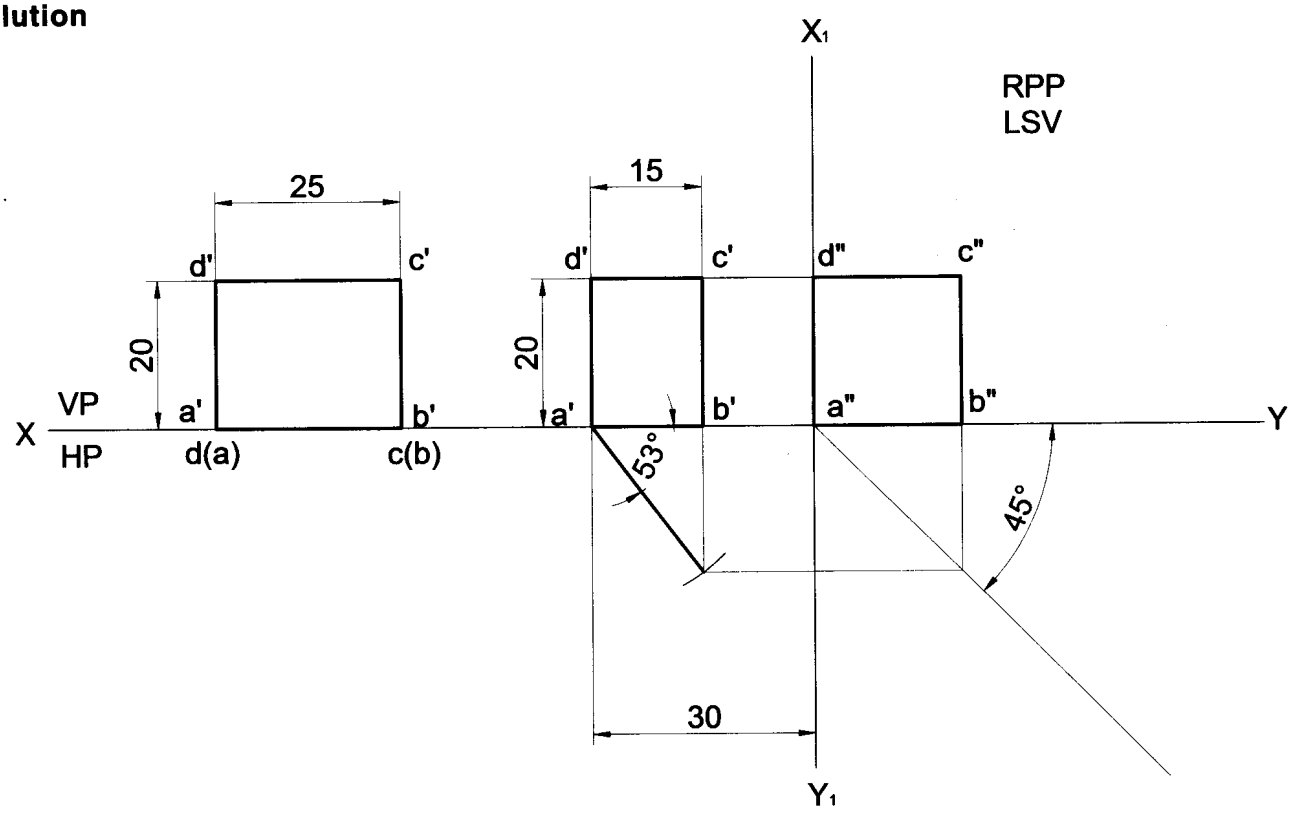
Problem 14 A rectangular lamina of 35mm x 20mm rests on HP on one of its shorter edges. The lamina is rotated about the edge on which it rests till it appears as a square in the top view. The edge on which the lamina rests is inclined 30° to VP. Draw its projections and find its inclination to HP.

Solution



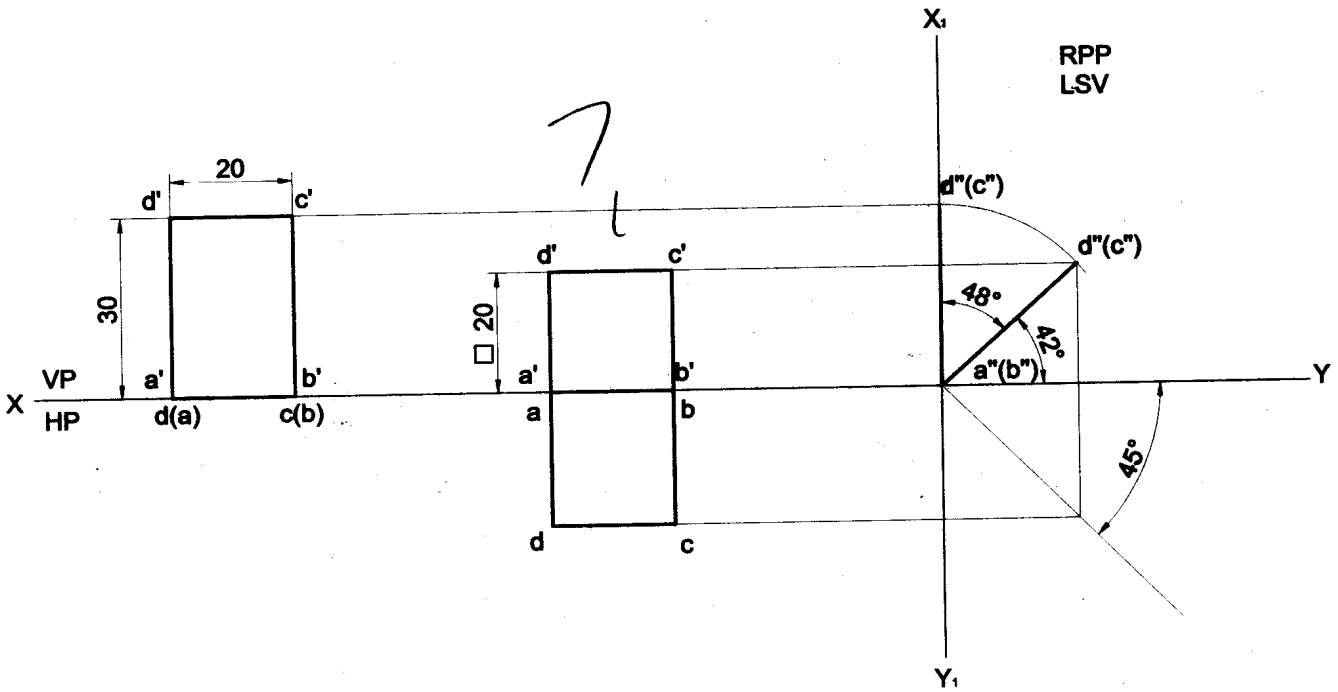
Problem 15 A rectangular lamina of sides 20mm x 25mm has an edge in HP and adjoining edge in VP, is tilted such that the front view appears as a rectangle of 20mm x 15mm. The edge, which is in VP, is 30mm from the right profile plane. (a) Draw the top view, front view and the left profile view in this position. (b) Find its inclinations with the corresponding principal planes.

Solution



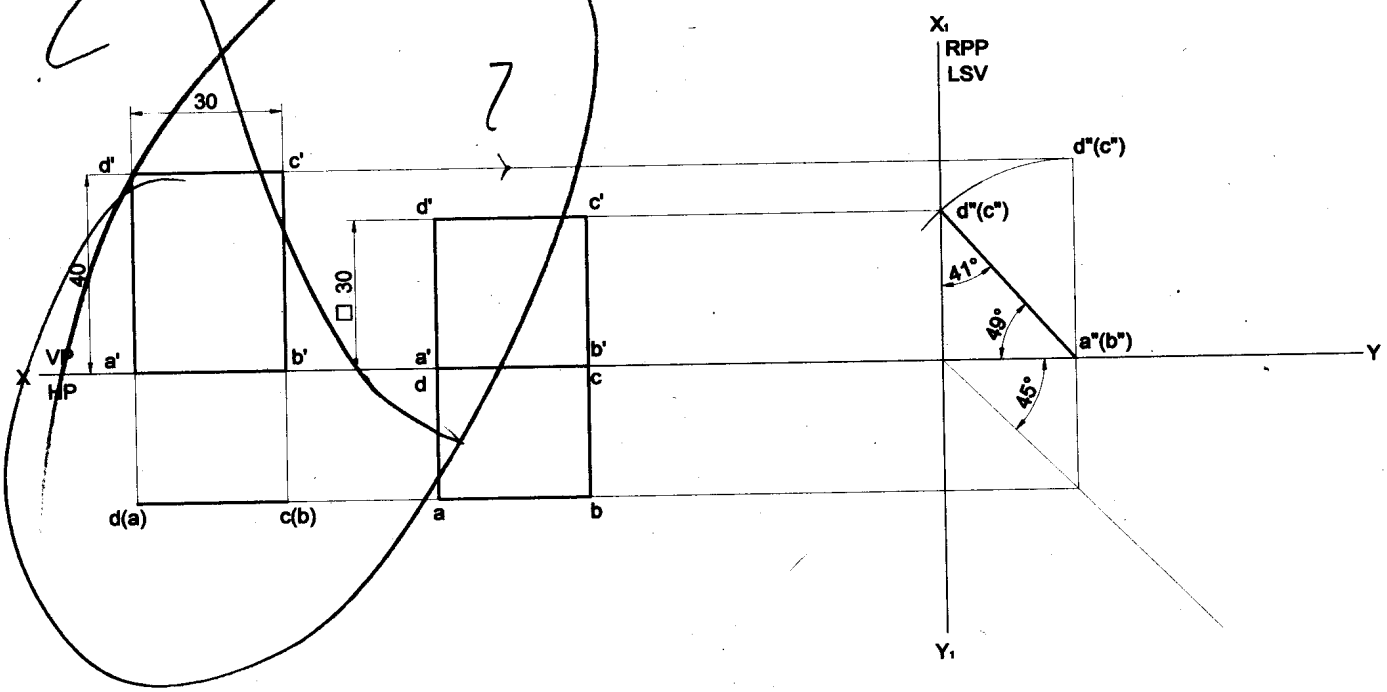
Problem 16 The front view of a rectangular lamina of sides 30mm x 20mm is square of 20mm sides. Draw the projections and determine the inclinations of the surface of the lamina with HP and VP.

Solution



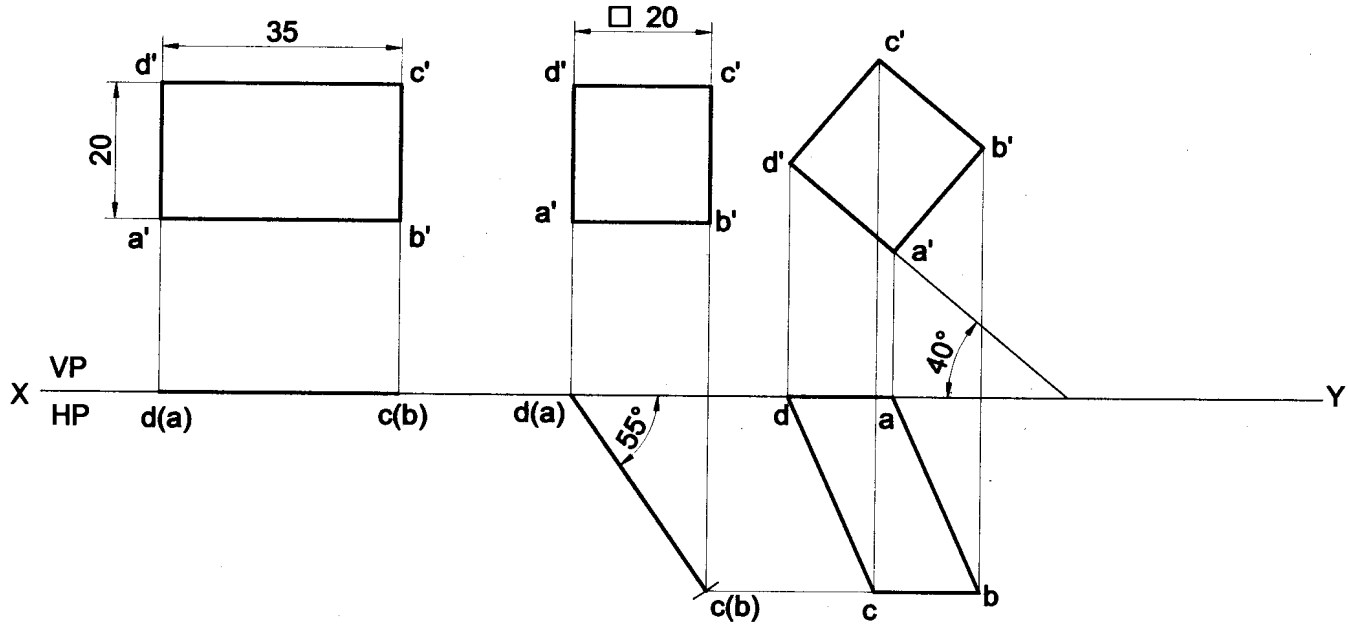
Problem 17 A mirror 30mm x 40mm is inclined to the wall such that its front view is a square of 30mm side. The longer sides of the mirror appear perpendicular to both HP and VP. Find the inclination of the mirror with the wall.

Solution



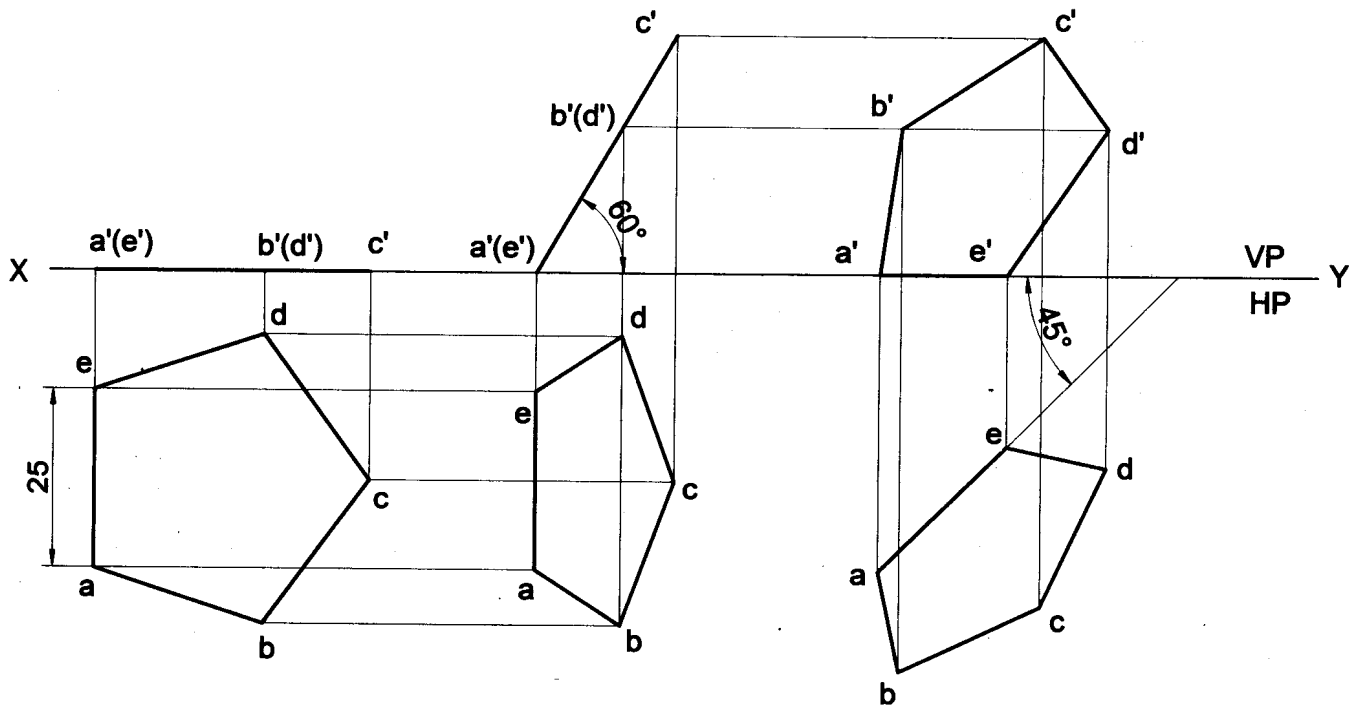
Problem 18 A rectangular plate of negligible thickness of size 35x20mm has one of its shorter edges in VP with that edge inclined at 40° to HP. Draw the top view if its front view is a square of side 20mm.

Solution



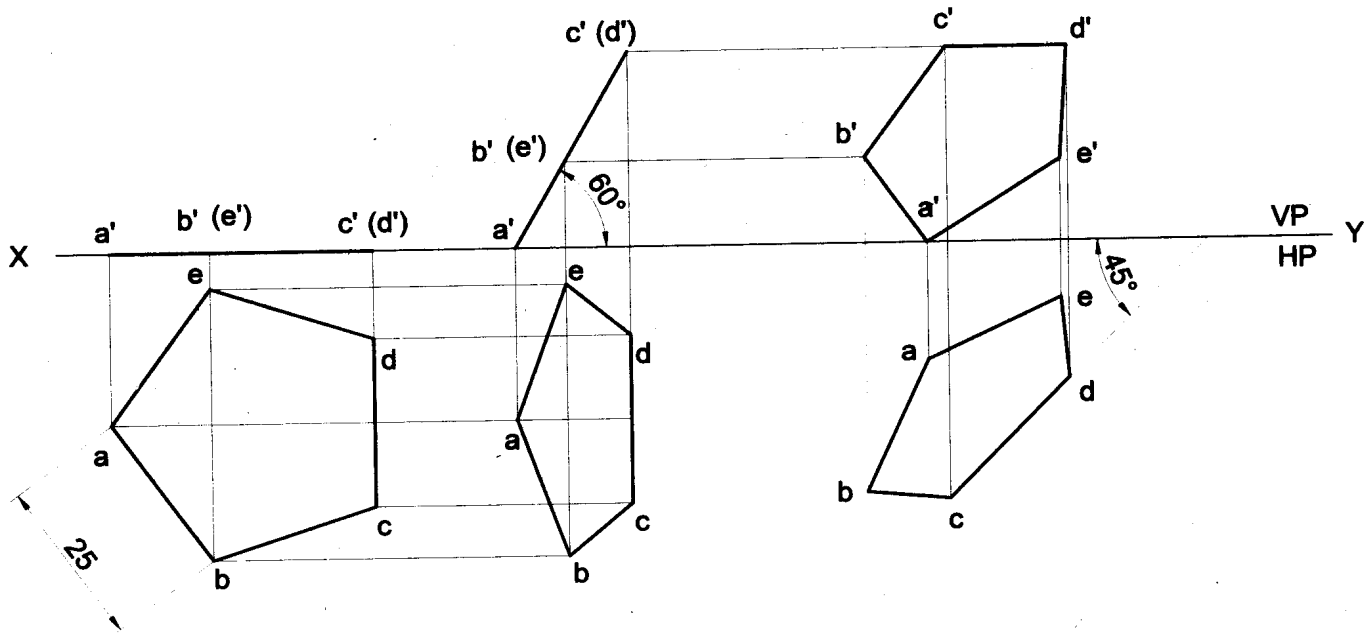
Problem 19 A pentagonal lamina of edges 25mm is resting on HP with one of its sides such that the surface makes an angle of 60° with HP. The edge on which it rests is inclined at 45° to VP. Draw its projections.

Solution



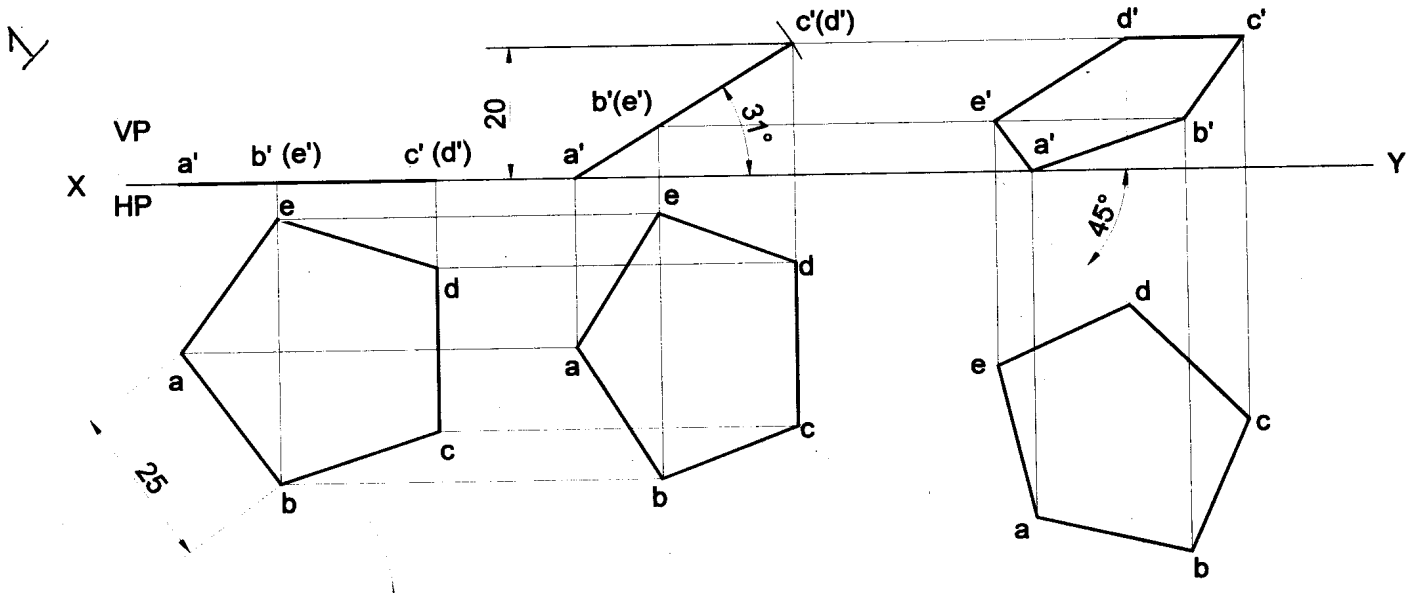
Problem 20 A pentagonal lamina of edges 25mm is resting on HP with one of its corners such that the plane surface makes an angle of 60° with HP. The two of the edges containing the corner on which the lamia rests make equal inclinations with HP. When the edge opposite to this corner make an angle of 45° with VP and nearer to the observer, draw the top and front views of the plane lamina in this position.

Solution



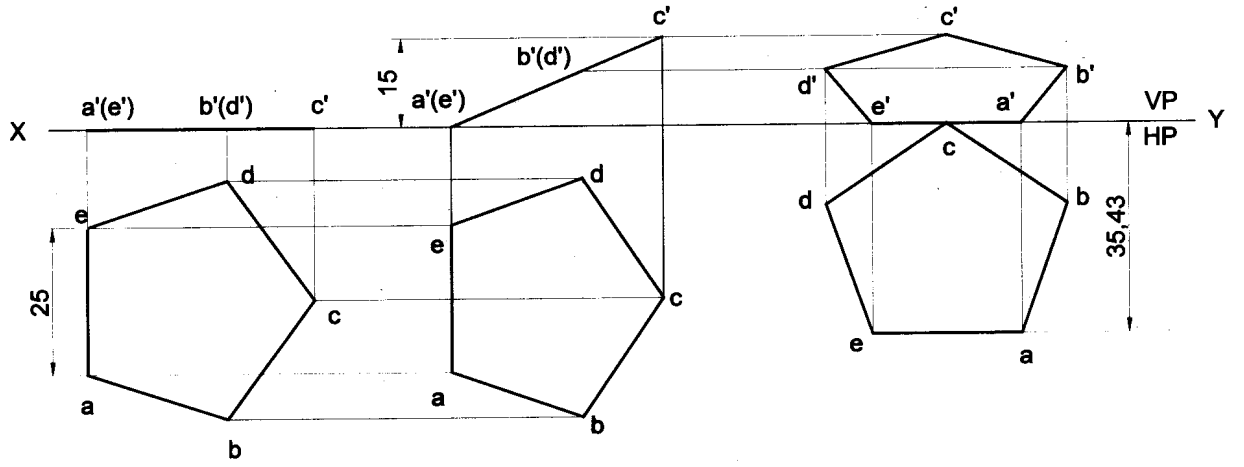
Problem 21 A pentagonal lamina of edges 25mm is resting on HP with one of its corners such that the edge opposite to this corner is 20mm above HP & makes an angle of 45° with VP. Draw the top and front views of the plane lamina in this position. Determine the inclination of the lamina with HP.

Solution



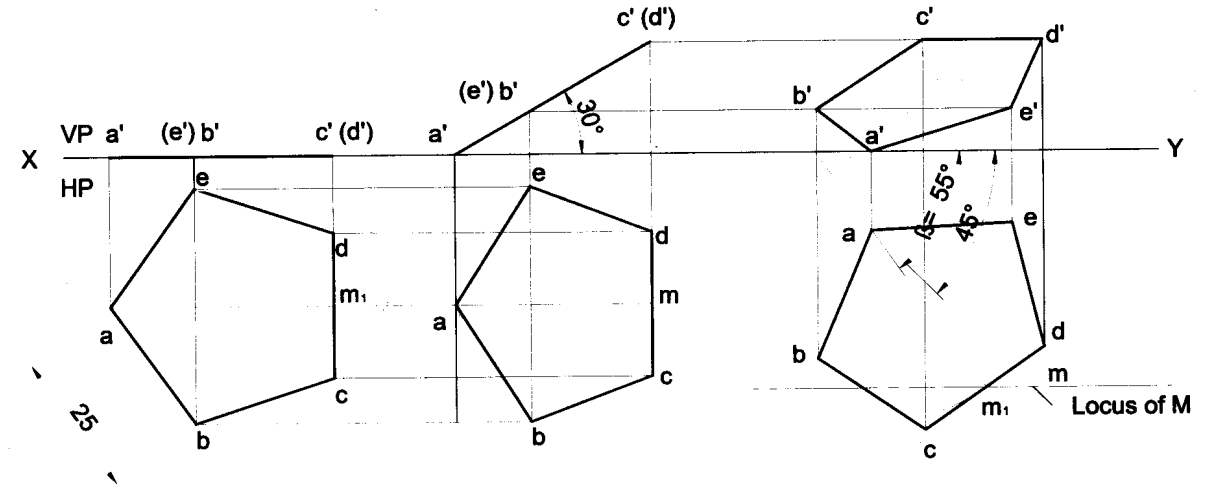
Problem 22 A pentagonal lamina of sides 25mm is resting on one of its edges on HP with the corner opposite to that edge touching VP. This edge is parallel to VP and the corner, which touches VP, is at a height of 15mm above HP. Draw the projections of the lamina and determine the inclinations of the lamina with HP and VP and the distance at which the parallel edge lies from VP.

Solution



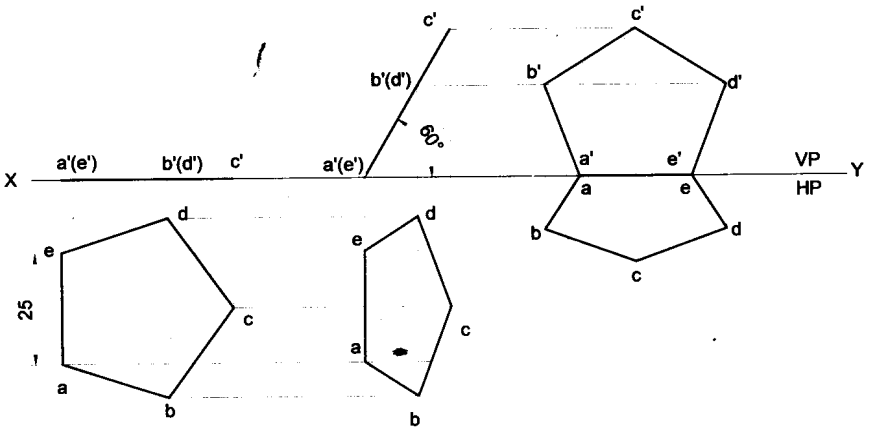
Problem 23 A pentagonal lamina having edges 25mm is placed on one of its corners on HP such that the perpendicular bisector of the edge passing through the corner on which the lamina rests is inclined at 30° to HP and 45° VP. Draw the top and front views of the lamina.

Solution



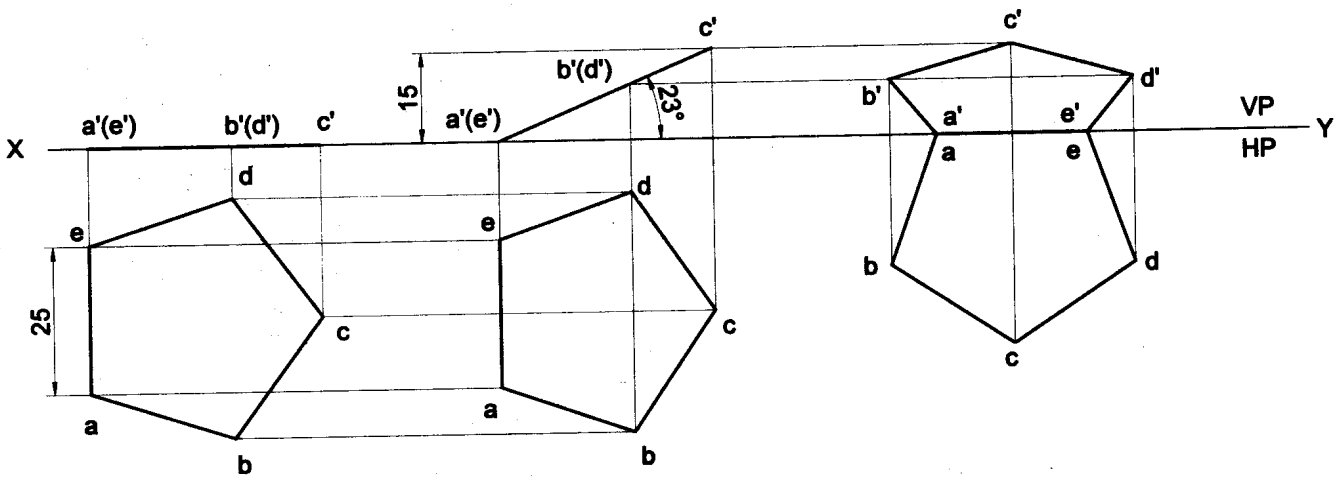
Problem 24 A pentagonal lamina of sides 25mm is having a side both on HP and VP. The corner opposite to the side on which it rests is 15mm above HP. Draw the top and front views of the lamina.

Solution



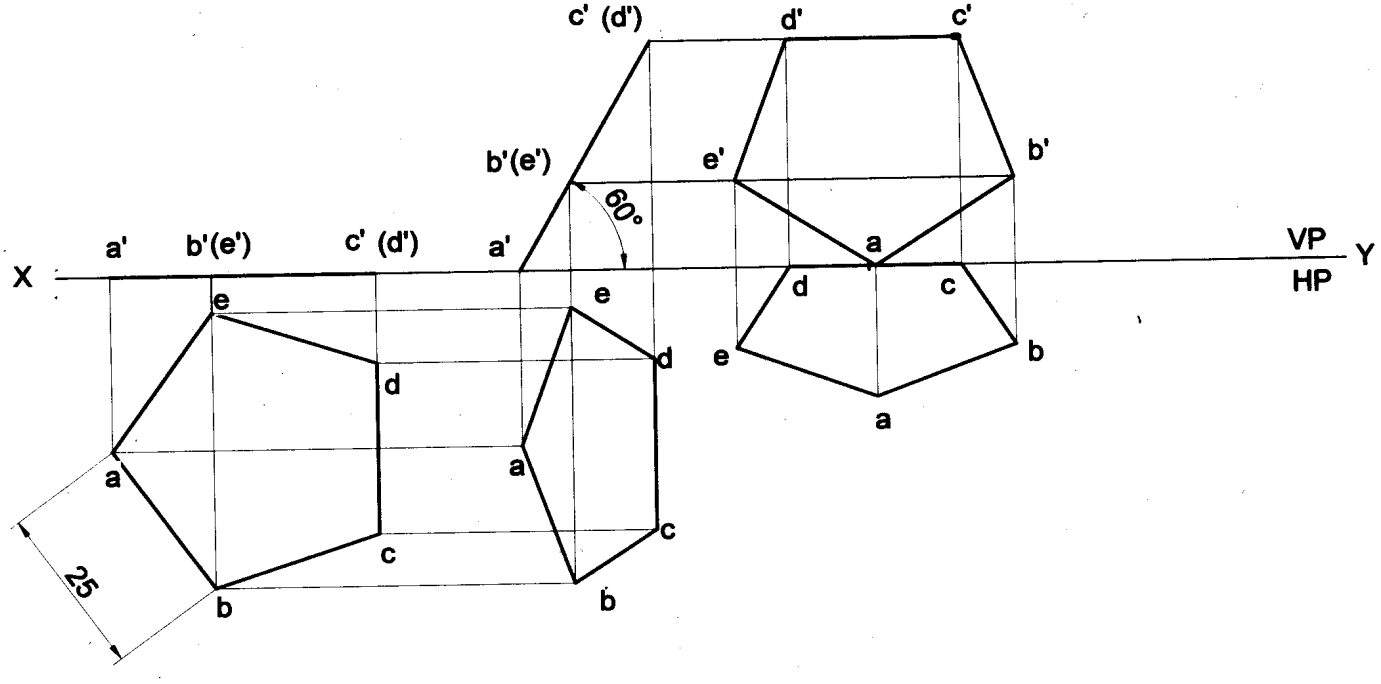
Problem 25 A pentagonal lamina of sides 25mm is having a side both on HP and VP. The surface of the lamina is inclined at an angle of 60° with HP. Draw the top and front views of the lamina.

Solution



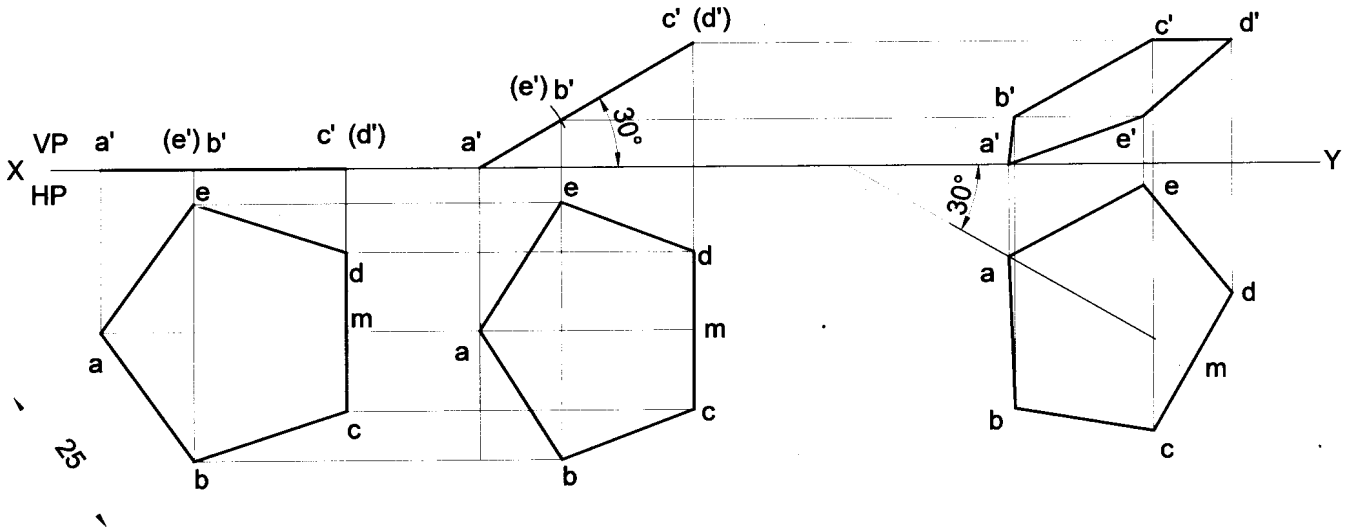
Problem 26 A regular pentagonal lamina of 25mm side is resting on one of its corners on HP while the side opposite to this corner touches VP. If the lamina makes an angle of 60° with HP and 30° with VP, draw the projections of the lamina.

Solution



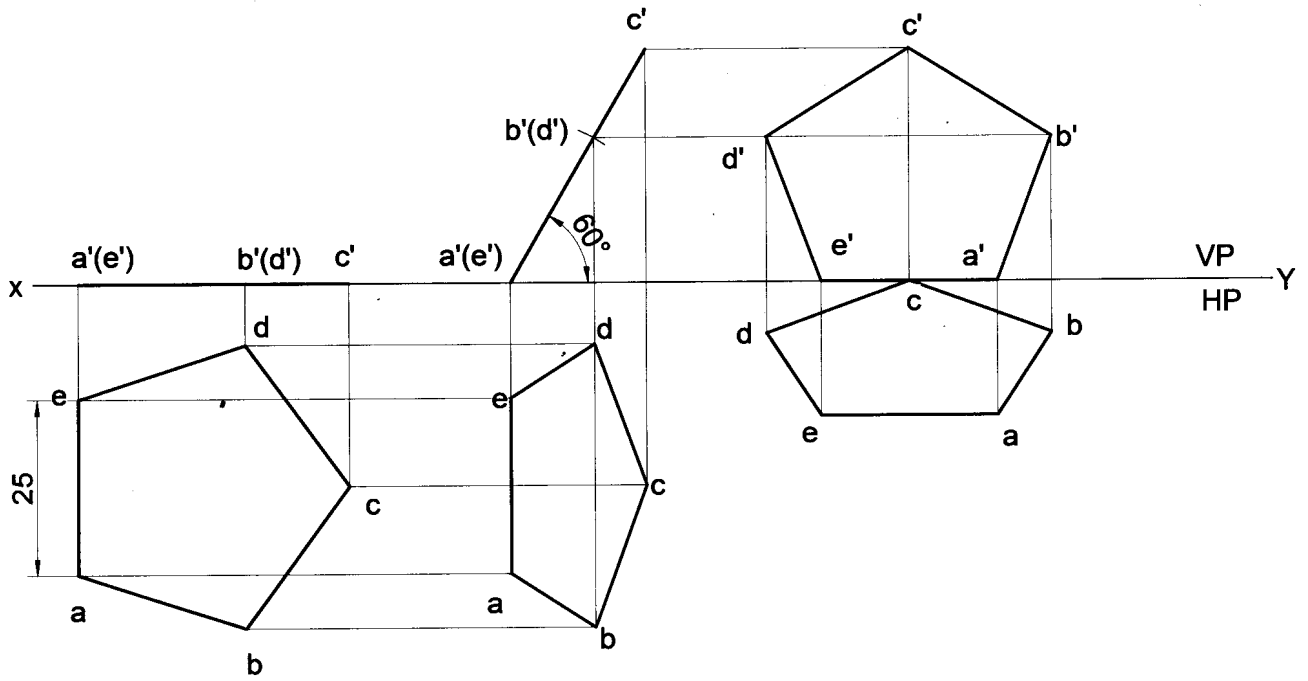
Problem 27 A pentagonal lamina having edges 25mm is placed on one of its corners on HP such that the surface makes an angle 30° with HP and perpendicular bisector of the edge passing through the corner on which the lamina rests appears to be inclined at 30° to VP. Draw the top and front views of the lamina.

Solution



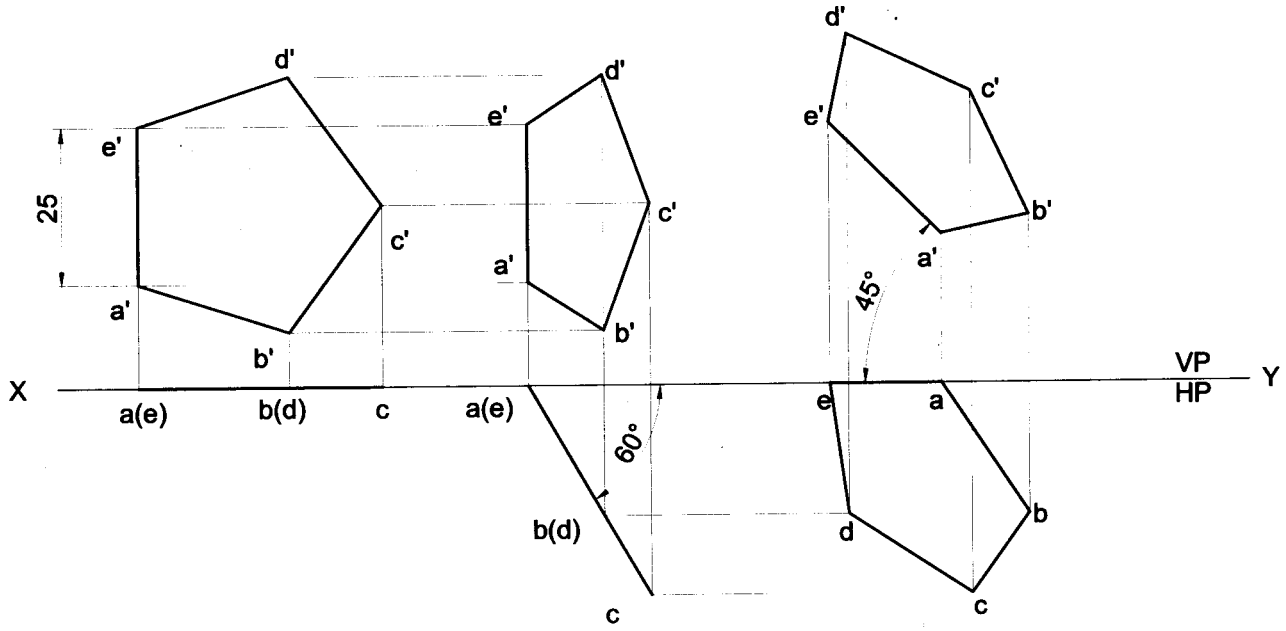
Problem 28 A regular pentagonal lamina of 25mm side is resting on one of its sides on HP while the corner opposite to this side touches VP. If the lamina makes an angle of 60° with HP and 30° with VP, draw the projections of the lamina.

Solution



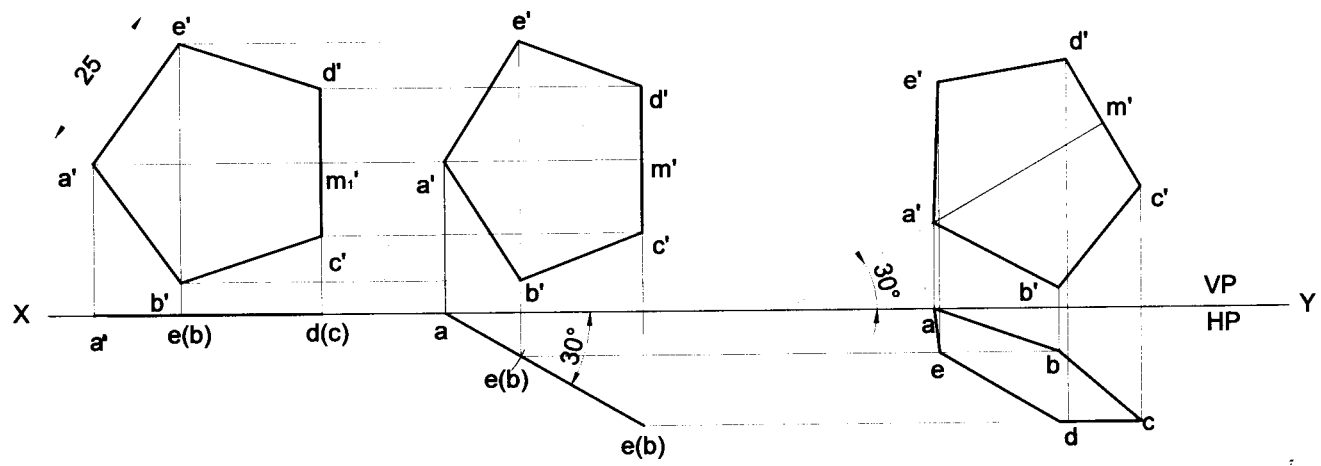
Problem 29 A pentagonal lamina of edges 25mm is resting on VP with one of its sides such that the surface makes an angle of 60° with VP. The edge on which it rests is inclined at 45° to HP. Draw its projections.

Solution



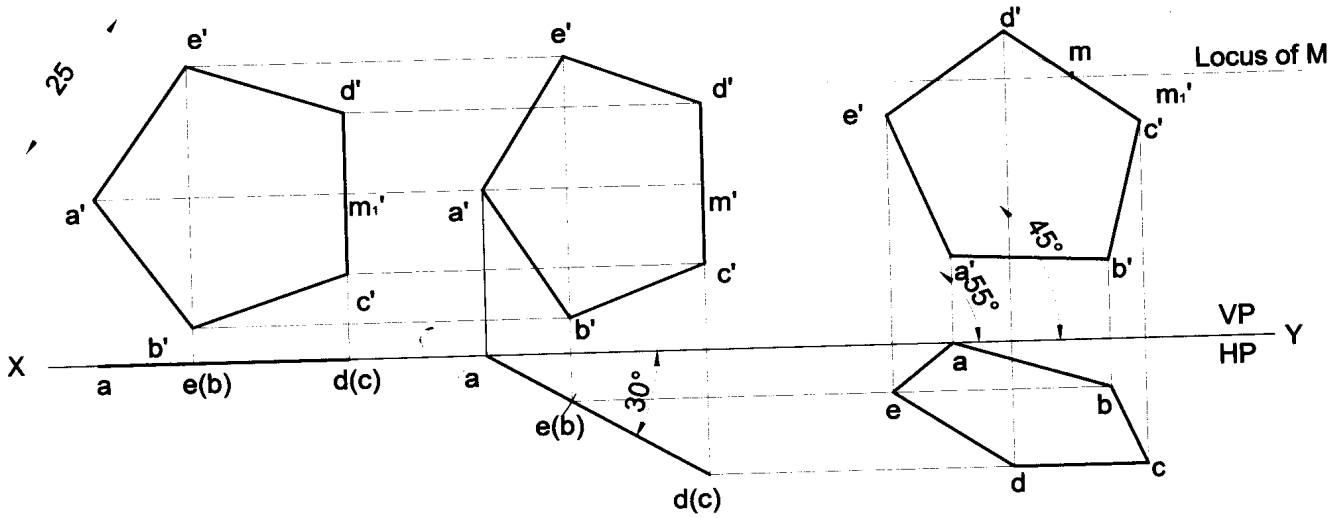
Problem 30 A pentagonal lamina having edges 25mm is placed on one of its corners on VP such that the surface makes an angle 30° with VP and perpendicular bisector of the edge passing through the corner on which the lamina rests appears to be inclined at 30° to HP. Draw the top and front views of the lamina.

Solution



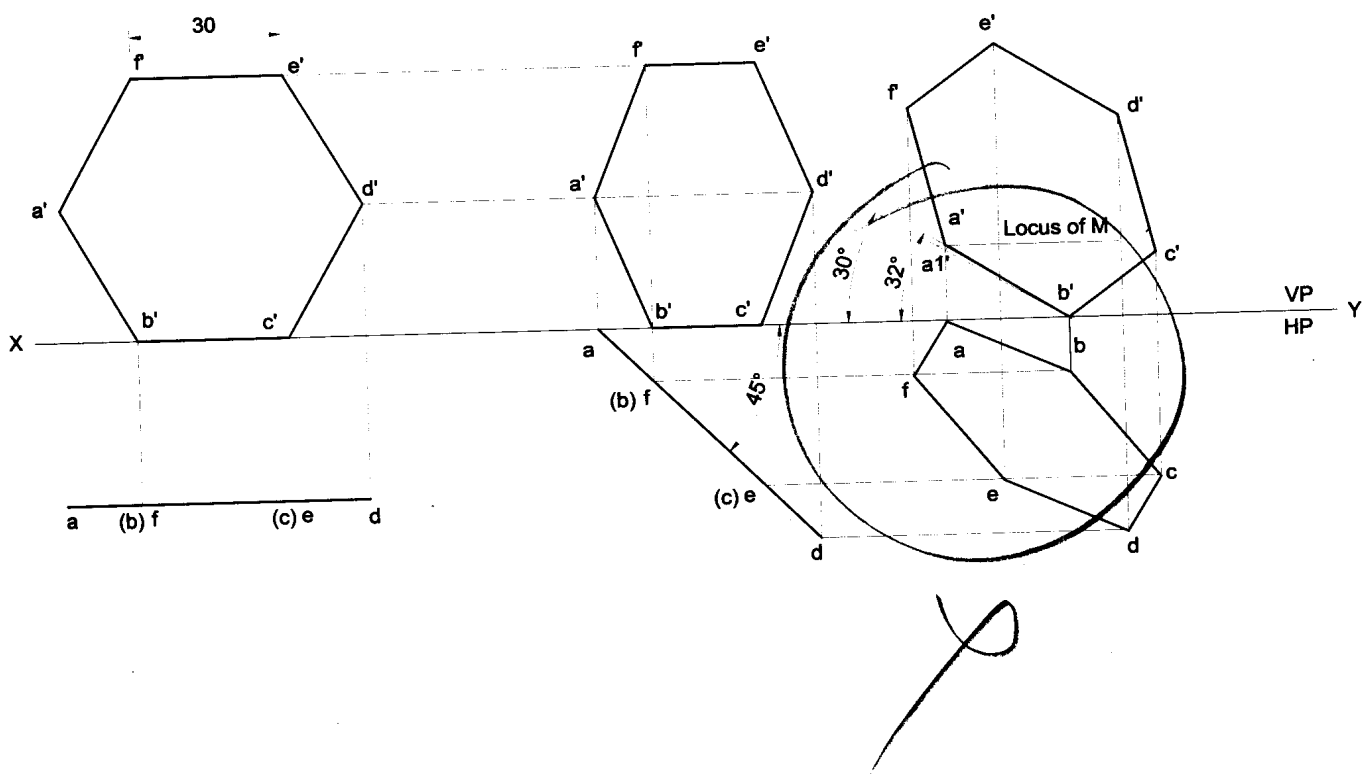
Problem 31 A pentagonal lamina having edges 25mm is placed on one of its corners on VP such that the surface makes an angle 30° with VP and perpendicular bisector of the edge passing through the corner on which the lamina rests is inclined at 45° to HP. Draw the top and front views of the lamina.

Solution



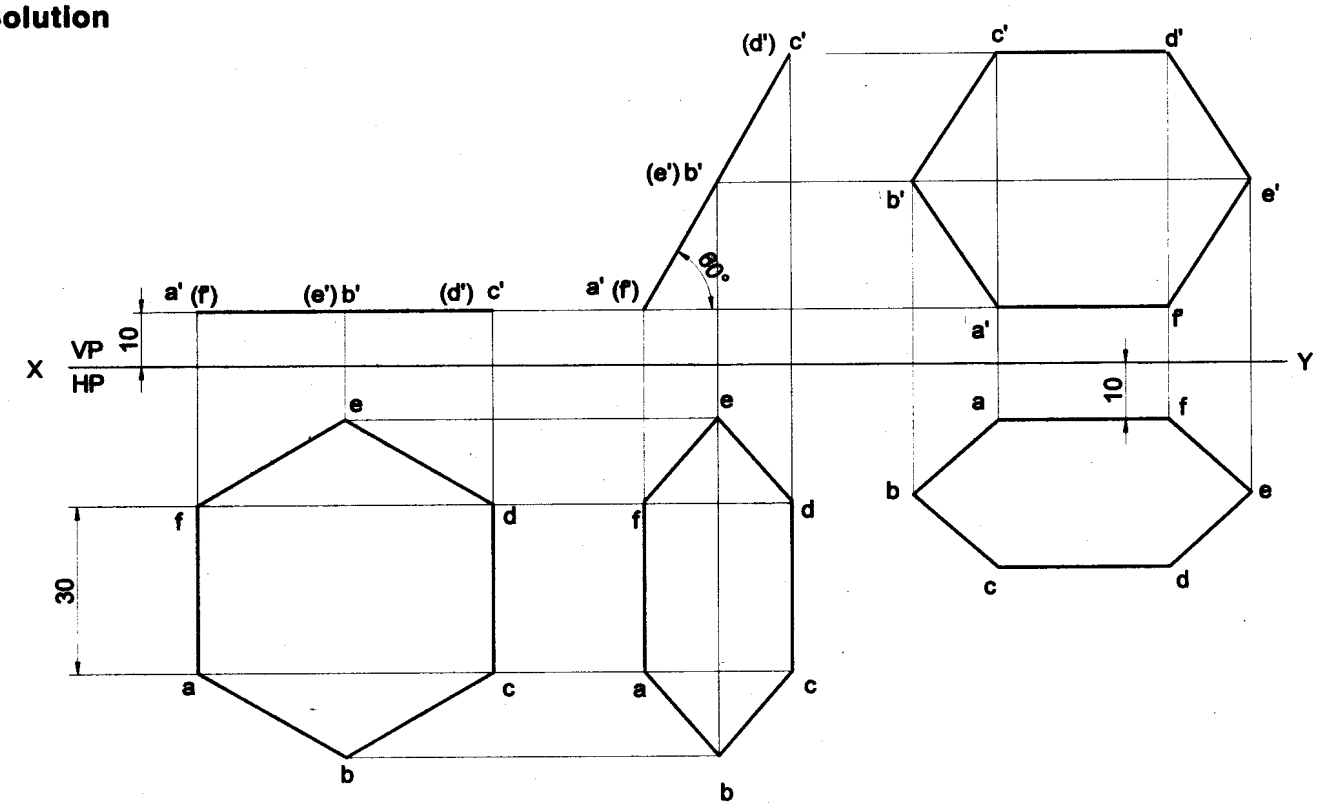
Problem 32 A hexagonal lamina of 30mm sides rests on HP with one of its corners touching VP and surface inclined at 45° to it. One of its edges is inclined to HP at 30°. Draw the front and top views of the lamina in its final position.

Solution



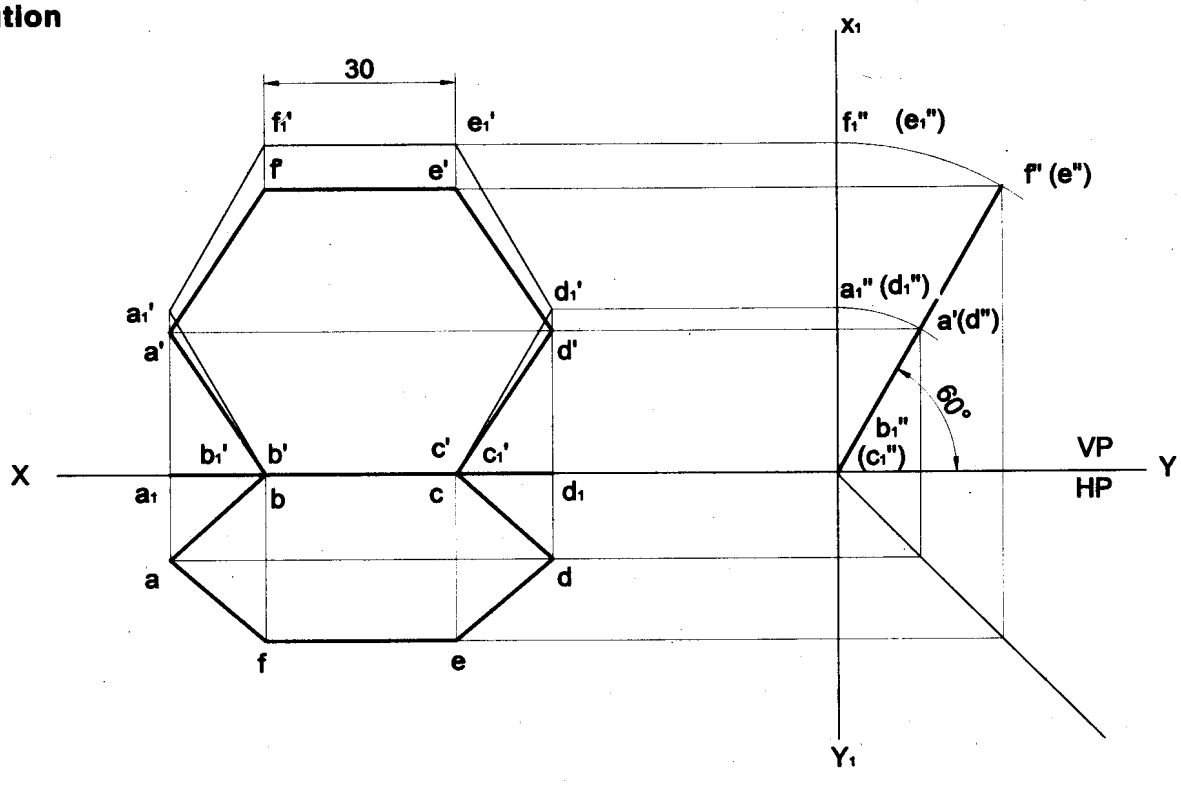
Problem 33 Draw the top and front views of a hexagonal lamina of 30mm sides having two of its edges parallel to both vertical and horizontal planes and one of its edges is 10mm from each of the planes of projection. The surface of the lamina is inclined at an angle of 60° to the HP.

Solution



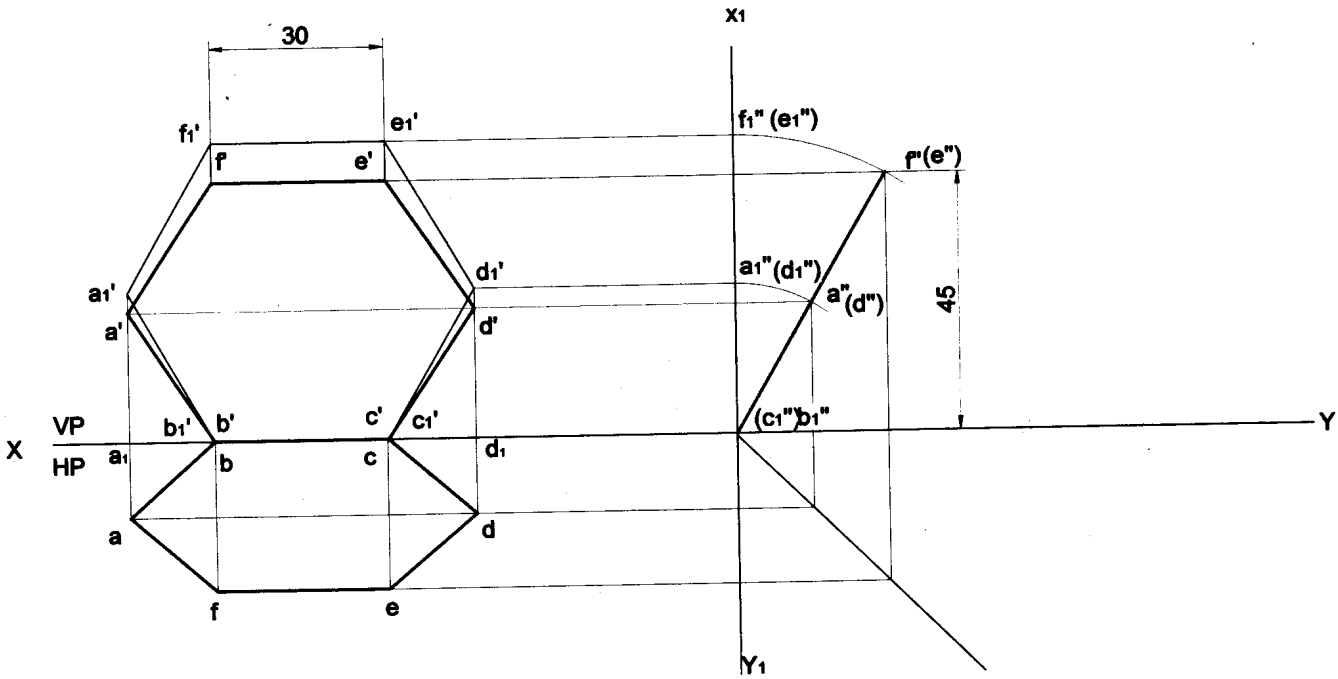
Problem 34 A regular hexagonal lamina of sides 30mm is lying in such a way that one of its sides touches both the reference planes. If the lamina makes 60° with HP, draw the projections of the lamina.

Solution



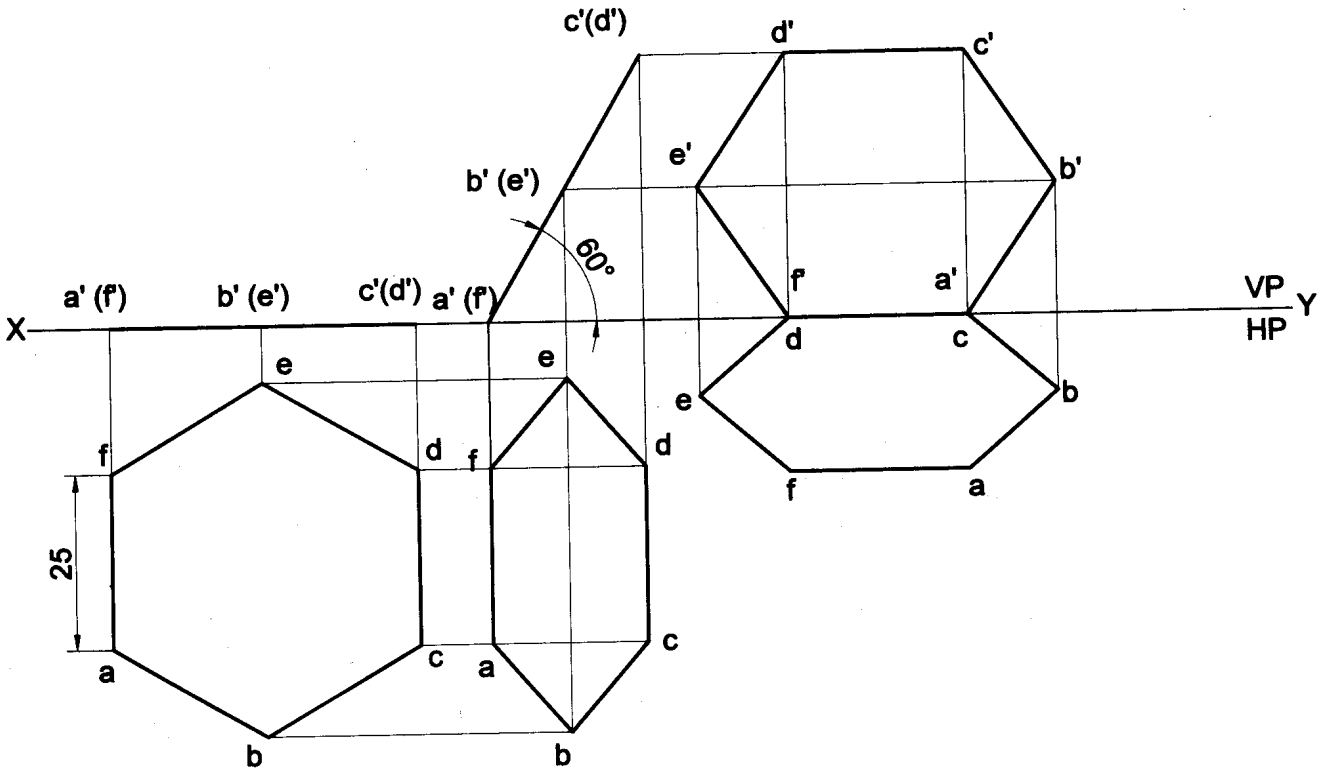
Problem 35 A regular hexagonal lamina of side 30mm is lying in such a way that one of its sides touches both the reference planes. If the side opposite to the side on which it rests is 45mm above HP, draw the projections of the lamina.

Solution



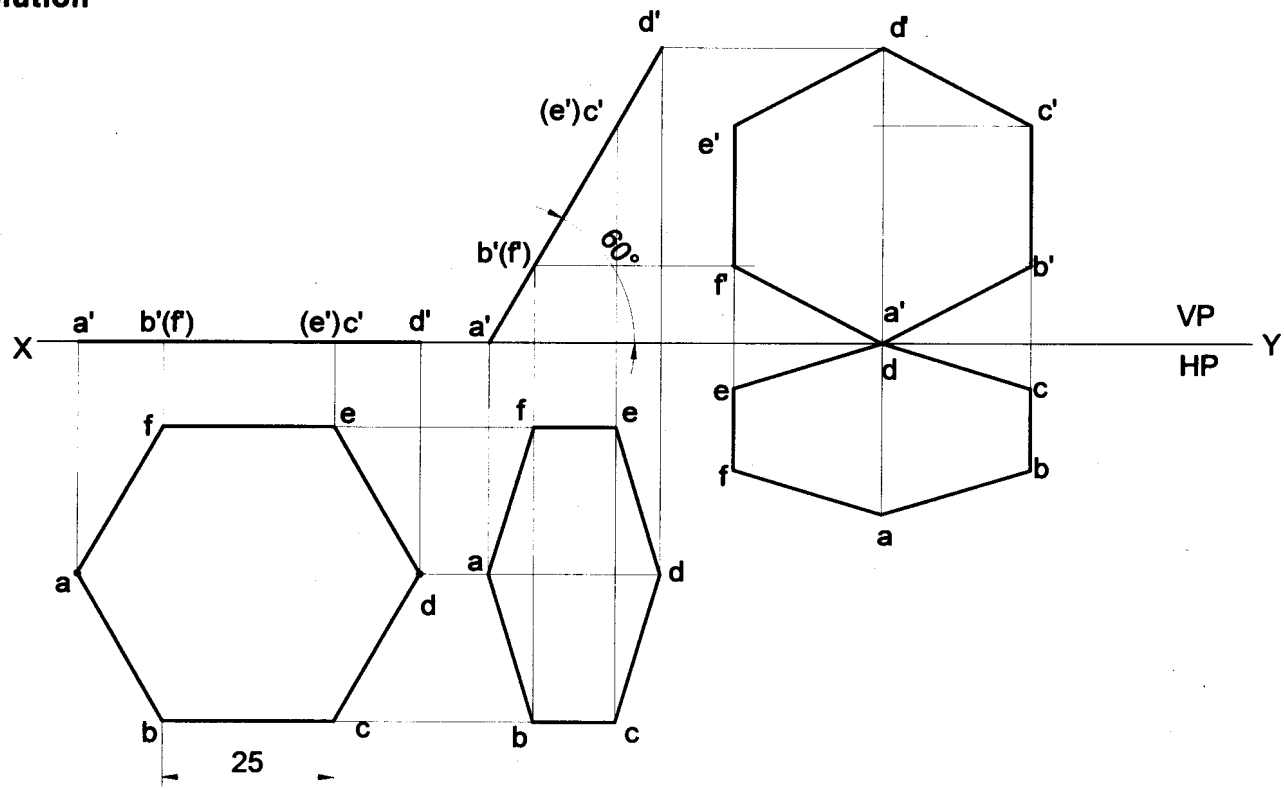
Problem 36 A regular hexagonal lamina of sides 25mm is lying in such a way that one of its sides on HP while the side opposite to the side on which it rests is on VP. If the lamina makes 60° to HP, Draw the projections of the lamina.

Solution



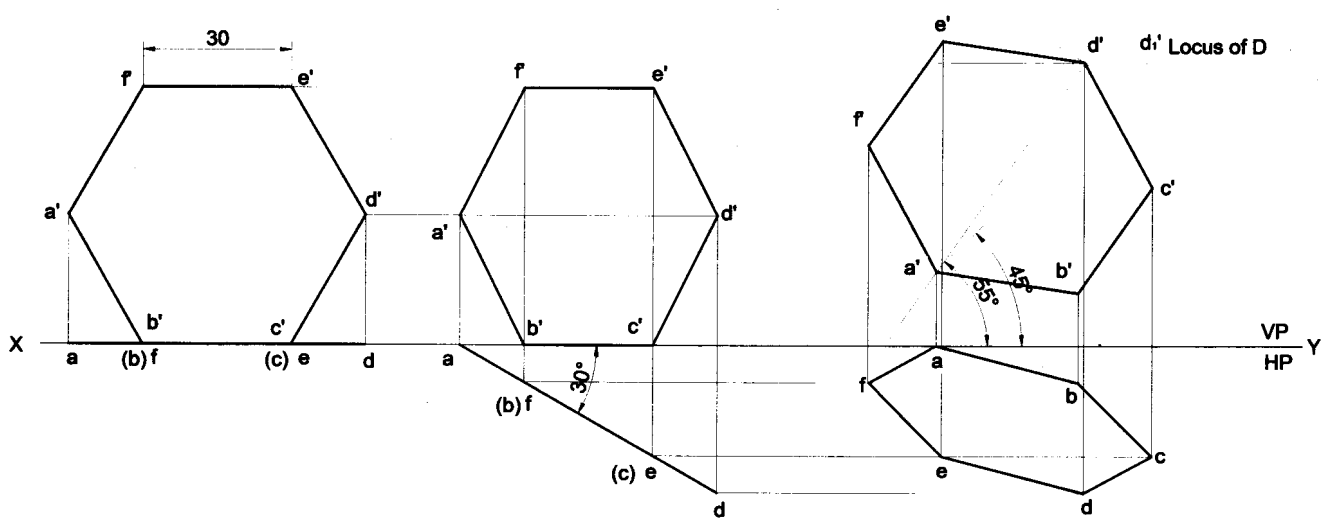
Problem 37 A regular hexagonal lamina of side 25mm is lying in such a way that one of its corners on HP while the corner opposite to the corner on which it rests is on VP. If the lamina makes 60° to HP, Draw the projections of the lamina.

Solution



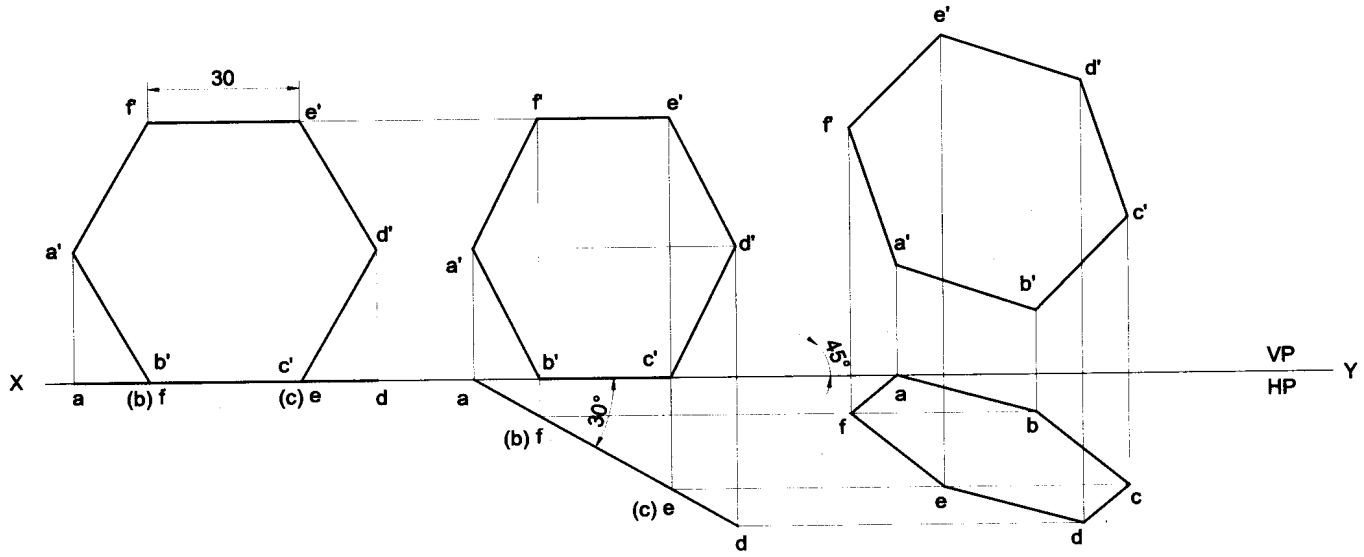
Problem 38 A hexagonal lamina of sides 30mm is resting on HP with one of its corners in VP and its surface inclined at an angle of 30° with VP. The diagonal passing through that corner which is in VP is inclined at 45° to HP. Draw the projections of the lamina.

Solution



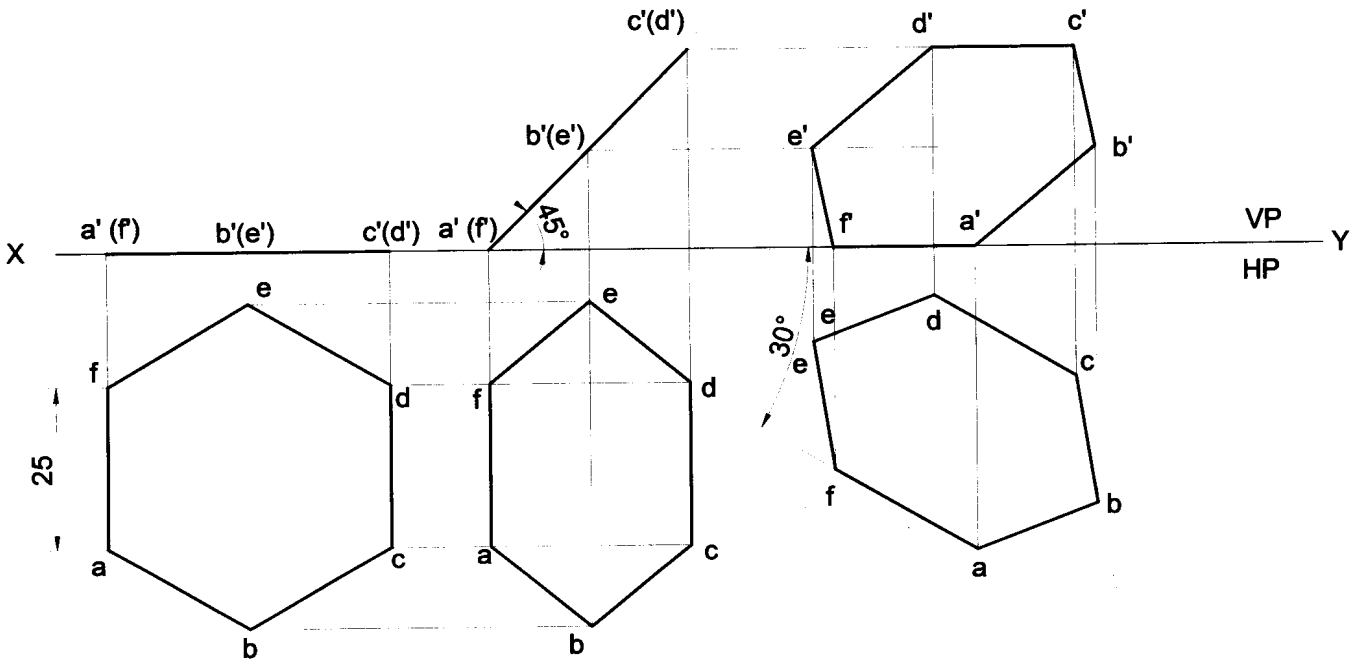
Problem 39 A hexagonal lamina of sides 30mm is resting on HP with one of its corners in VP and its surface inclined at an angle of 30° with VP. The diagonal passing through that corner which is in VP appears to be inclined at 40° to HP. Draw the projections of the lamina.

Solution



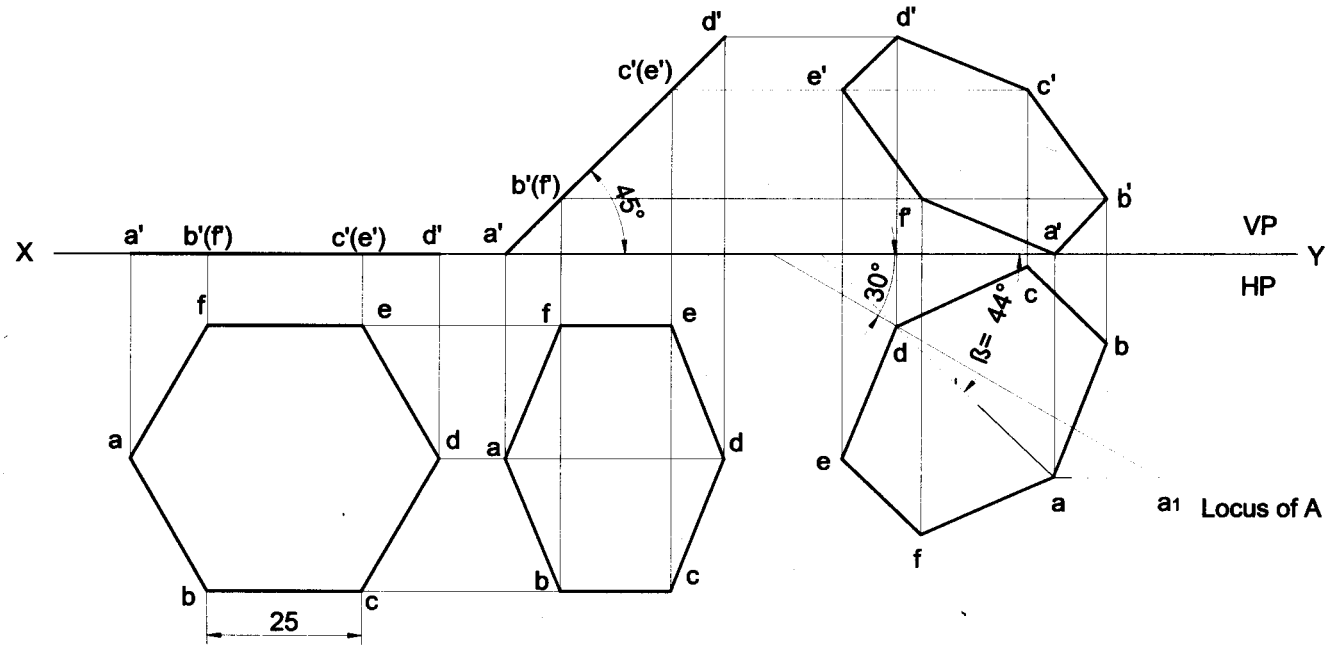
Problem 40 A hexagonal lamina of sides 25mm rests on one of its sides on HP. The lamina makes 45° to HP and the side on which it rests makes 30° to VP. Draw its projections.

Solution



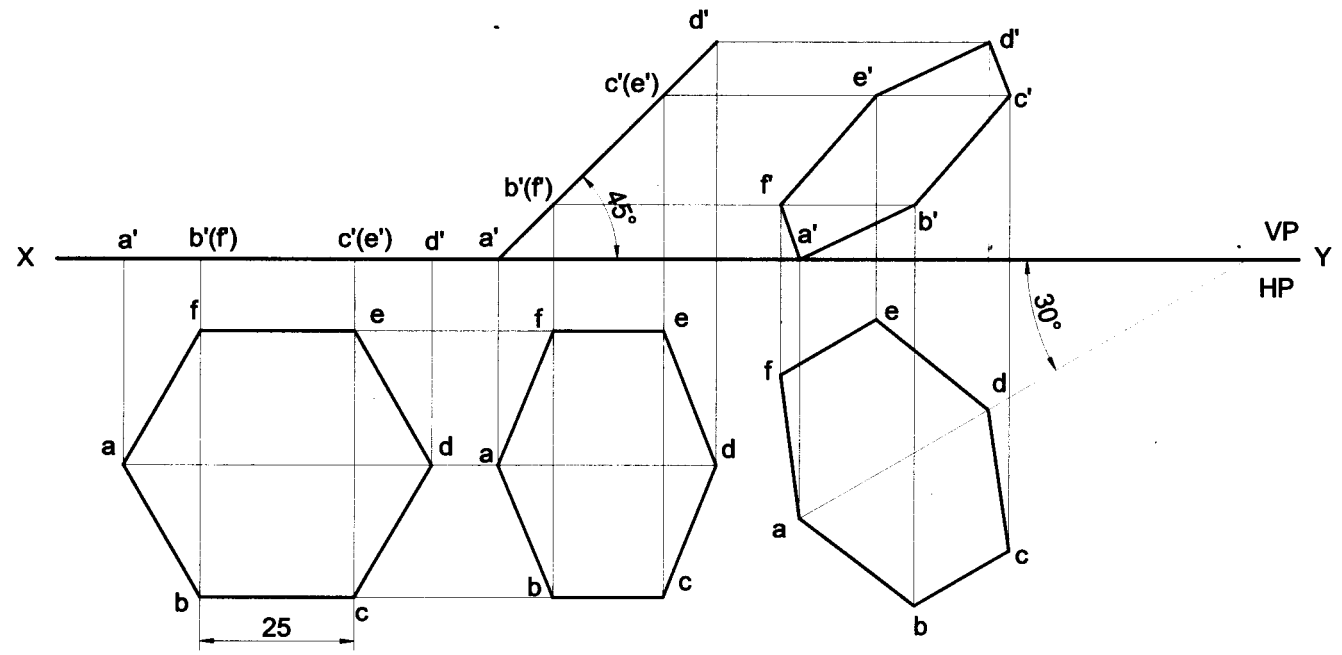
Problem 41 A hexagonal lamina of sides 25mm rests on one of its corners on HP. The lamina makes 45° to HP and the diagonal passing through the corner on which it rests is inclined at 30° to VP. Draw its projections.

Solution



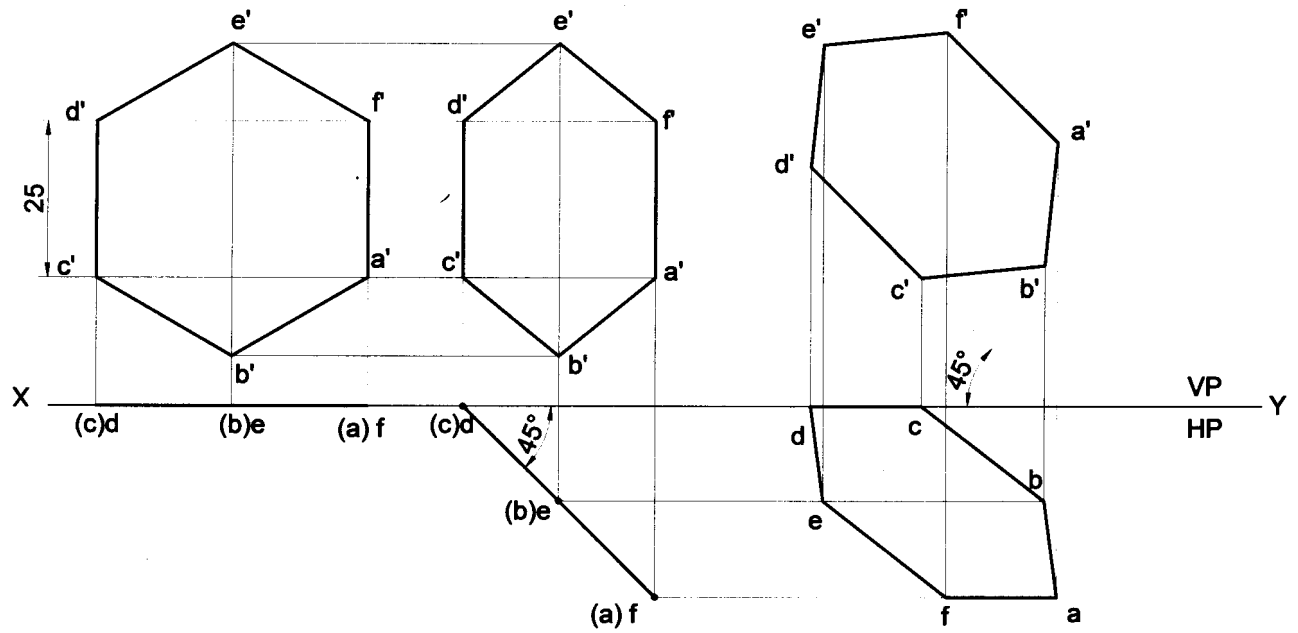
Problem 42 A hexagonal lamina of sides 25mm rests on one of its corners on HP. The lamina makes 45° to HP and the diagonal passing through the corner on which it rests appears to be inclined at 30° to VP. Draw its projections.

Solution



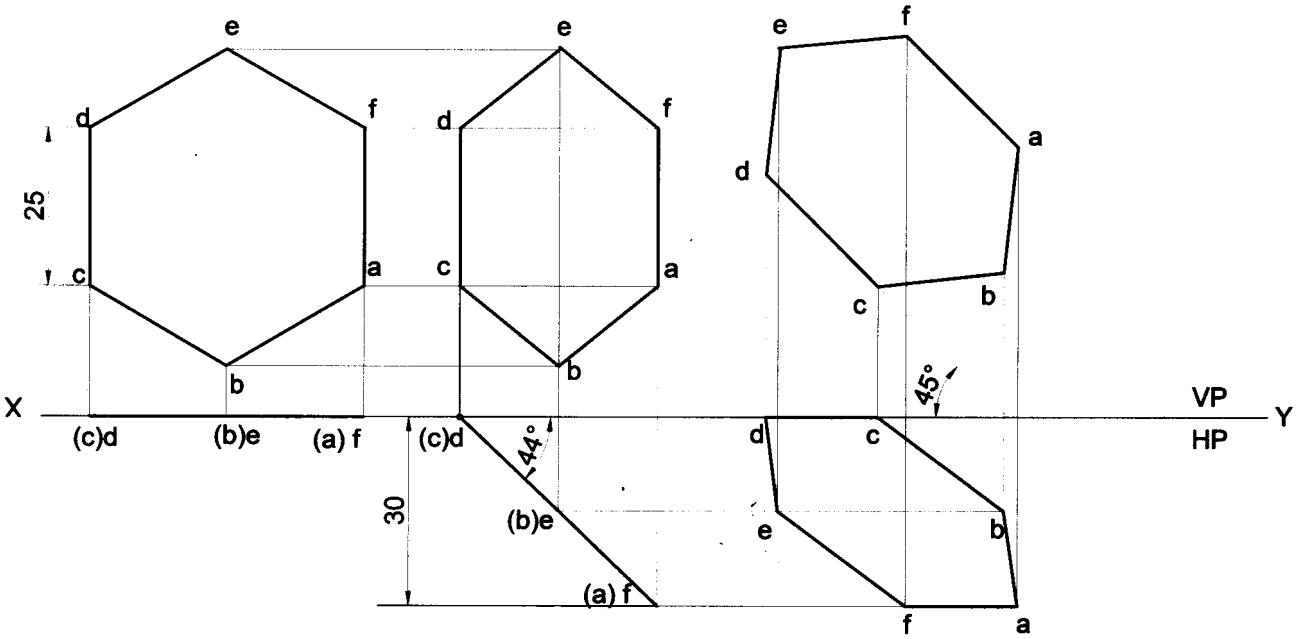
Problem 43 A hexagonal lamina of sides 25mm rests on one of its sides on VP. The lamina makes 45° to VP and the side on which it rests makes 45° to HP. Draw its projections.

Solution



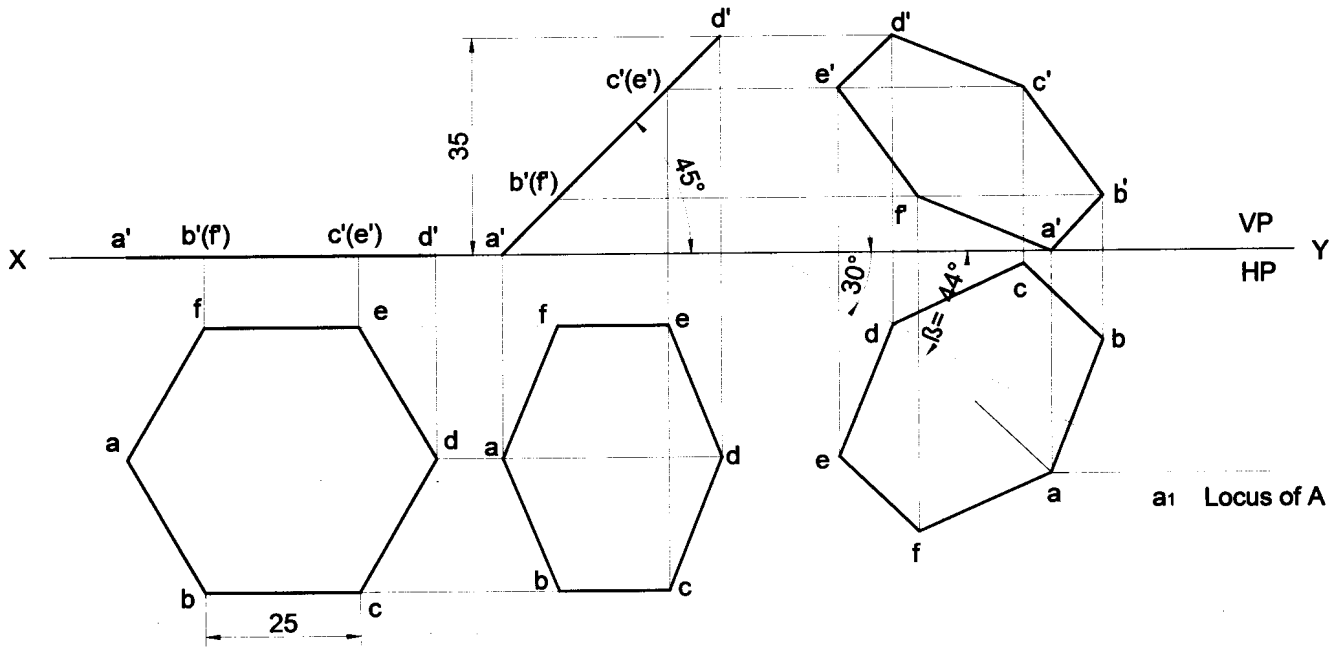
Problem 44 A hexagonal lamina of sides 25mm rests on one of its sides on VP. The side opposite to the side on which it rests is 30mm infront of VP & the side on which it rests makes 45° to HP. Draw its projections. Also determine the inclination of the lamina with the reference plane.

Solution



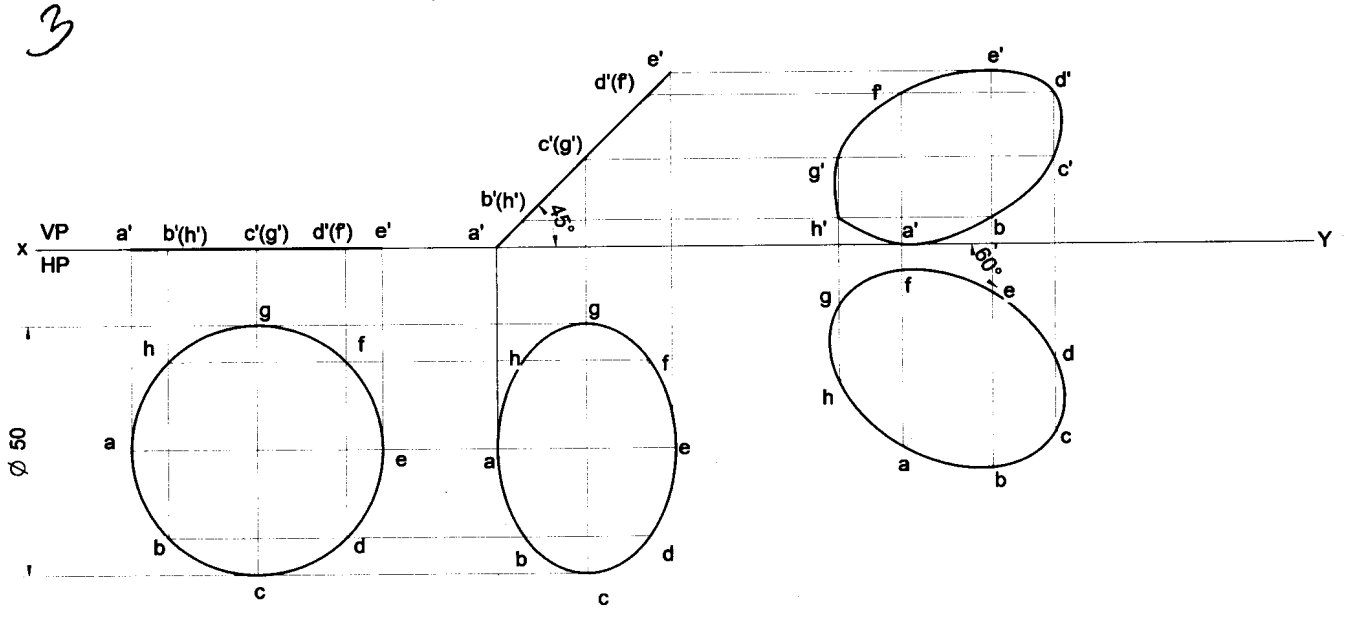
Problem 45 A hexagonal lamina of sides 25mm rests on one of its corners on HP. The corner opposite to the corner on which it rests is 35mm above HP and the diagonal passing through the corner on which it rests is inclined at 30° to VP. Draw its projections. Find the inclination of the surface with HP.

Solution



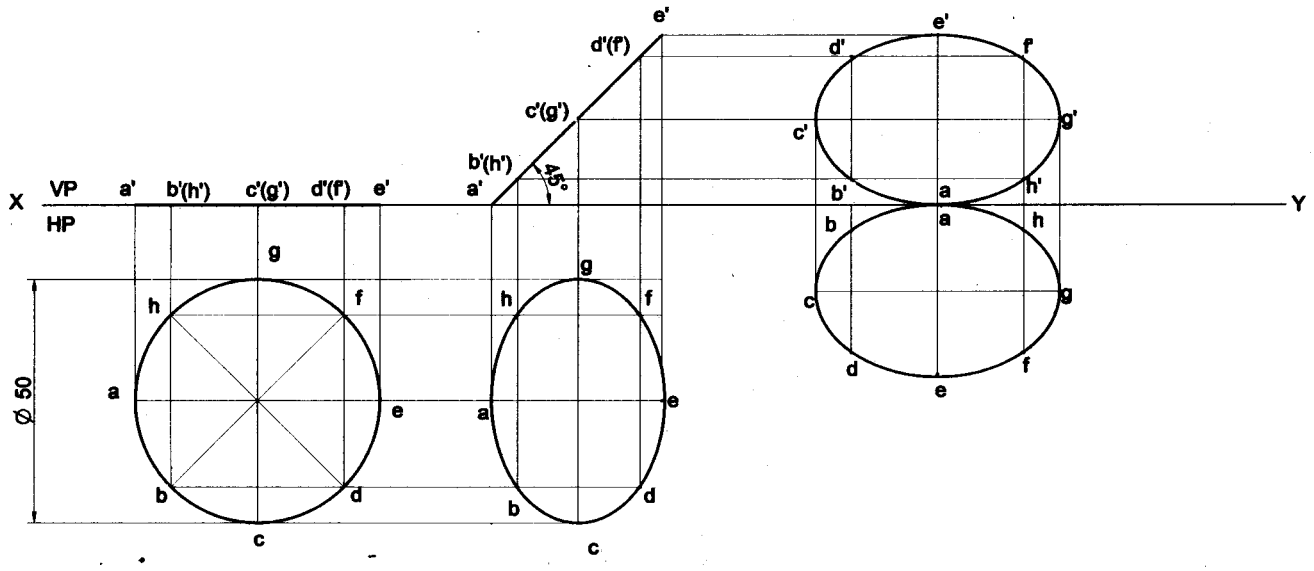
Problem 46 Draw the projections of a circular plate of negligible thickness of 50mm diameter resting on HP on a point A on the circumference, with its plane inclined at 45° to HP and the top view of the diameter passing through the resting point makes 60° with VP.

Solution



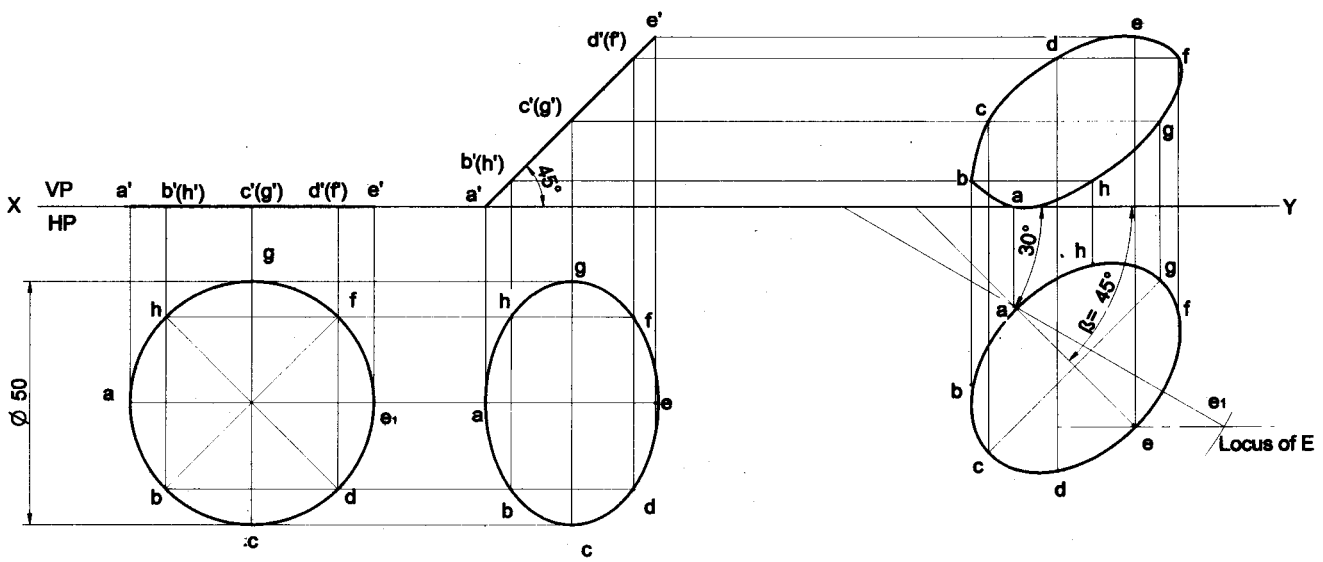
Problem 47 A circular lamina of 50mm diameter is standing with one of its points on the rim on HP and the lamina inclined at 45° to HP. The diameter at right angles to the diameter which is passing through the point on which the lamina rests is parallel to VP. Draw its projections.

Solution



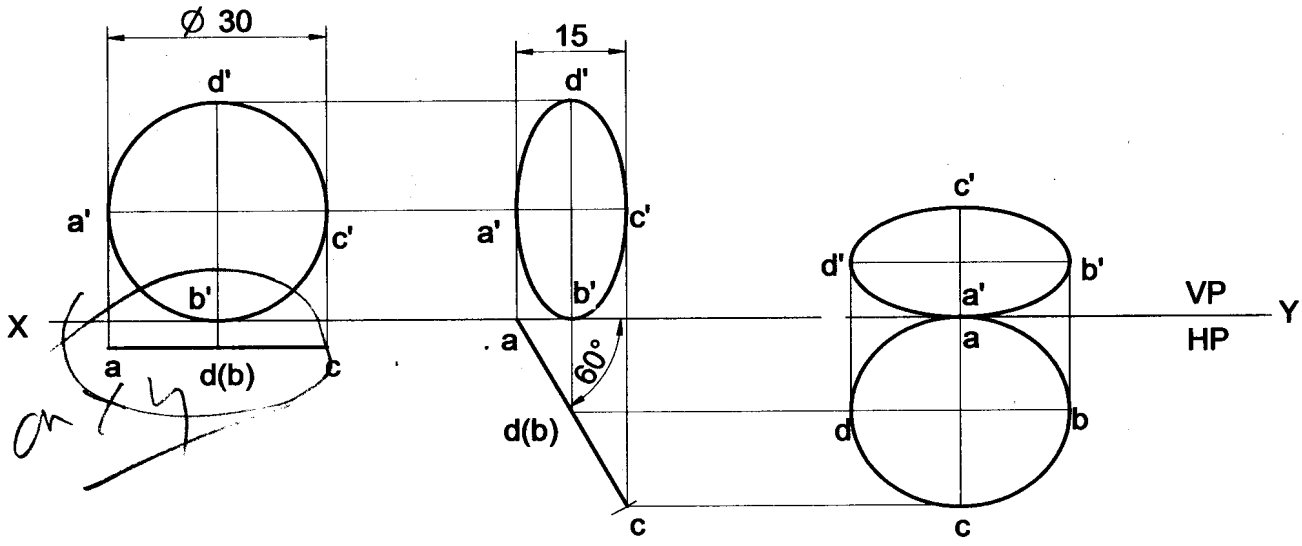
Problem 48 A circular lamina of 50mm diameter rests on HP such that one of its diameters is inclined at 30° to VP and 45° to HP. Draw its top and front views in this position.

Solution



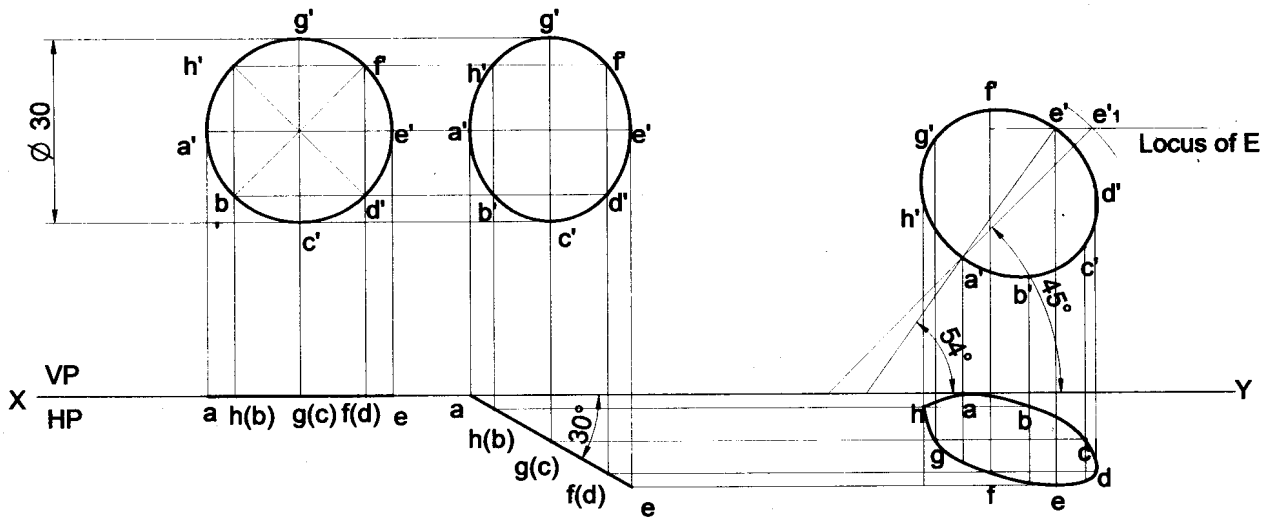
Problem 49 A circular lamina inclined to the VP appears in the front view as an ellipse of major axis 30mm and minor axis 15mm. The major axis is parallel to both HP and VP. One end of the minor axis is in both the HP and VP. Draw the projections of the lamina and determine the inclination of the lamina with the VP.

Solution



Problem 50 A circular lamina of 30mm diameter rests on VP such that one of its diameters is inclined at 30° to VP and 45° to HP. Draw its top and front views in this position.

Solution

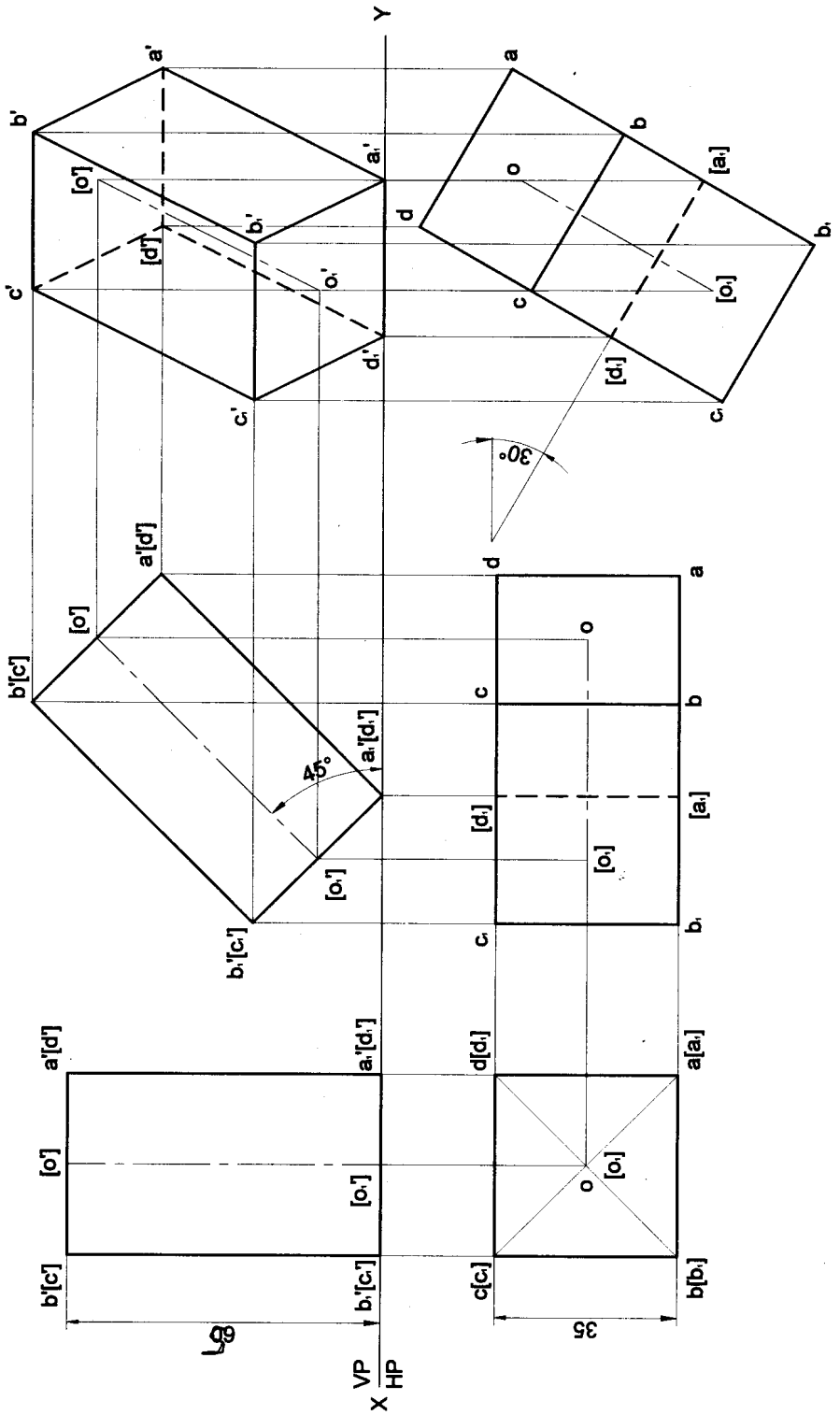


CHAPTER 4

PROJECTIONS OF SOLIDS

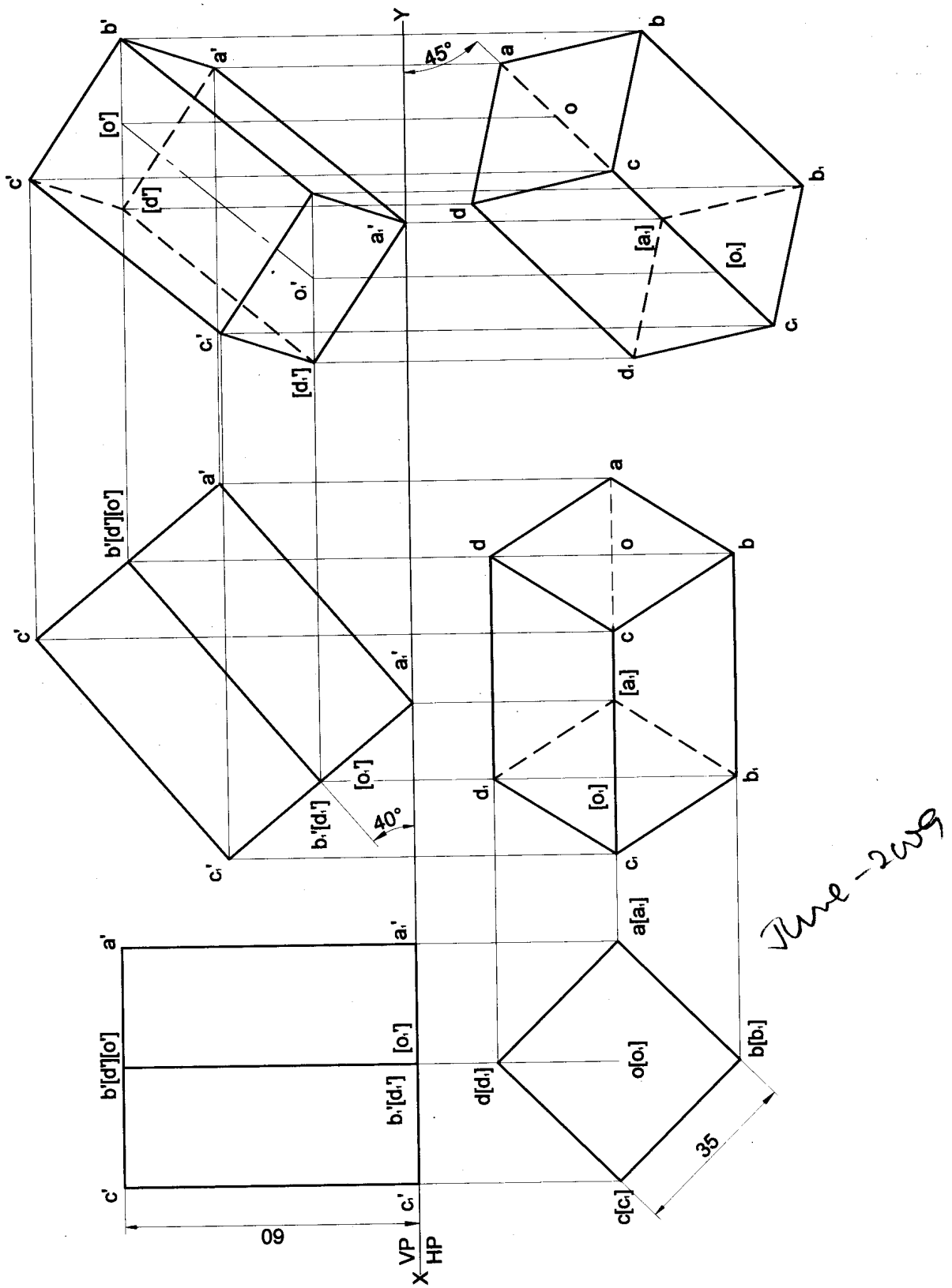
Problem 1 A square prism 35 mm sides of base and 65 mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30º. Draw the projections of the prism when the axis is inclined to HP at 45º.

Solution



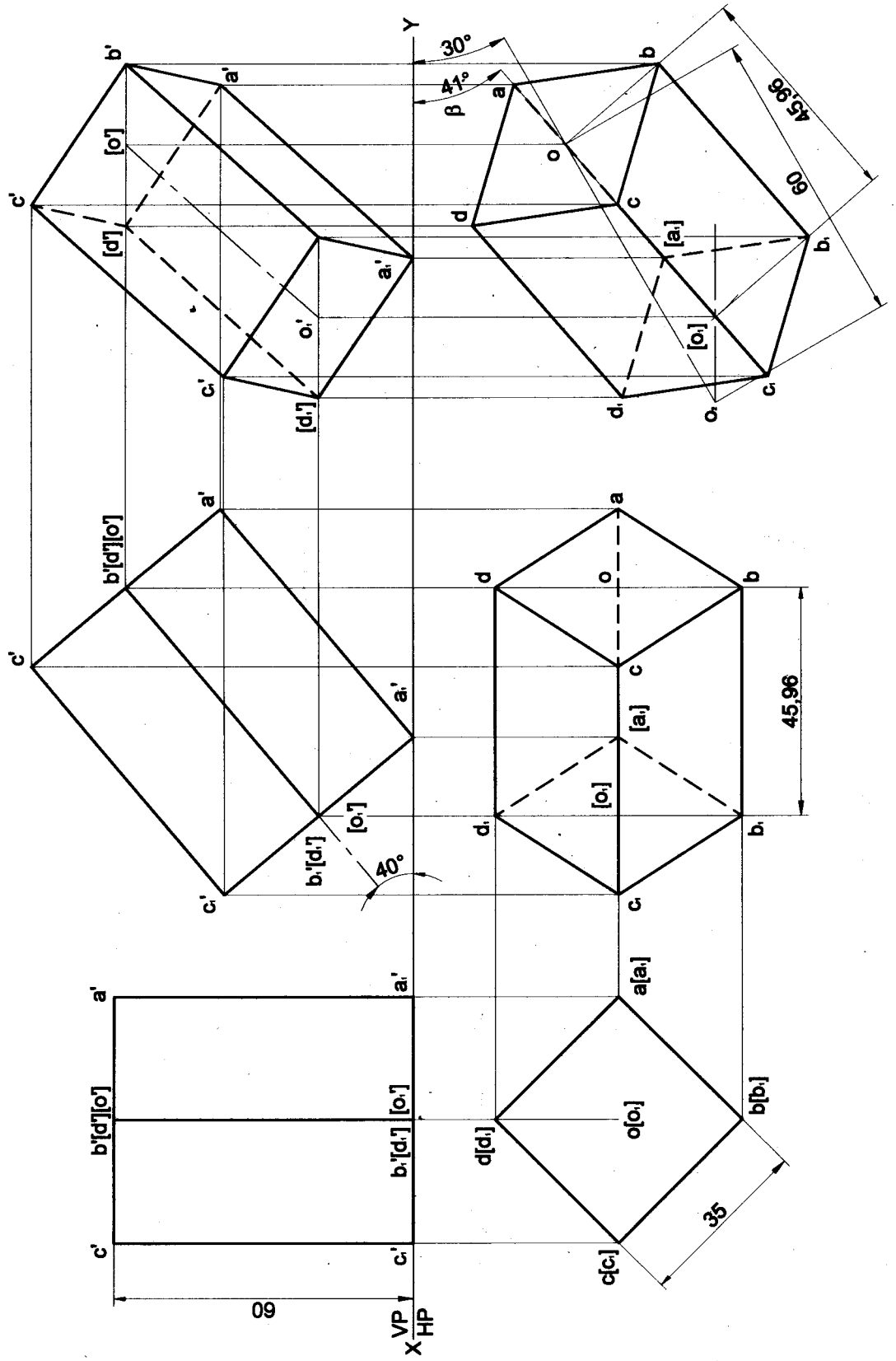
Problem 2 A square prism 35 mm sides of base and 60 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40º and appears to be inclined to VP at 45º.

Solution



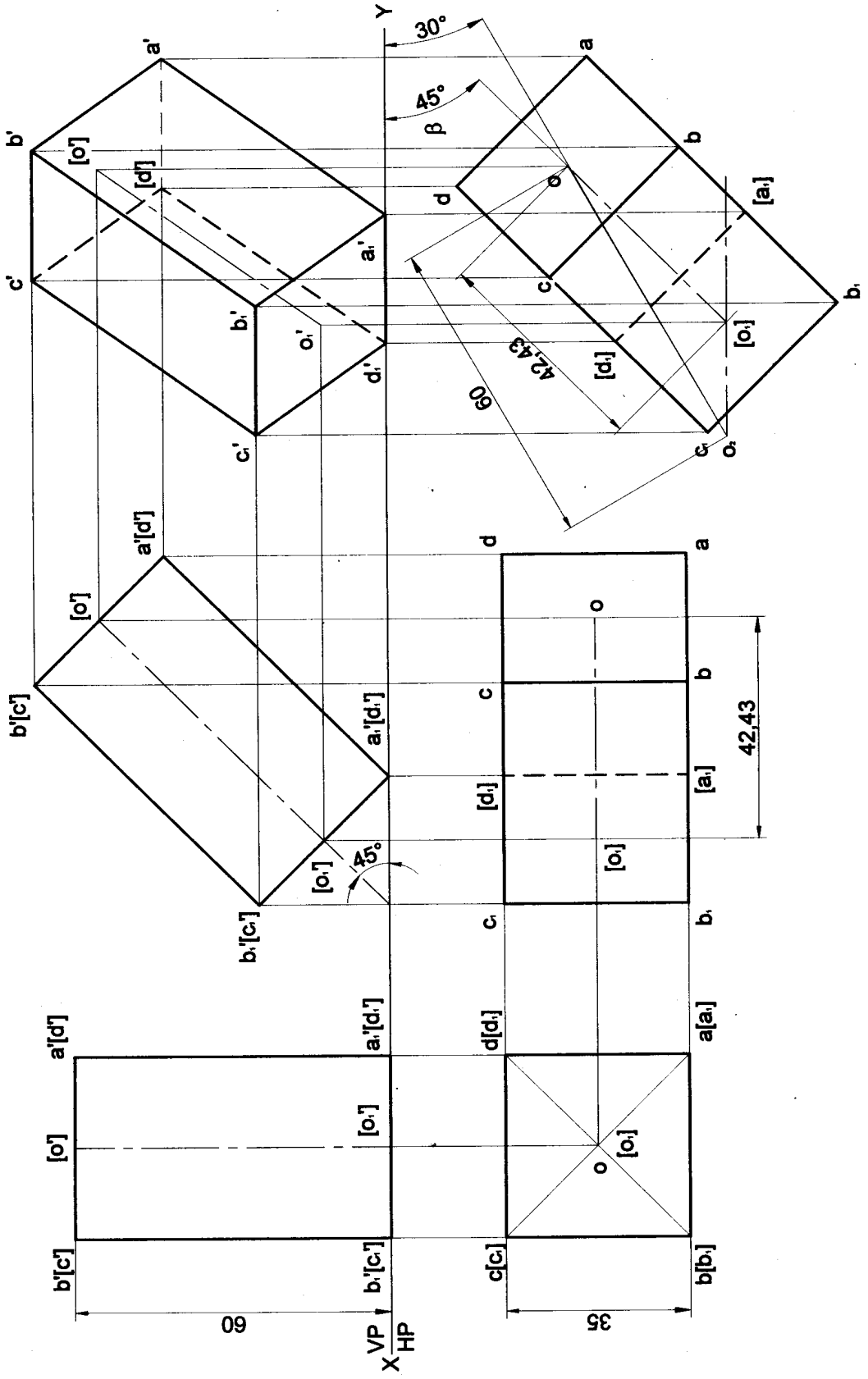
Problem 3 A square prism 35 mm sides of base and 60 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40º and to VP at 30º.

Solution



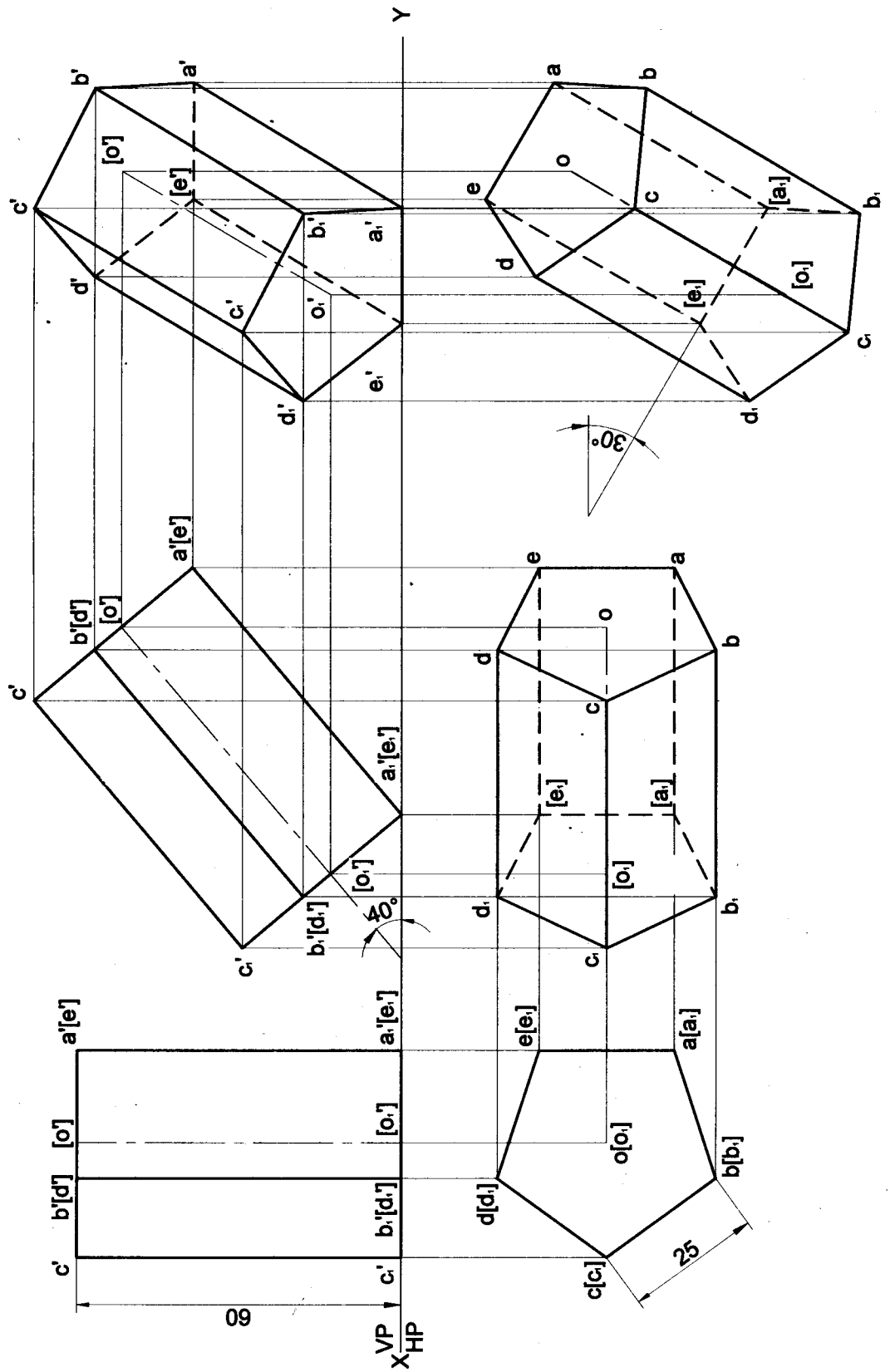
Problem 4 A square prism 35 mm sides of base and 60 mm axis length rests on HP on one of its edges of the base. Draw the projections of the prism when the axis is inclined to HP at 45º and VP at 30º.

Solution



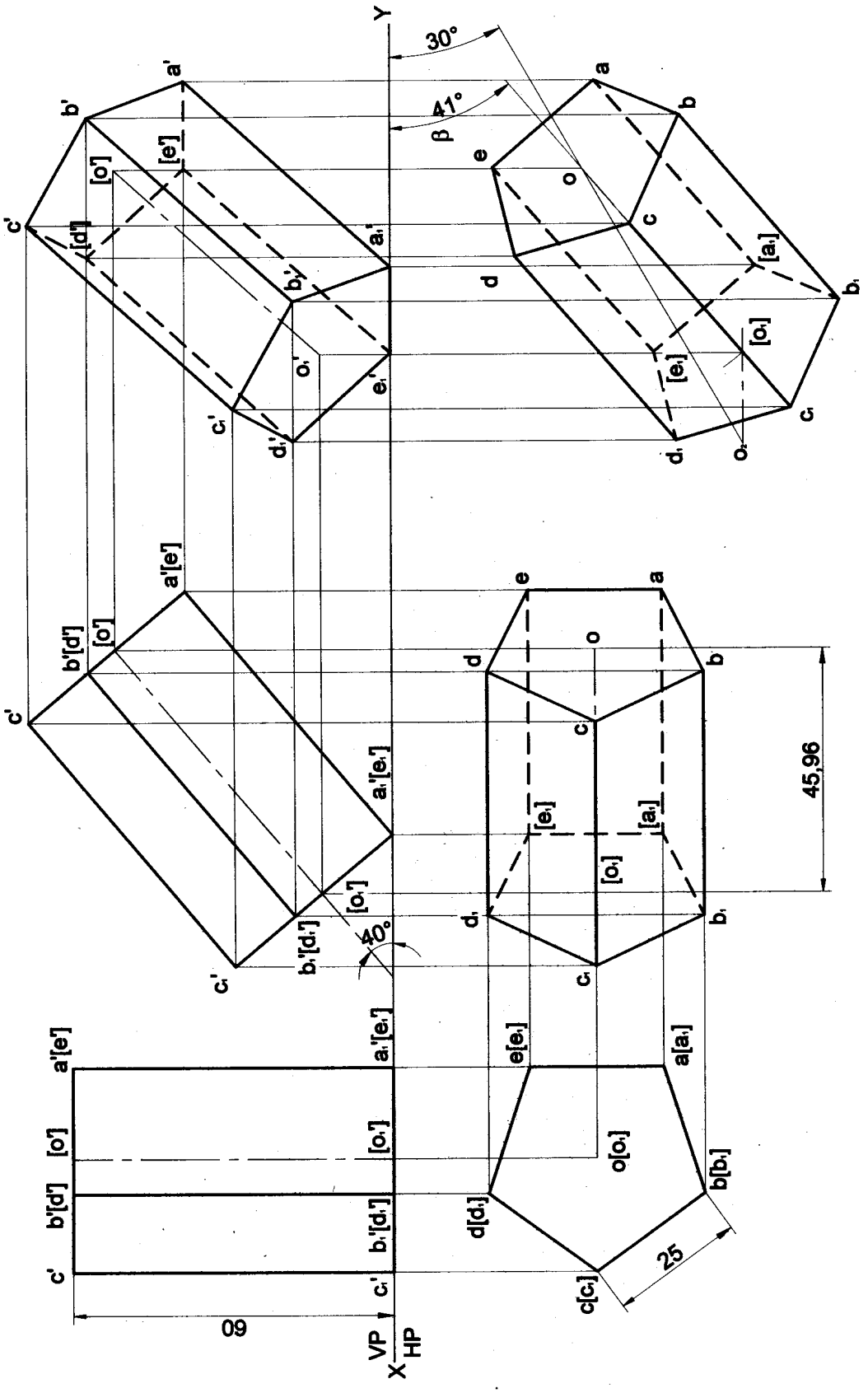
Problem 5 A pentagonal prism 25 mm sides of base and 60 mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30º. Draw the projections of the prism when the axis is inclined to HP at 40º.

Solution



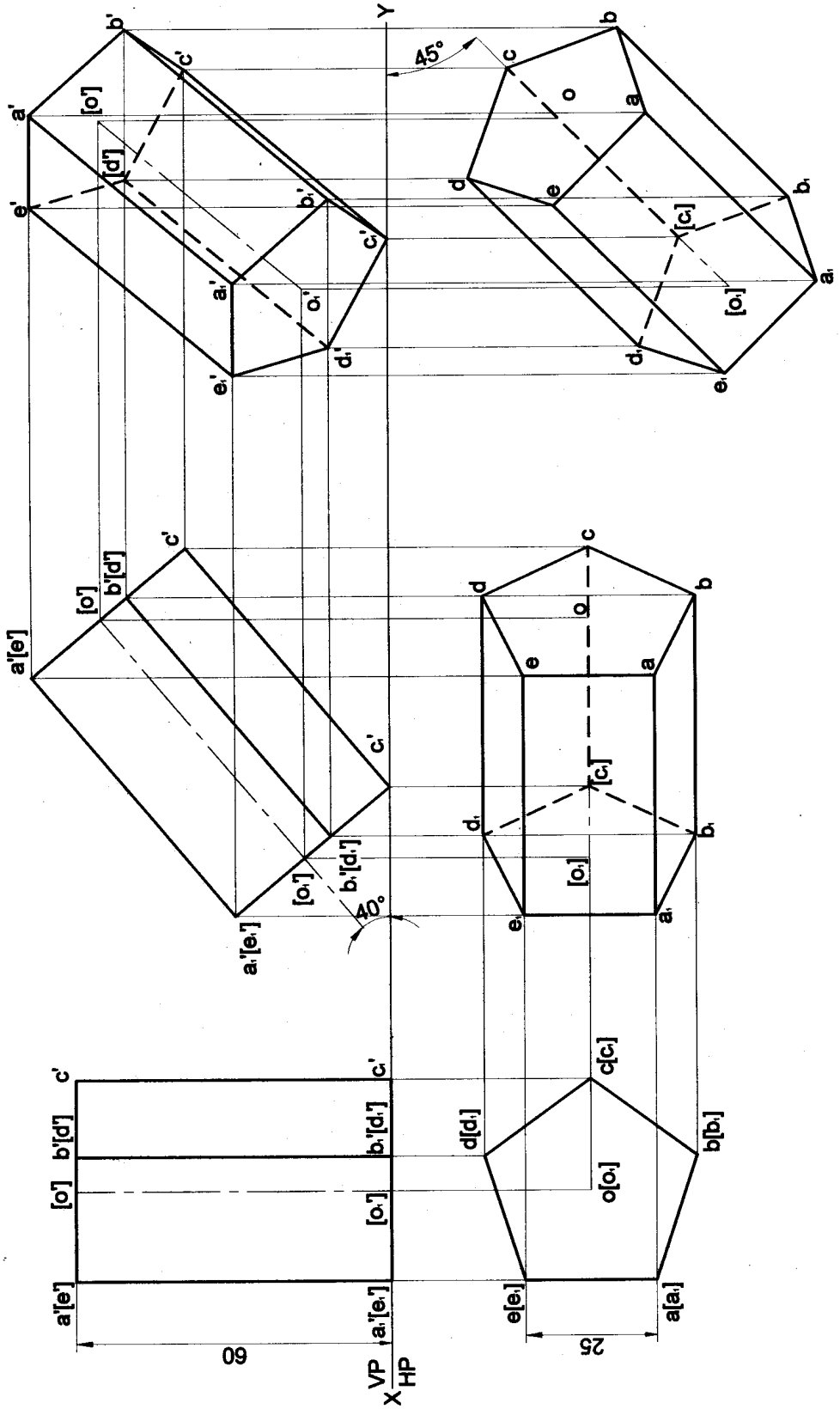
Problem 6 A pentagonal prism 25 mm sides of base and 60 mm axis length rests on HP on one of its edges of the base. Draw the projections of the prism when the axis is inclined to HP at 40º and VP at 30º.

Solution



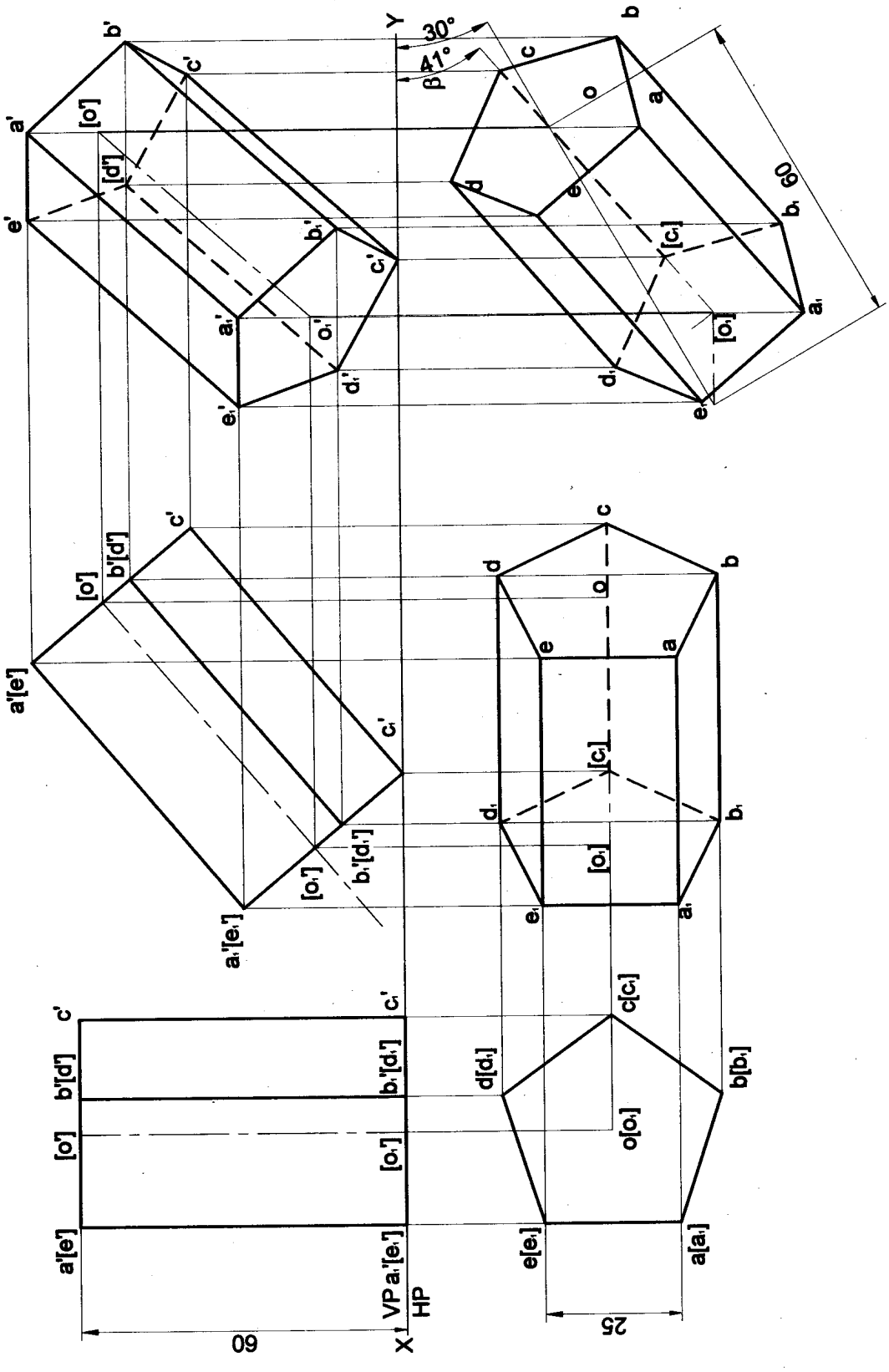
Problem 7 A pentagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40º and appears to be inclined to VP at 45º.

Solution



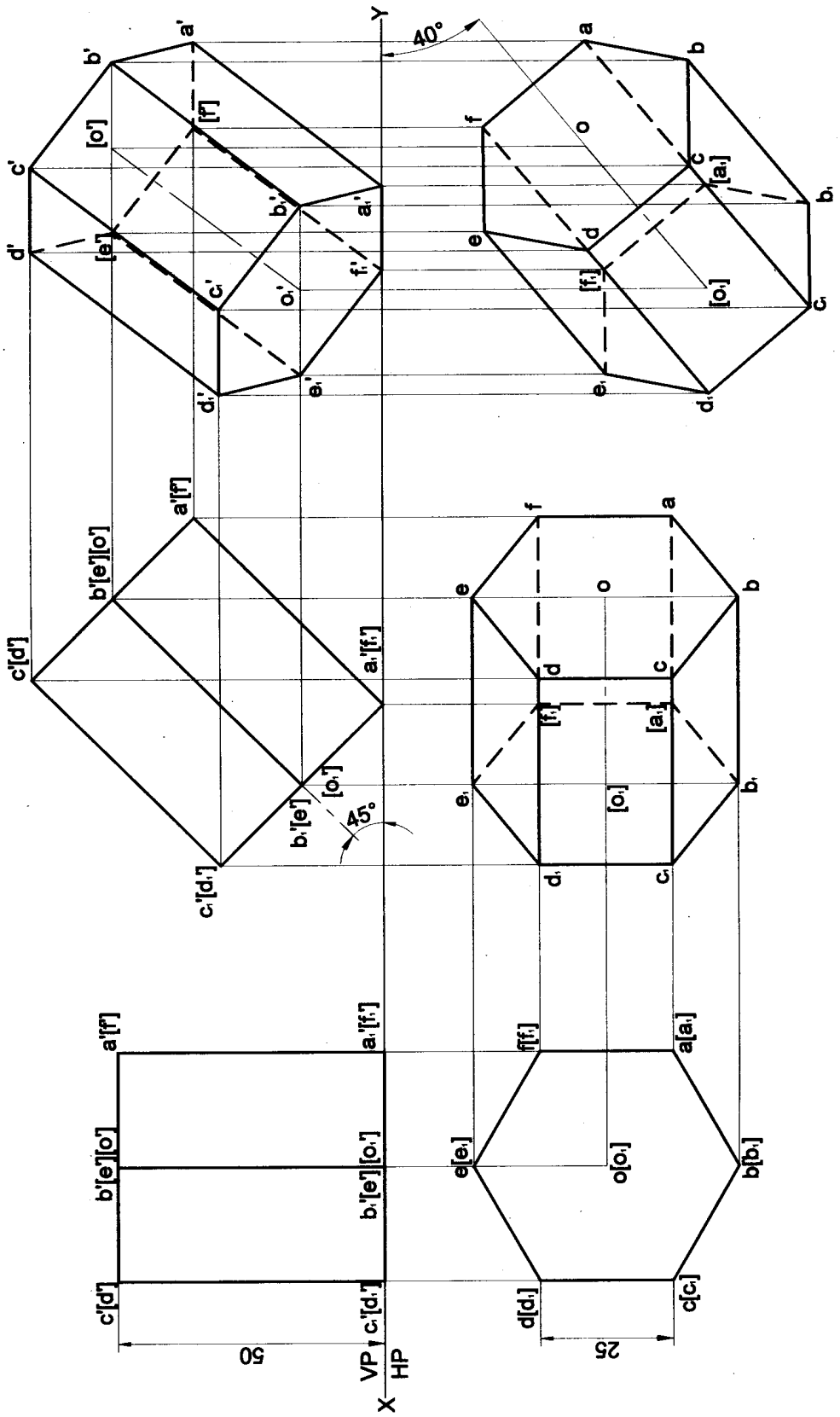
Problem 8 A pentagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40º and to VP at 30º.

Solution



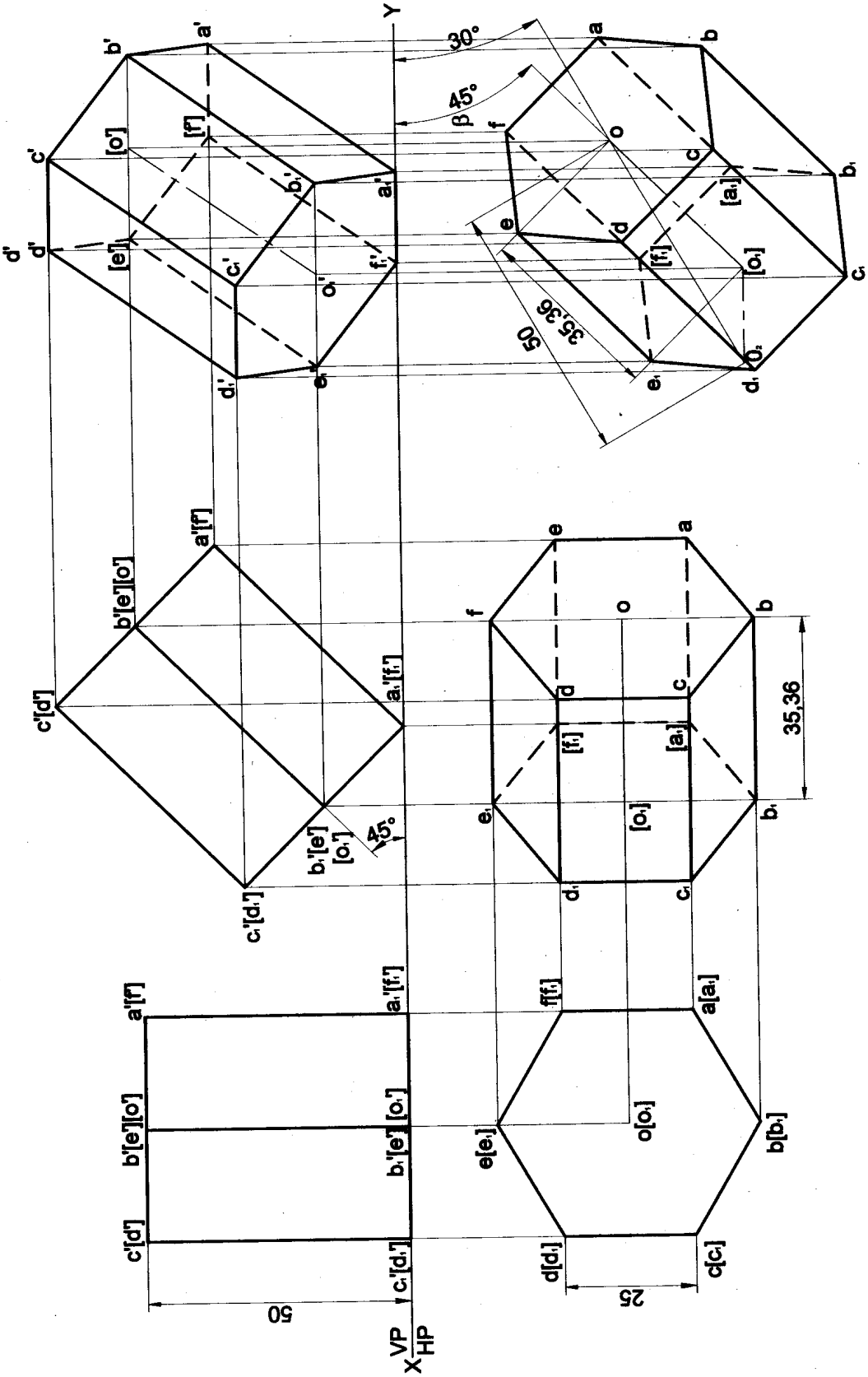
Problem 9 A hexagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its edges. Draw the projections of the prism when the axis is inclined to HP at 45º and appears to be inclined to VP 40º.

Solution



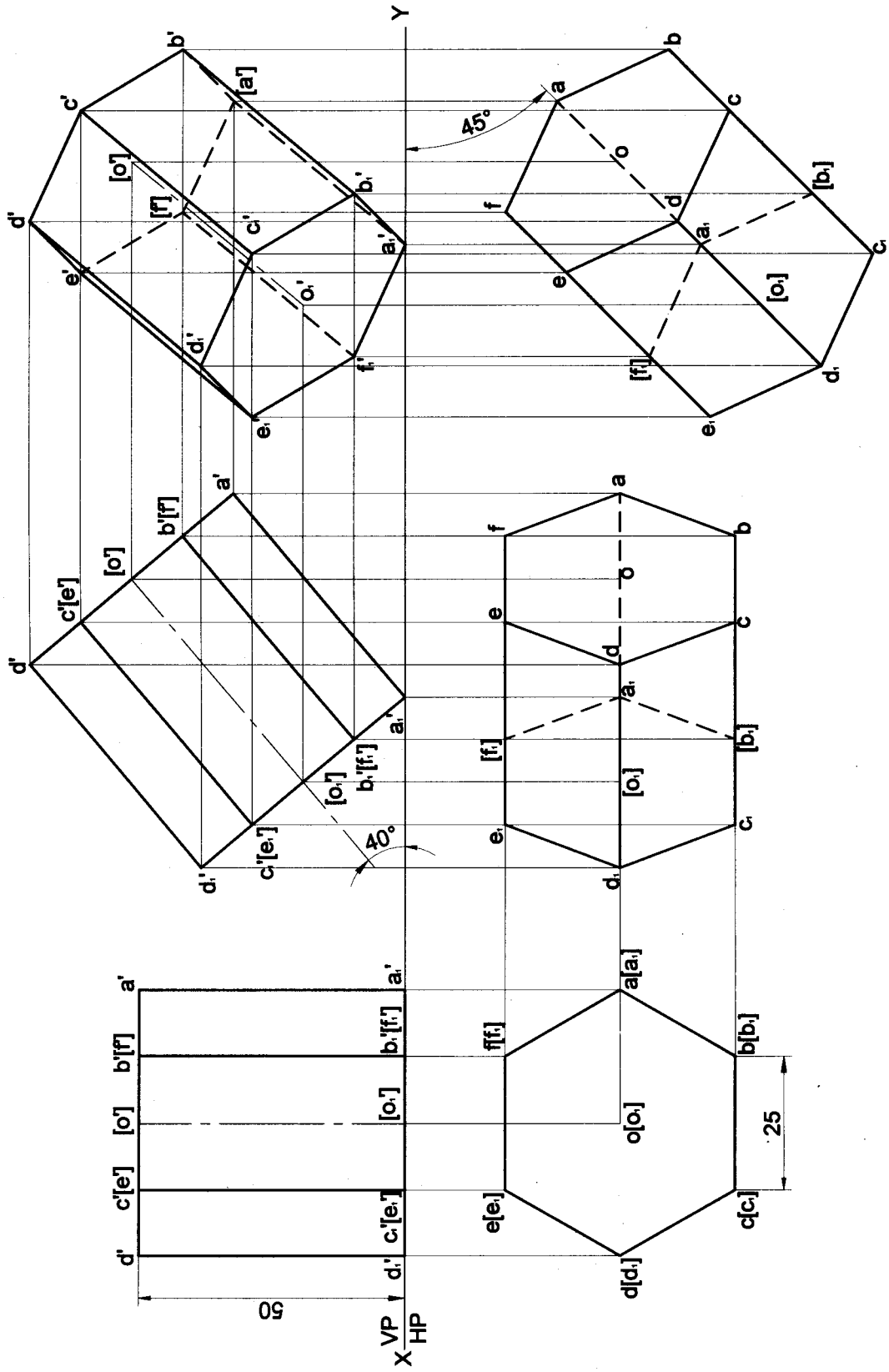
Problem 10 A hexagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its edges of the base. Draw the projections of the prism when the axis is inclined to HP at 45º and VP at 30º.

Solution



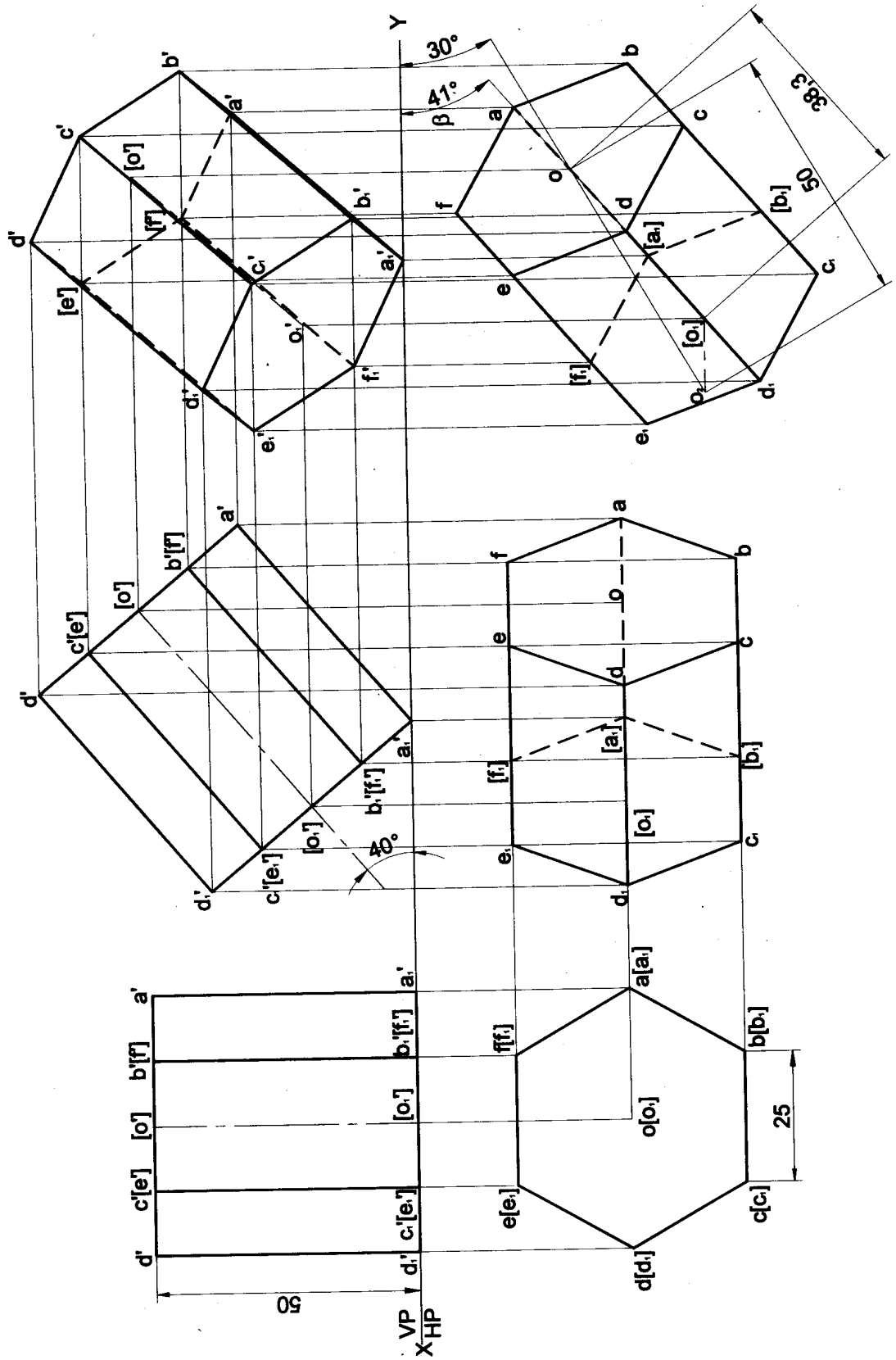
Problem 11 A hexagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40º and appears to be inclined to VP at 45º.

Solution



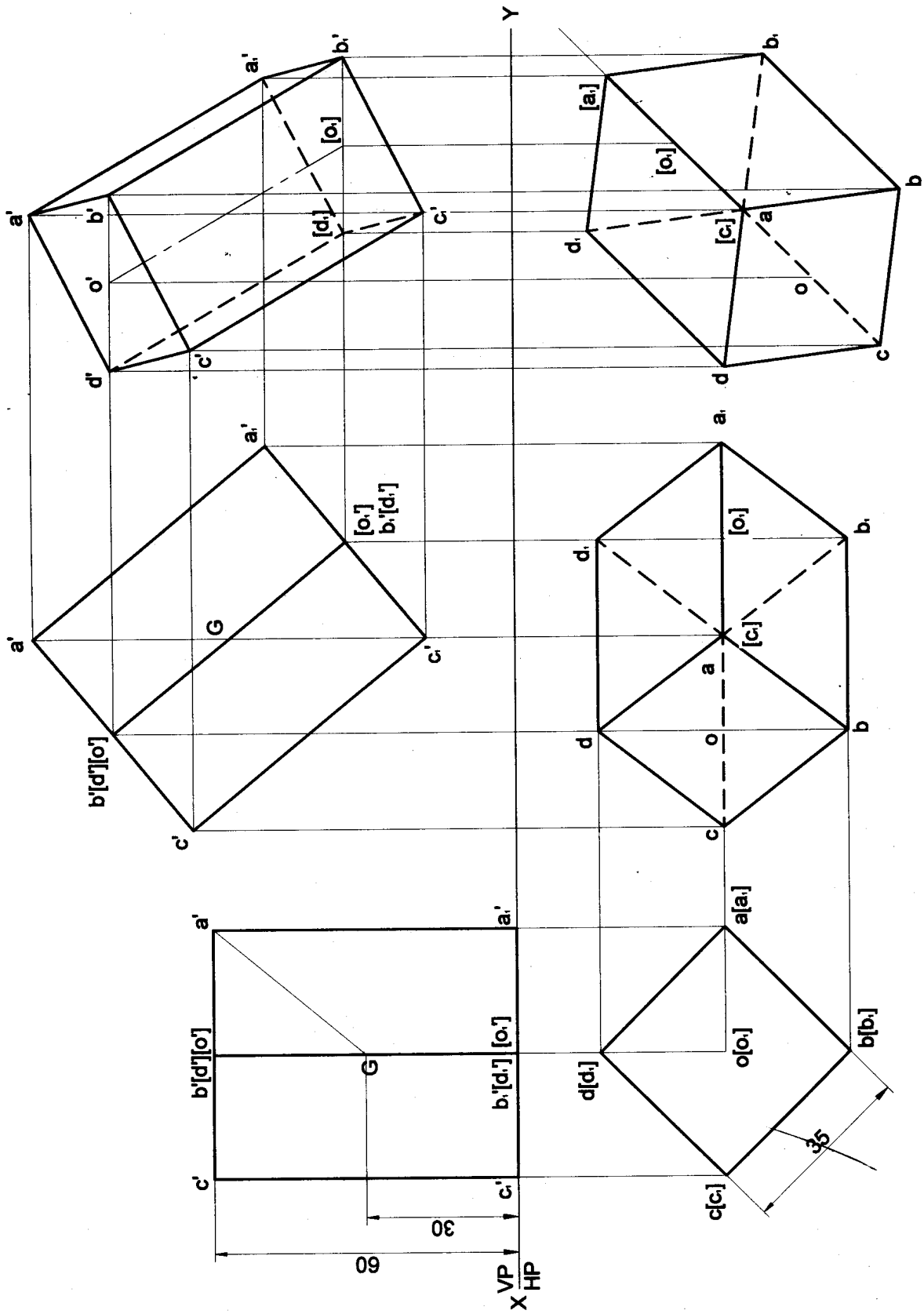
Problem 12 A hexagonal prism 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40º and to VP at 30º.

Solution



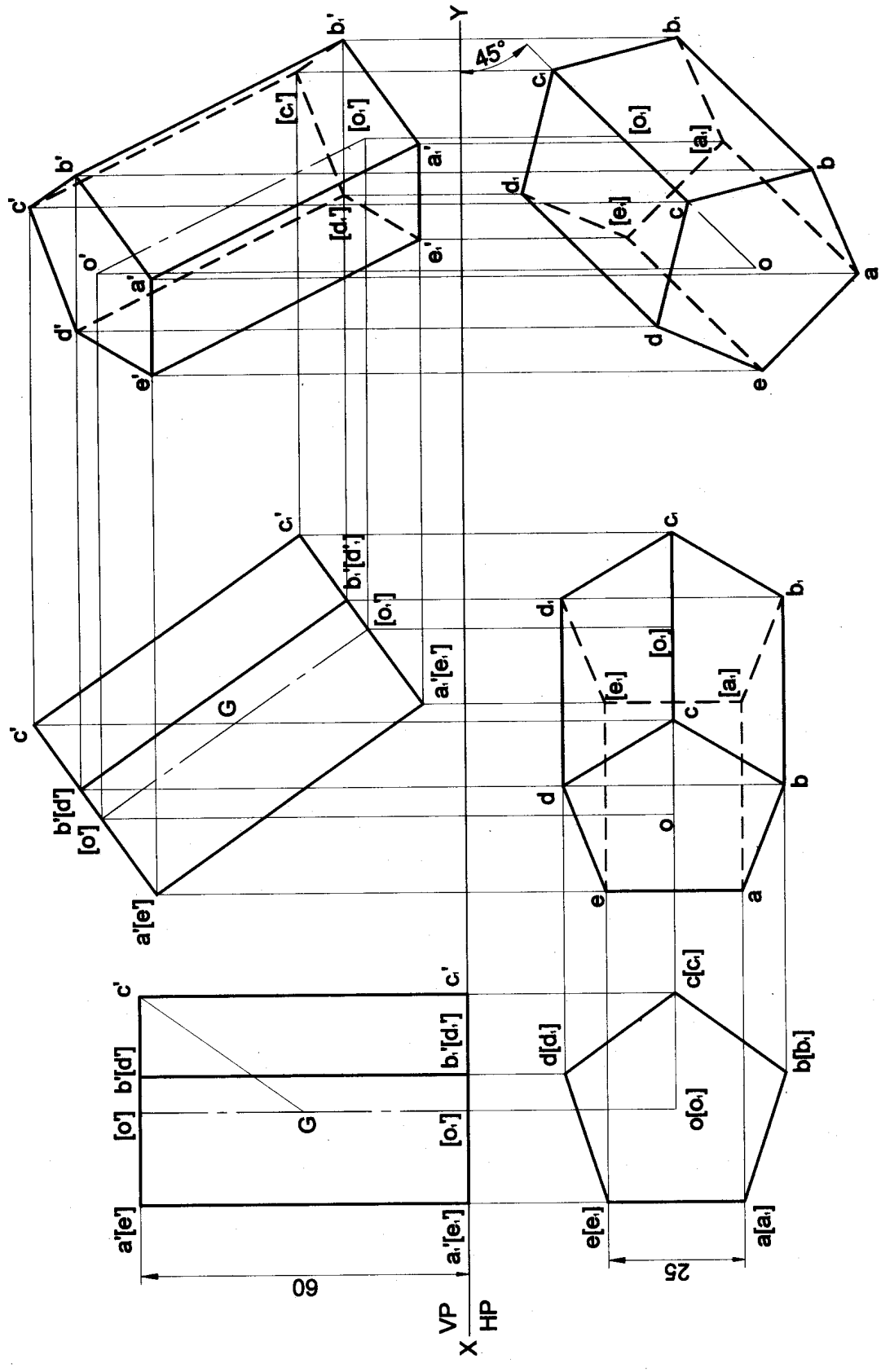
Problem 13 A square prism 35 mm sides of base and 60 mm axis length is suspended freely from a corner of its base. Draw the projections of the prism when the axis appears to be inclined to VP at 45º.

Solution



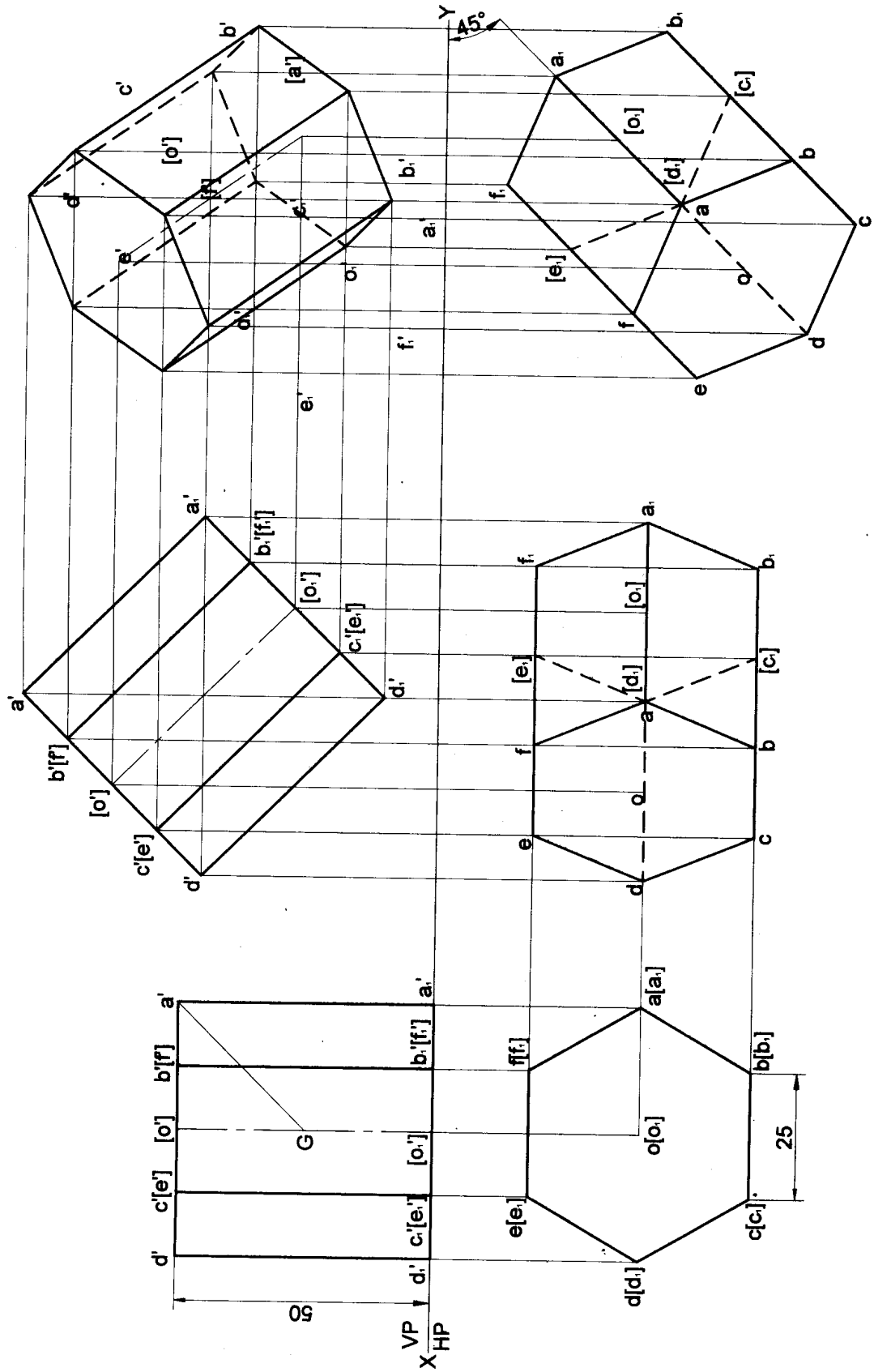
Problem 14 A pentagonal prism 25 mm sides of base and 50 mm axis length is suspended freely from a corner of its base. Draw the projections of the prism when the axis appears to be inclined to VP at 45º.

Solution



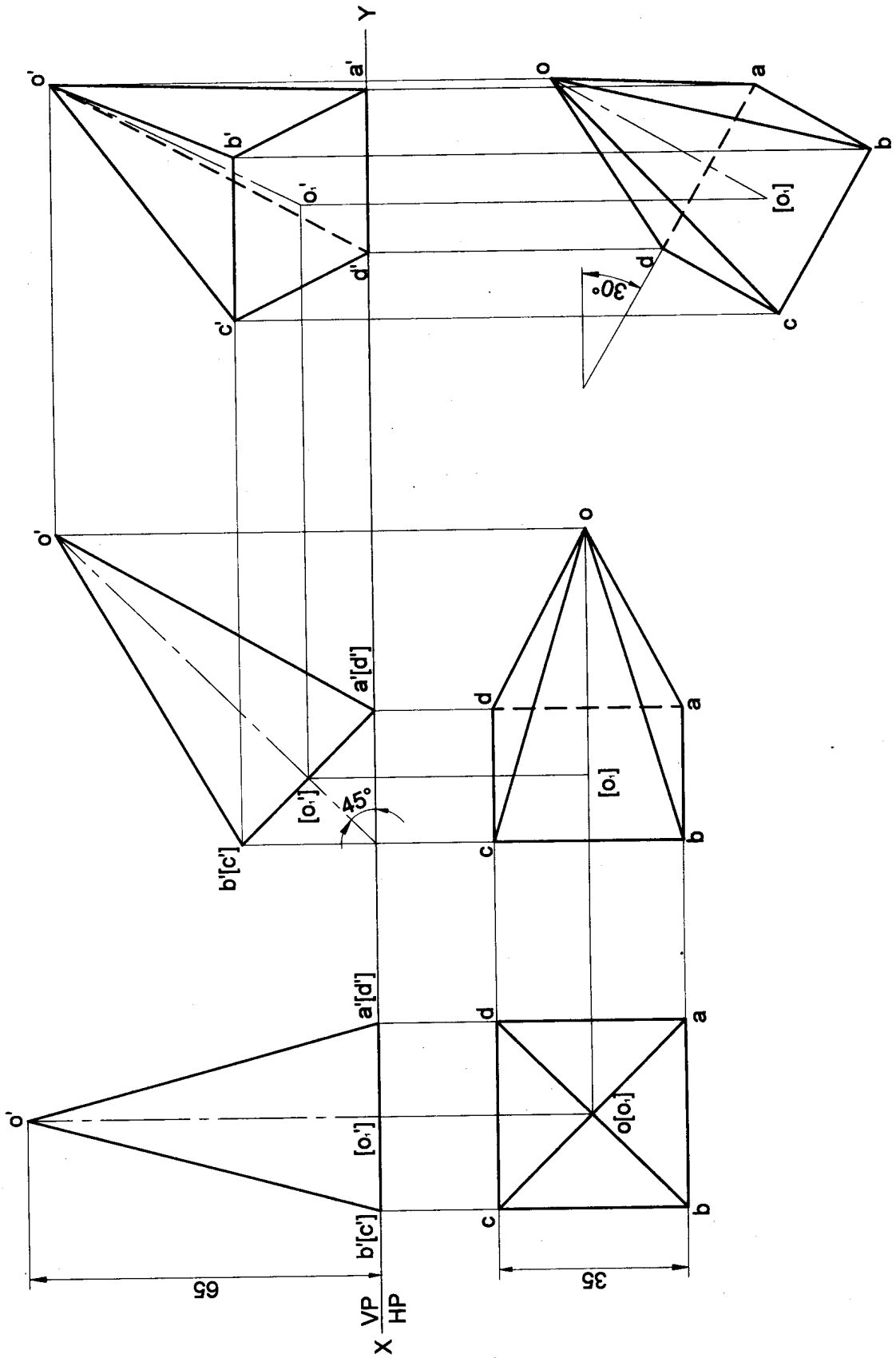
Problem 15 A hexagonal prism 25 mm sides of base and 50 mm axis length is suspended freely from a corner of its base. Draw the projections of the prism when the axis appears to be inclined to VP at 45º.

Solution



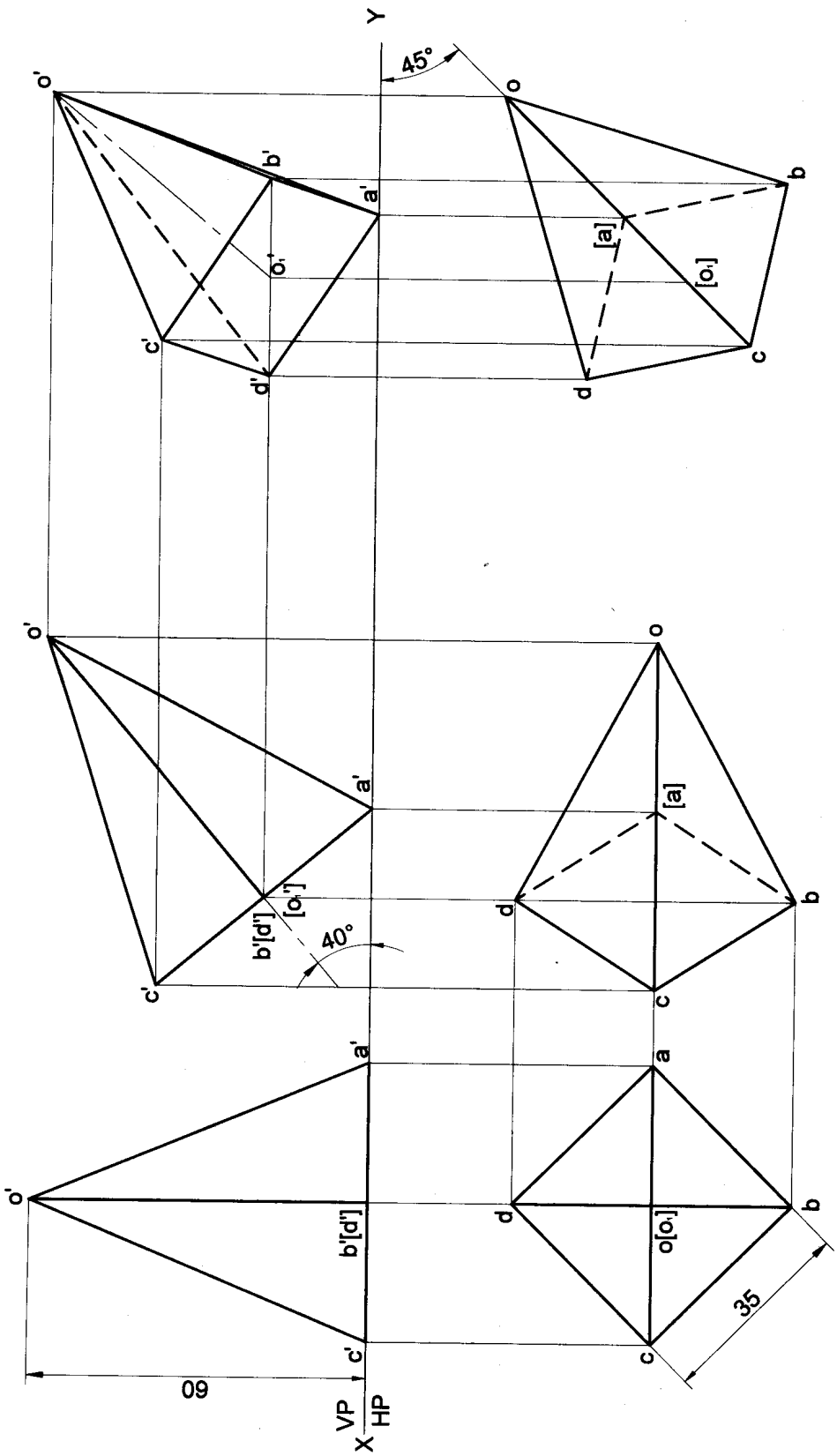
Problem 16 A square pyramid 35 mm sides of base and 65 mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30º. Draw the projections of the pyramid when the axis is inclined to HP at 45º.

Solution



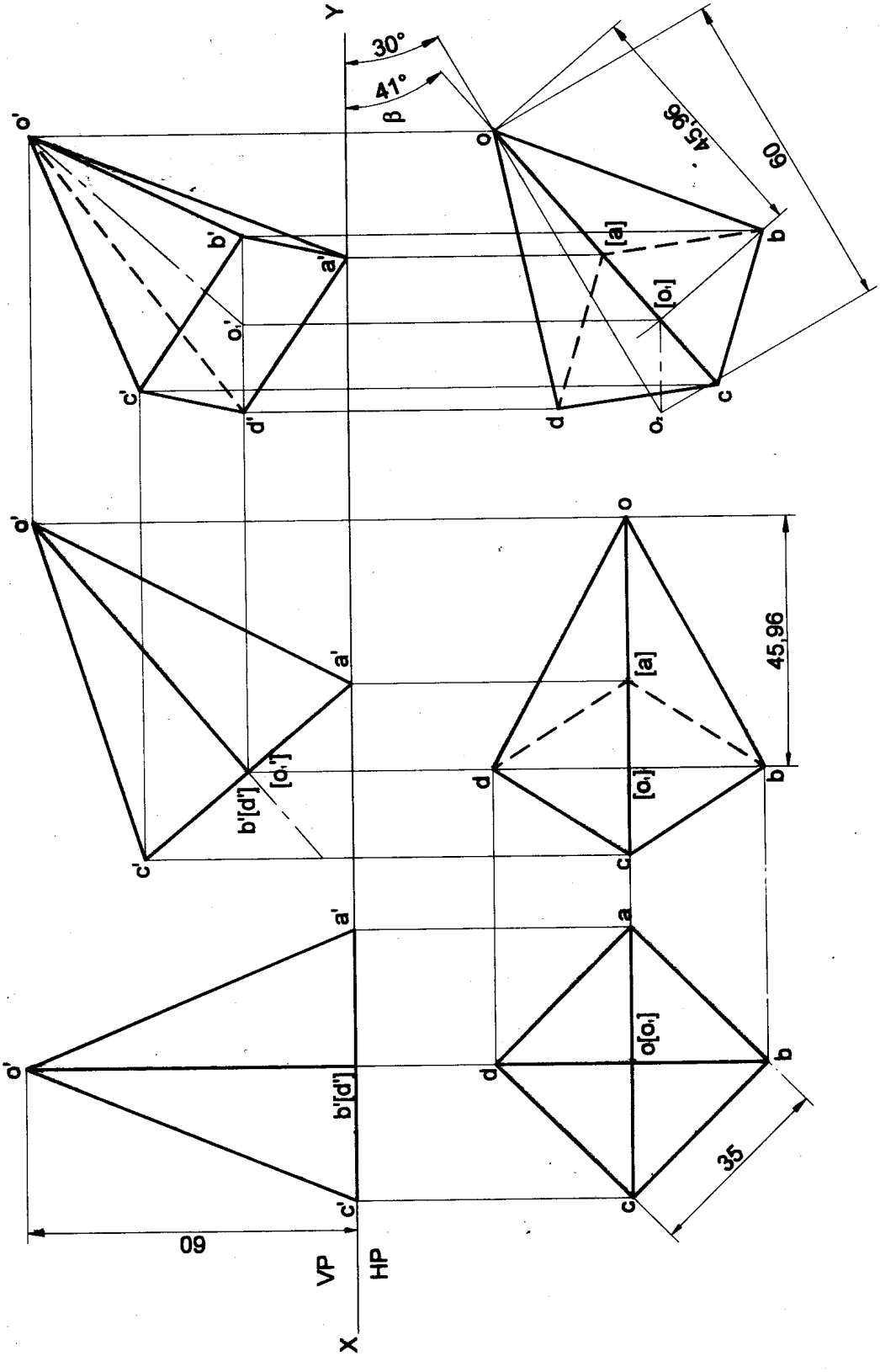
Problem 17 A square pyramid 35 mm sides of base and 60 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40º and appears to be inclined to VP at 45º.

Solution



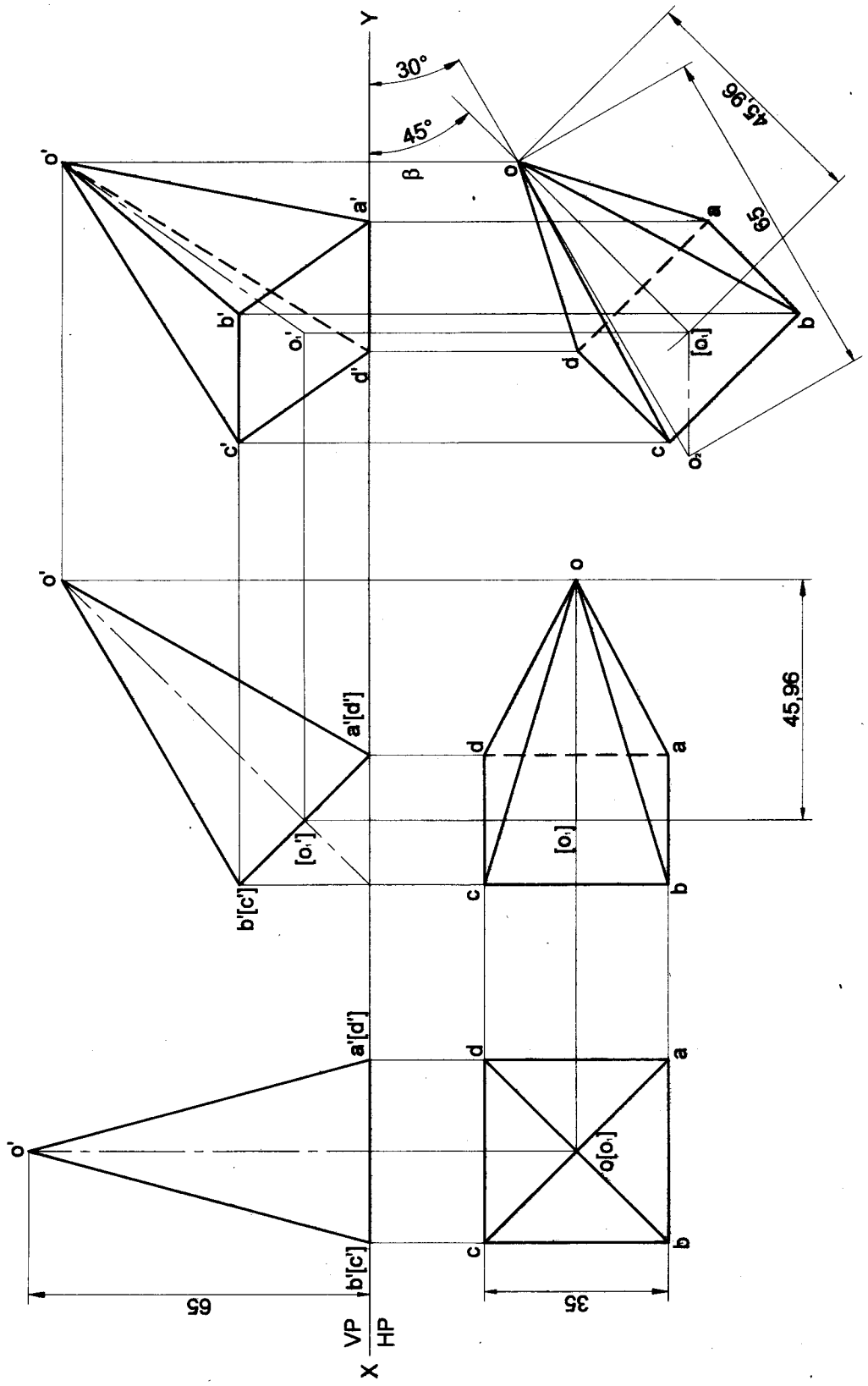
Problem 18 A square pyramid 35 mm sides of base and 60 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40º and to VP at 30º.

Solution



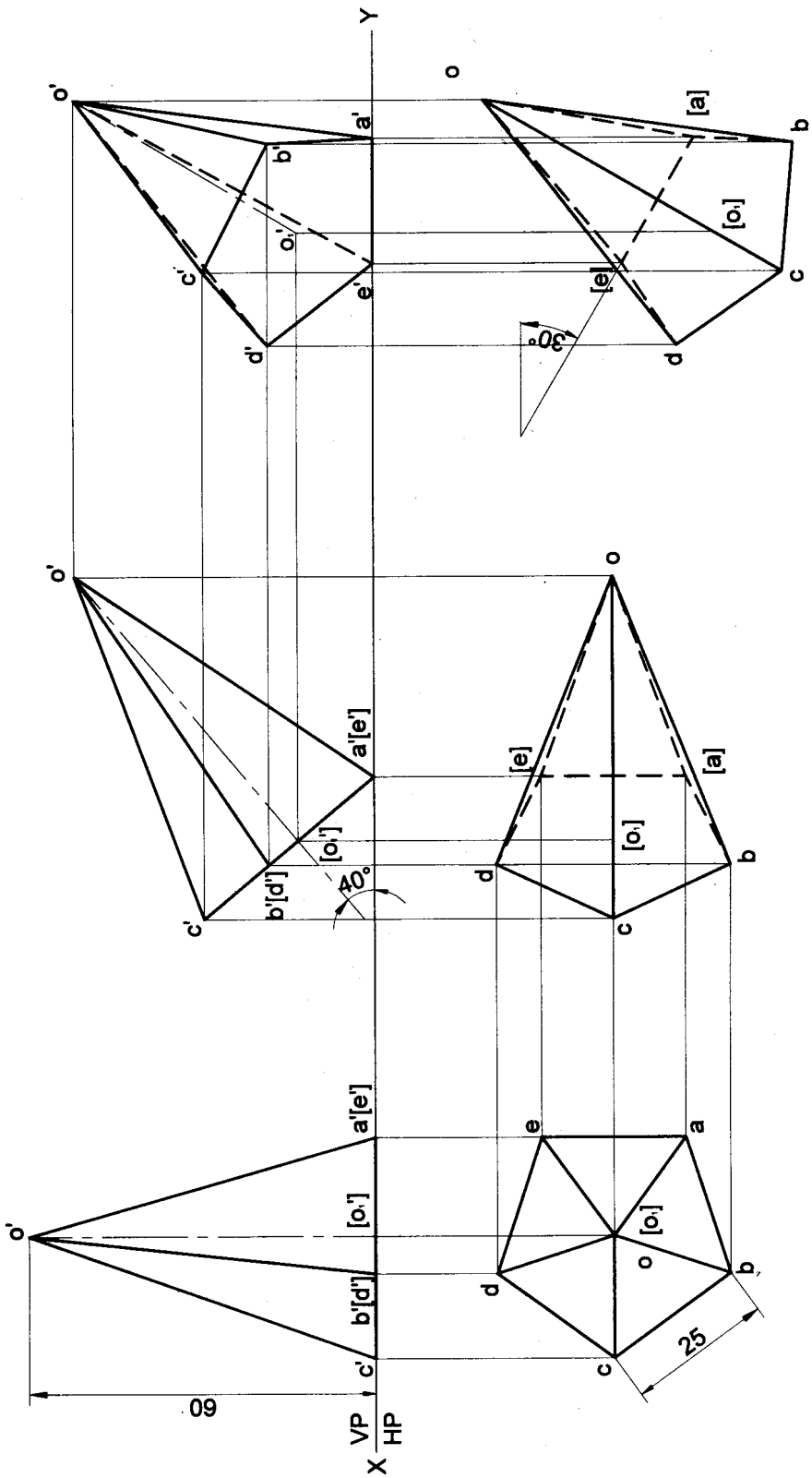
Problem 19 A square pyramid 35 mm sides of base and 60 mm axis length rests on HP on one of its edges of the base. Draw the projections of the pyramid when the axis is inclined to HP at 45º and VP at 30º.

Solution



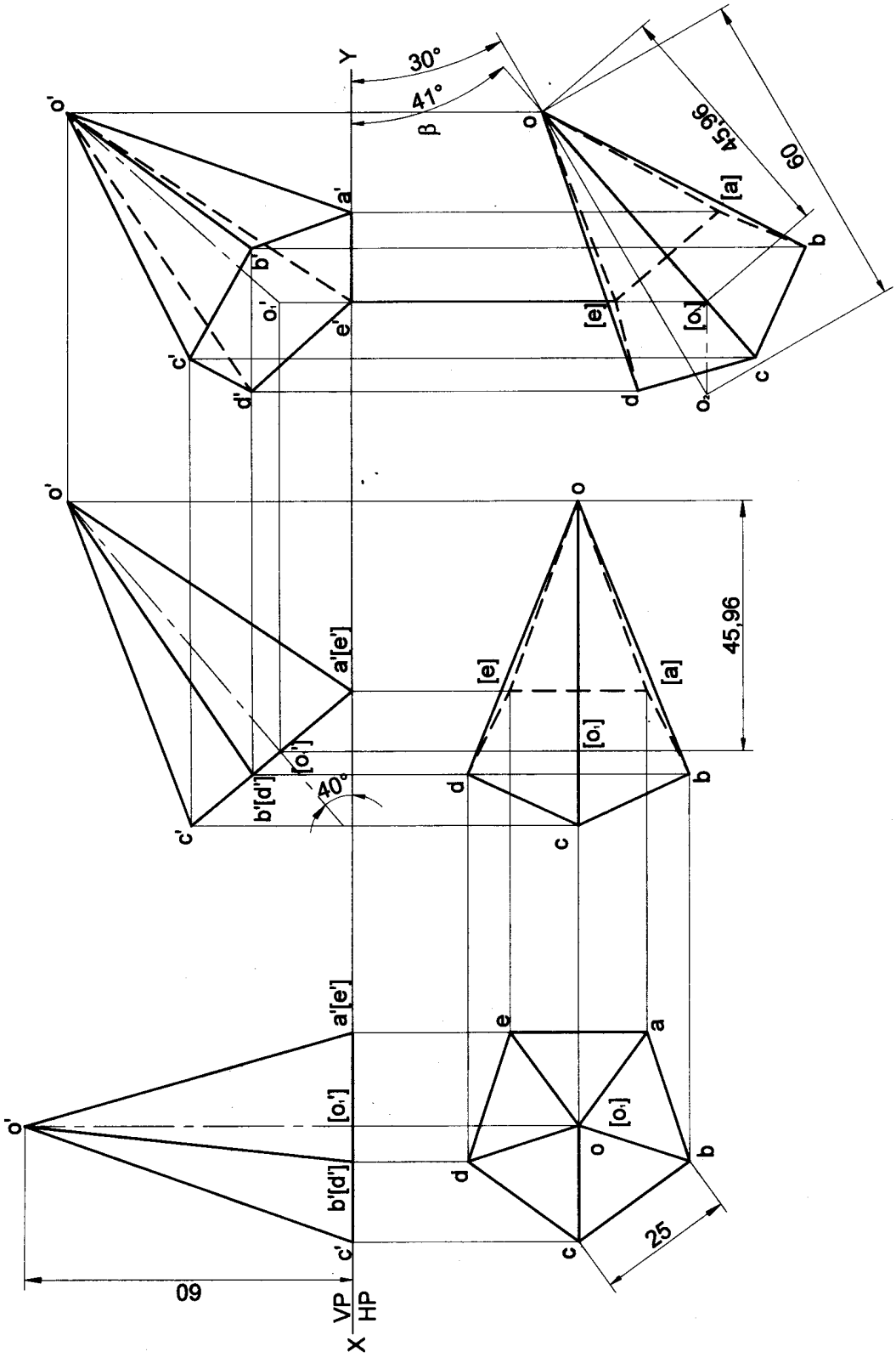
Problem 20 A pentagonal pyramid 25 mm sides of base and 60 mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30º. Draw the projections of the pyramid when the axis is inclined to HP at 40º.

Solution



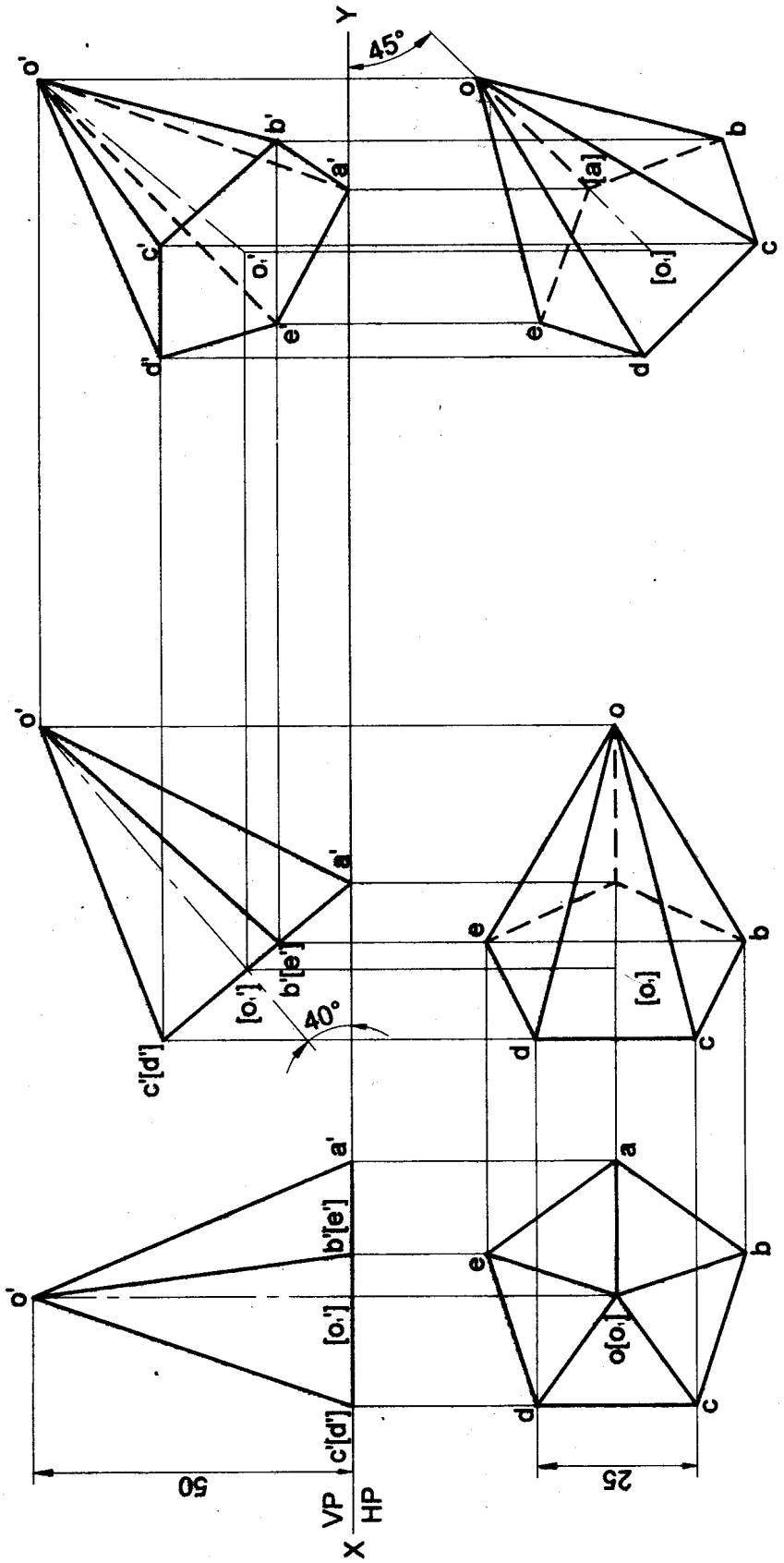
Problem 21 A pentagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its edges of the base. Draw the projections of the pyramid when the axis is inclined to HP at 45º and VP at 30º.

Solution



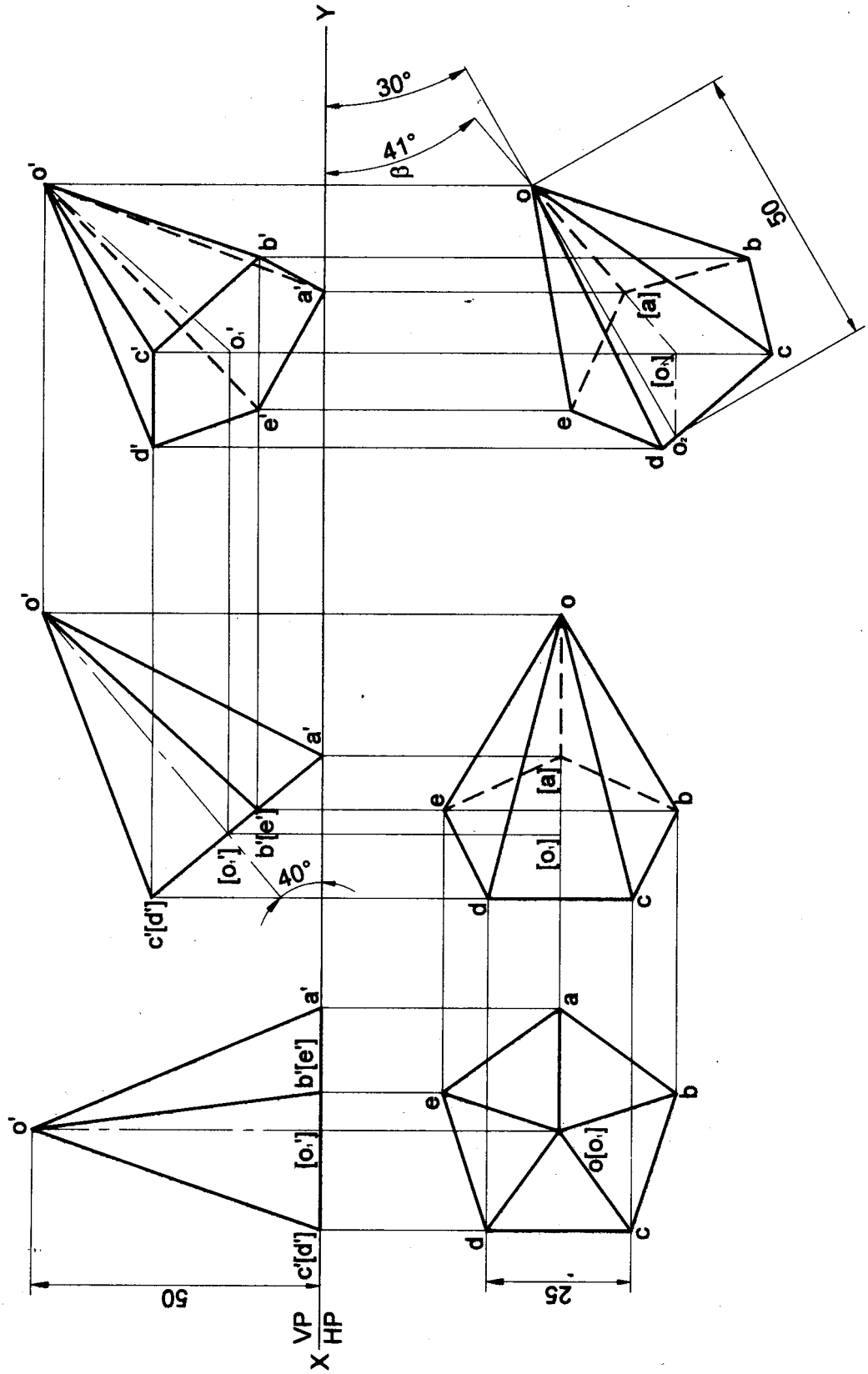
Problem 22 A pentagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40º and appears to be inclined to VP at 45º.

Solution



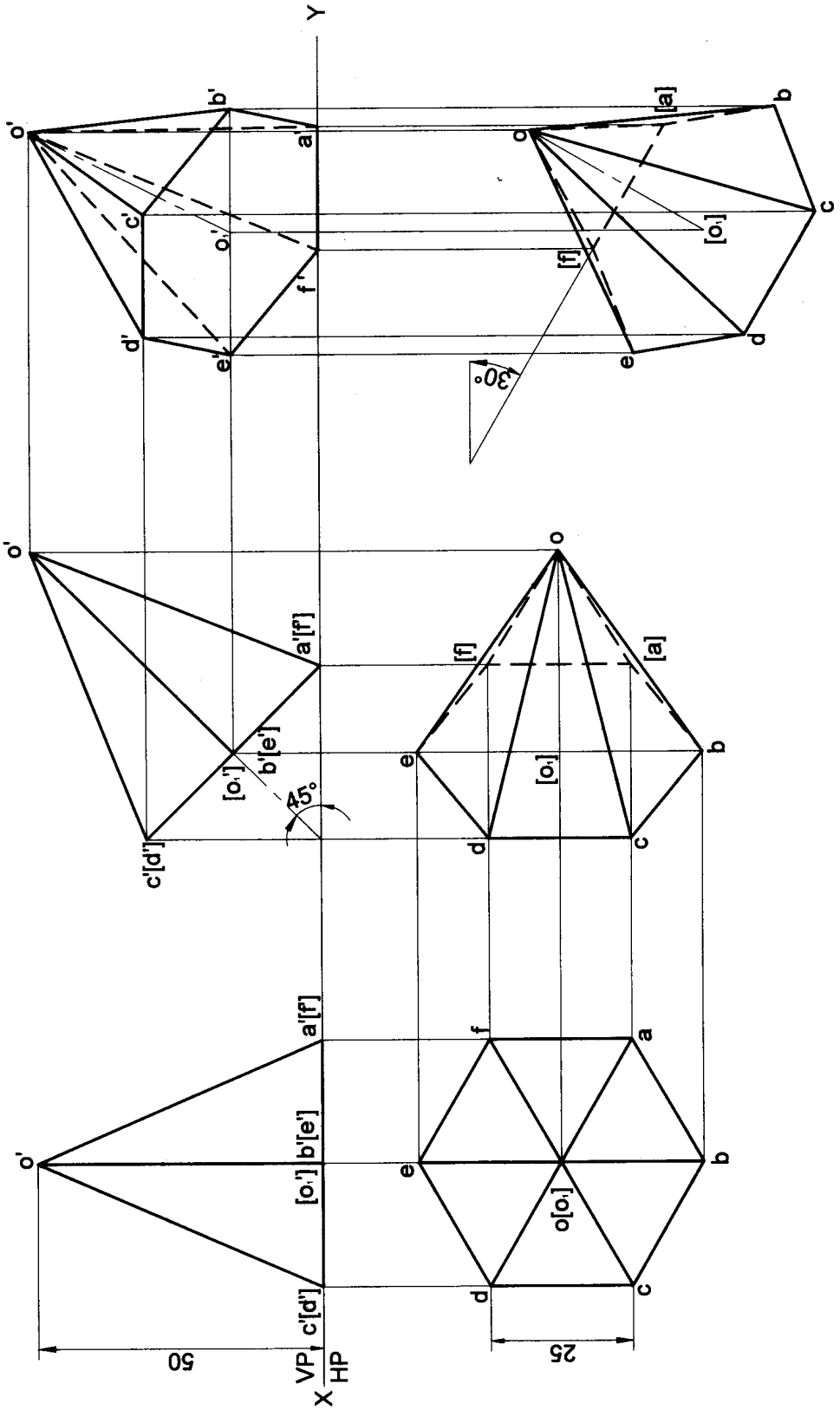
Problem 23 A pentagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40º and to VP at 30º.

Solution



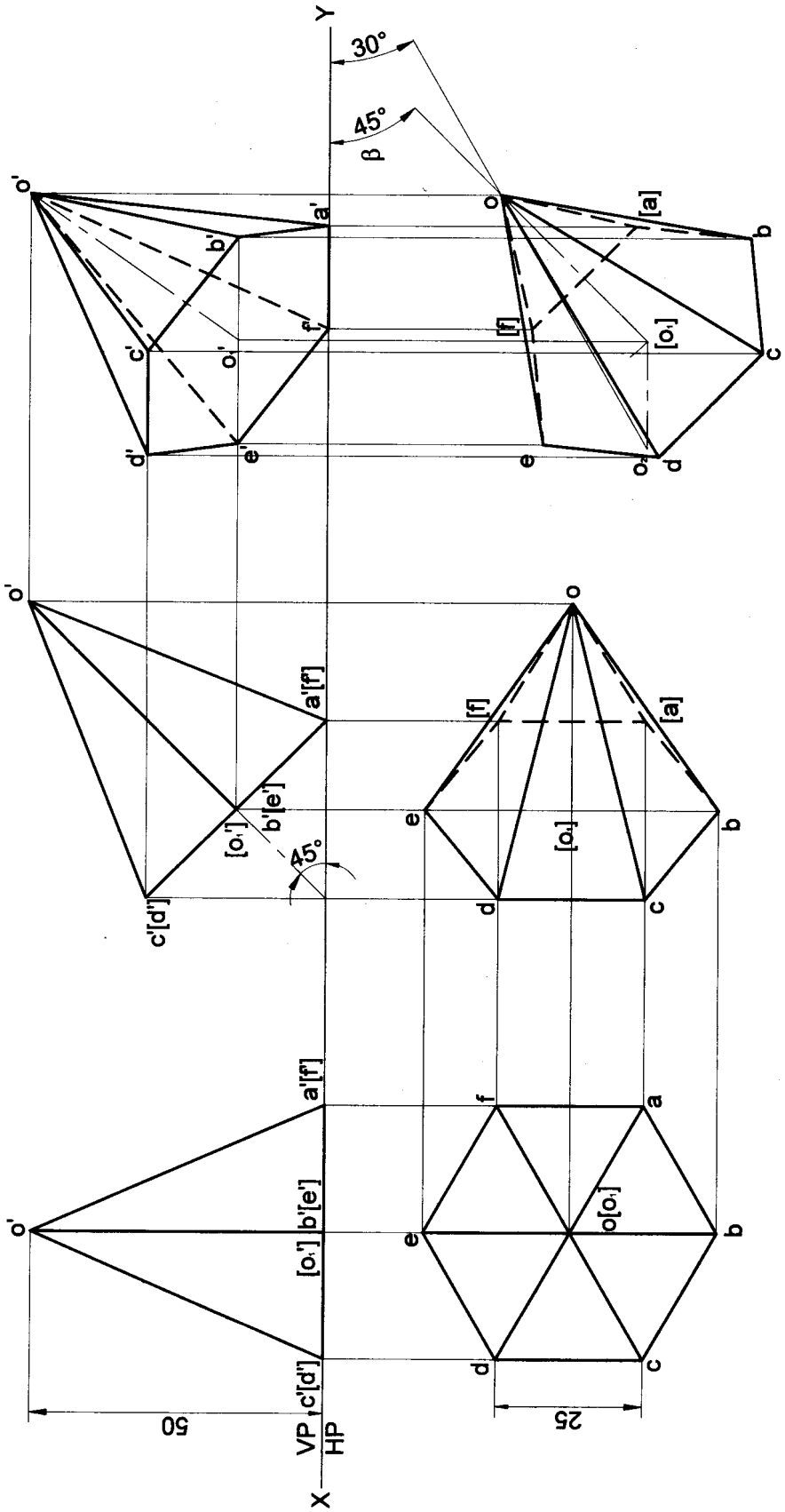
Problem 24 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30º. Draw the projections of the pyramid when the axis is inclined to HP at 45º.

Solution



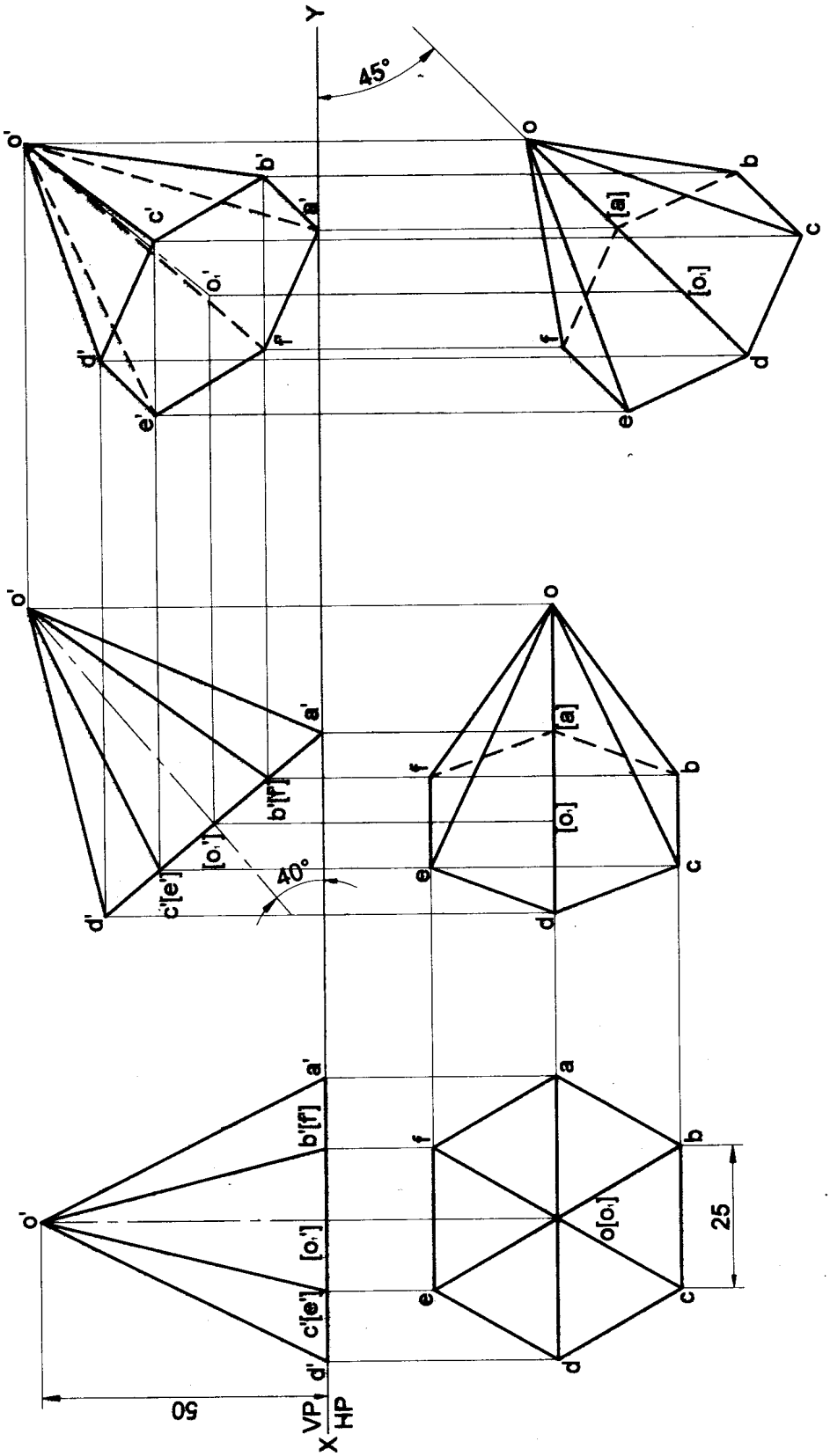
Problem 25 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its edges of the base. Draw the projections of the pyramid when the axis is inclined to HP at 45º and VP at 30º.

Solution



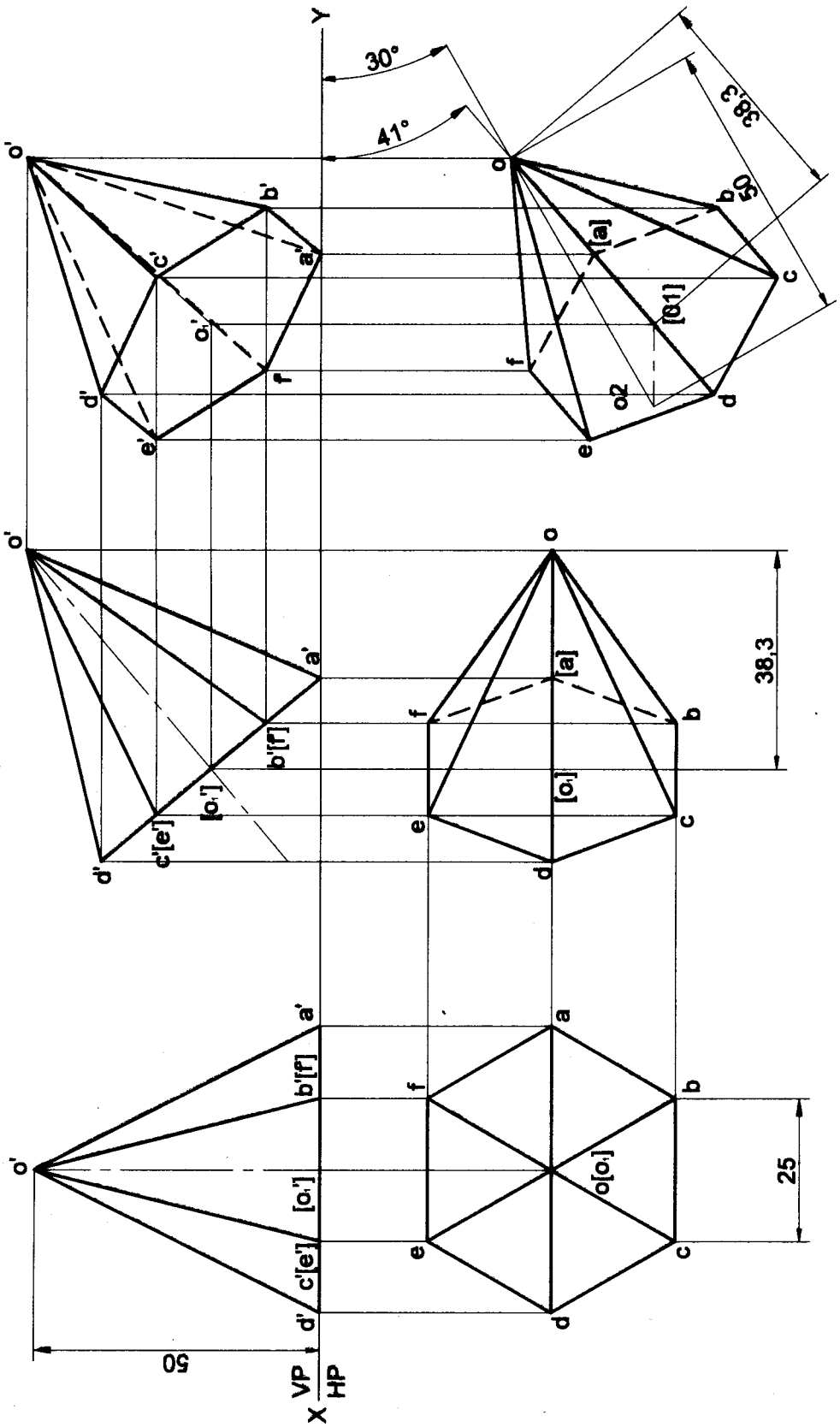
Problem 26 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40º and appears to be inclined to VP at 45º.

Solution



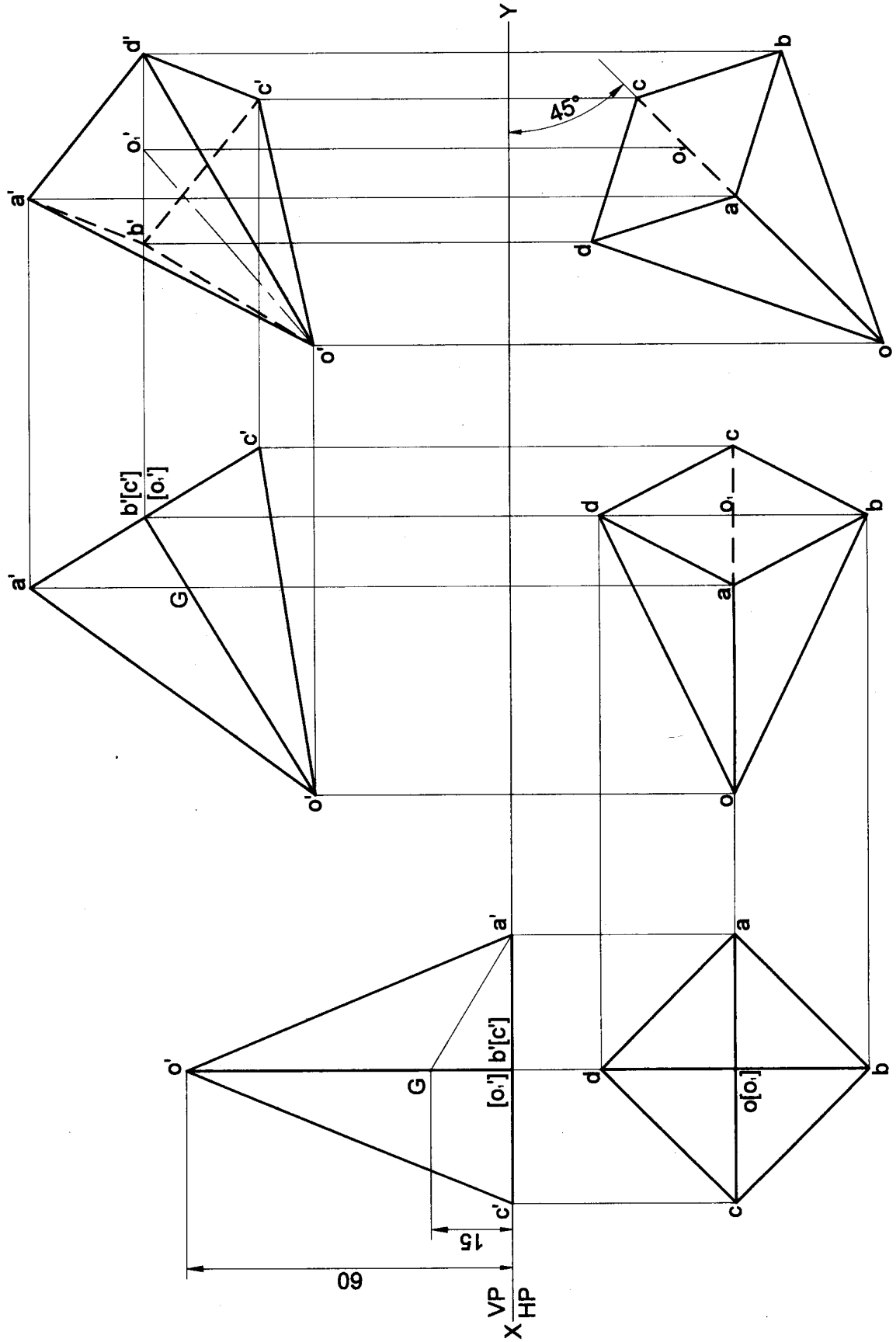
Problem 27 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40º and to VP at 30º.

Solution



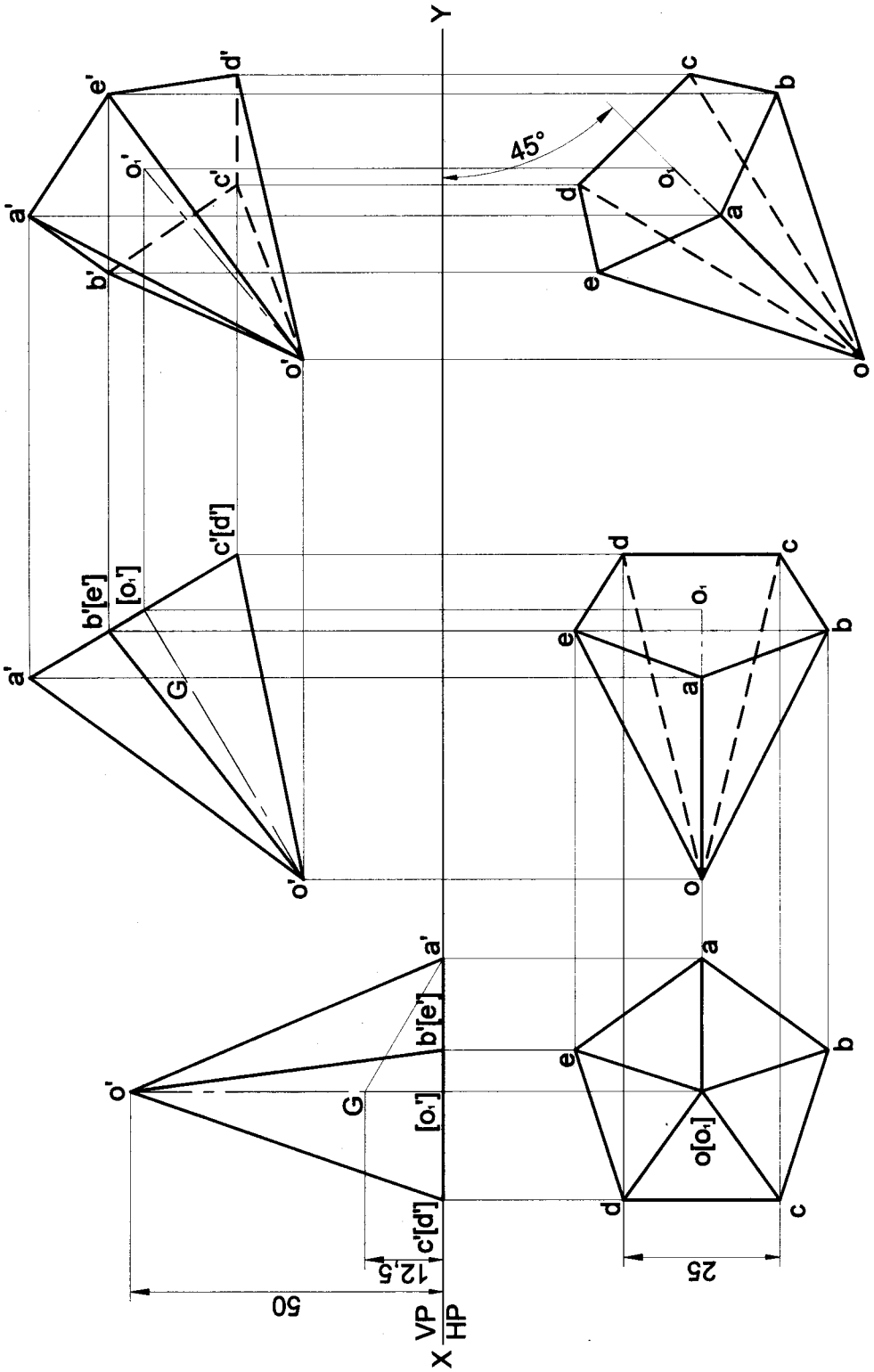
Problem 28 A square pyramid 35 mm sides of base and 60 mm axis length is suspended freely from a corner of its base. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



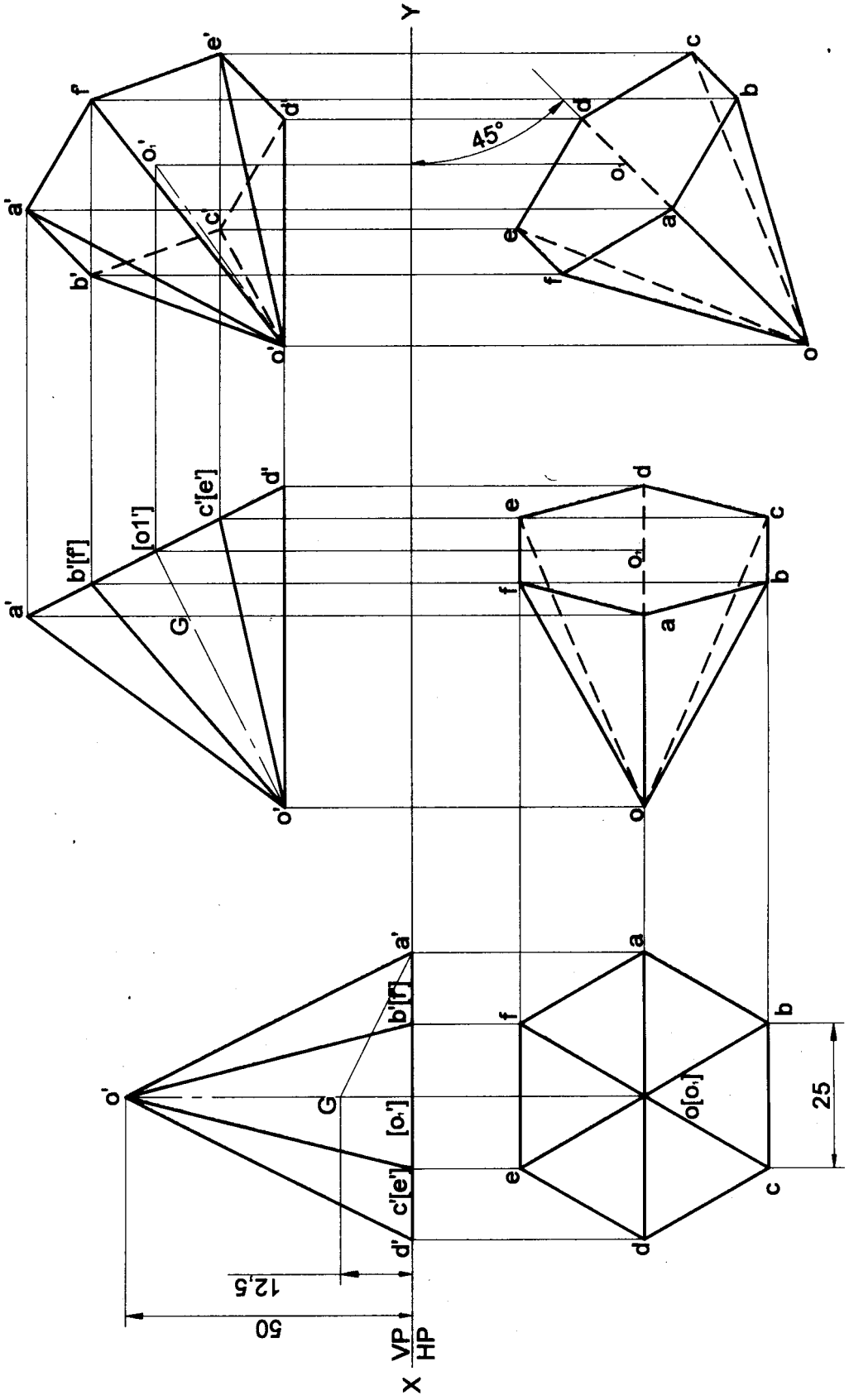
Problem 29 A pentagonal pyramid 25 mm sides of base and 50 mm axis length is suspended freely from a corner o its base. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



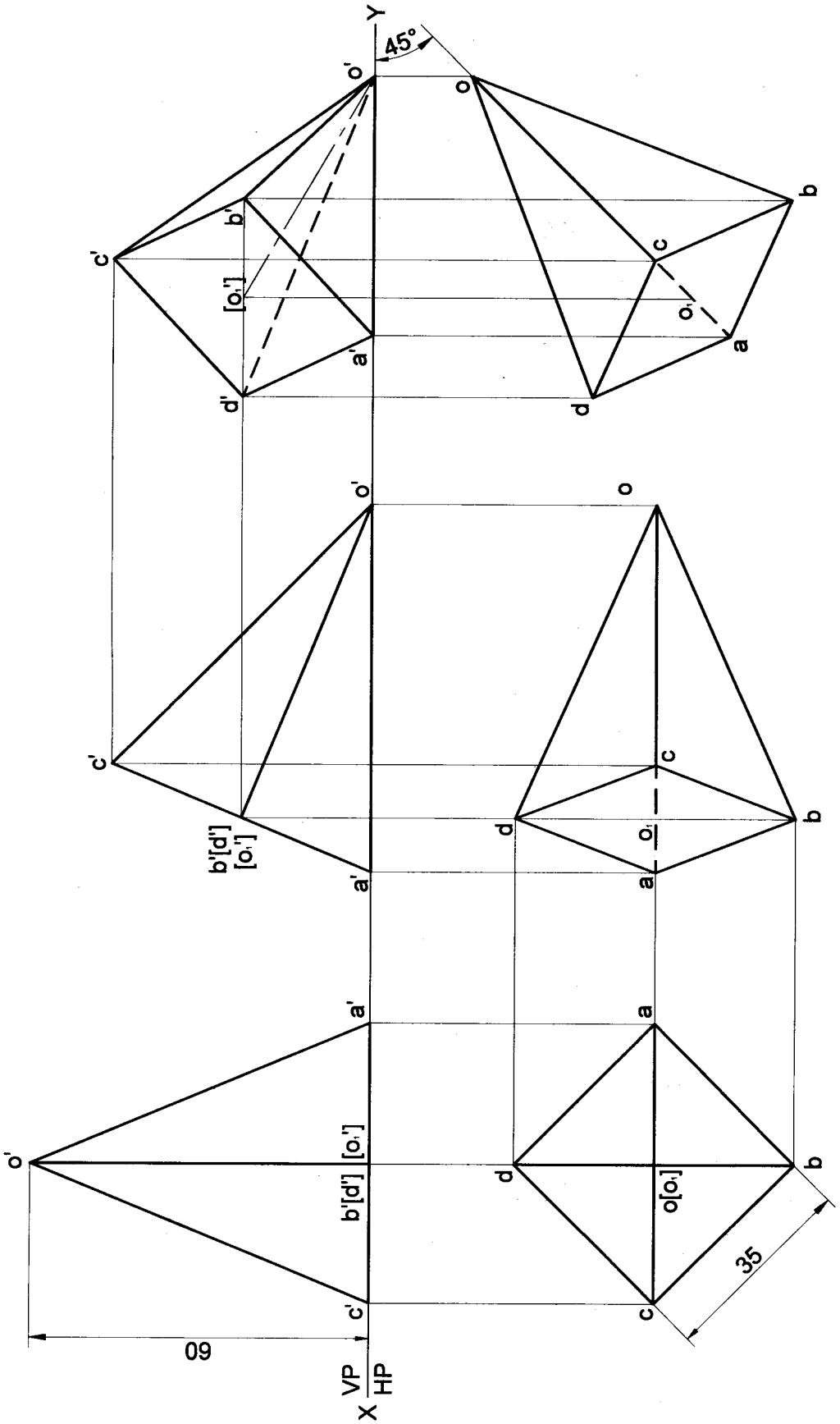
Problem 30 A hexagonal pyramid 25 mm sides of base and 50 mm axis length is suspended freely from a corner of its base. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



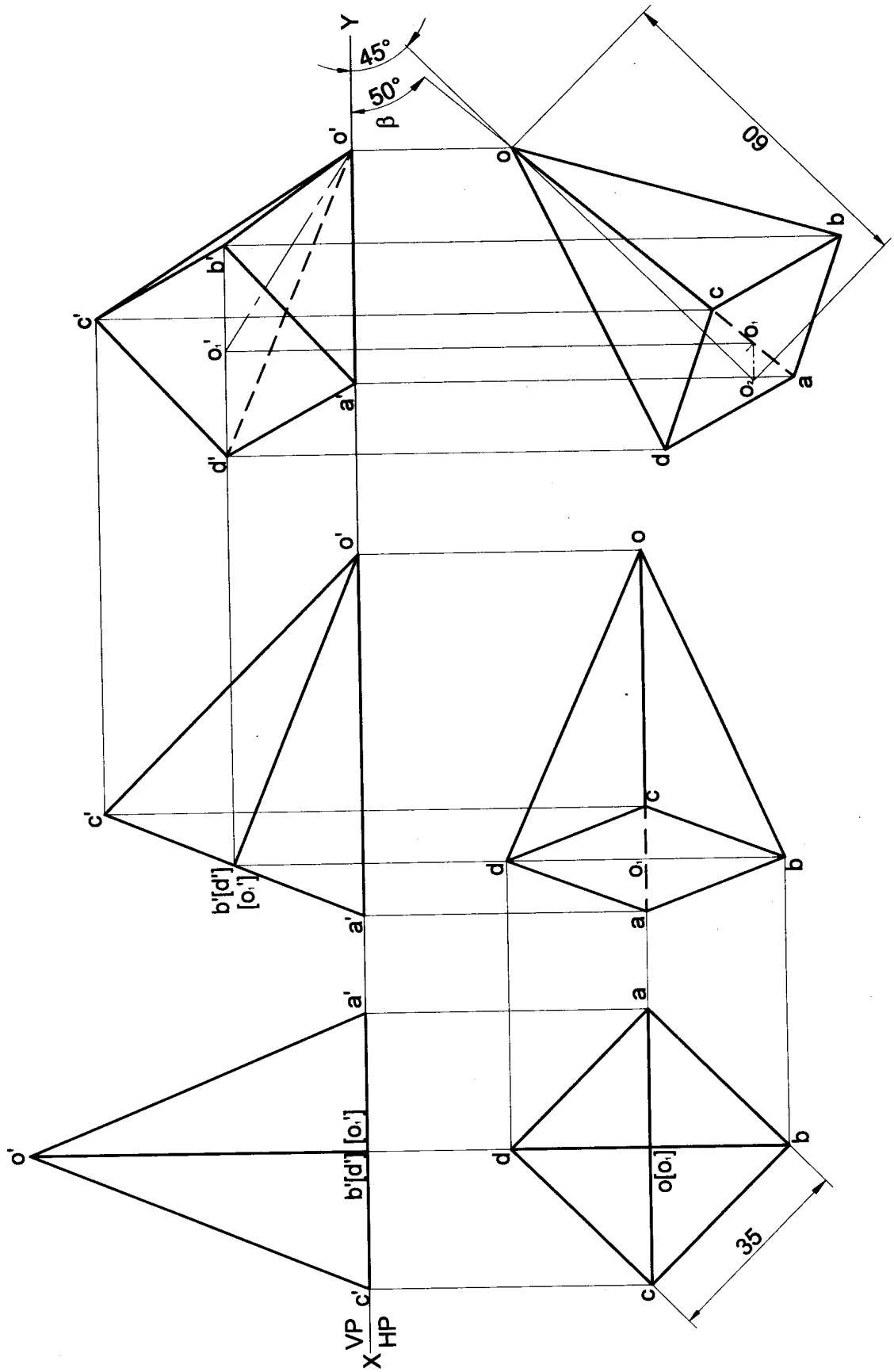
Problem 31 A square pyramid 35 mm sides of base and 60 mm axis length rests on HP on one of its slant edges. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



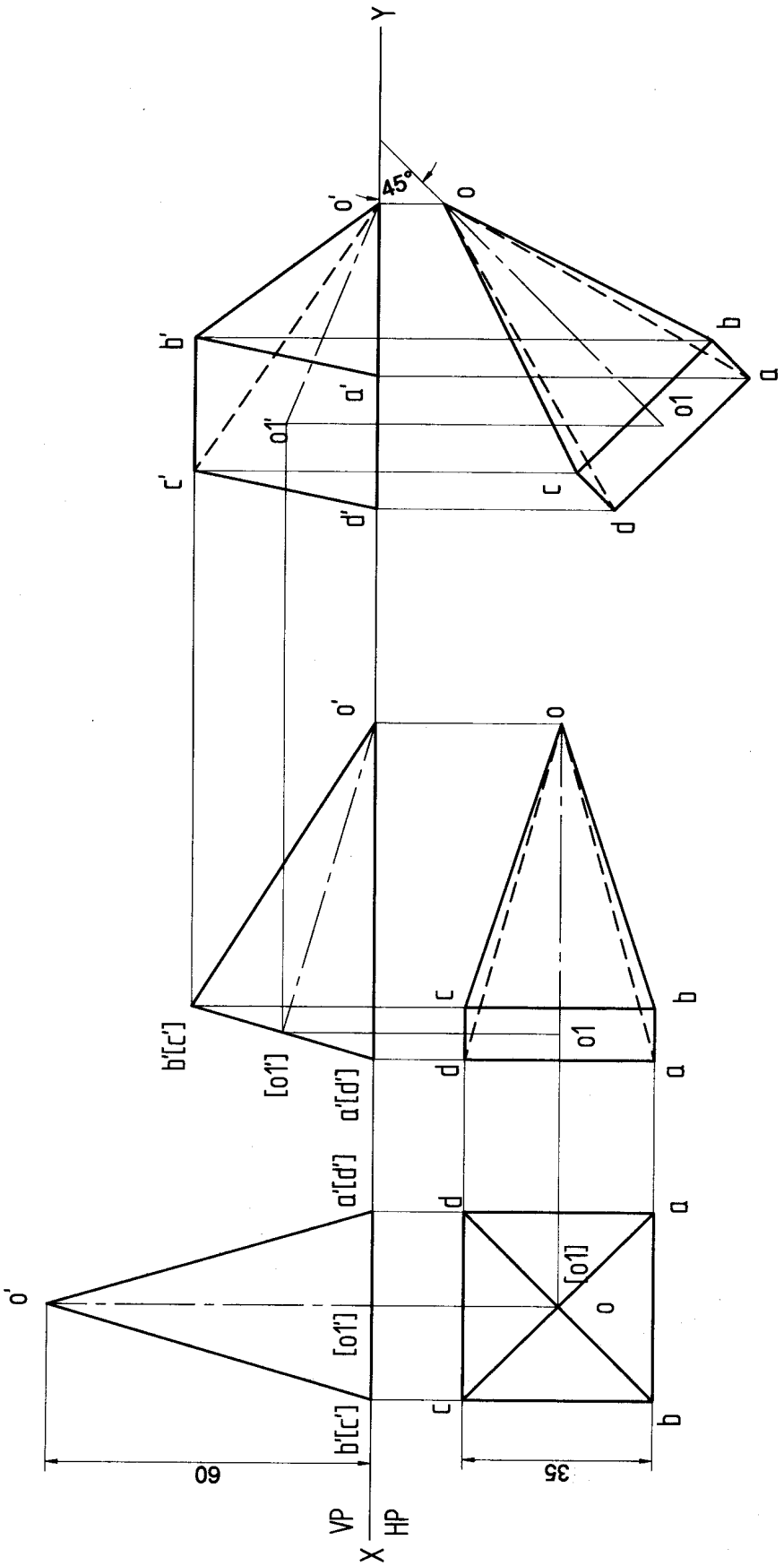
Problem 32 A square pyramid 35 mm sides of base and 60 mm axis length rests on HP on one of its slant edges. Draw the projections of the pyramid when the axis is inclined to VP at 45º.

Solution



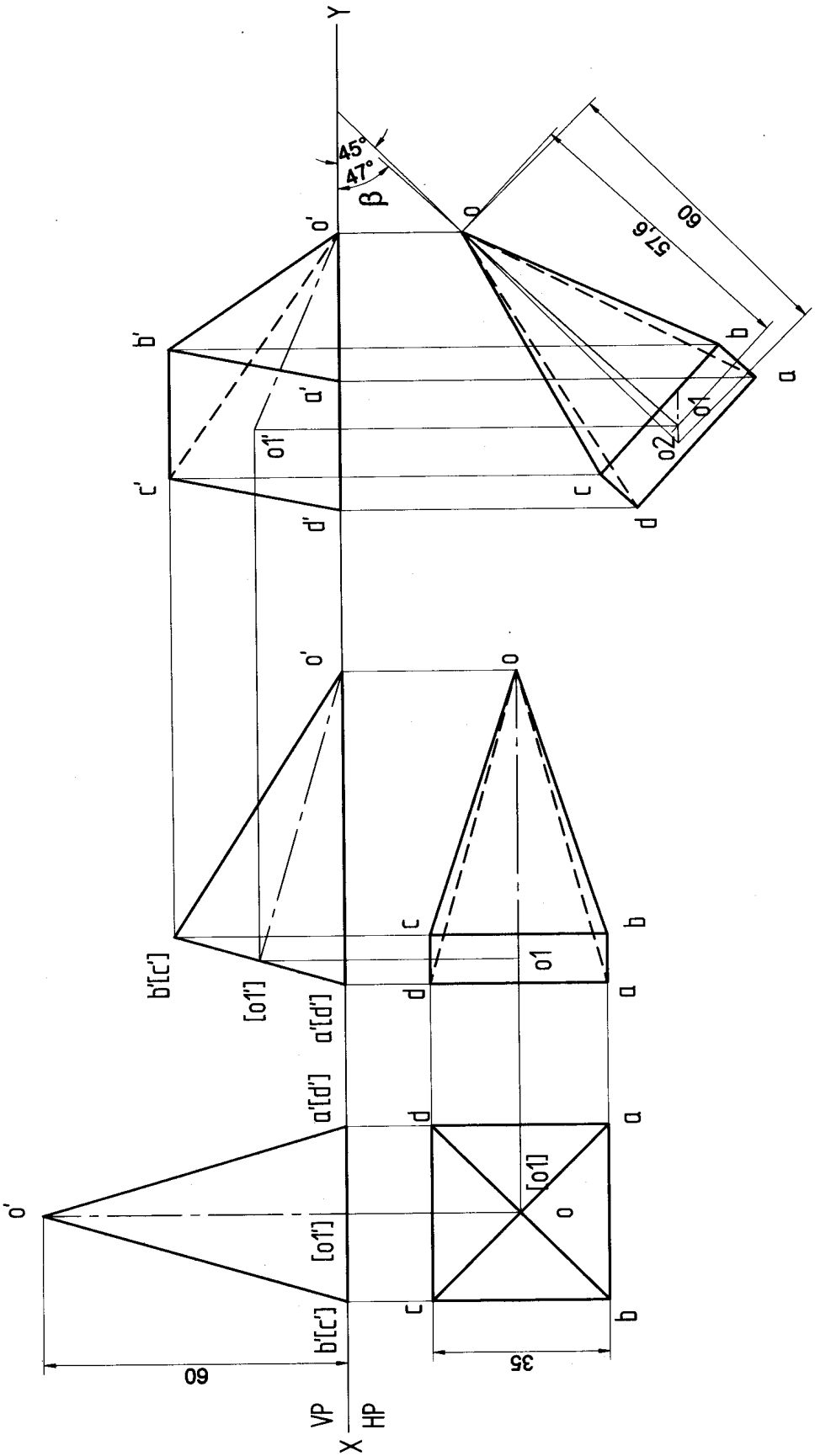
Problem 33 A square pyramid 35 mm sides of base and 60 mm axis length rests on HP on one of its slant triangular faces. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



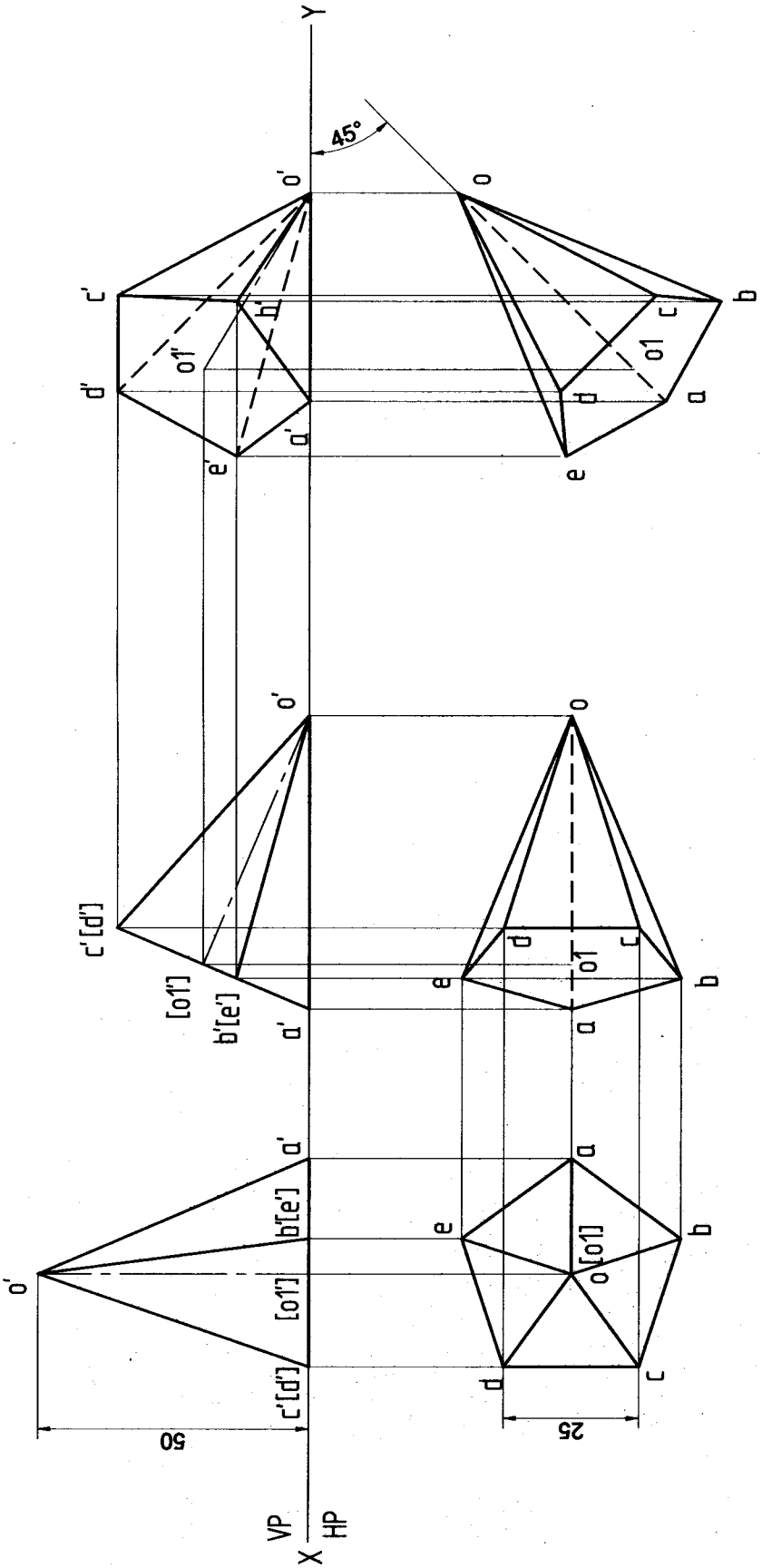
Problem 34 A square pyramid 35 mm sides of base and 60 mm axis length rests on HP on one of its slant triangular faces. Draw the projections of the pyramid when the axis is inclined to VP at 45º.

Solution



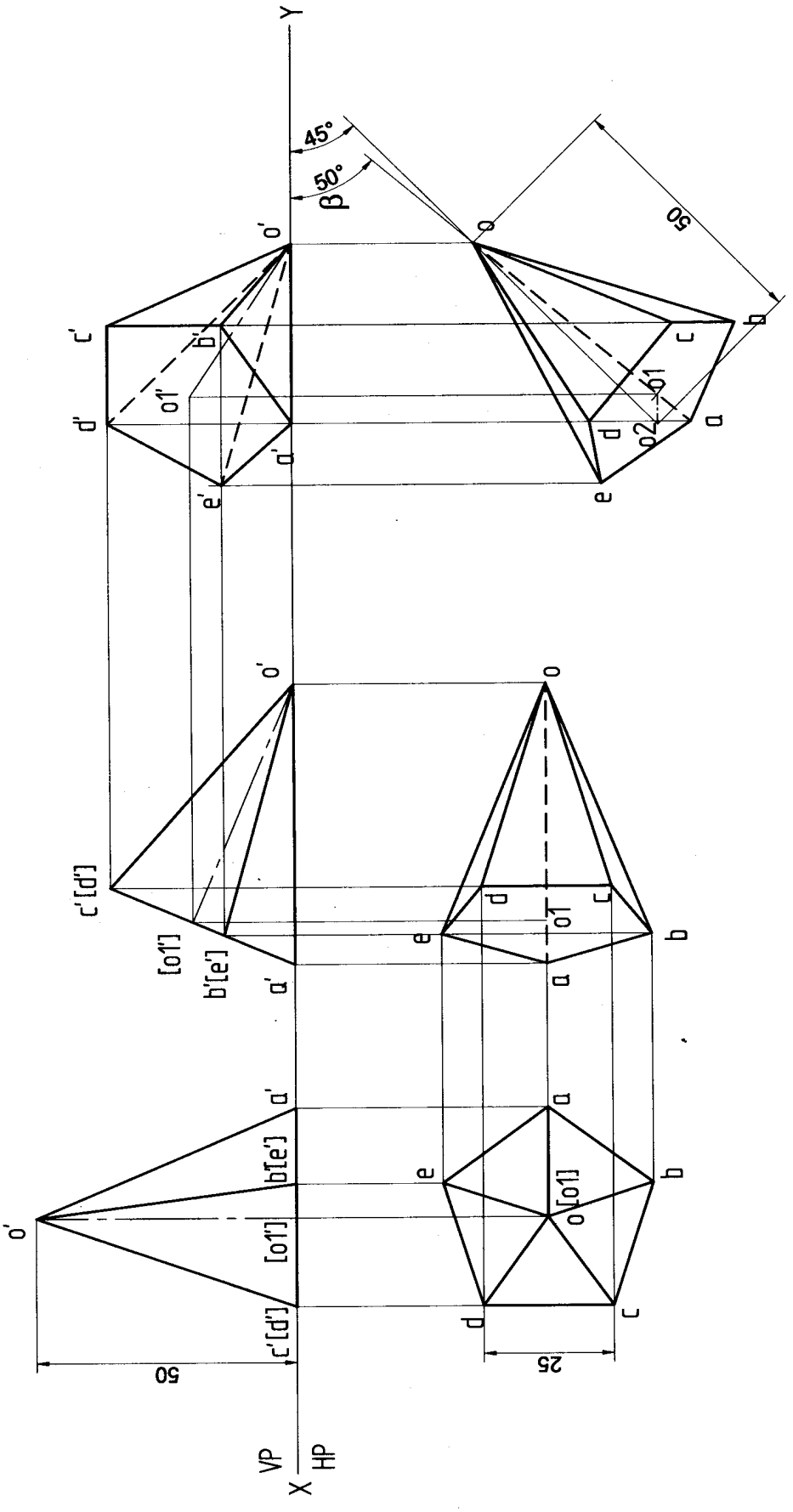
Problem 35 A pentagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant edges. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



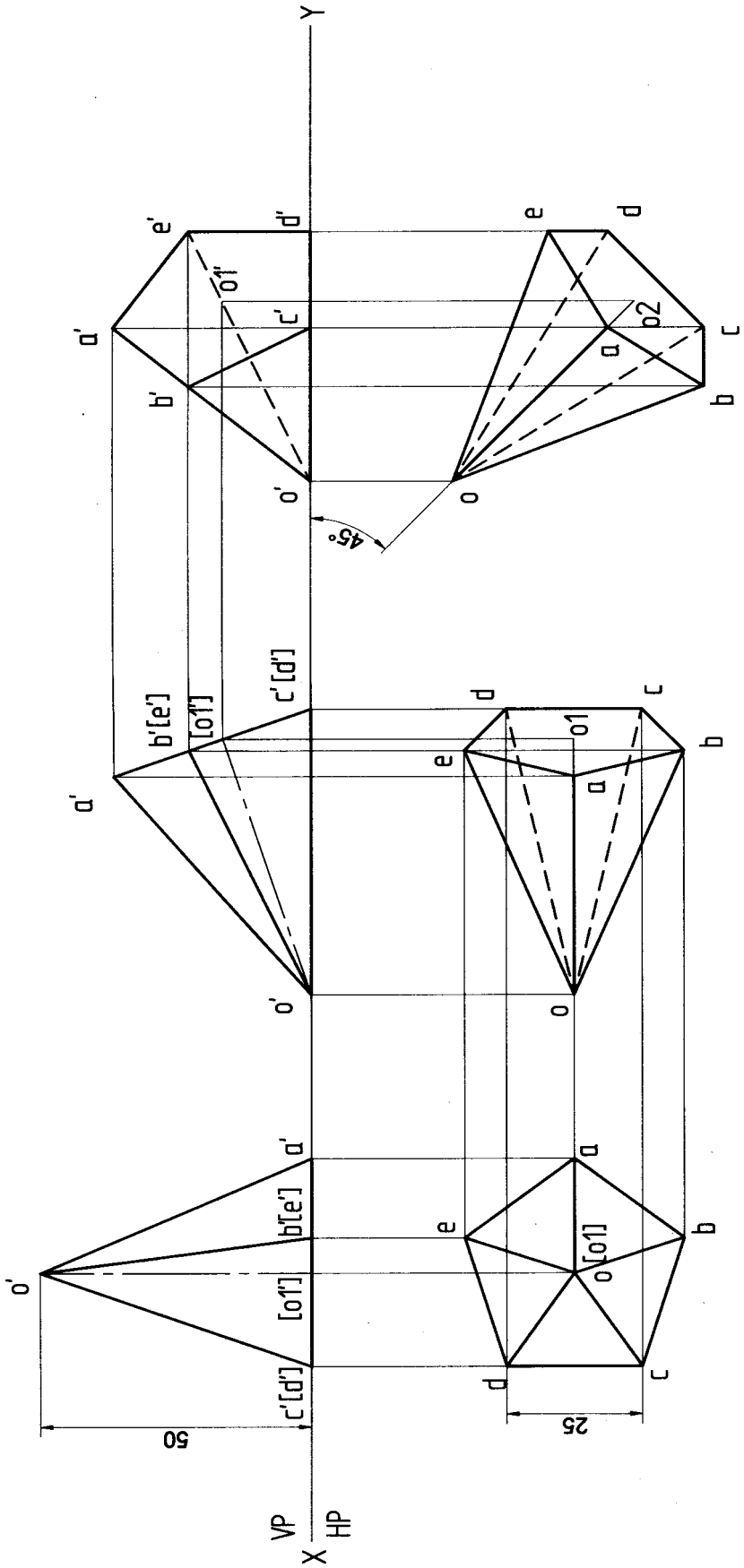
Problem 36 A pentagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant edges. Draw the projections of the pyramid when the axis is inclined to VP at 45º.

Solution



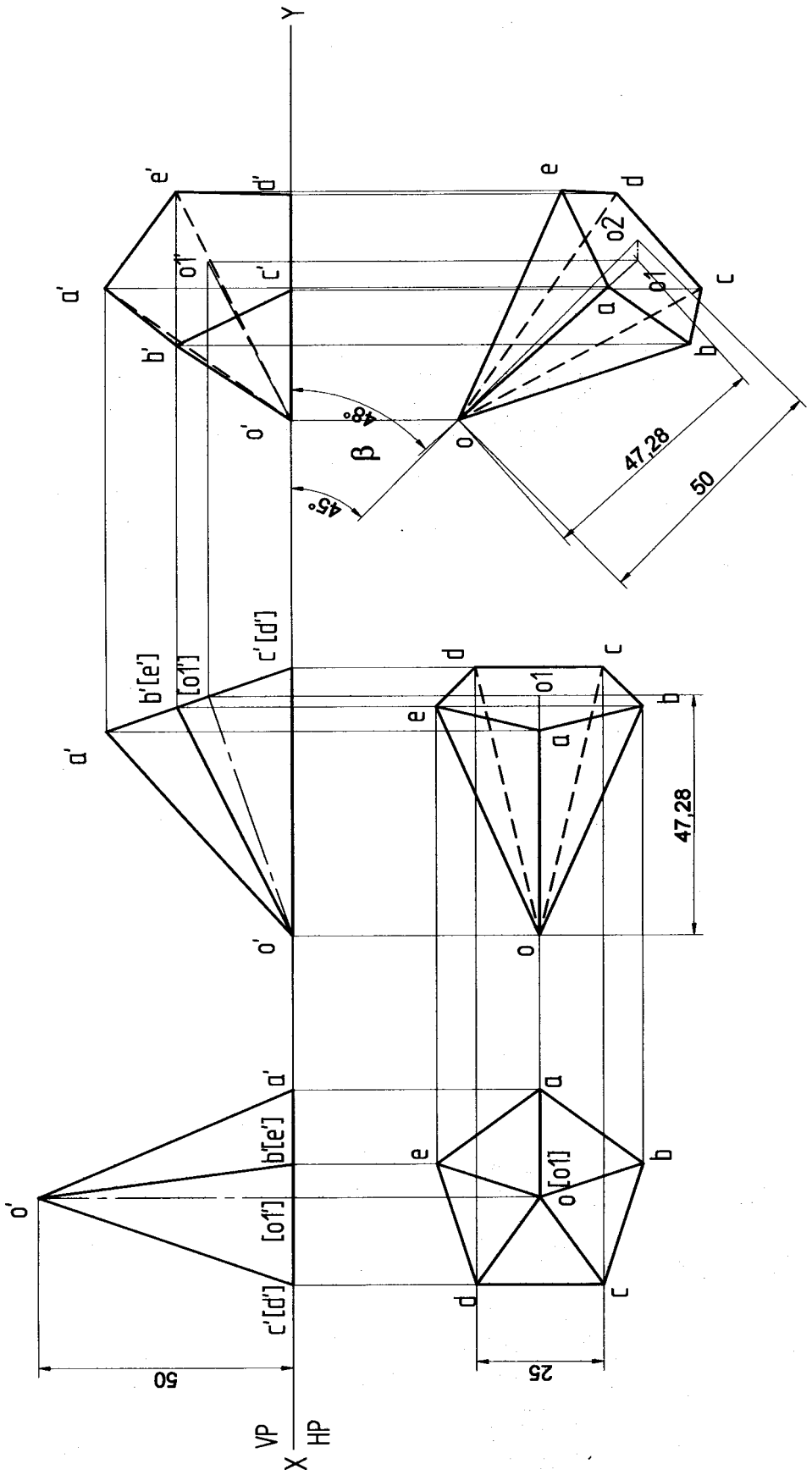
Problem 37 A pentagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant triangular faces. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



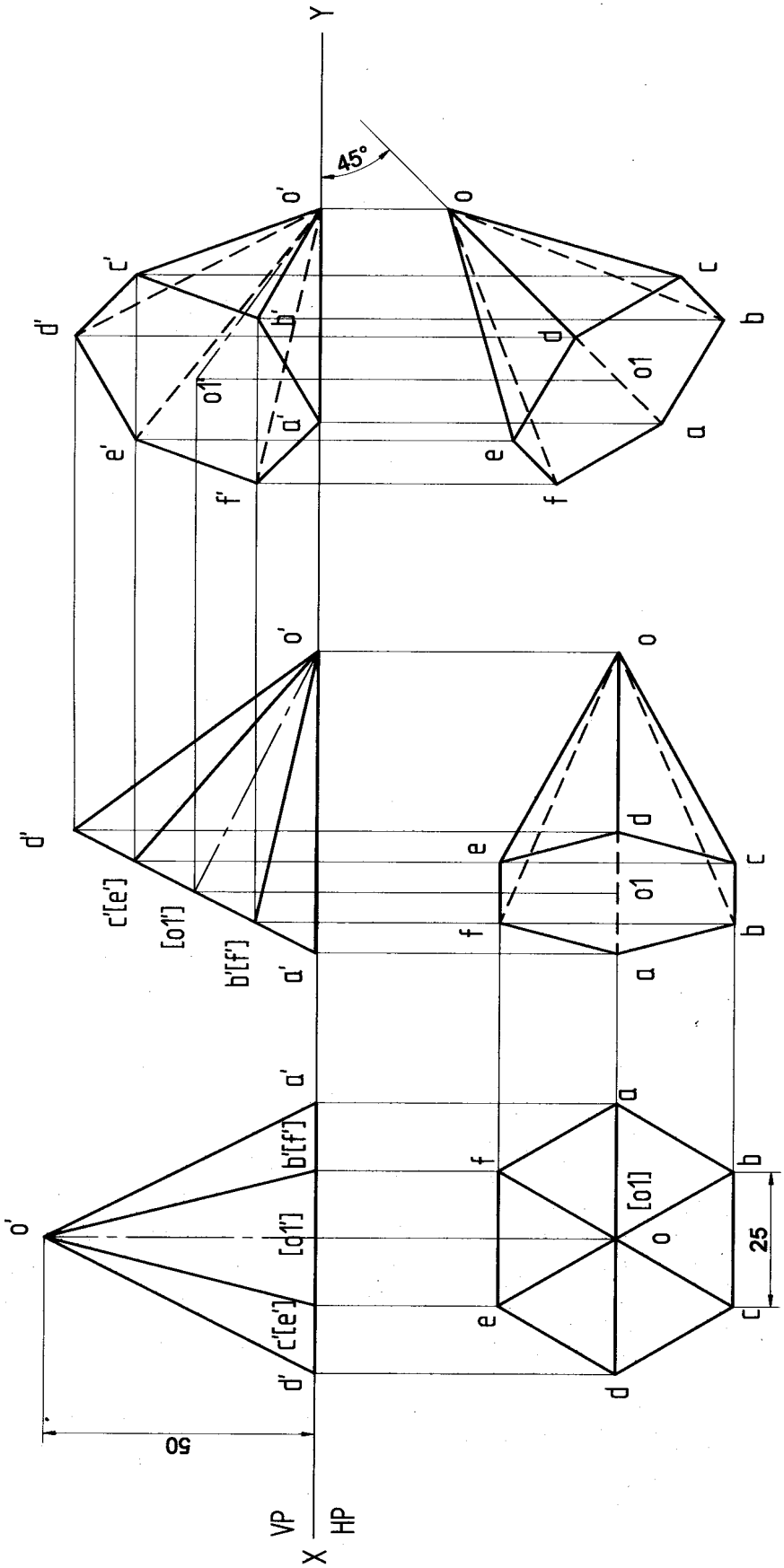
Problem 38 A pentagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant triangular faces. Draw the projections of the pyramid when the axis is inclined to VP at 45º.

Solution



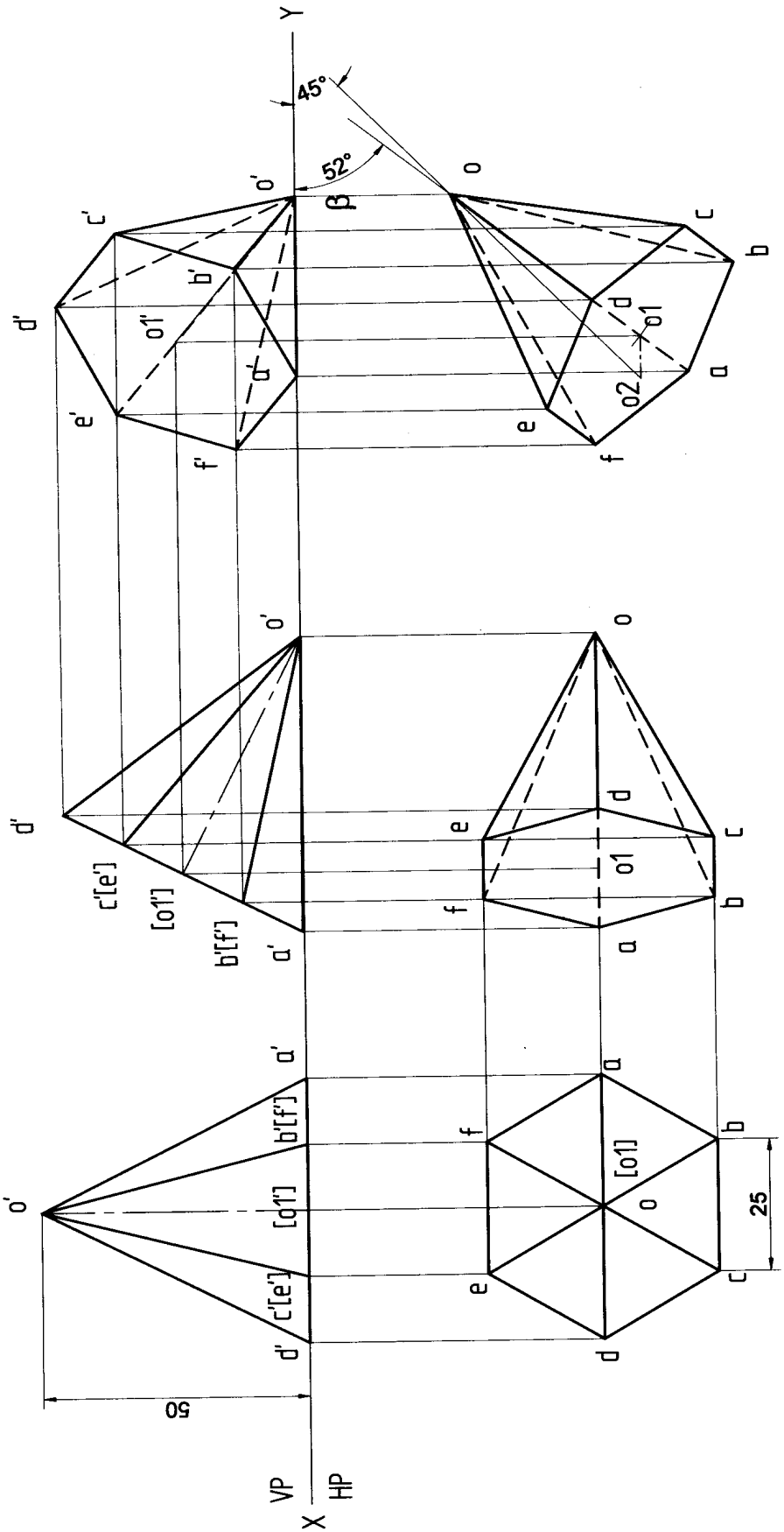
Problem 39 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant edges. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



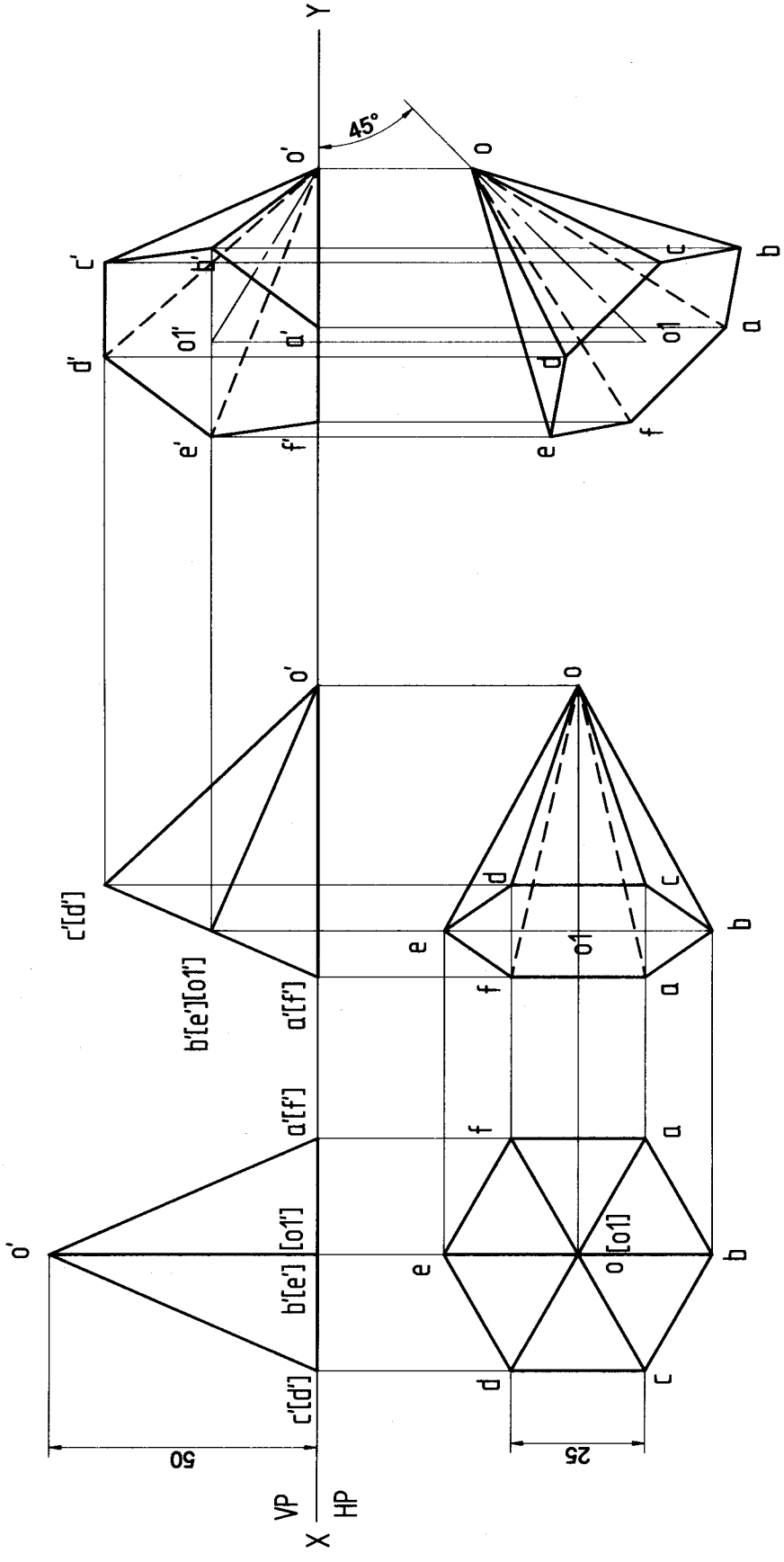
Problem 40 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant edges. Draw the projections of the pyramid when the axis is inclined to VP at 45º.

Solution



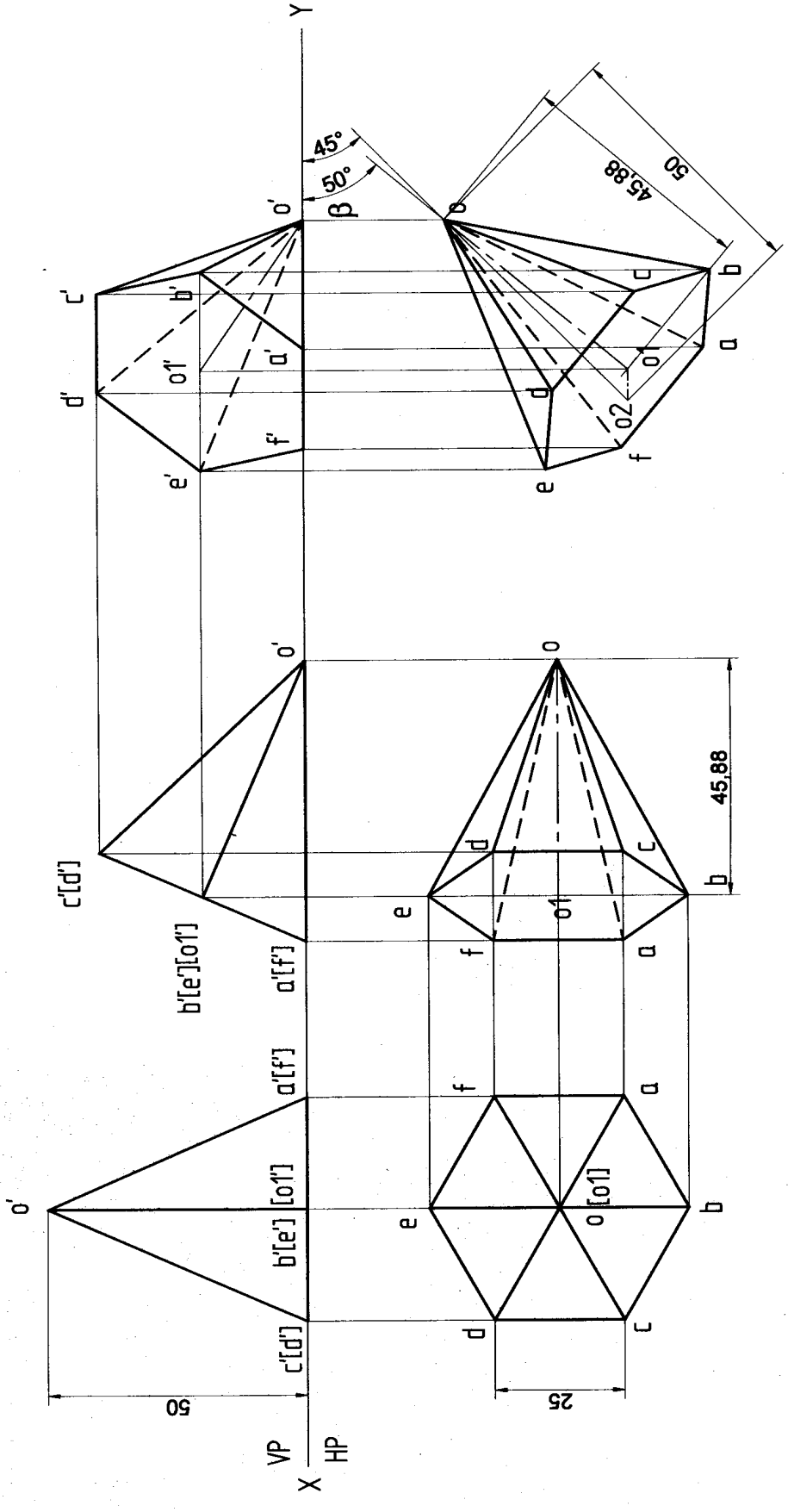
Problem 41 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant triangular faces. Draw the projections of the pyramid when the axis appears to be inclined to VP at 45º.

Solution



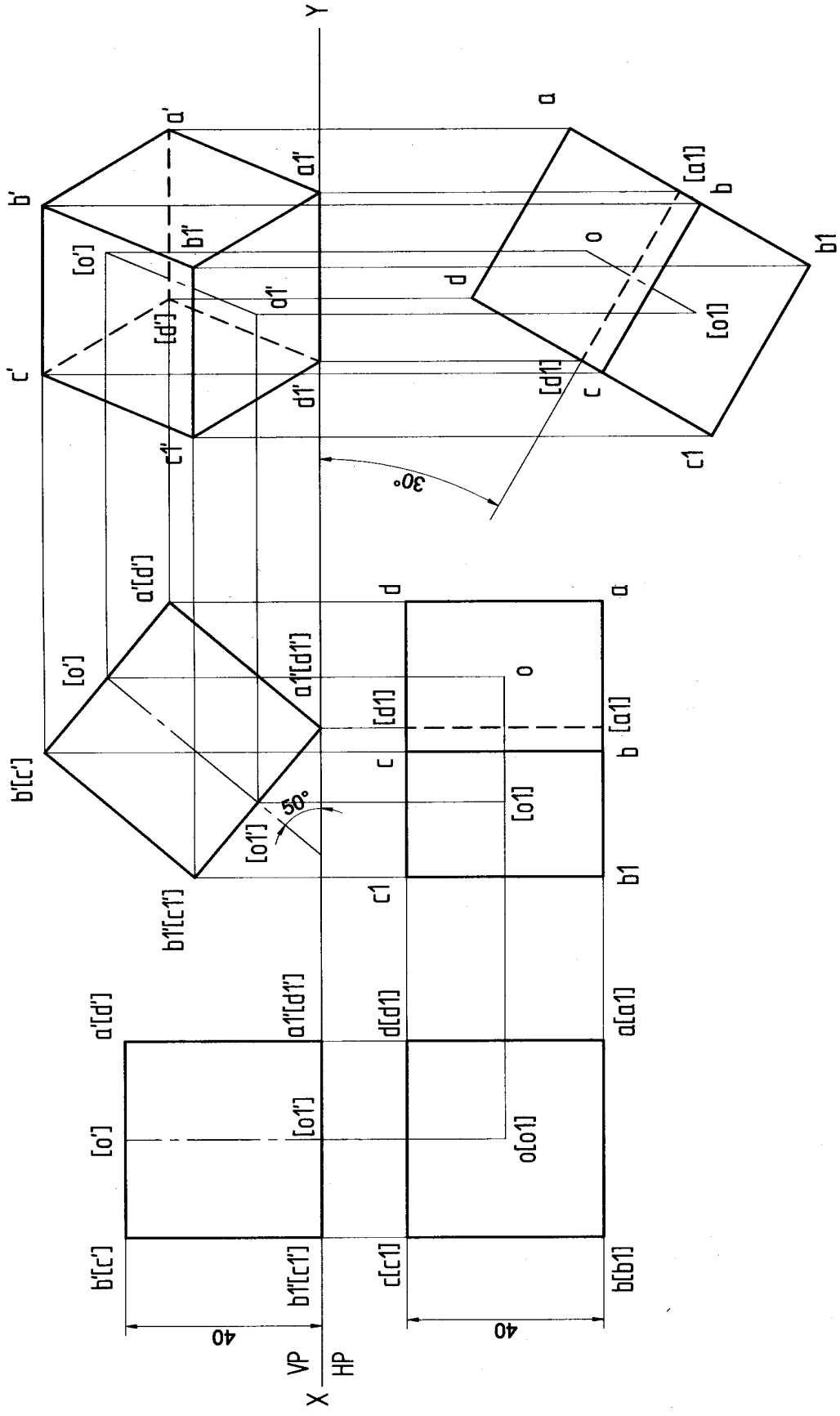
Problem 42 A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its slant triangular faces. Draw the projections of the pyramid when the axis is inclined to VP at 45º.

Solution



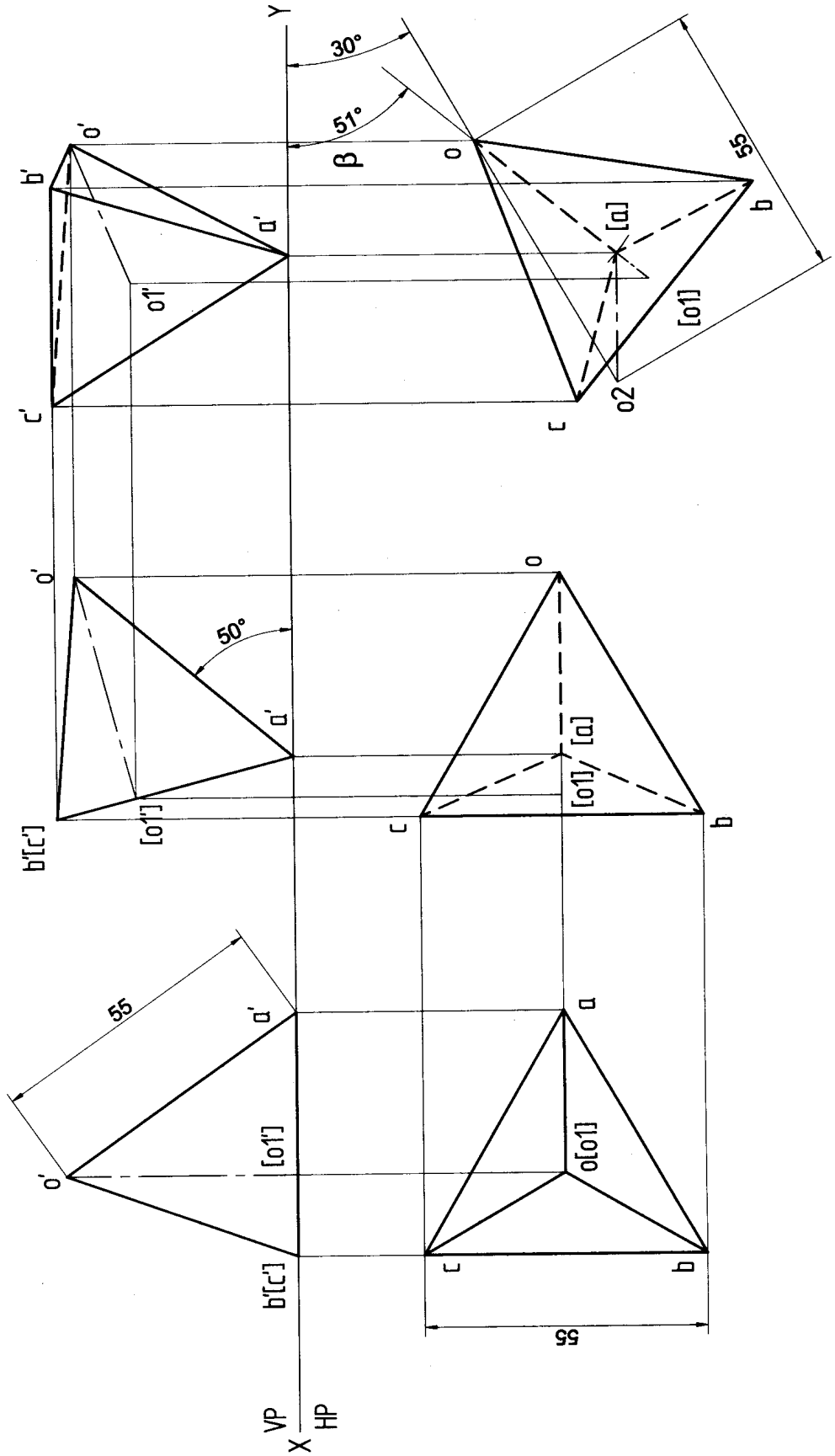
Problem 43 A cube of 40 mm sides rests on HP on an edge which is inclined to VP at 30º. Draw the projections when the lateral square face containing the edge on which it rests makes an angle of 50º to HP.

Solution



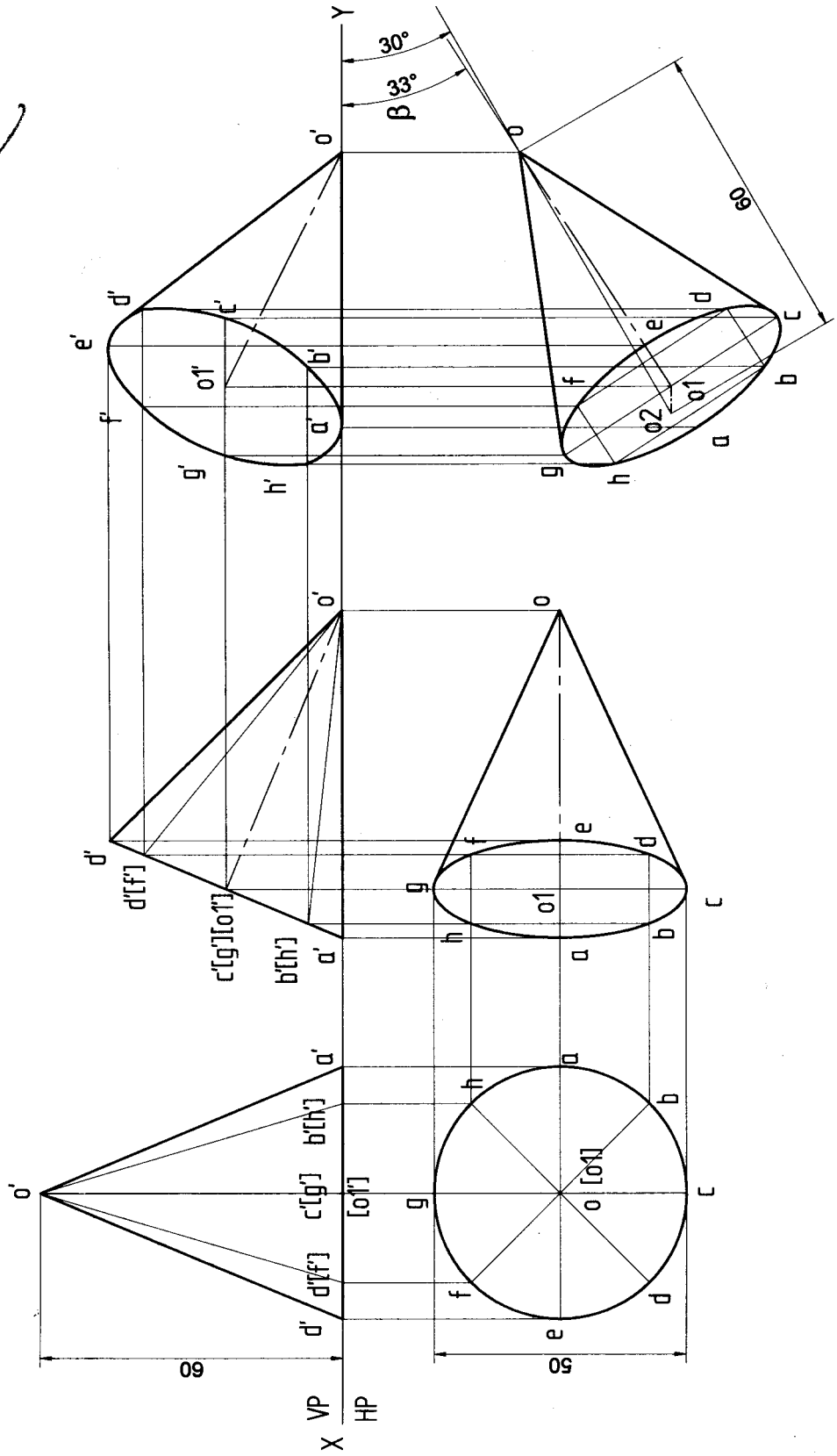
Problem 44 A tetrahedron of 55 mm sides rests on one of its corners such that an edge containing that corner is inclined to HP at 50º and VP at 30º. Draw its projections.

Solution



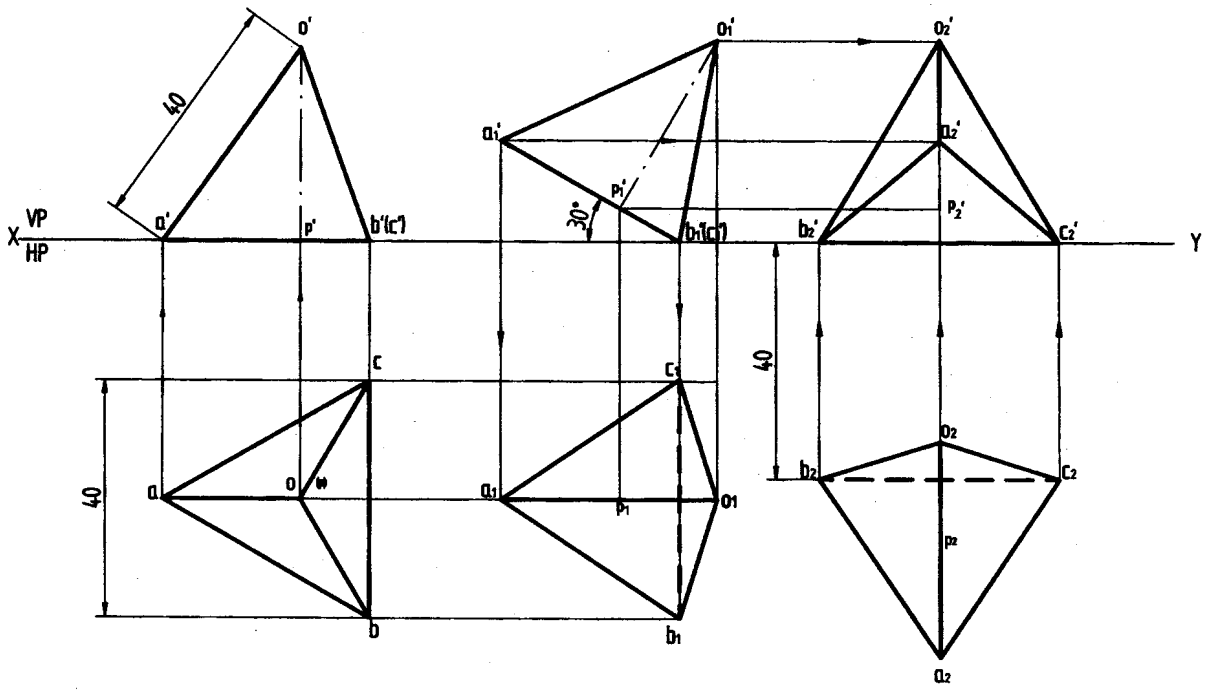
Problem 45 A cone of 50 mm base diameter and 60 mm axis length rests on HP on one of its generators. Draw its projections when the axis is inclined to VP at 30º.

Solution



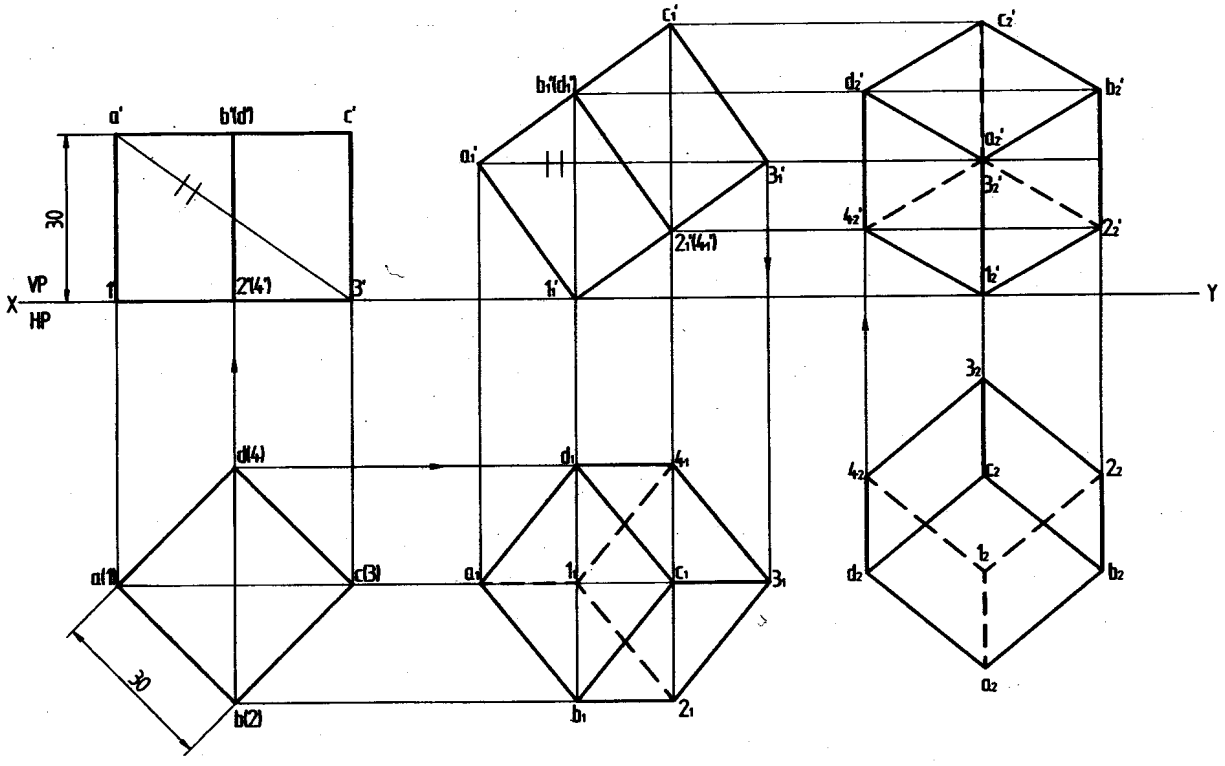
Problem 46 A tetrahedron of sides 40 mm is resting on one of its sides on HP. This side is parallel to VP and 40 mm away from it. It is tilted about resting side such that the base containing this edge is inclined at 30° to HP. Draw the projections of the solid.

Solution



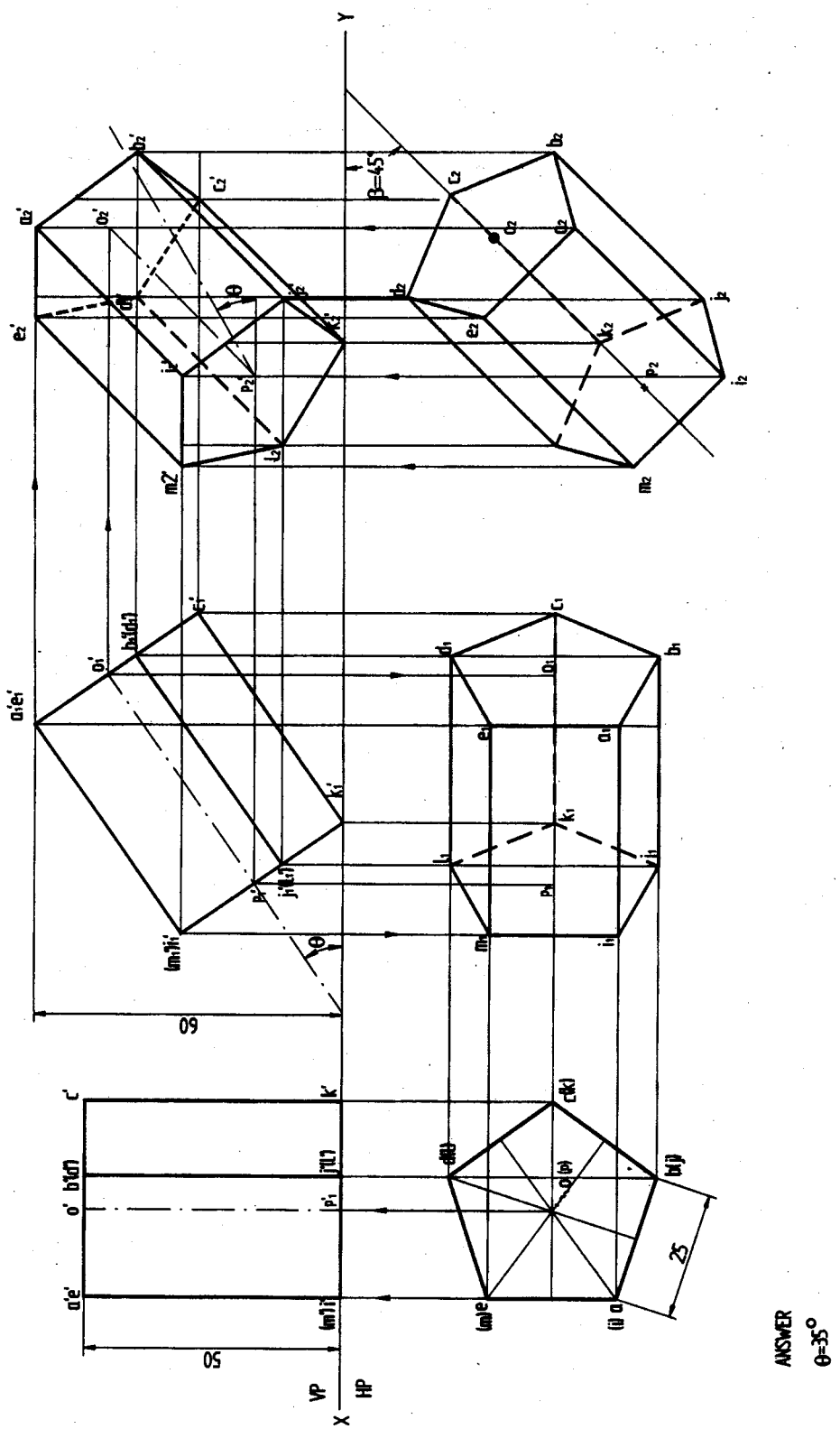
Problem 47 A Hexahedron of 30 mm sides is resting on one of its corners on HP such that one of its solid diagonals is perpendicular to VP. Draw the projections of the solid.

Solution



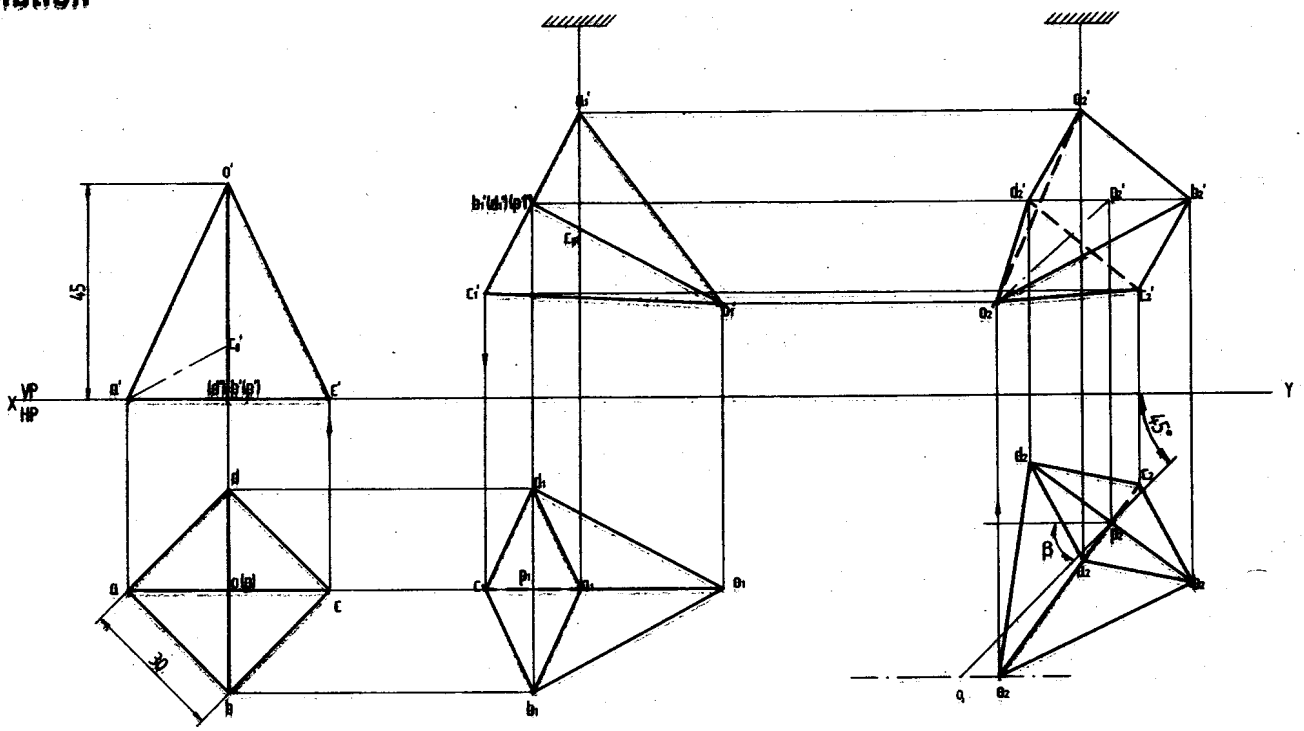
Problem 48 A pentagonal prism of base side 25 mm and height 50 mm is resting on HP on one of its base corners such that the top most edge is at a distance of 60 mm above HP. Draw its projections, when its top view of the axis is inclined at 45° to VP. Also, determine the inclination of the longer edge of the prism to HP which contains the resting corner.

Solution



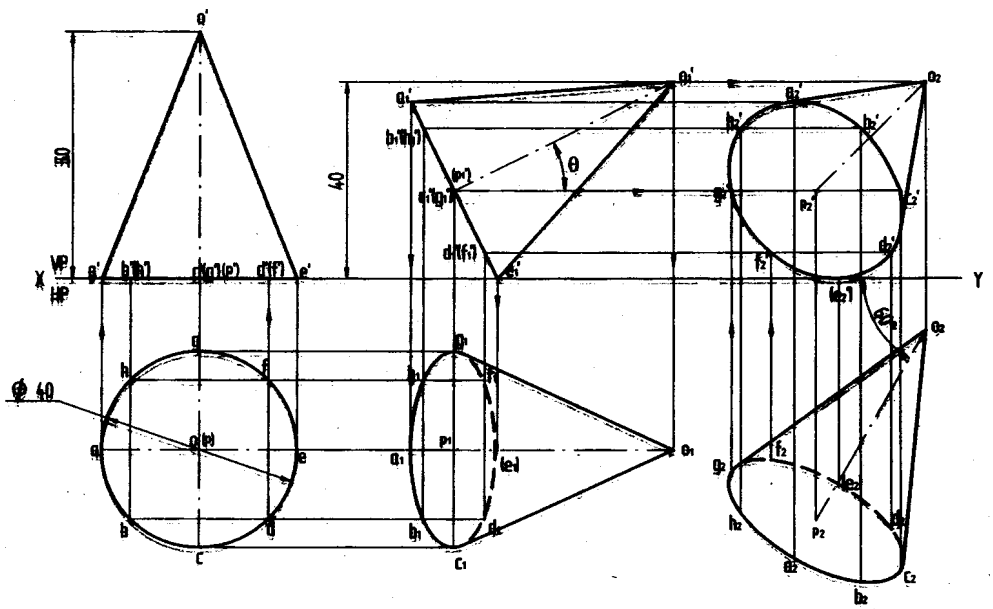
Problem 49 A square pyramid of base sides 30 mm and height 60 mm is suspended by a thread tied to one of the corners of its base. It is then tilted such that the axis makes an angle of 45° with respect to the VP. Considering the apex of the solid to be nearer to the observer, draw the projections of the solid.

Solution



Problem 50 A cone of base dia. 40 mm and axis length 50 mm is resting on HP on a point on the circumference of its base such that its apex is at 40 mm above the HP and its top view of the axis is inclined at 60° to VP. Draw the top and front views of the solid. Also, determine the inclinations of the axis when the base is nearer to the observer.

Solution



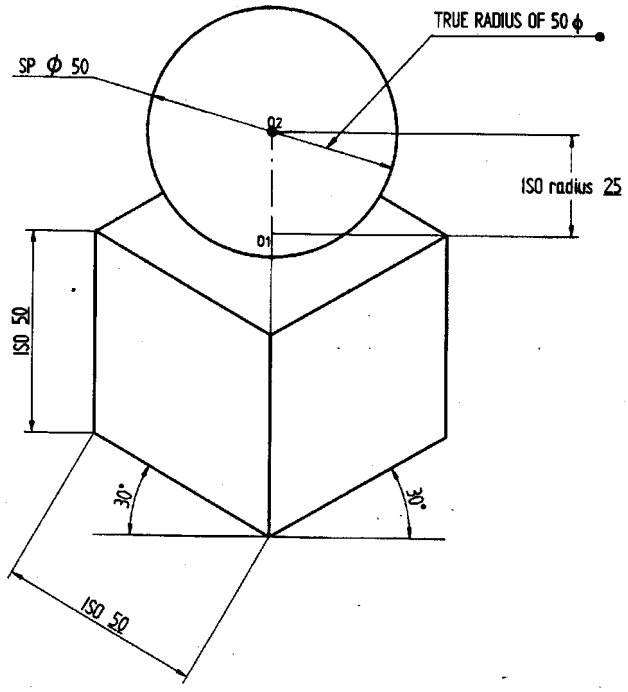
ANSWERS θ =26°
ϕ =51°

CHAPTER 6

ISOMETRIC PROJECTION

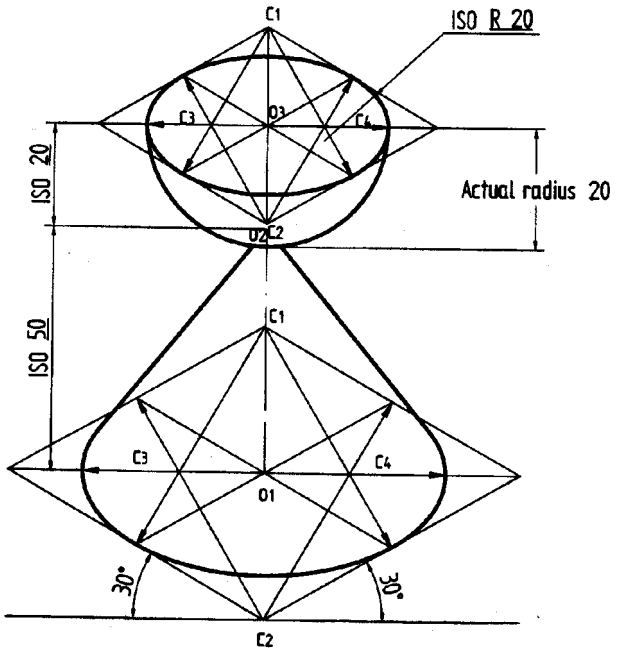
Problem 1 A sphere of diameter 50 mm rests centrally on top of a cube of sides 50 mm. Draw the Isometric projections of the combination of solids.

Solution



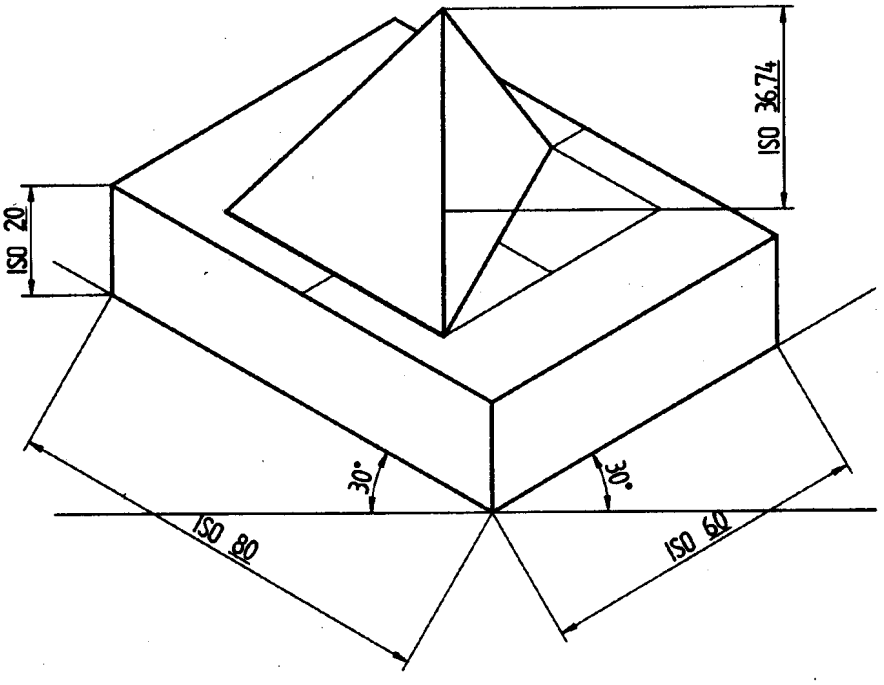
Problem 2 A hemisphere of 40 mm diameter is supported co-axially on the vertex of a cone of base dia. 60 mm and axis length 50 mm. The flat circular face of the hemisphere is facing upside. Draw the isometric projection of the combination of solids.

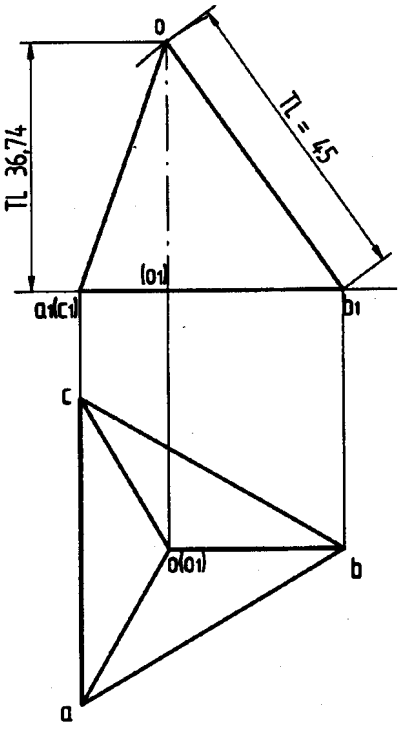
Solution



Problem 3 Draw the Isometric projection of a rectangular prism of 60 x 80 x 20 mm thick surmounting a tetrahedron of sides 45 mm such that the axes of the solids are collinear and at least one of the edges of both the solids are parallel to VP. Solved examples 6.1 p140, 6.2 p143, 6.3 p146, 6.4 p150 and 6.5 p156 of primer

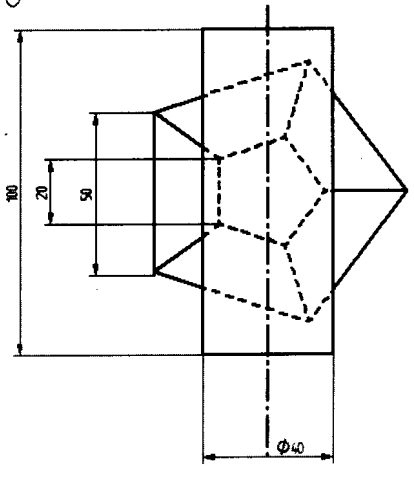
Solution

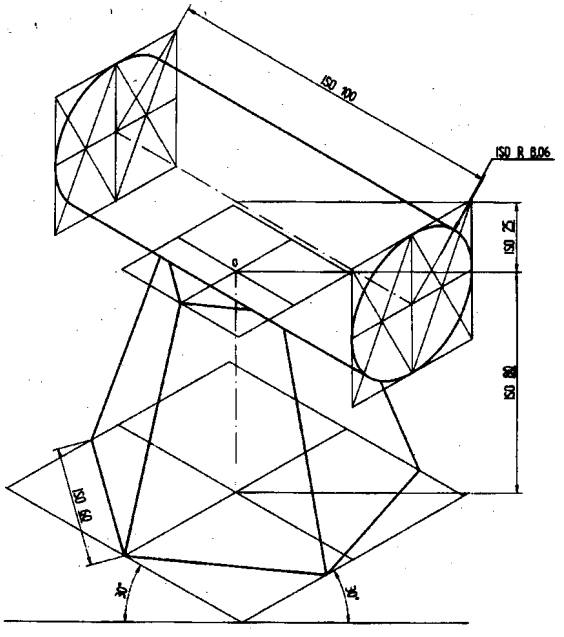




Problem 4 Following figure shows the top view of a cylinder which is centrally mounted on a frustum of a pentagonal pyramid of 60 mm height. Draw the Isometric projection of the combination of solids.

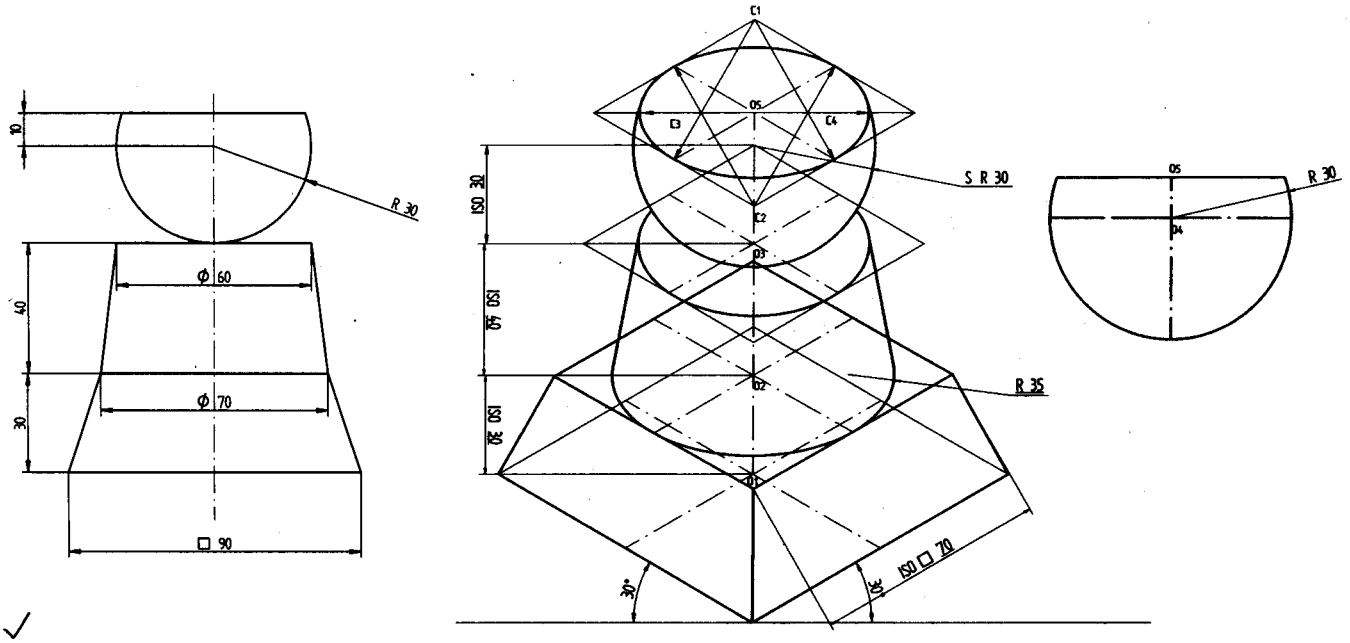
Solution





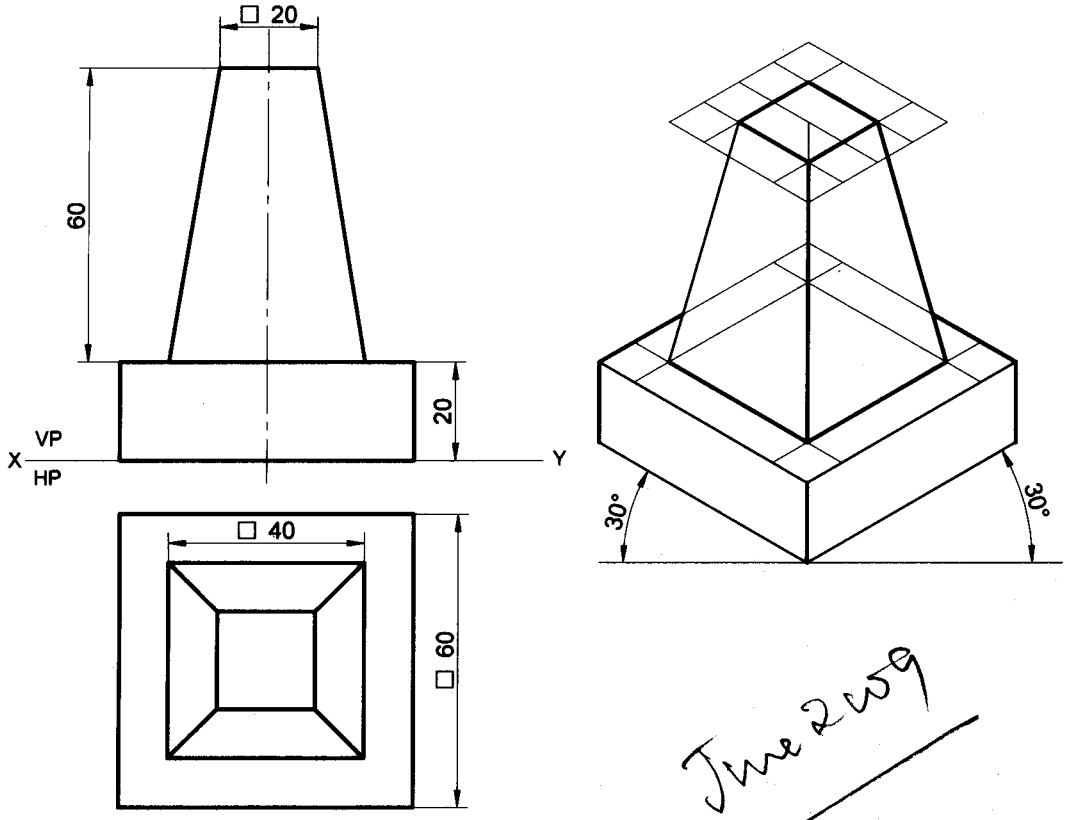
Problem 5 Following figure shows the front view of combination of solids consisting a cut sphere and frustums of a cone and a square pyramid. Draw the Isometric projection of the combination of solids.

Solution



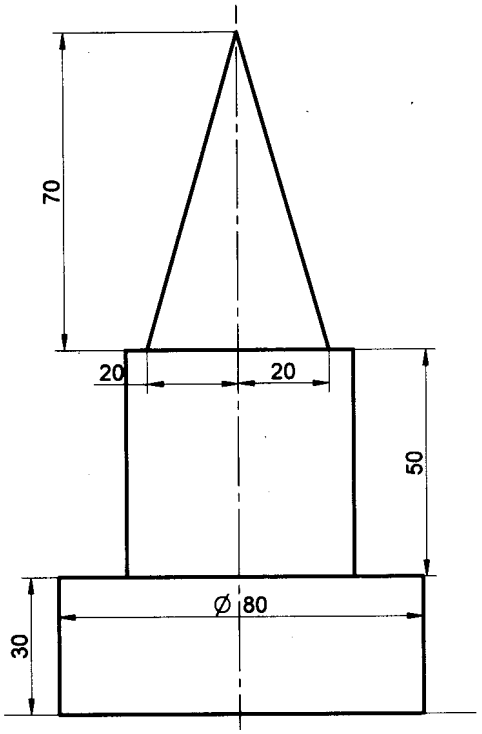
Problem 6 The frustum of a square pyramid of sides 40mm and height 60mm rest on the centre of the top of a square block of side 60mm and height 20mm. The base edges of the pyramid are parallel to the top edges of the square block. Draw the isometric projection of the combination of the solids.

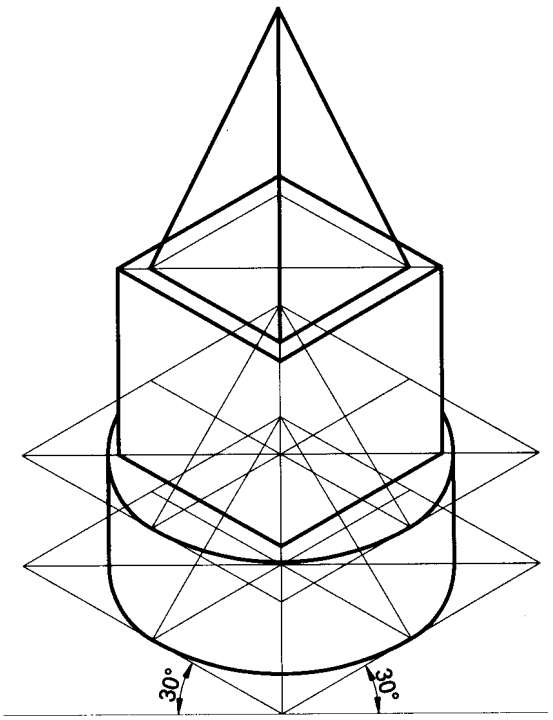
Solution



Problem 7 A square pyramid of base side 40mm and height 70mm rests symmetrically on a cube of edge 50mm, which itself is placed on a cylinder of diameter 80mm and thickness 30mm. Draw the isometric projection of the solids, if the axes of the three solids are in common line.

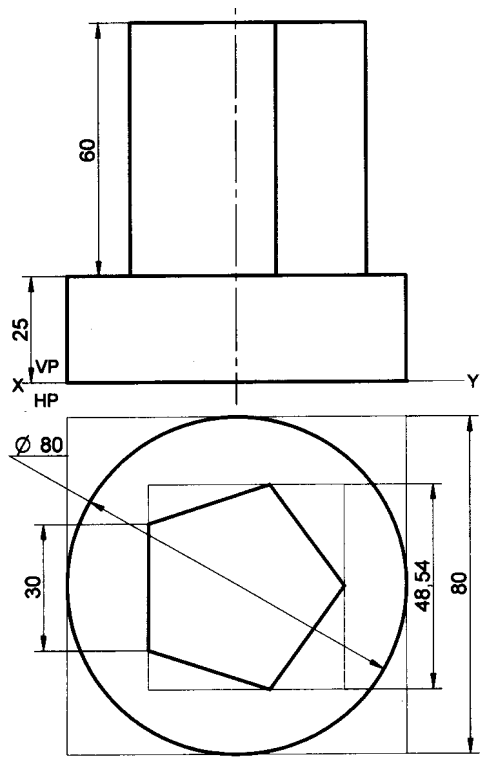
Solution

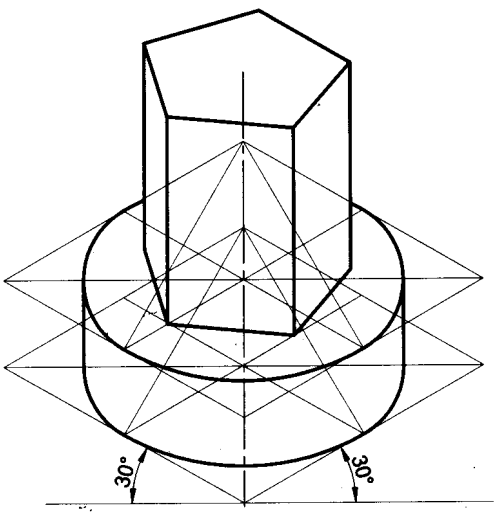




Problem 8 A regular pentagonal prism of base edge 30mm and axis 60mm is mounted centrally over a cylindrical block of 80mm diameter and 25mm thick. Draw isometric projection of the combined solids.

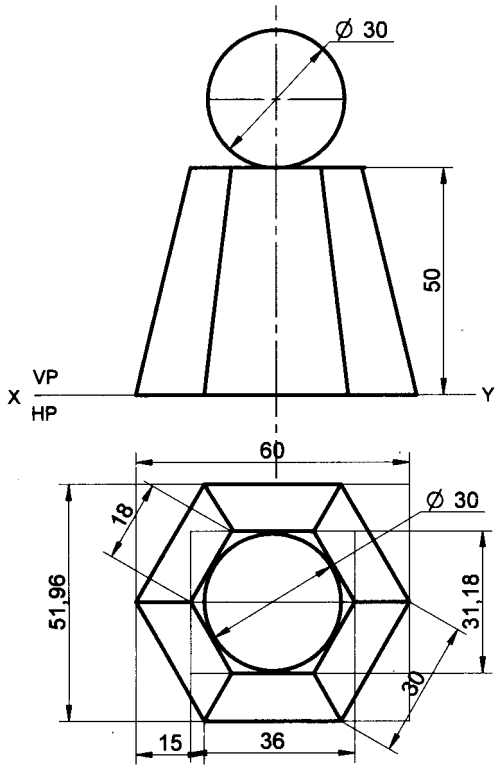
Solution

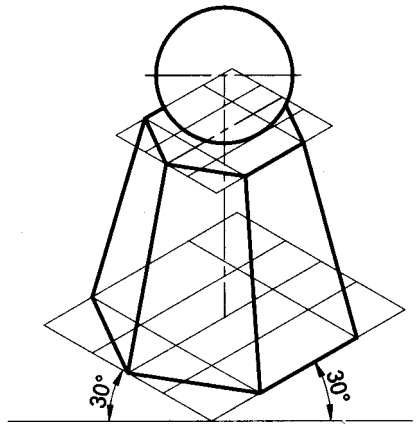




Problem 9 A sphere of diameter 30mm rests on the frustum of a hexagonal pyramid base 30mm, top face 18mm side and height 50mm, such that their axes coincide. Draw the isometric projection of the combined solids.

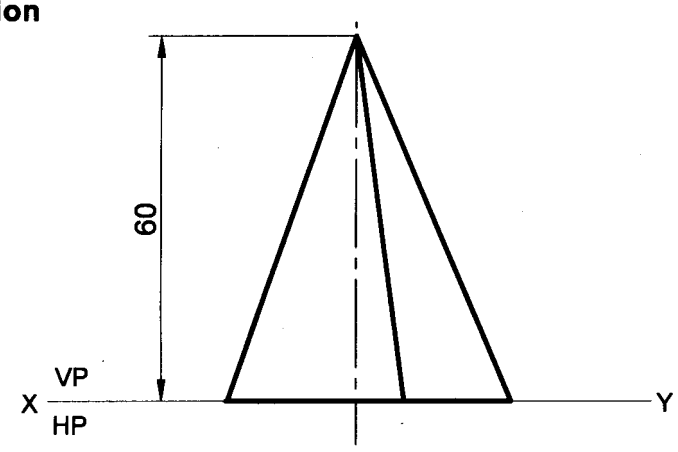
Solution

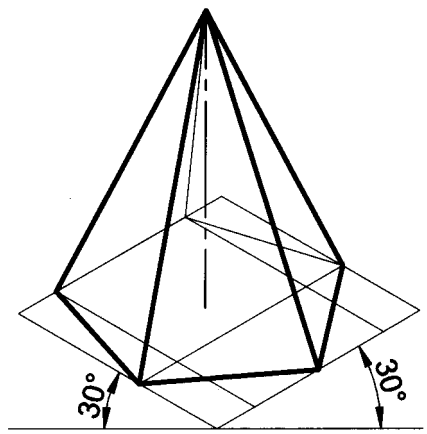


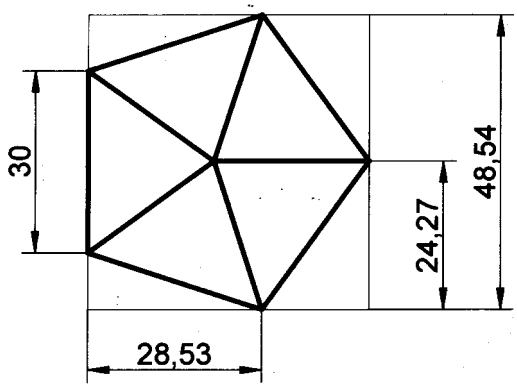


Problem 10 A pentagonal pyramid of base side 30mm and axis length 60mm is resting on HP on its base with a side of base perpendicular to VP. Draw its isometric projections

Solution

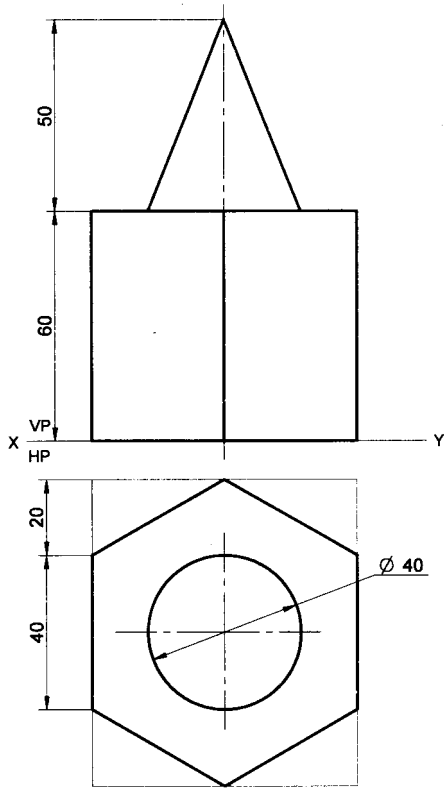


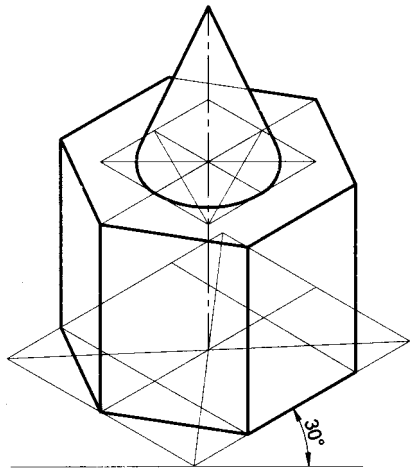




Problem 11 Draw isometric projection of a hexagonal prism of side of base 40mm and height 60mm with a right circular cone of base 40mm as diameter and altitude 50mm, resting on its top such that the axes of both the solids are collinear.

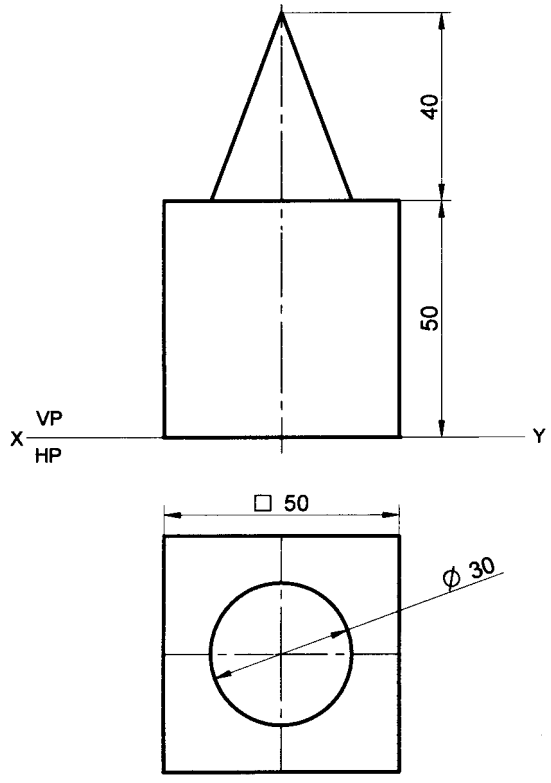
Solution

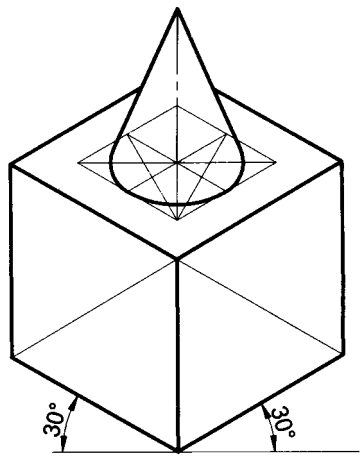




Problem 12 A cone of base diameter 30mm and height 40mm rests centrally over a cube of side 50mm. Draw the isometric projection of the combination of solids

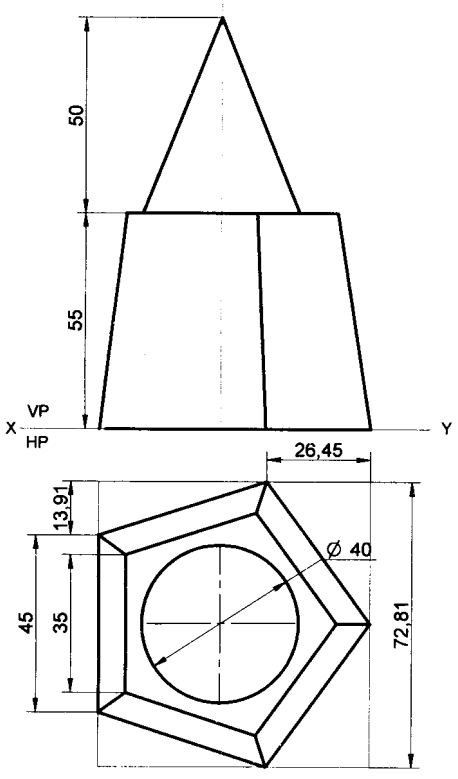
Solution

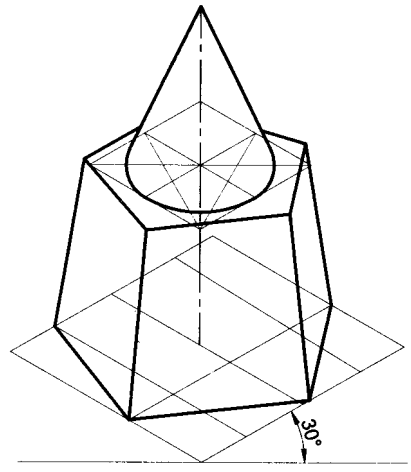




Problem 13 A cone of base diameter 40mm and height 50mm rests centrally over a frustum of a pentagonal pyramid of base side 45mm and top side 35mm and height 55mm. Draw isometric projections of the solids.

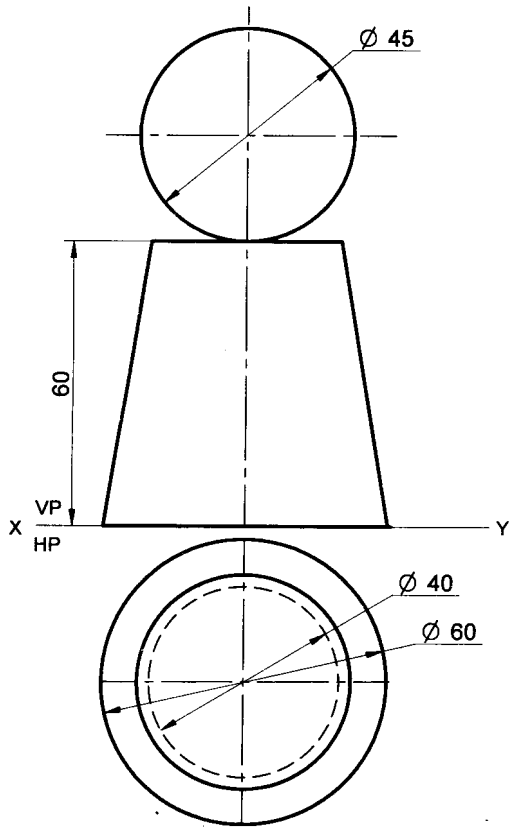
Solution

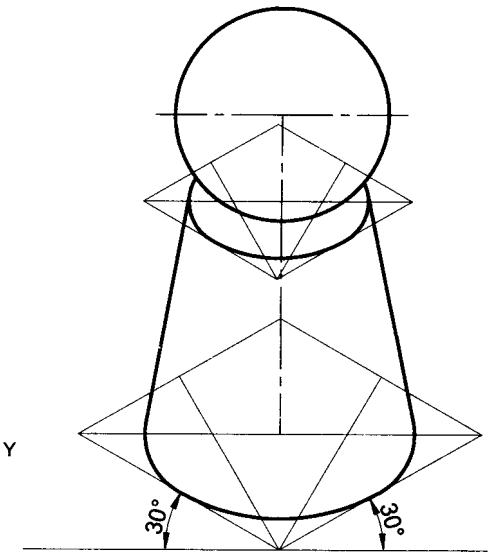




Problem 14 A sphere of diameter 45mm rests centrally over a frustum of cone of base diameter 60mm, top diameter 40mm and height 60mm. Draw its isometric projections.

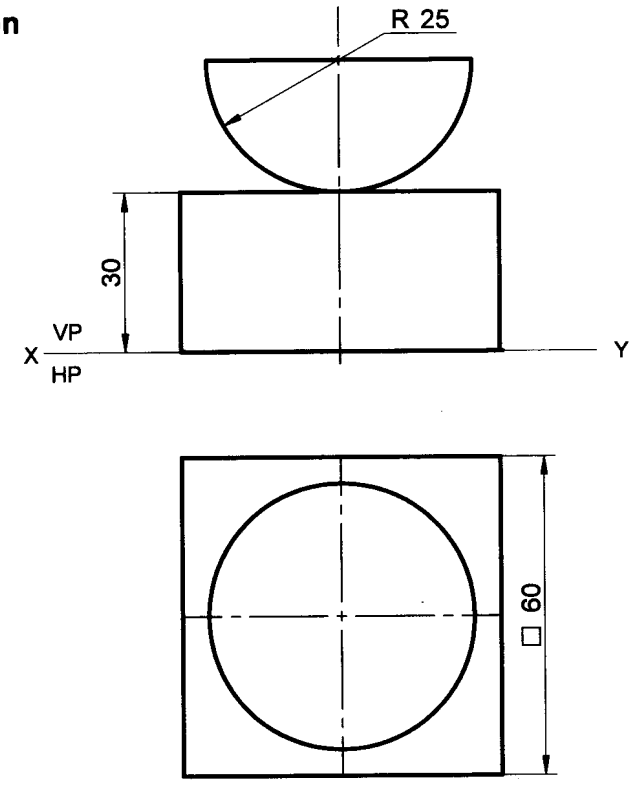
Solution

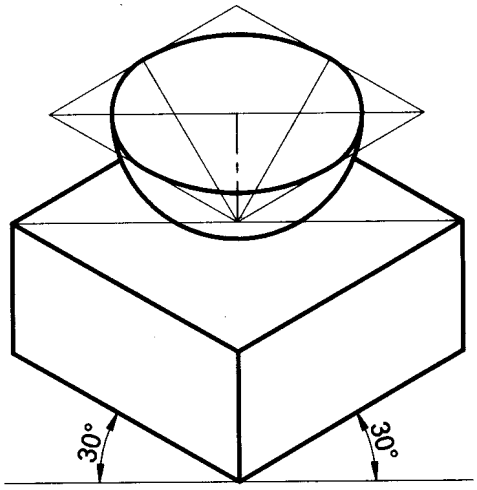




Problem 15 A hemisphere of diameter 50mm is centrally resting on top of a square prism of base side 60mm and height 30mm such that the curved surface of hemisphere is touching the top face of the prism. Draw its isometric projections

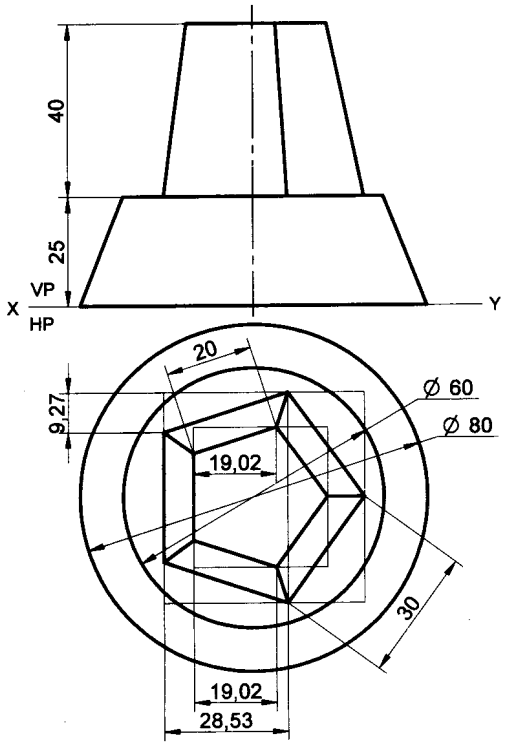
Solution

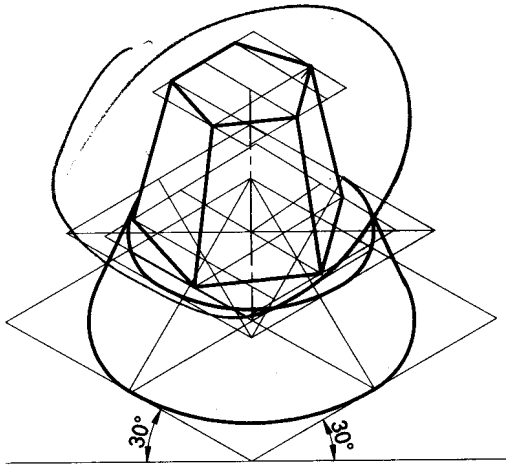




Problem 16 Draw the isometric projection of the combination of solids formed by a frustum of cone and co-axial frustum of pentagonal pyramid. The lower frustum of cone is of 80mm base diameter, 60mm top diameter and height 25mm. the upper frustum of pyramid is of 30mm side of base, 20mm side of top face and height 40mm.

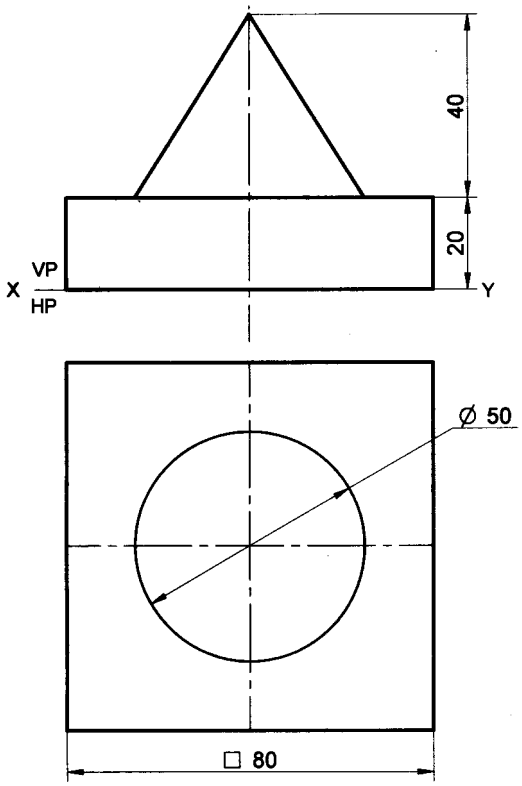
Solution

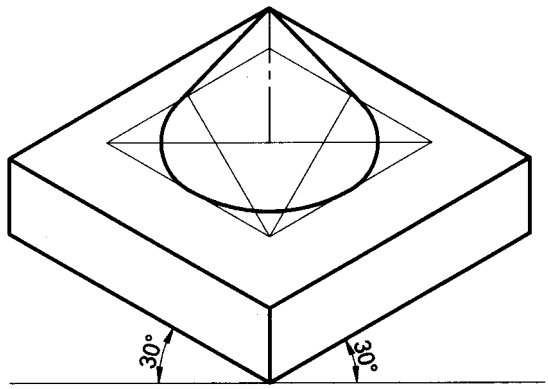




Problem 17 A cone of base diameter 50mm and height 40mm is placed centrally on the top face of a square slab side-80mm and height20mm. Draw the isometric projection of the combination

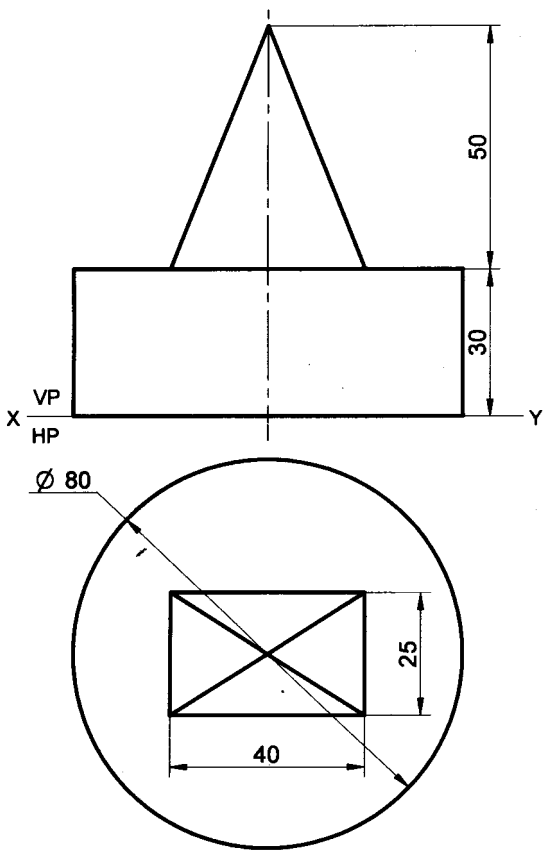
Solution

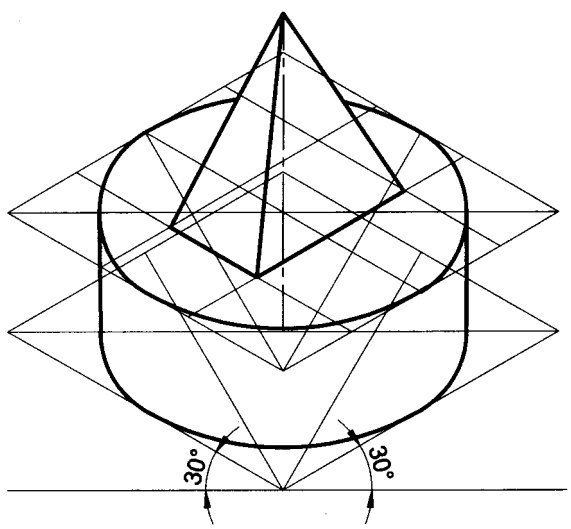




Problem 18 A rectangular pyramid of base-40mmx25mm and height 50mm is placed centrally on a cylindrical slab of diameter 100mm and thickness-30mm. Draw the isometric projection of the combination

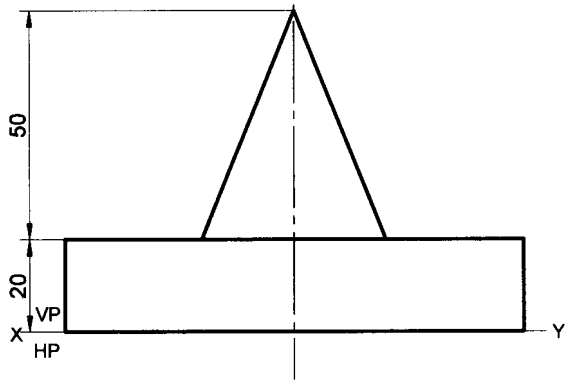
Solution

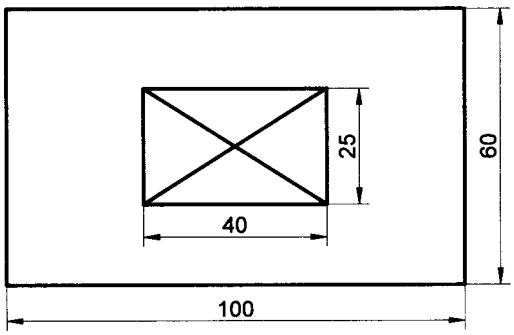


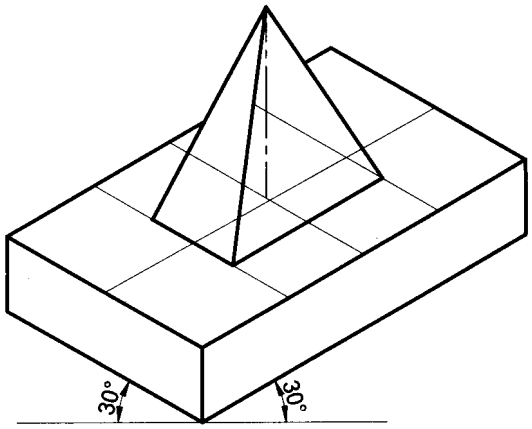


Problem 19 A rectangular pyramid of base-40mmx25mm and height50mm is placed centrally on a rectangular slab sides-100mmx60mm and thickness-20mm. Draw the isometric projection of the combination

Solution

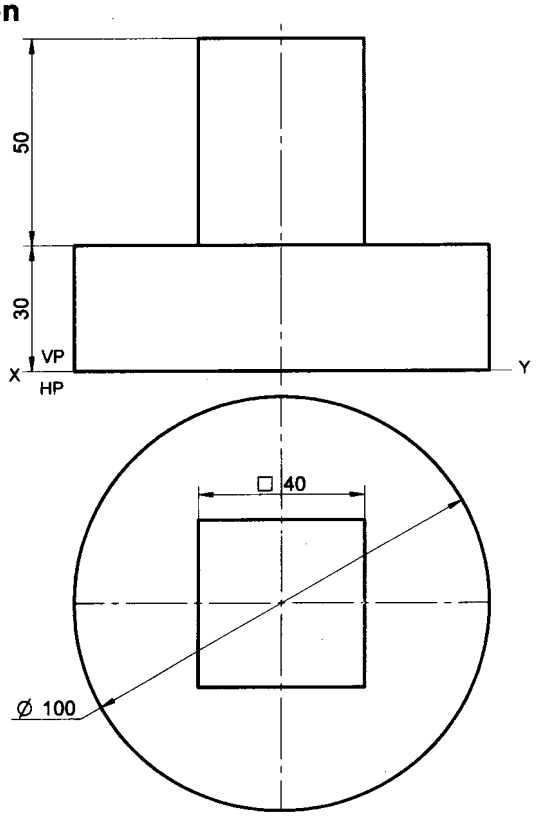


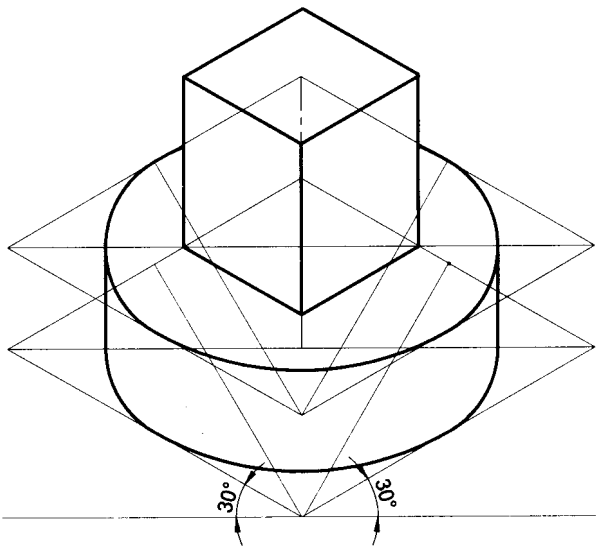




Problem 20 A square prism base side-40mm, height50mm is placed centrally on a cylindrical slab of diameter 100mm and thickness-30mm. Draw the isometric projection of the combination

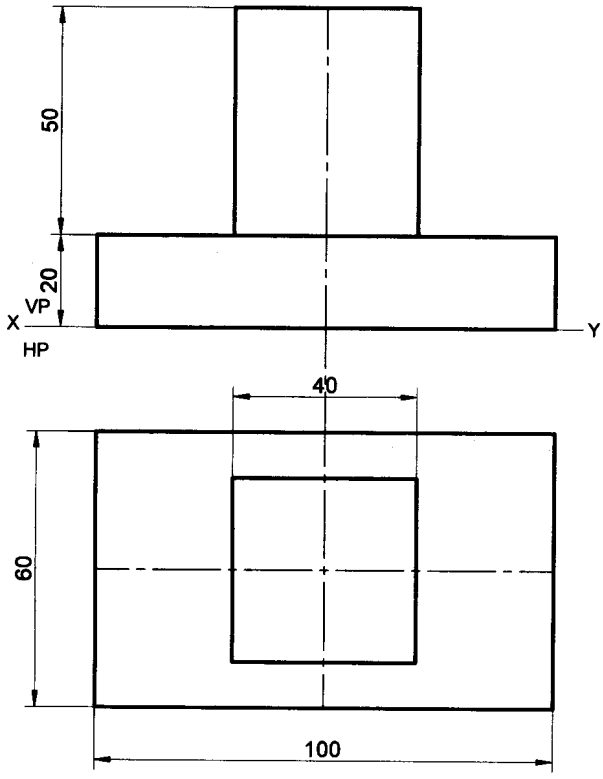
Solution

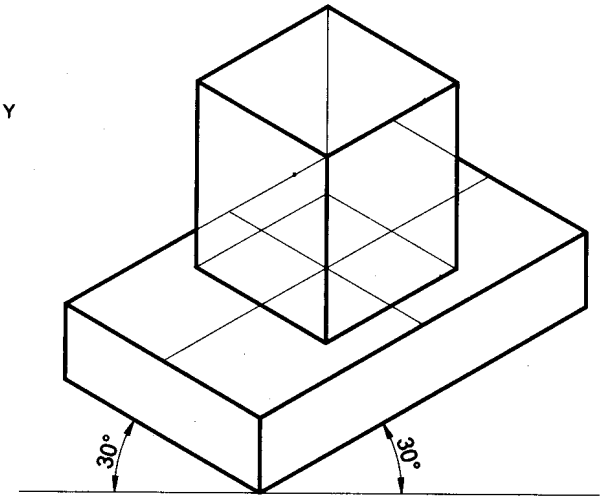




Problem 21 A square prism base side-40mm, height50mm is placed centrally on a rectangular slab sides-100mmx60mm and thickness-20mm. Draw the isometric projection of the combination

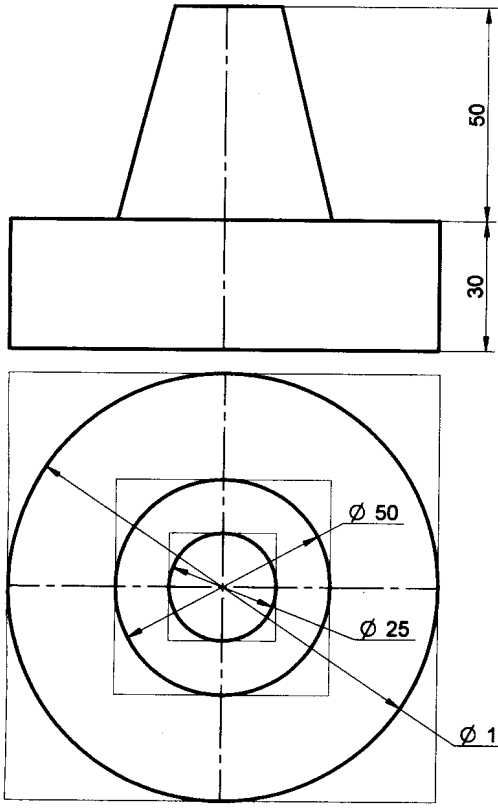
Solution

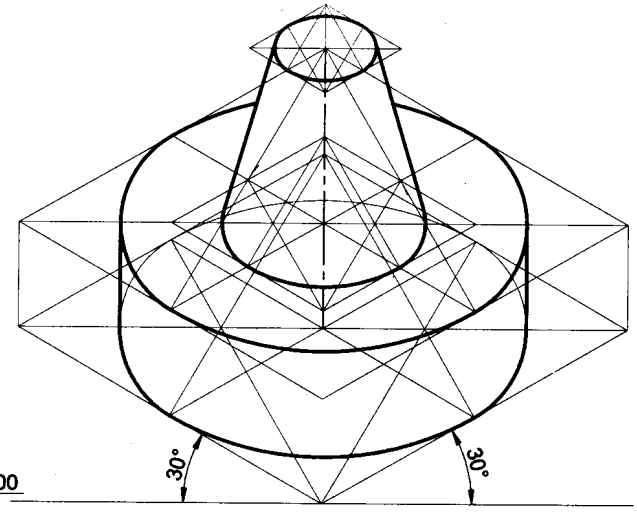




Problem 22 A frustum of cone base diameter 50mm, top diameter 25mm and height50mm is placed centrally on a cylindrical slab of diameter 100mm and thickness-30mm. Draw the isometric projection of the combination

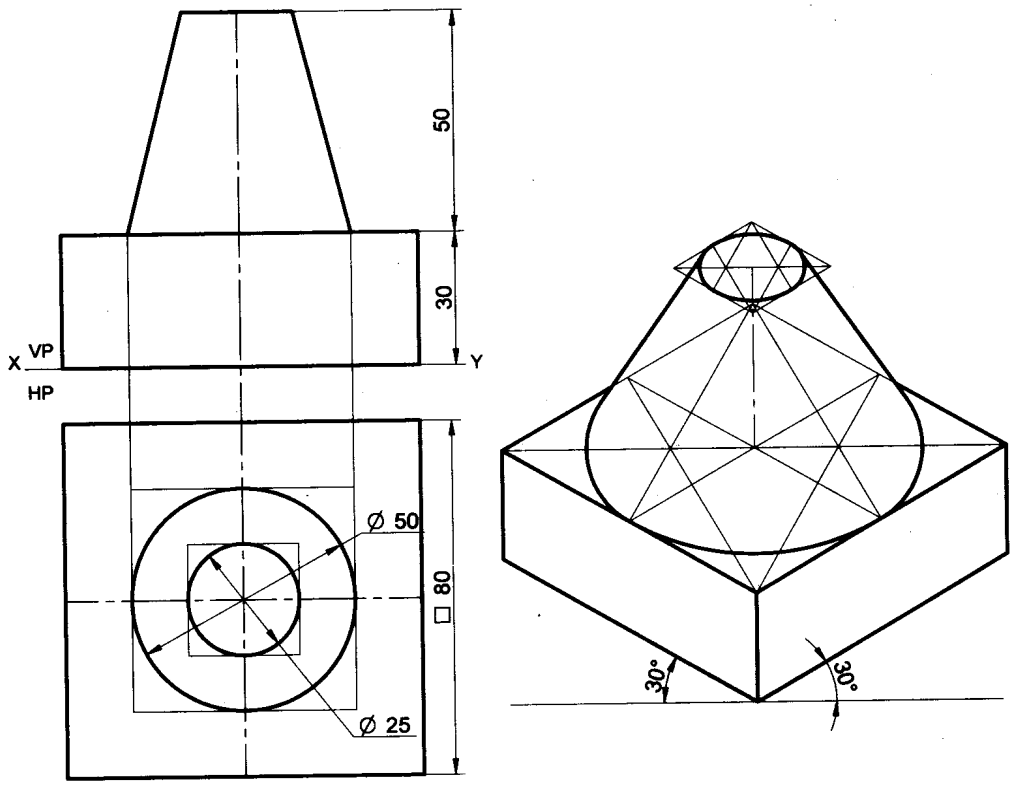
Solution





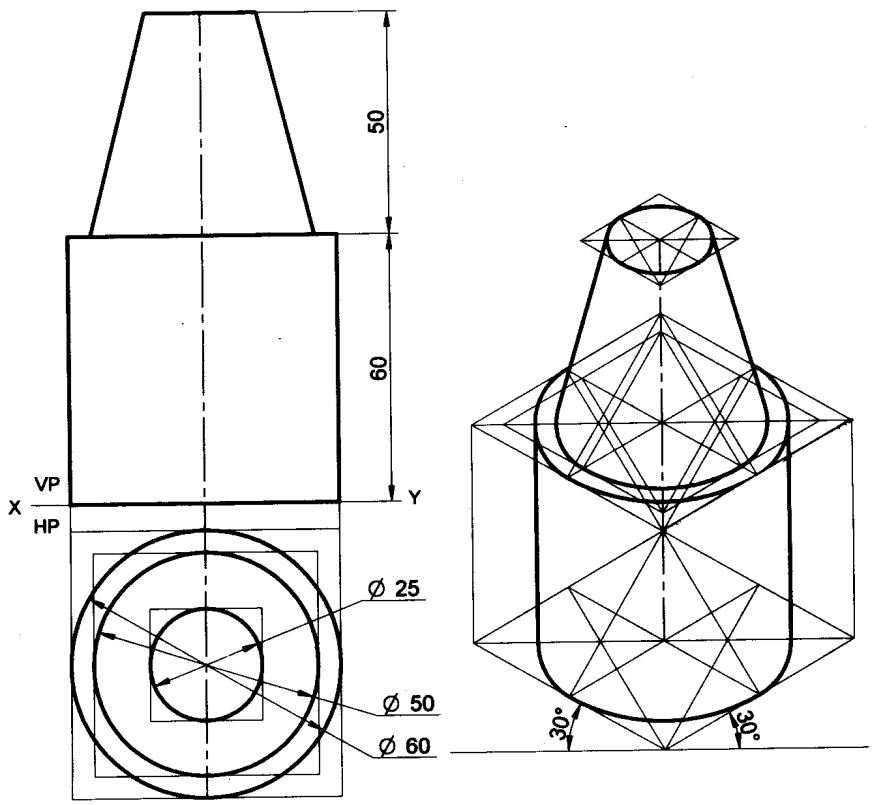
Problem 23 A frustum of cone base diameter 50mm, top diameter 25mm and height 50mm is placed centrally on a square slab side-80mm and thickness-30mm. Draw the isometric projection of the combination.

Solution



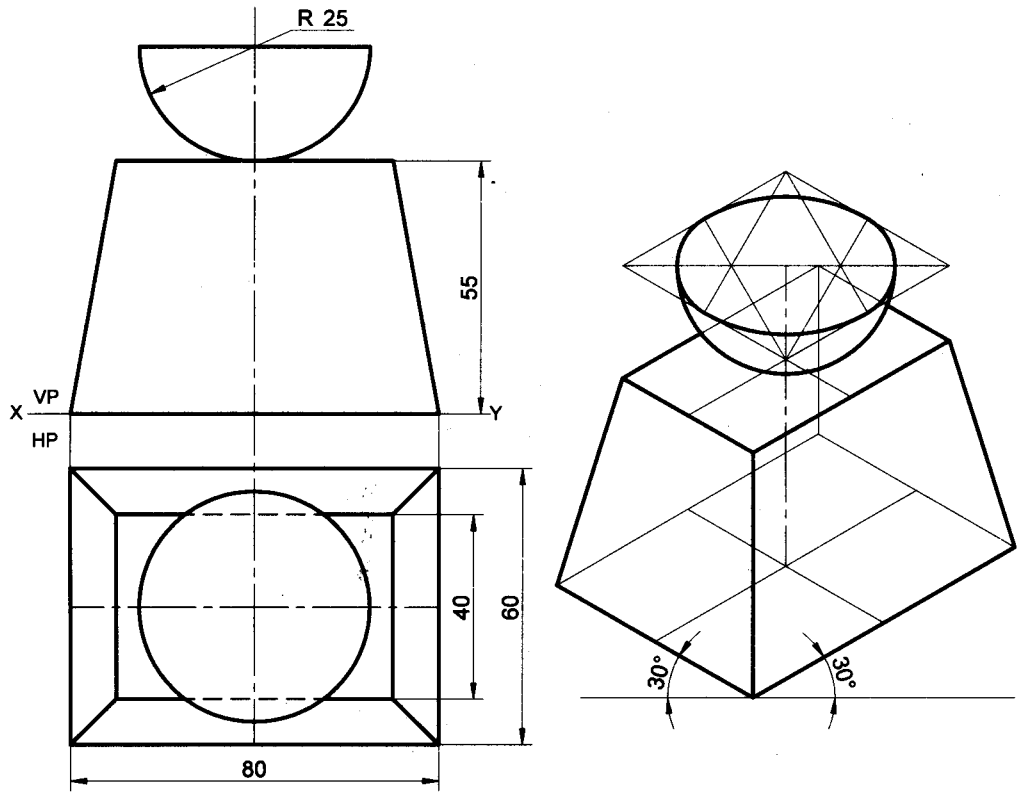
Problem 24 A frustum of cone base diameter 50mm, top diameter 25mm and height 50mm is placed centrally on the top face of a cylinder diameter 60mm and height 60mm. Draw the isometric projection of the combination

Solution



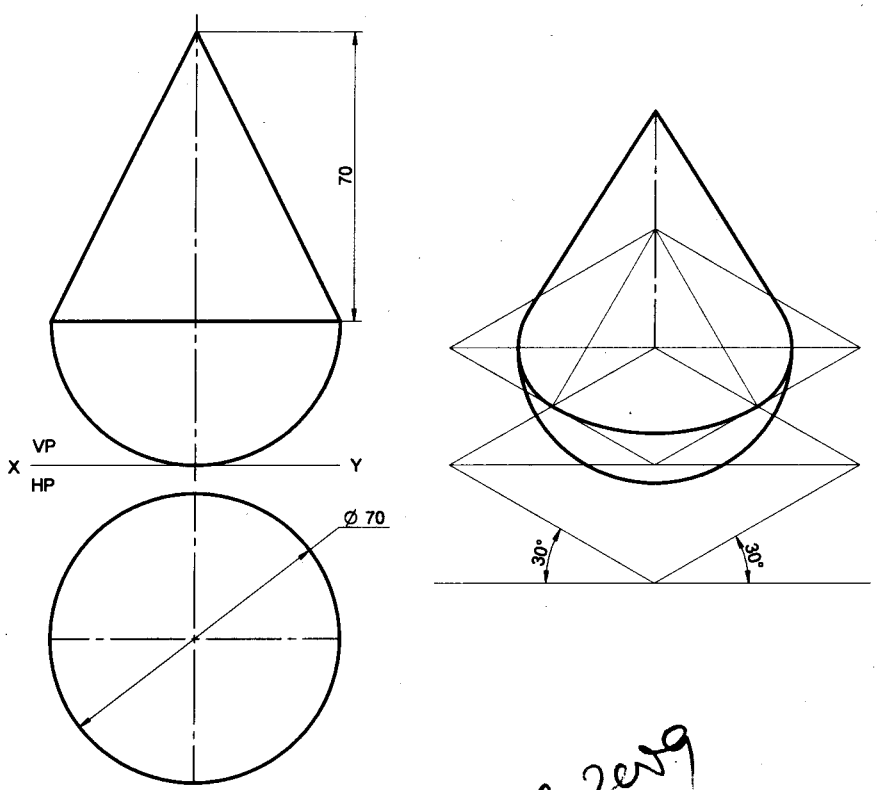
Problem 25 A hemisphere diameter 50mm is resting on its curved surface centrally on the top face of frustum of a rectangular pyramid base-80mmx60mm and top-60mmx40mm, height 55mm. Draw the isometric projection of the combination

Solution



Problem 26 A hemisphere diameter 70mm is placed on the ground on its curved surface. A cone base diameter 70mm and height 70mm is placed centrally on it. Draw the isometric projection of the combination

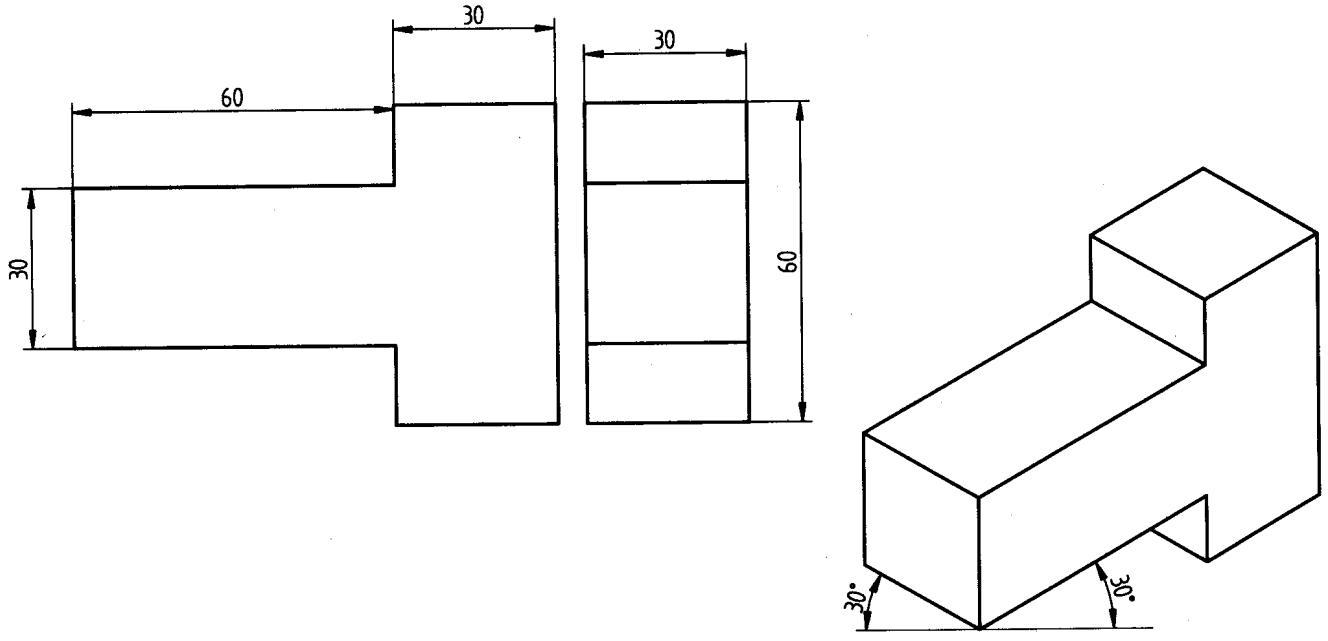
Solution



June 2019

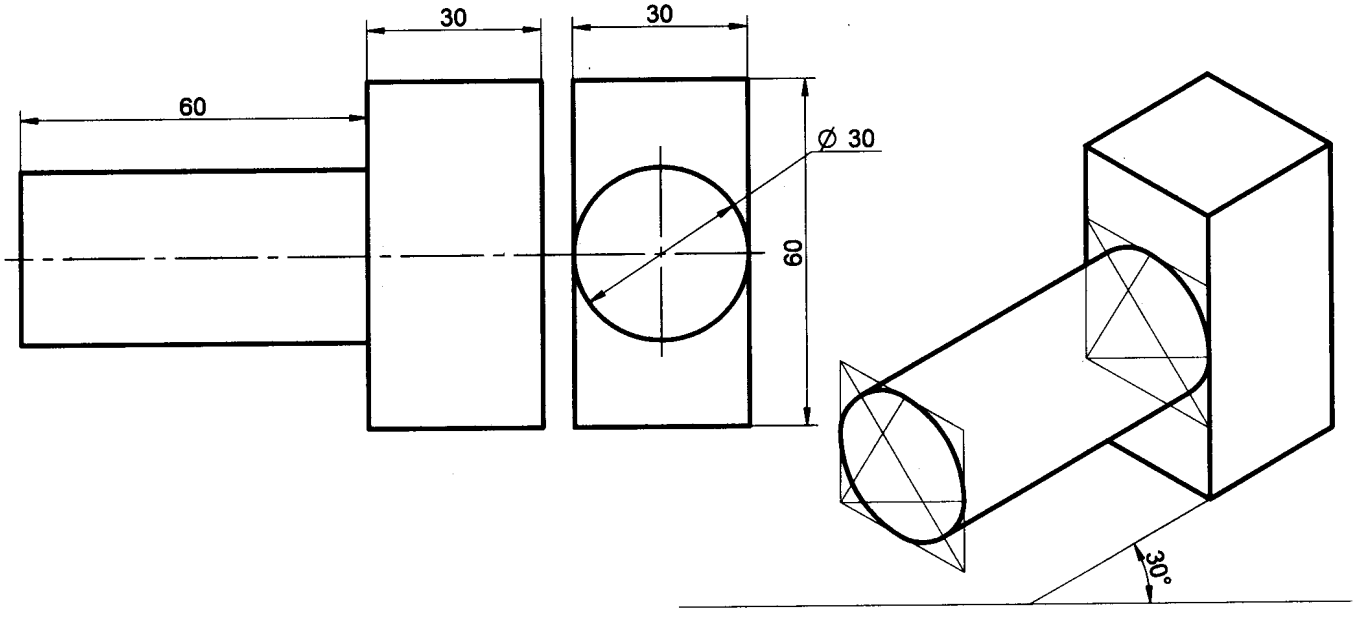
Problem 27 Following figure shows the front and side views of solid. Draw the Isometric projection of the solid.

Solution



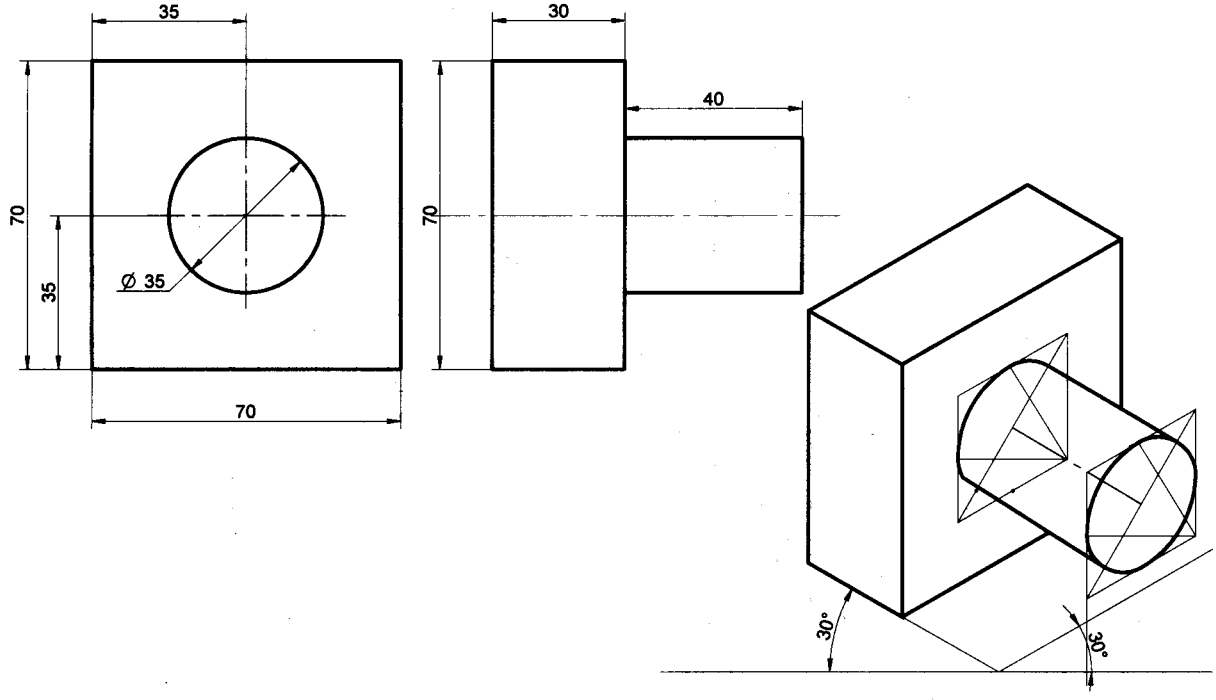
Problem 28 Following figure shows the front and side views of solid. Draw the Isometric projection of the solid.

Solution



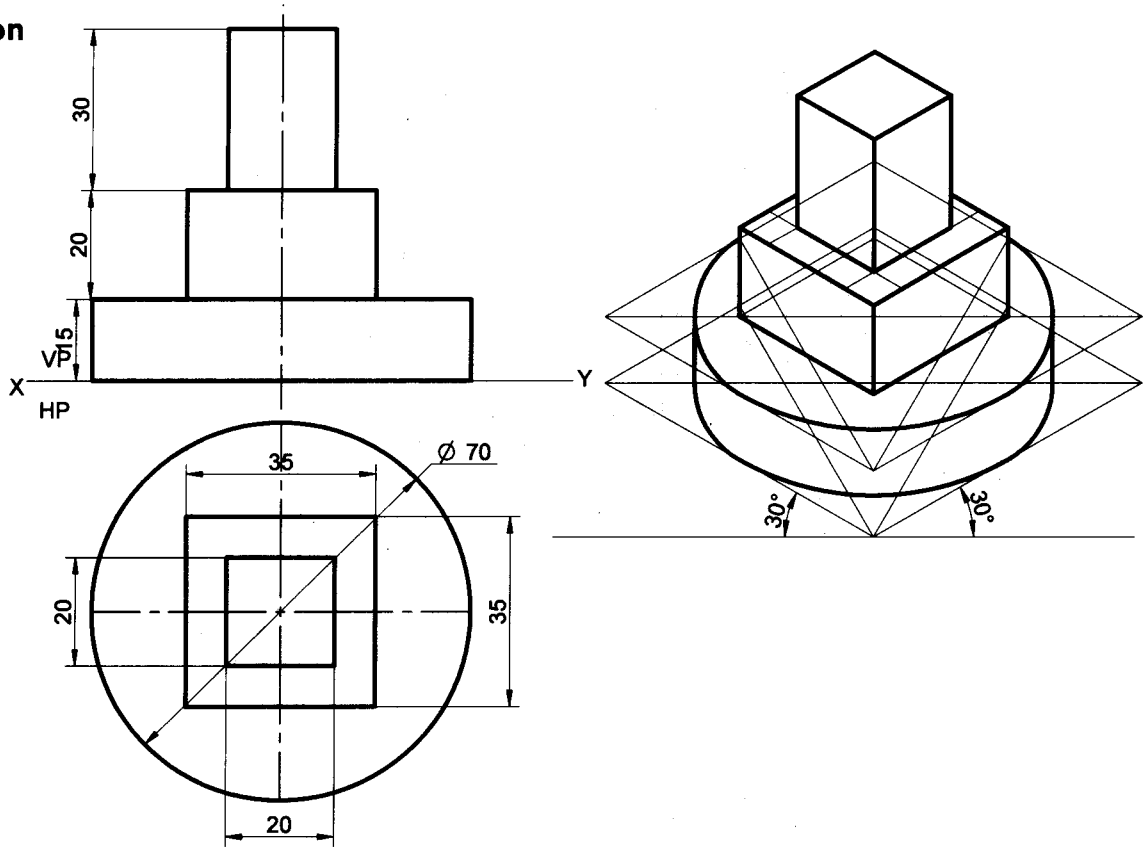
Problem 29 Following figure shows the front and side views of solid. Draw the Isometric projection of the solid.

Solution



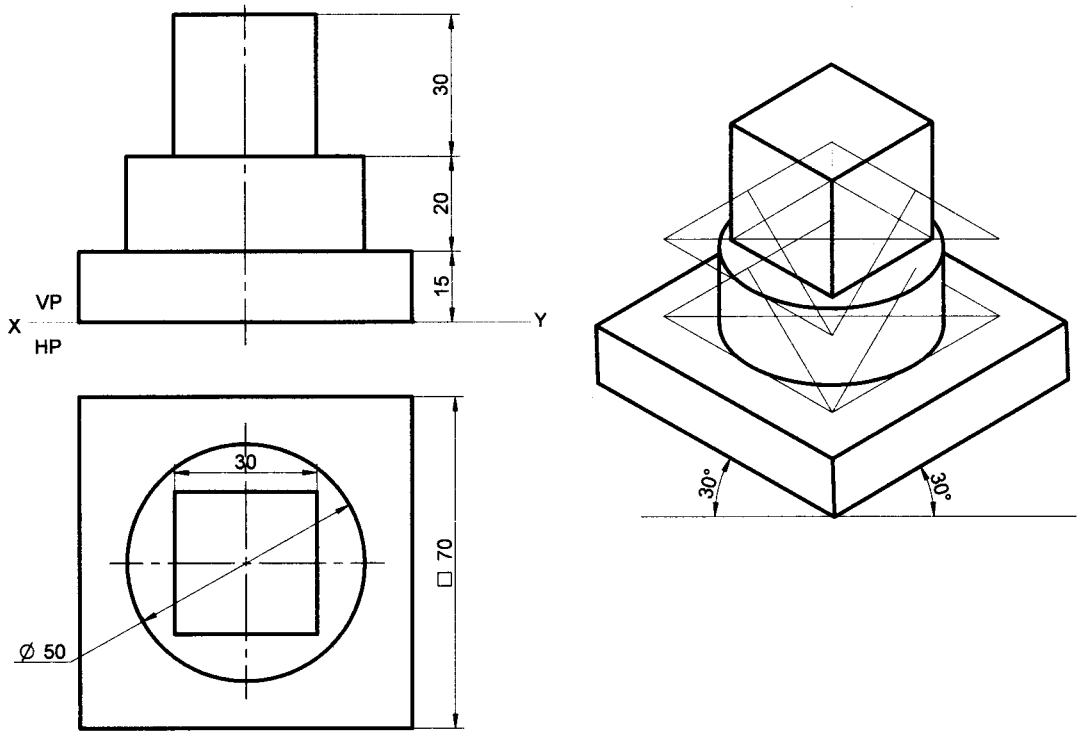
Problem 30 Following figure shows the front and top views of solid. Draw the Isometric projection of the solid.

Solution



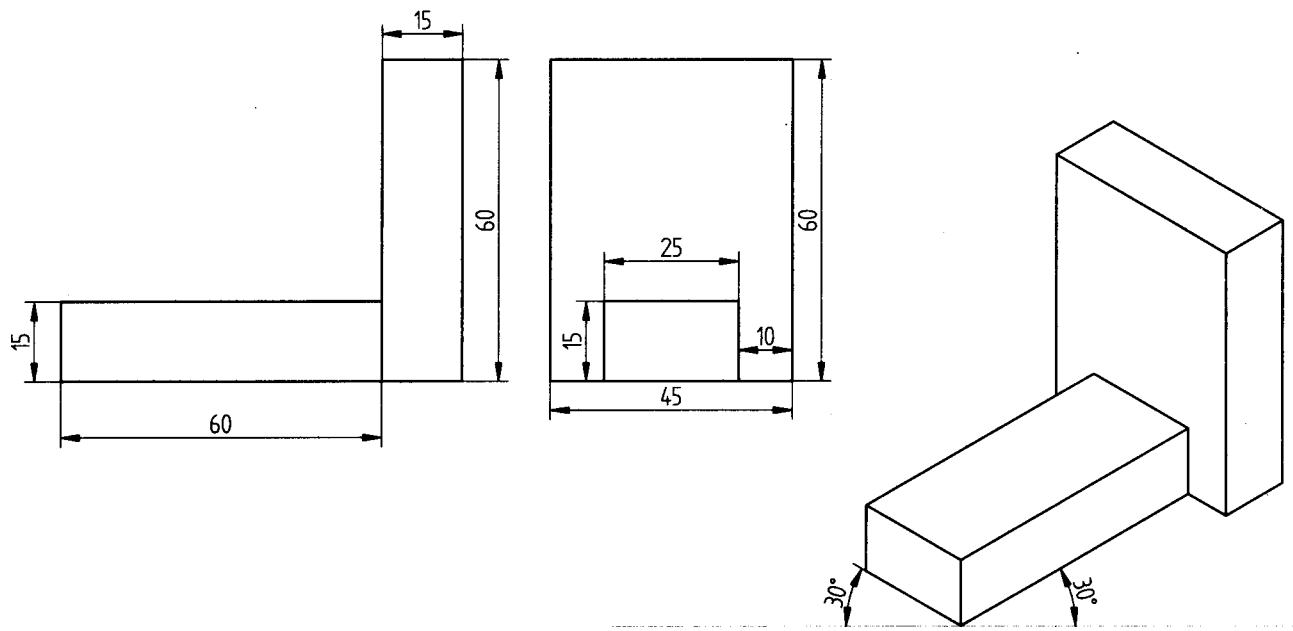
Problem 31 Following figure shows the front and top views of solid. Draw the Isometric projection of the solid.

Solution



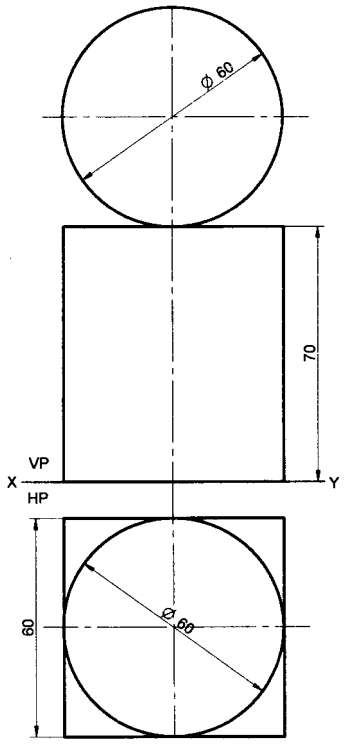
Problem 32 Following figure shows the front and side views of solid. Draw the Isometric projection of the solid.

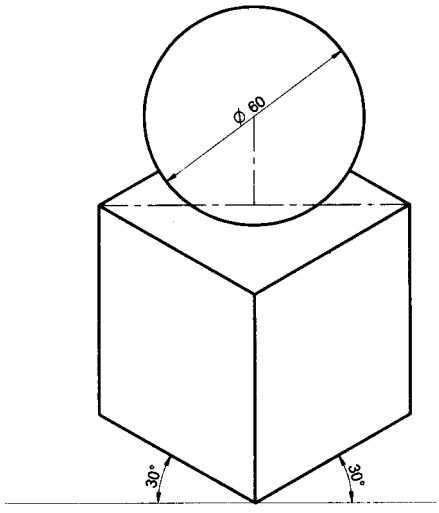
Solution



Problem 33 A sphere diameter 60mm is placed centrally on the top face of a square prism side-60mm and height 70mm. Draw the isometric projection of the combination

Solution

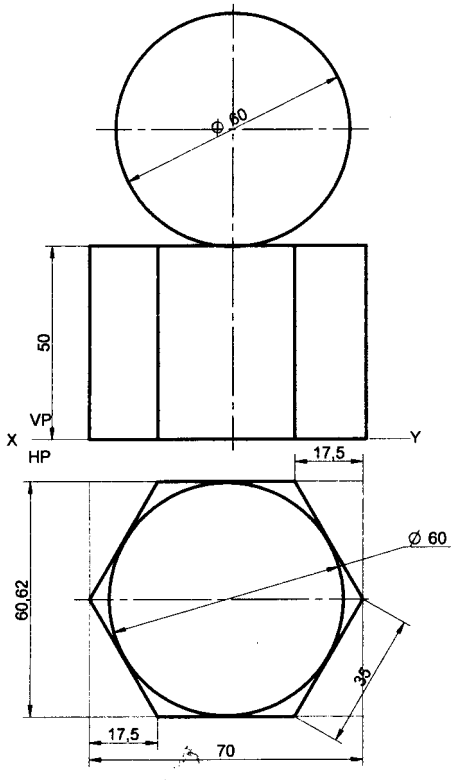


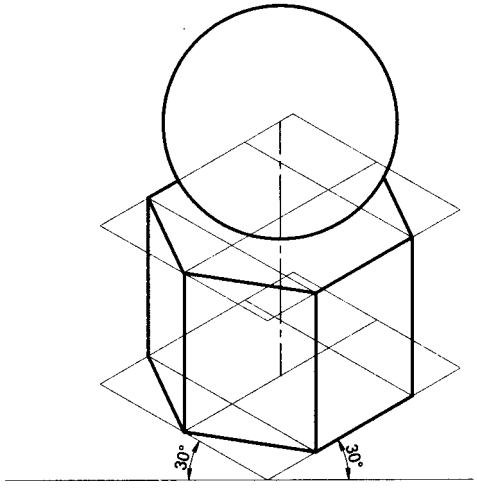


Problem 34 A sphere f60mm is placed centrally on the top face of a hexagonal prism side-35mm and height 50mm. Draw the isometric projection of the combination

Solution

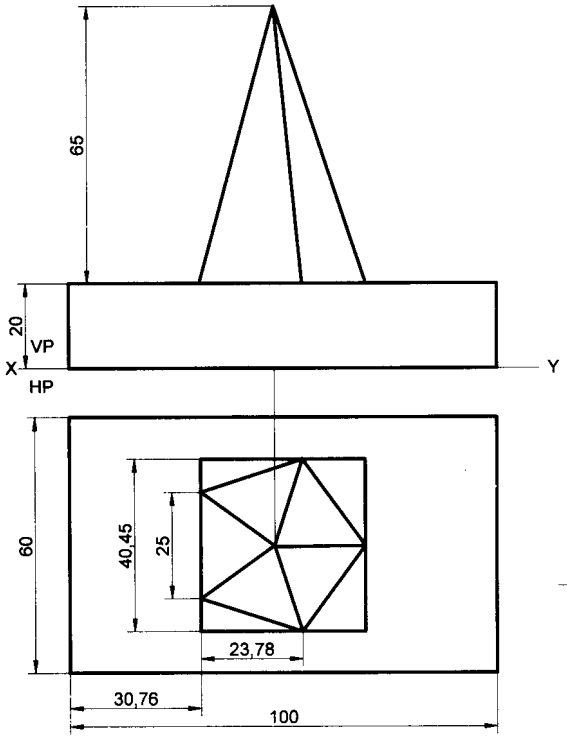
2

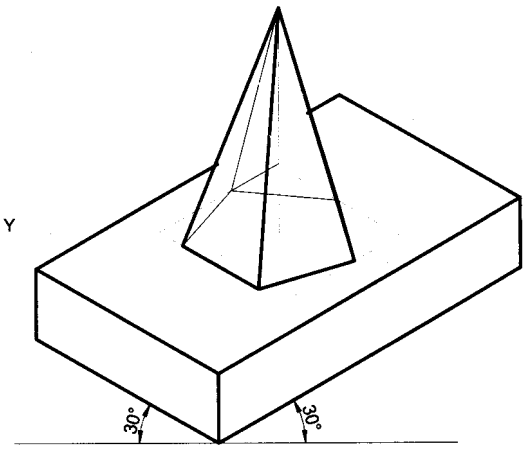




Problem 35 A pentagonal pyramid base side-25mm and height 65mm is placed centrally on a rectangular slab 100mmx60mm and 20mm-thick. Draw the isometric projection of the combination.

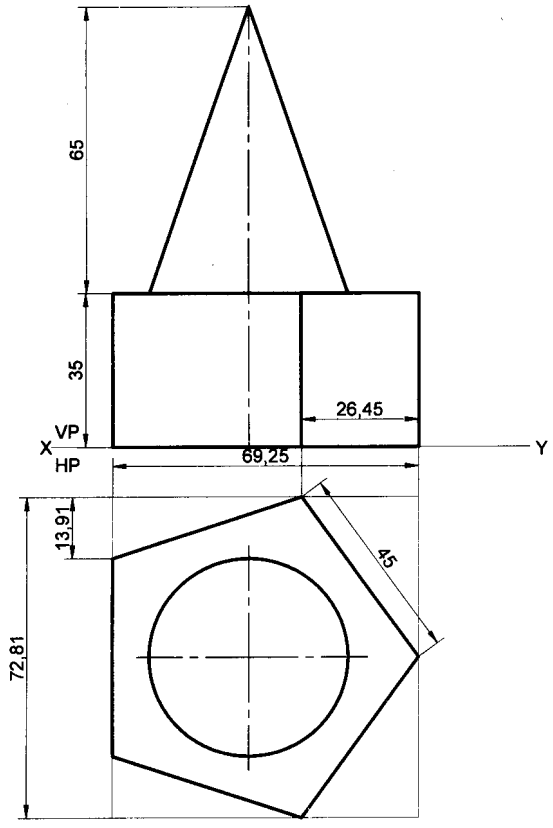
Solution

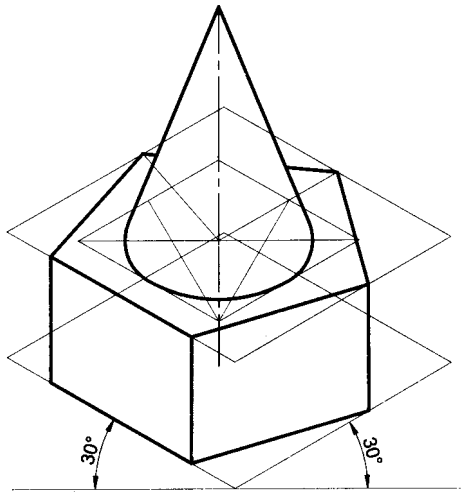




Problem 36 A cone base diameter 45mm and height 65mm is placed centrally on the top face of a pentagonal prism side-45mm and height 35mm. Draw the isometric projection of the combination

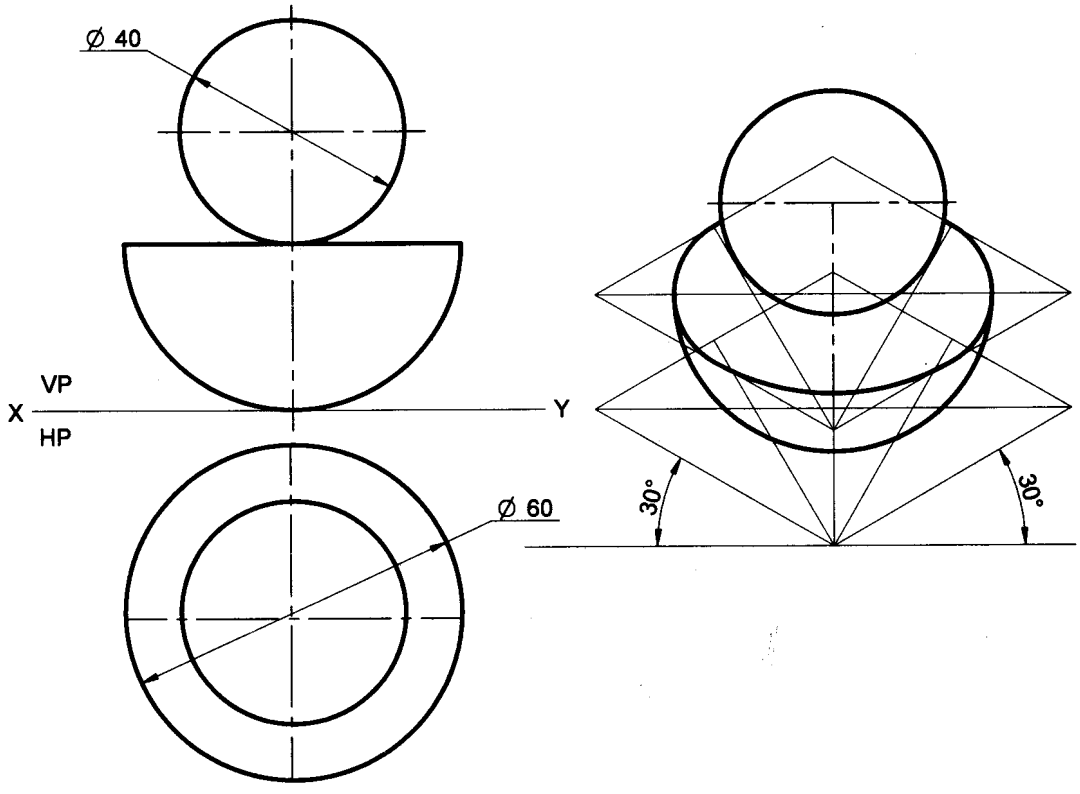
Solution





Problem 37 A sphere diameter 40mm is placed centrally on the flat face of a hemisphere diameter 60mm. Draw the isometric projection of the combination

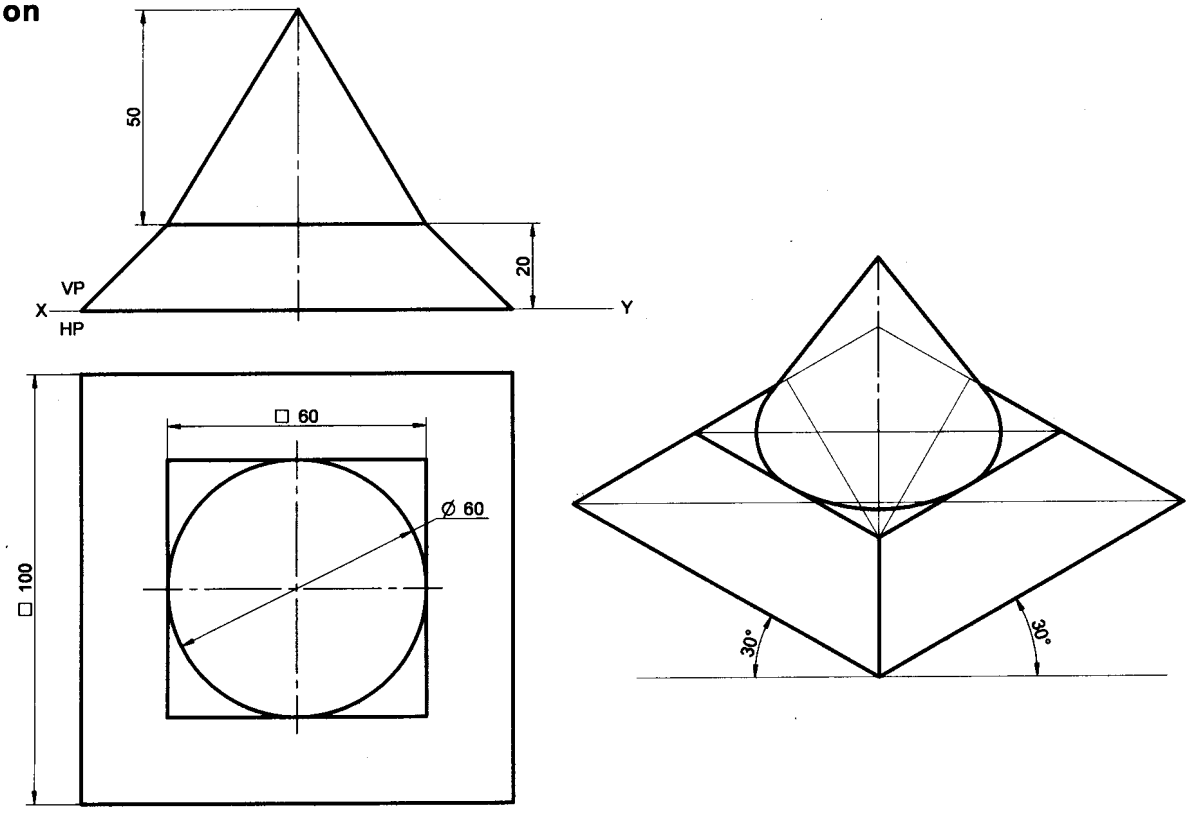
Solution



3

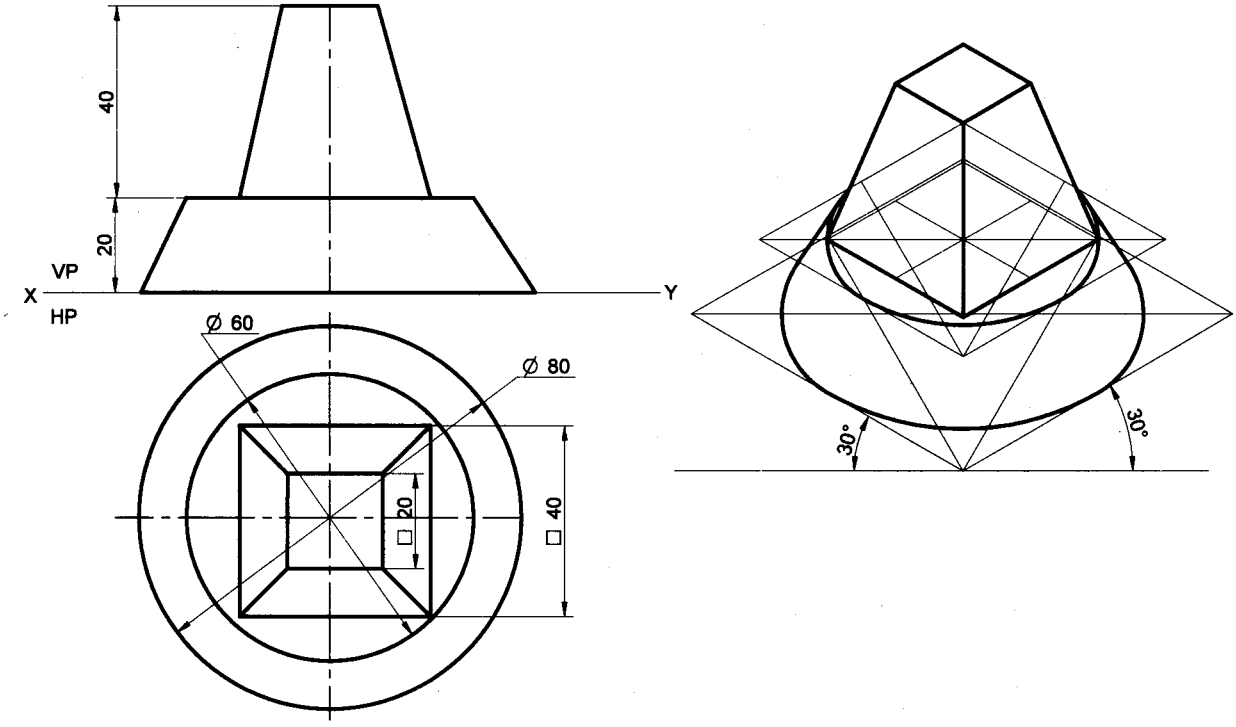
Problem 38 A cone of base diameter 60mm, top diameter 40mm and height 50mm is placed centrally on frustum of a square pyramid base side-100mm top face side-60mm and height 20mm. Draw the isometric projection of the combination

Solution



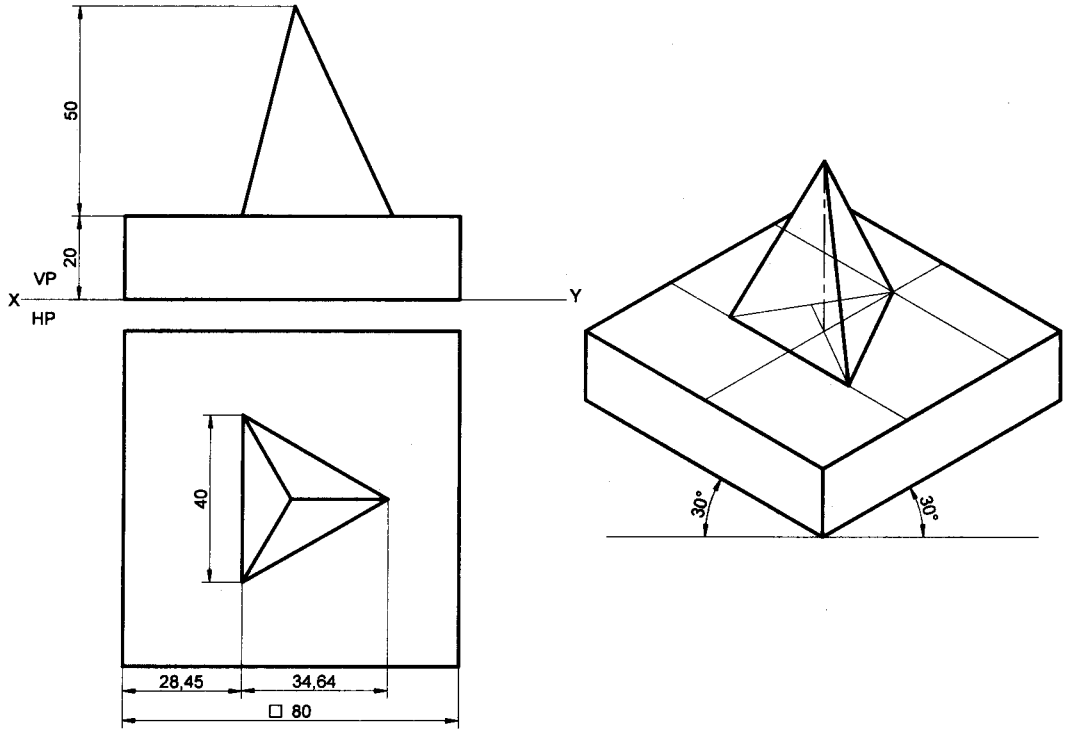
Problem 39 A frustum of a square pyramid base side-40mm, top face side-20mm and height 40mm is placed centrally on frustum of a cone base diameter 80mm, top diameter 60mm and height 20mm. Draw the isometric projection of the combination

Solution



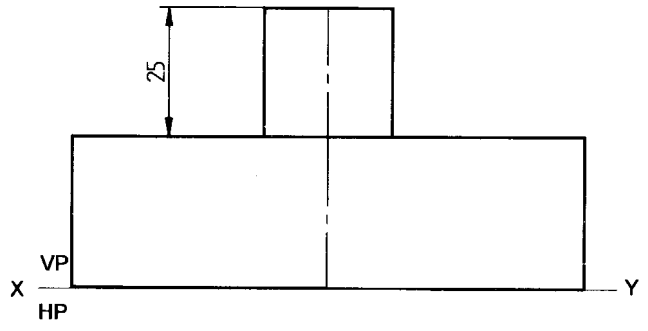
Problem 40 A triangular pyramid base side-40mm and height 50mm is placed centrally on a square slab side-80mm and 20mm-thick. Draw the isometric projection of the combination

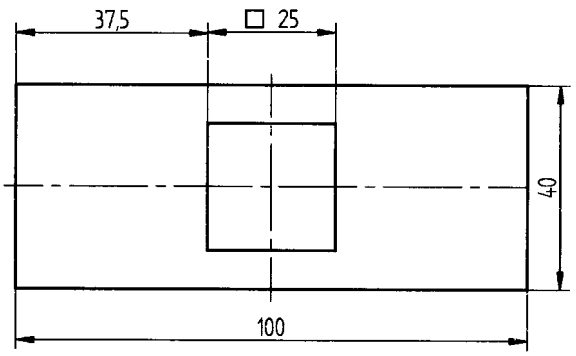
Solution

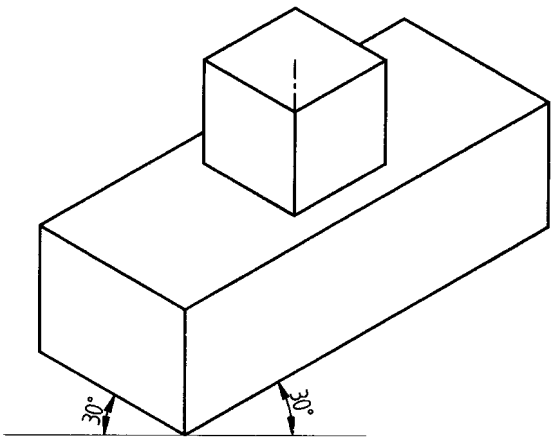


Problem 41 A cube of side-25mm is resting centrally on a rectangular slab 100mmx40mm and 30mm thick. Draw the isometric projection of the combination

Solution

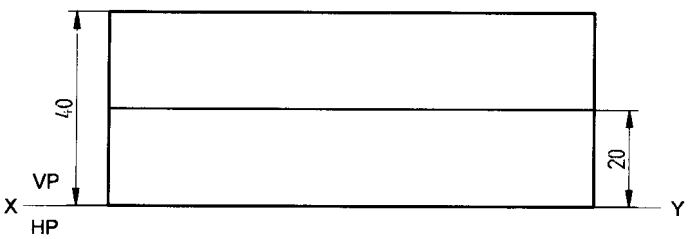


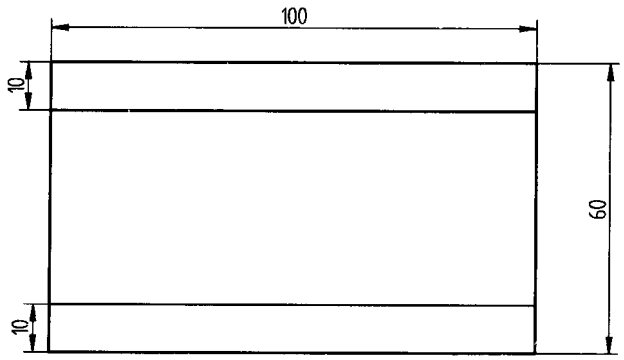


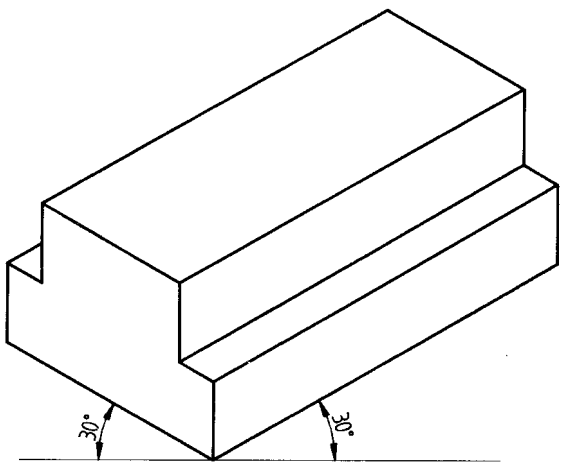


Problem 42 Two rectangular plates are placed centrally with dimensions (lxbxh)100mmx60mmx20mm and 100mmx40mmx20mm such that longer edges are parallel. Draw the isometric projection of the combination

Solution

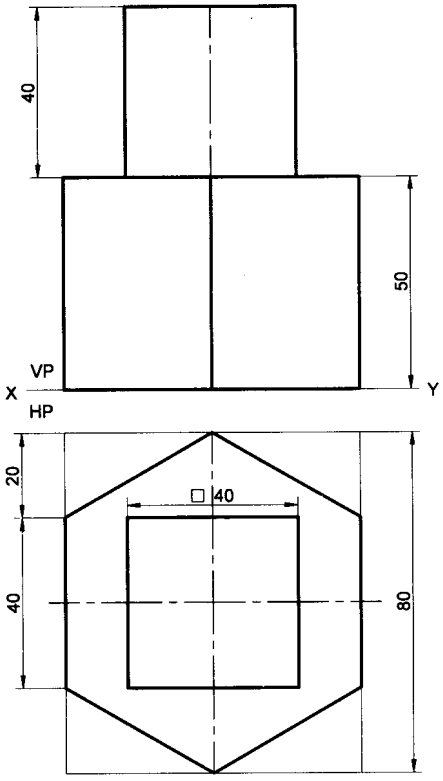


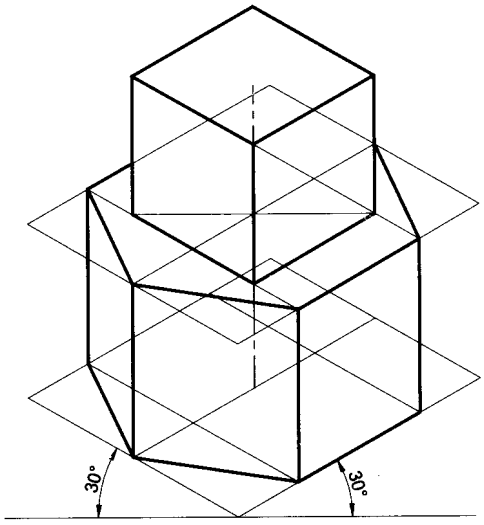




Problem 43 A cube of side-40mm is resting centrally on a hexagonal prism base side-40mm and height 50mm, such that one of the base sides of the cube is parallel to one of the sides of the top face of the prism. Draw the isometric projection of the combination.

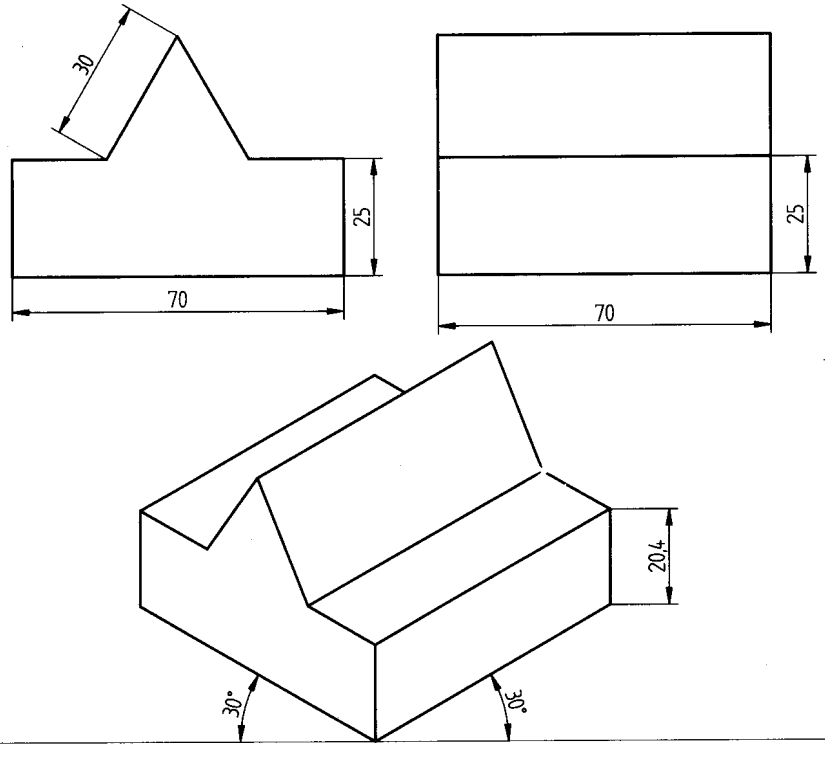
Solution





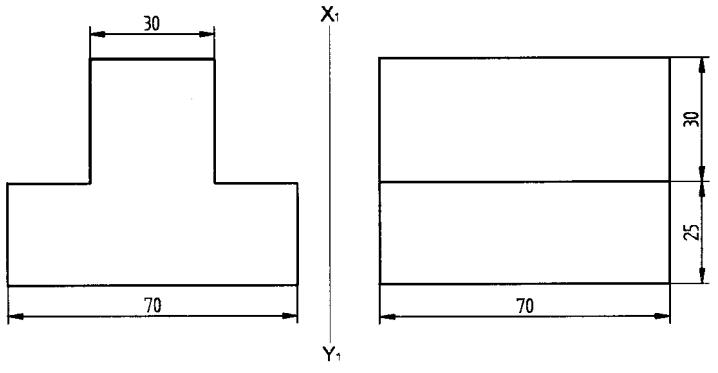
Problem 44 A triangular prism base side-30mm and length-70mm is resting on its rectangular face on top of a square slab side-70mm and 25mm-thick. Draw the isometric projection of the combination

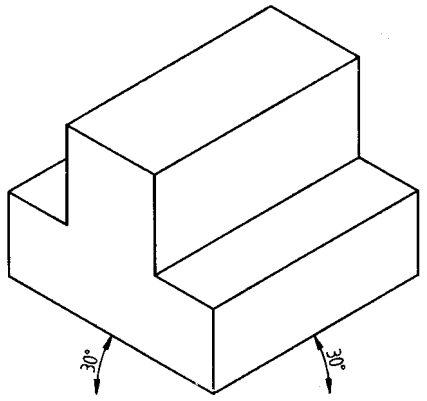
Solution



Problem 45 A square prism of base side-30mm and length-70mm, is resting on its rectangular face on top of a square slab side -70mm and 25mm-thick. Draw the isometric projection of the combination

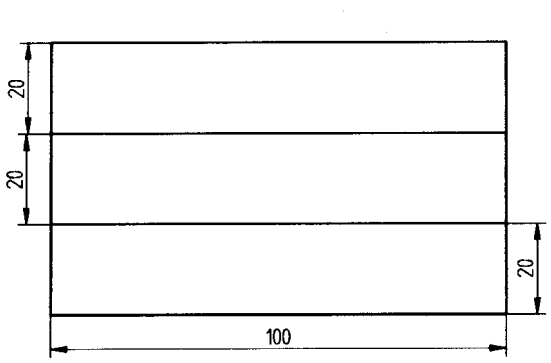
Solution

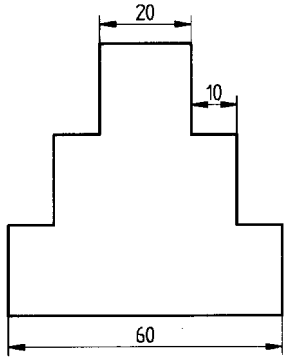


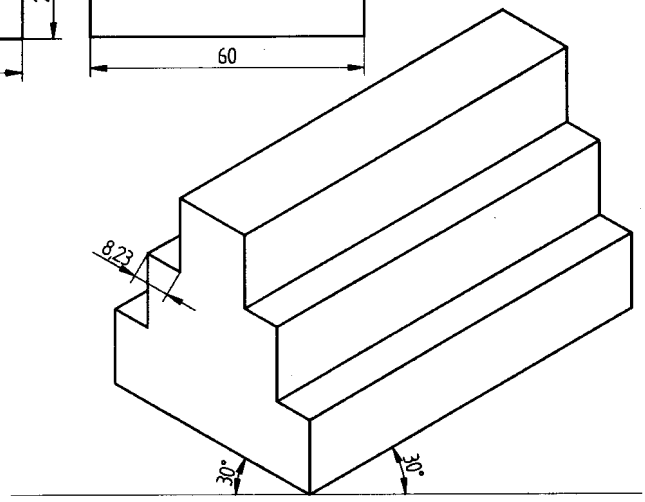


Problem 46 Three rectangular slabs (lxbxh) 100mmx60mmx20mm 100mmx40mmx20mm and 100mmx20mmx20mm are placed one above the other in the ascending order of their width-b, such that their longer axes are co-planar. Draw the isometric projection of the combination

Solution

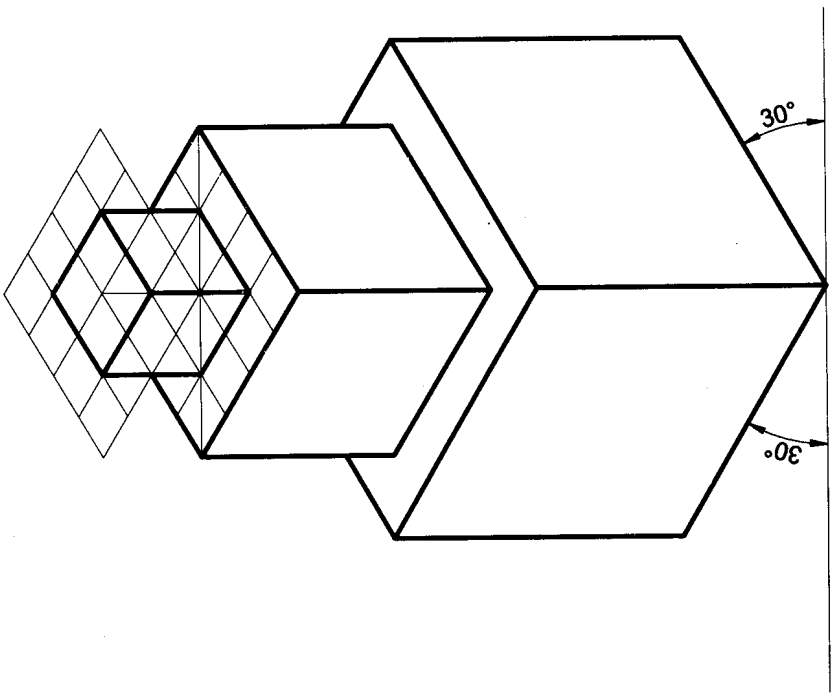


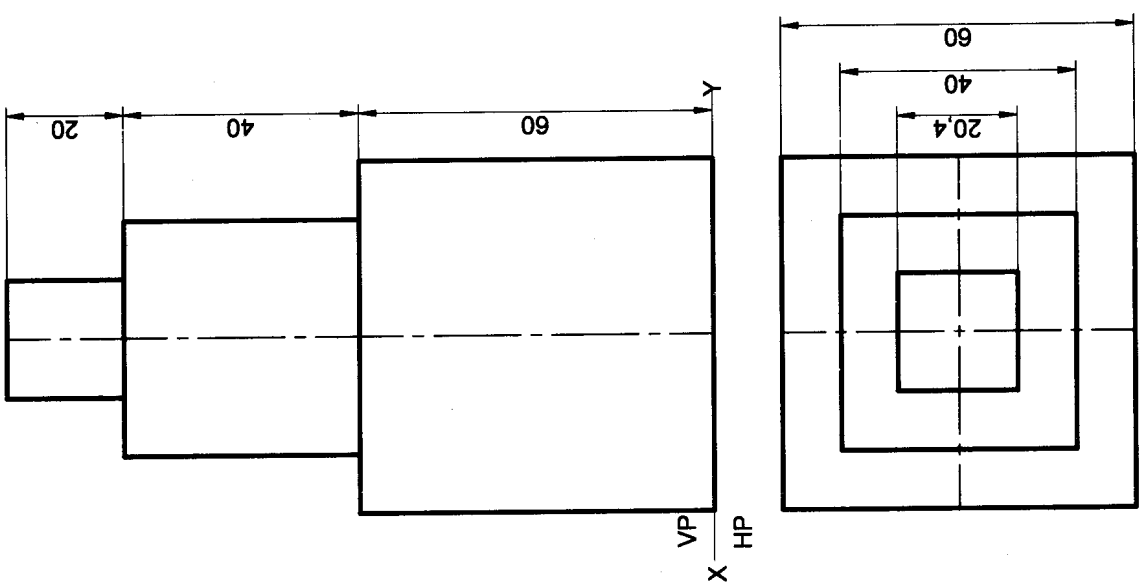




Problem 47 Three cubes of sides 60mm, 40mm and 20mm are placed centrally one above the other in the ascending order of their side. Draw the isometric projection of the combination

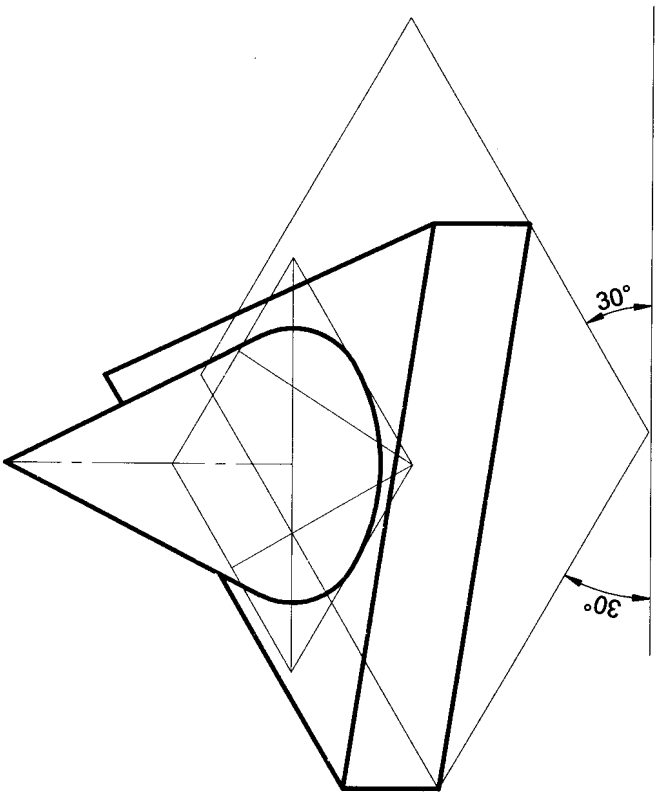
Solution

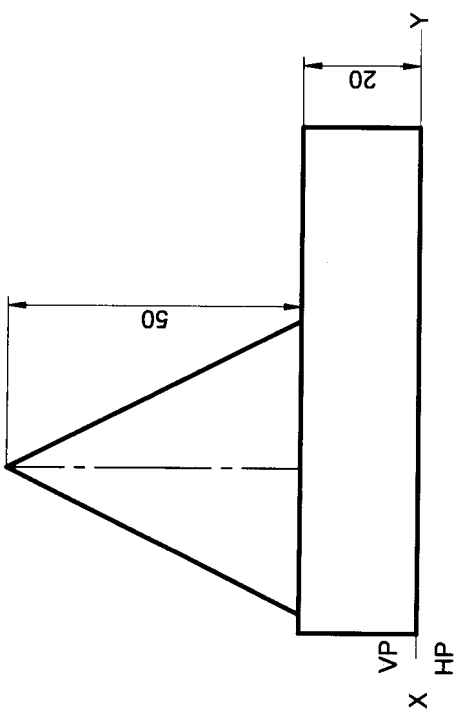


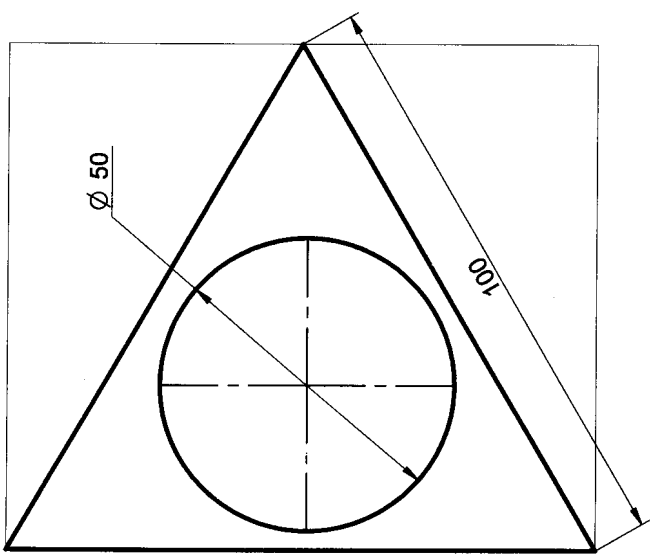


Problem 48 A cone of base diameter 50mm and height 60mm is placed centrally on an equilateral triangular prism of side-100mm and 20mm thick Draw the isometric projection of the combination

Solution

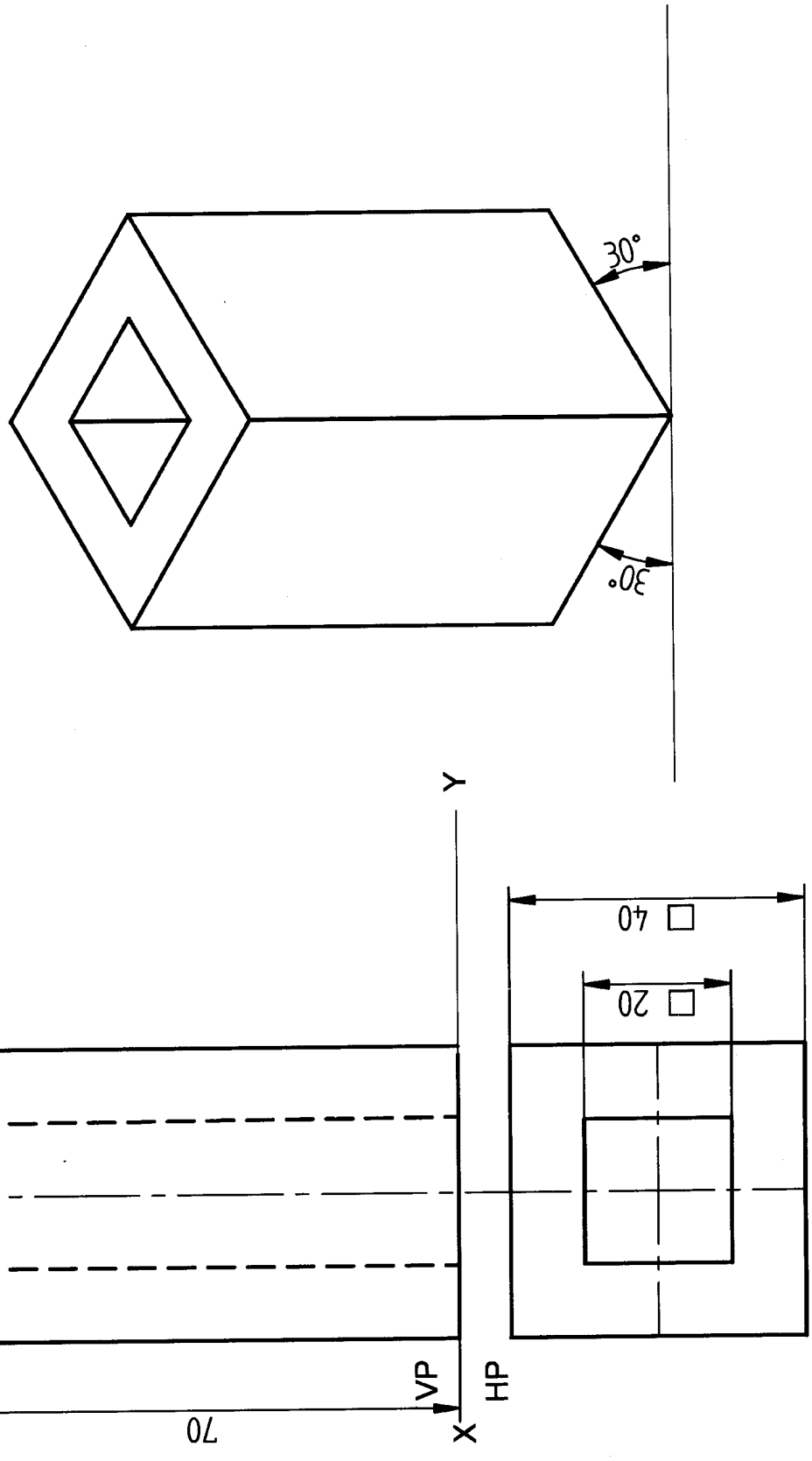






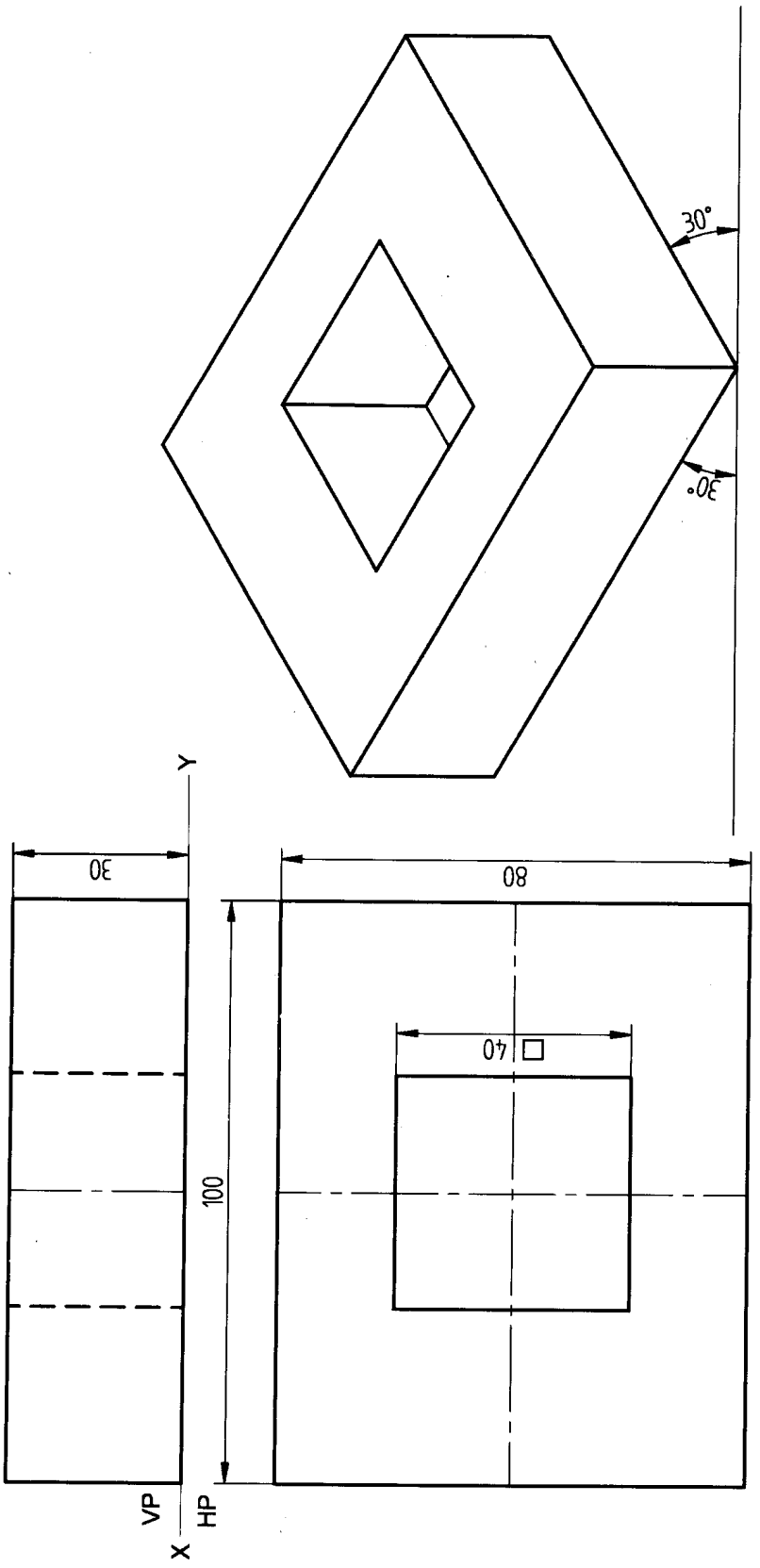
Problem 49 A square prism side-40mm and height 70mm has a full depth co-axial square hole side-20mm, such that edges of both the squares are parallel. Draw the isometric projection of the combination

Solution



Problem 50 A rectangular slab base-100mmx80mm and height 30mm has a full depth co-axial square hole side-40mm, such that one of the sides of the square is parallel to one of the sides of the rectangle. Draw the isometric projection of the combination

Solution

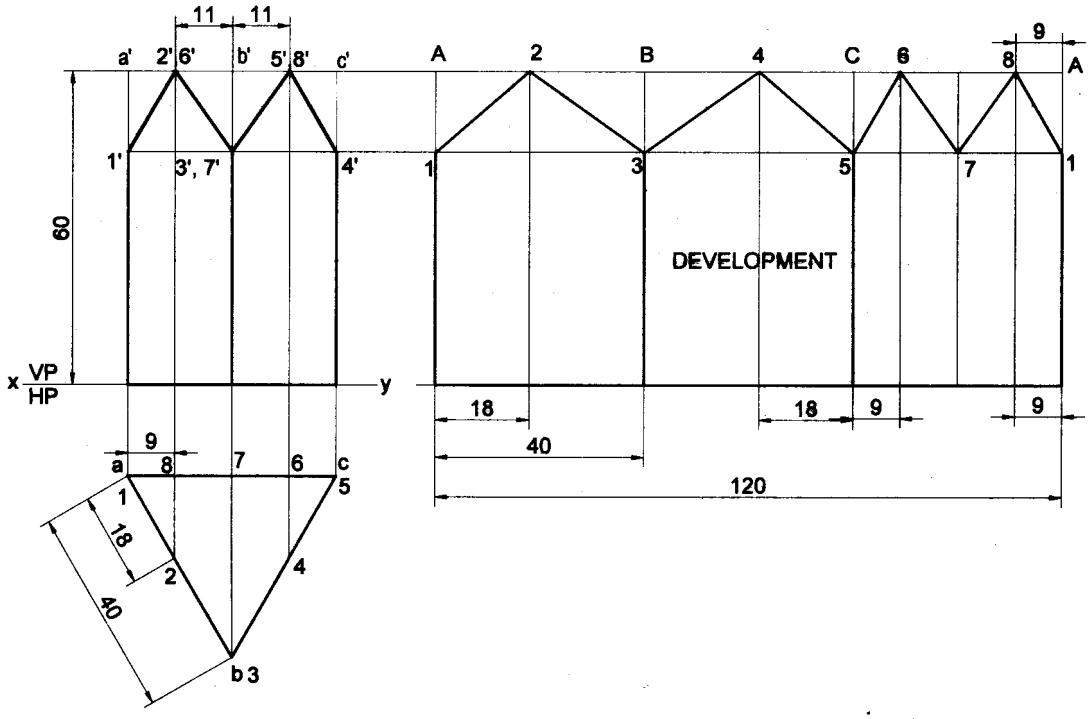


CHAPTER 5

DEVELOPMENT OF LATERAL SURFACES OF SOLIDS

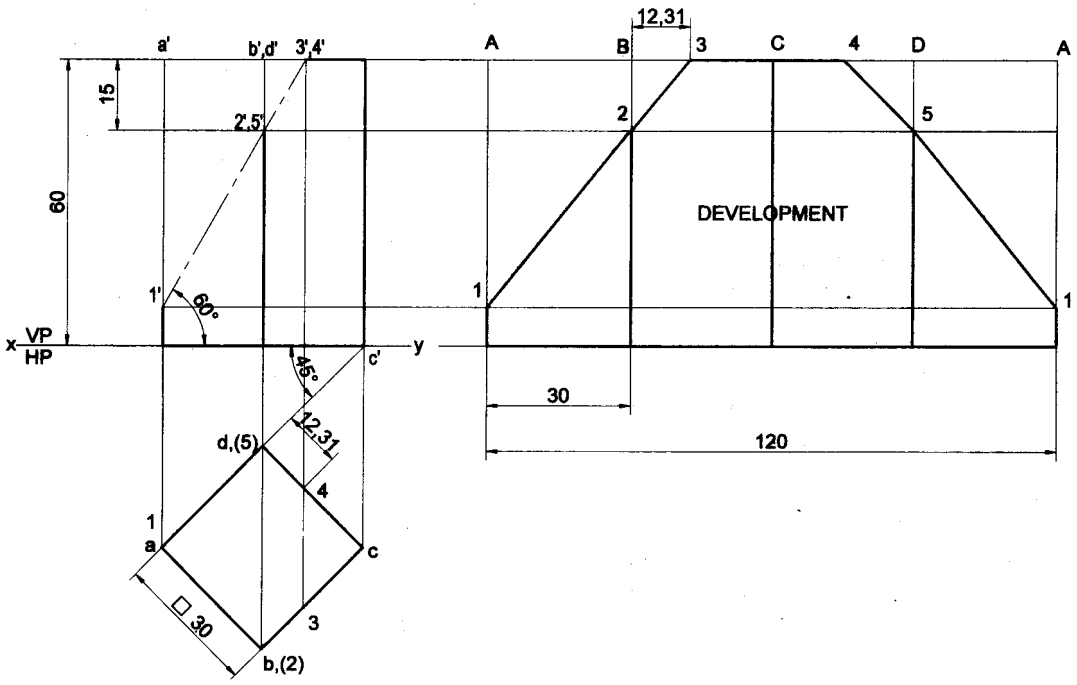
Problem 1 A triangular prism with one of its rectangular faces parallel to VP and nearer to it is cut as shown in Fig. Draw the development of the retained portions of the prism which are shown in dark lines.

Solution



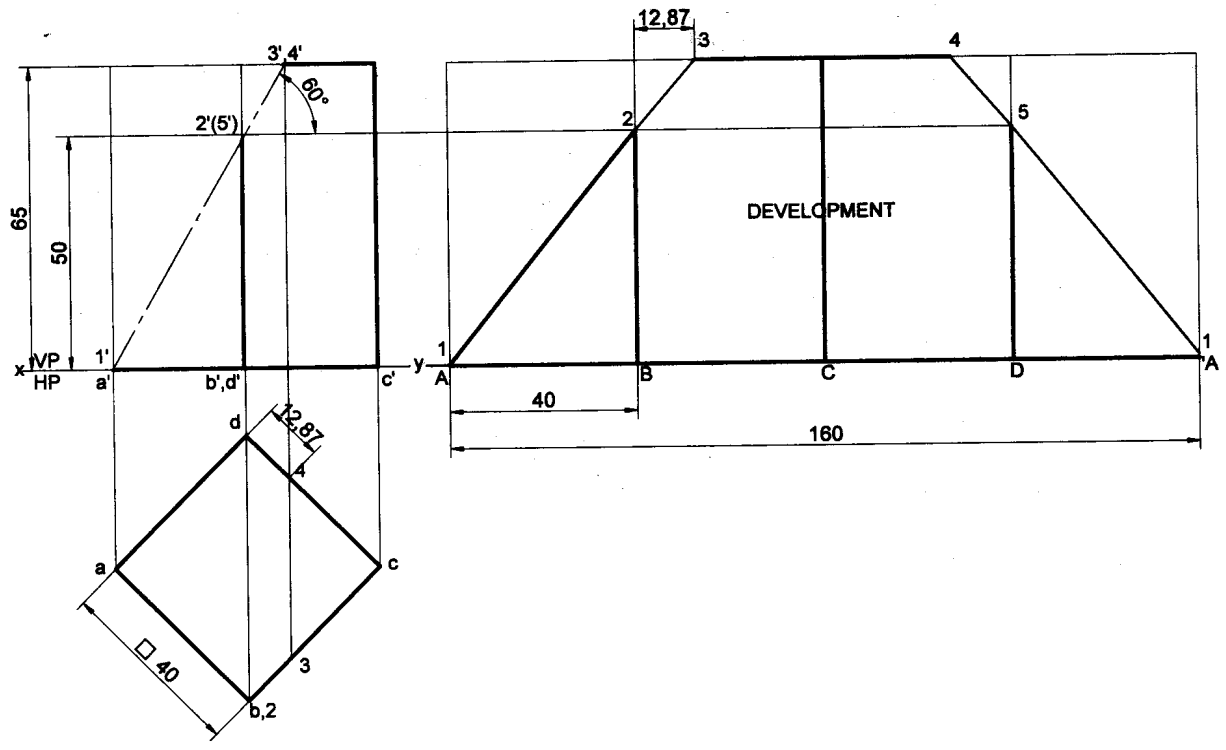
Problem 2 A square prism of base side 30 mm and axis length 60 mm is resting on HP on its base with all the vertical faces being equally inclined to VP. It is cut by an inclined plane 60° to HP and perpendicular to VP and is passing through a point on the axis at a distance 50 mm from the base. Draw the development of the lower portion of the prism.

Solution



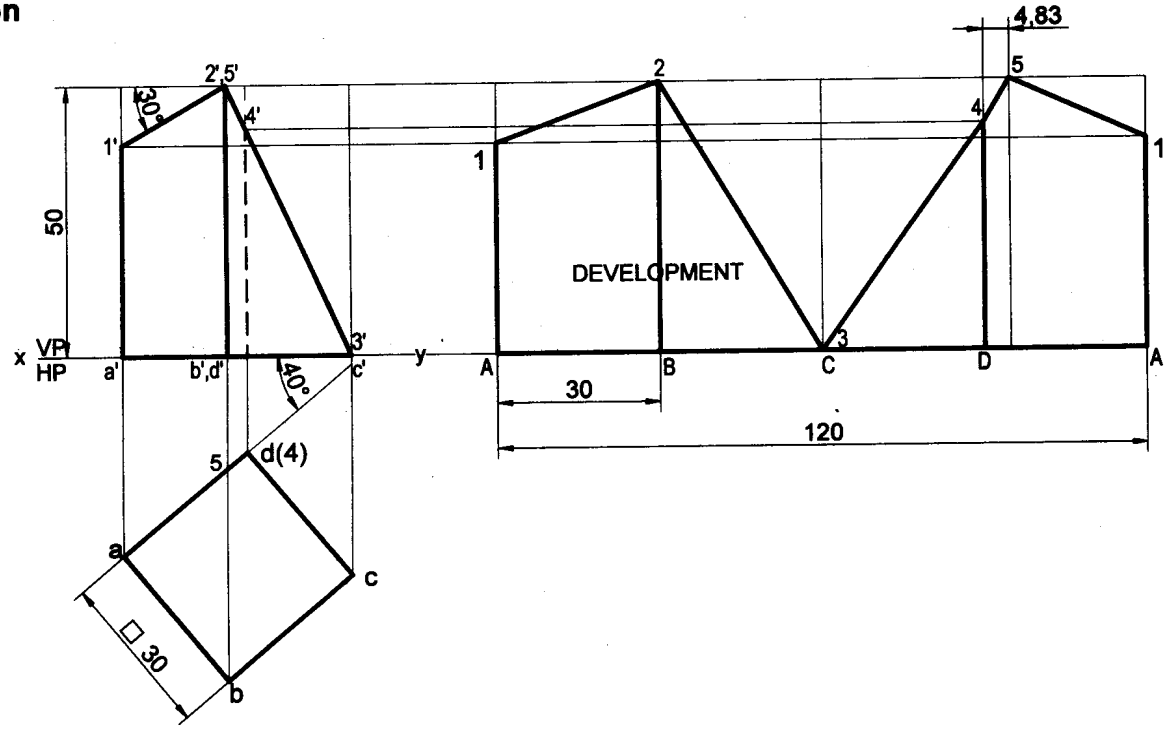
Problem 3 A square prism of base side 40mm and axis length 65mm is resting on HP on its base with all the vertical faces being equally inclined to VP. It is cut by an inclined plane 60° to HP and perpendicular to VP and is passing through a point on the axis at a distance 15mm from the top face. Draw the development of the lower portion of the prism.

Solution



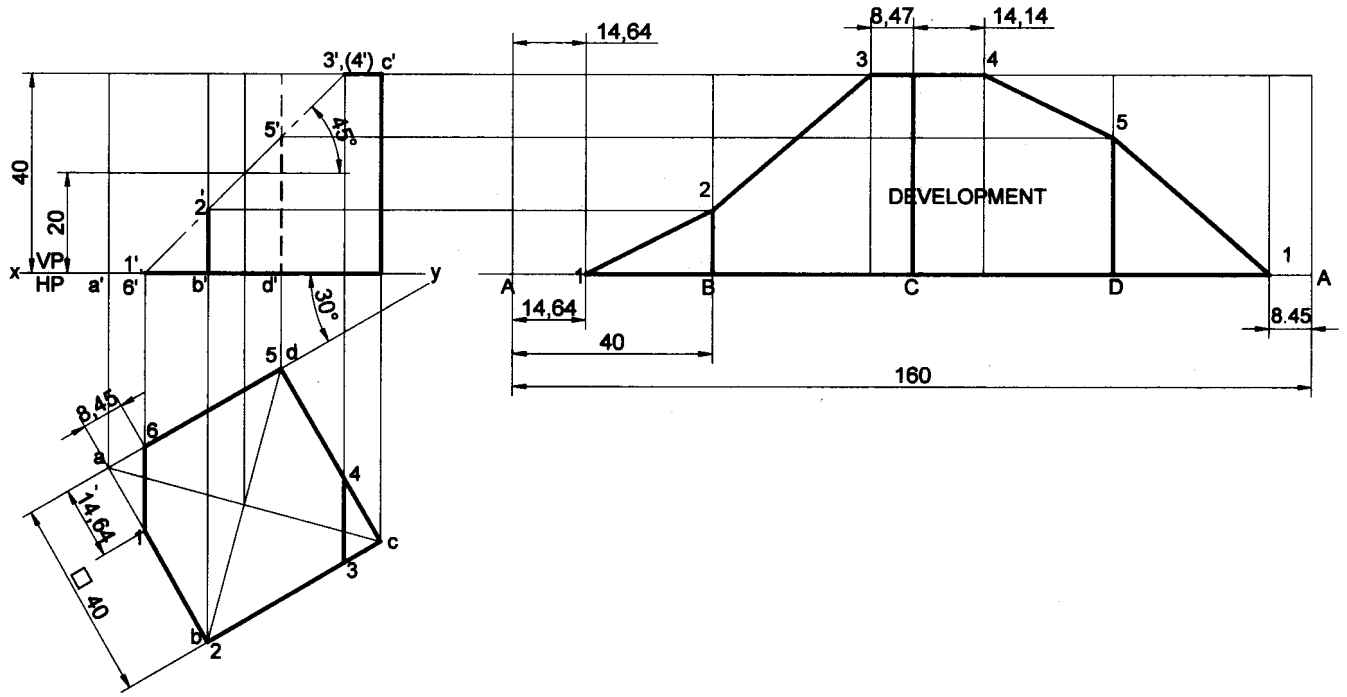
Problem 4 A square prism of 30mm side of the base and height 50mm is resting with its base on HP such that one of its vertical faces is inclined at 40° to VP. It is cut as shown in the following front view figure. Draw the development of the lateral surface of the prism.

Solution



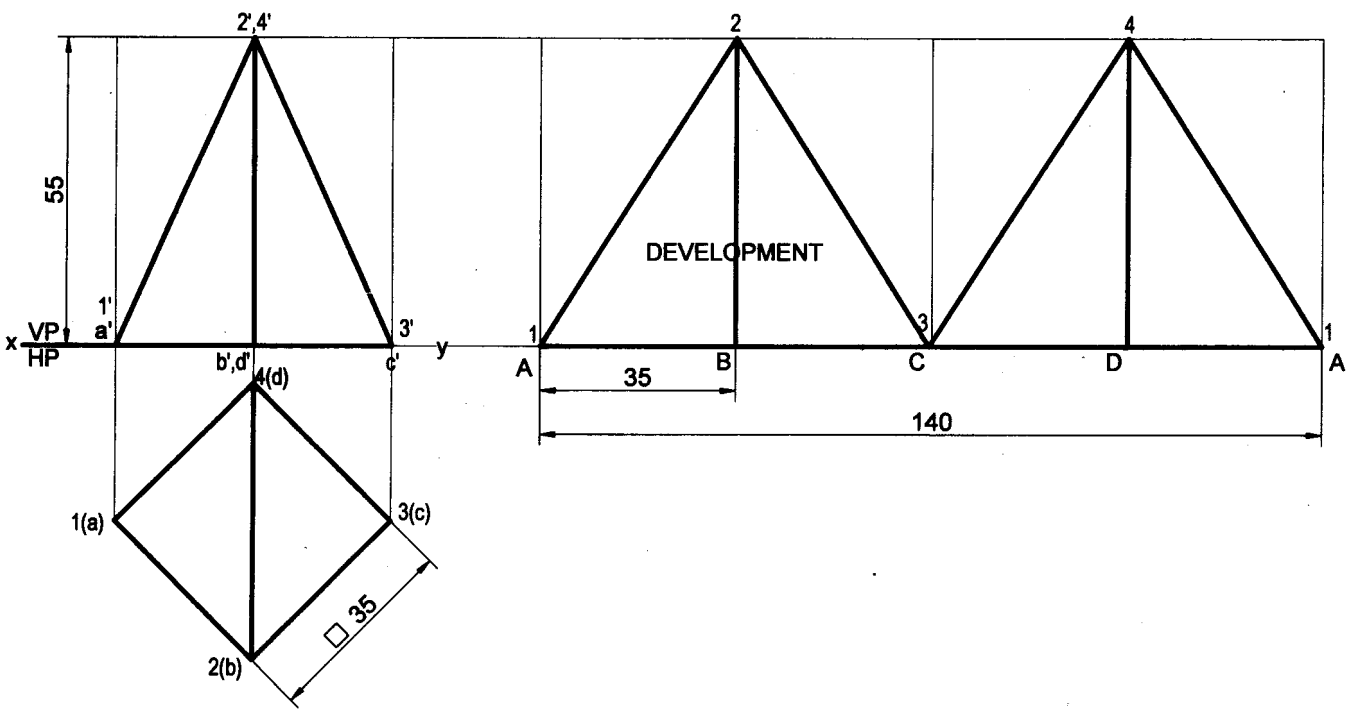
Problem 5 A cube of side 40mm is resting on HP with its base on HP such that one of its vertical faces is inclined at 30° to the VP. It is cut by a section plane perpendicular to VP, inclined to HP at an angle 45º and passes through the midpoint of the axis. Draw the development of the lower lateral surface of the cube.

Solution



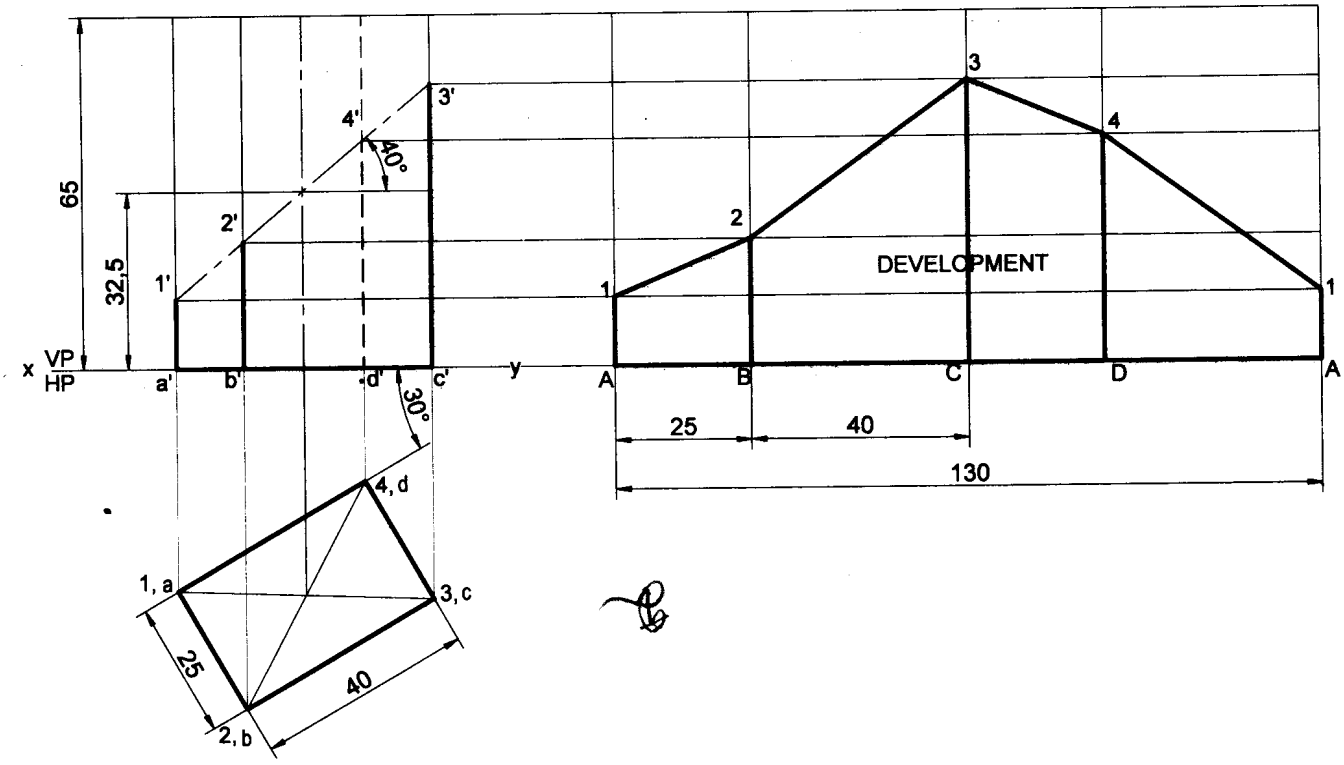
Problem 6 A square prism of base side 35mm rests with its base on HP and two faces equally inclined to VP. Draw the development of the lateral surfaces of the retained portions of the cut prism shown by dark lines in the Fig.

Solution



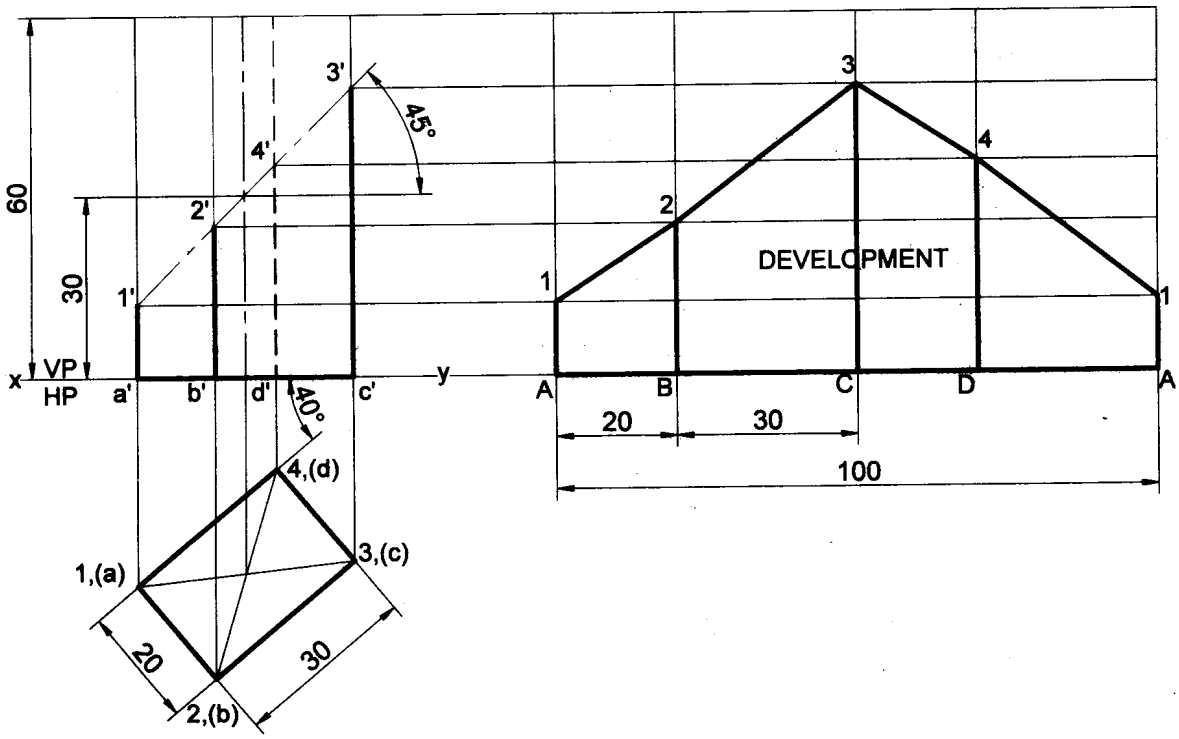
Problem 7 A rectangular prism of base 40mm x 25mm and height 65mm rests on HP on its base with the longer base side inclined at 30° to VP. It is cut by a plane inclined at 40° to HP, perpendicular to VP cuts the axis at its mid height. Draw the development of the remaining portion of the prism.

Solution



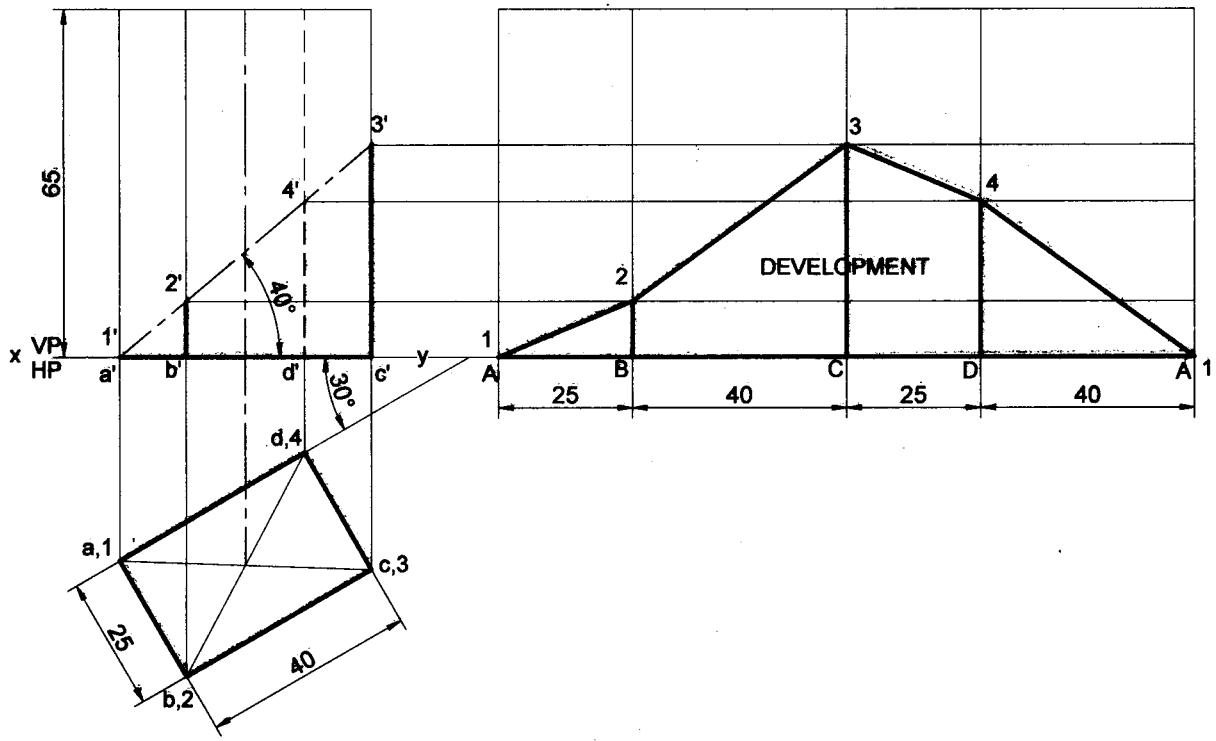
Problem 8 A rectangular prism of base 30mm x 20mm and height 60mm rests on HP on its base with the longer base side inclined at 40° to VP. It is cut by a plane inclined at 45° to HP, perpendicular to VP and bisects the axis. Draw the development of the lateral surface of the prism.

Solution



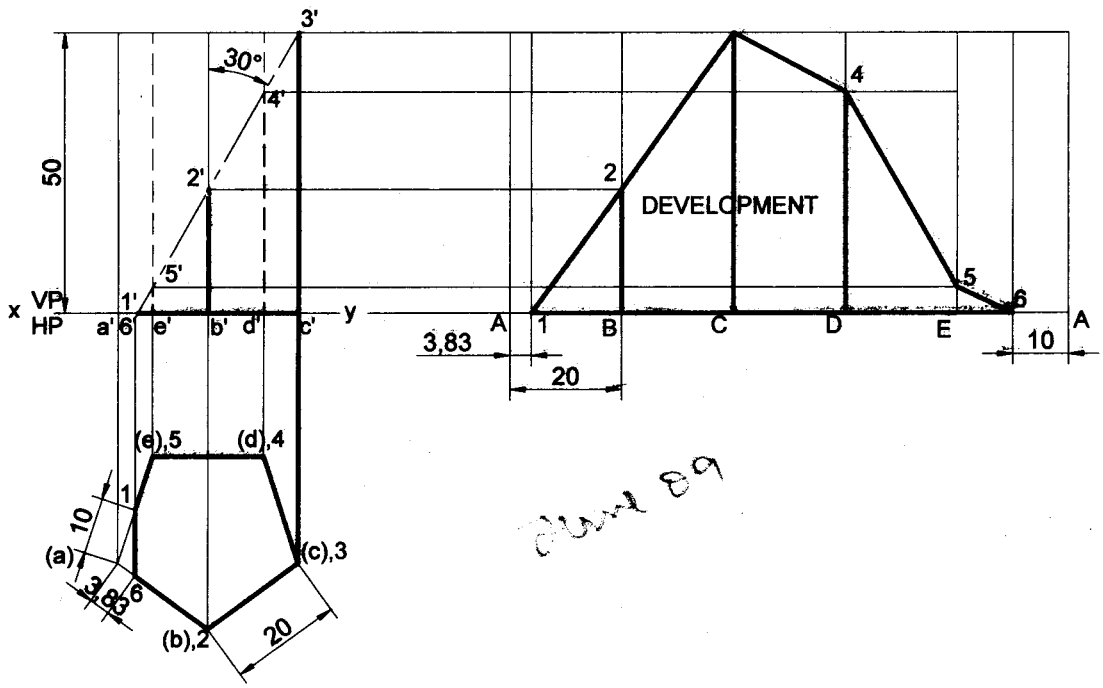
Problem 9 A rectangular prism of base size 25mmx40mm and axis length 65mm is resting on HP on its base with the longer side of base inclined at 30° to VP. It is cut by a plane inclined at 40° to HP and perpendicular to VP and passes through the extreme left corner of base. Draw the development of the lateral surface of the remaining portion of the prism.

Solution



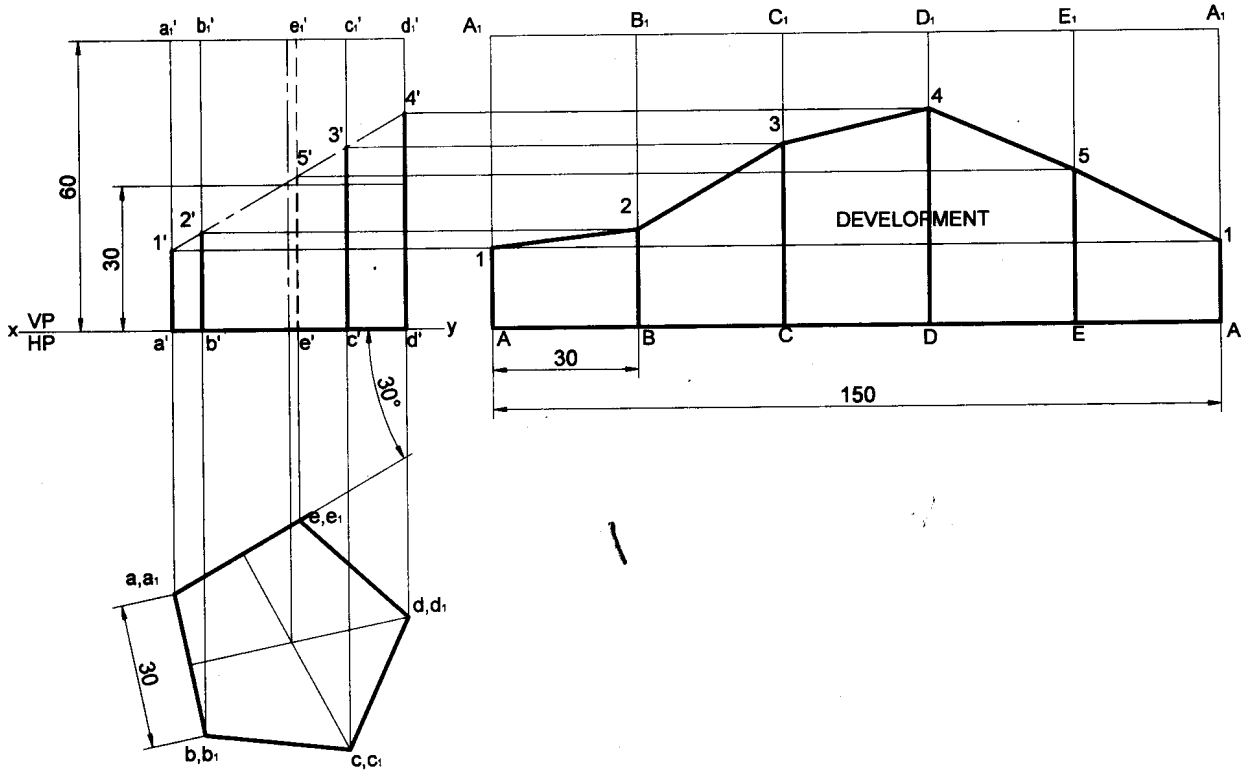
Problem 10 Draw the development of the truncated portion of the lateral faces of a pentagonal prism of 20mm sides of base and 50mm height standing vertically with one of its rectangular faces parallel to VP and nearer to it so as to produce a one piece development. The inclined face of the truncated prism is 30° to its axis and passes through the right extreme corner of the top face of the prism.

Solution



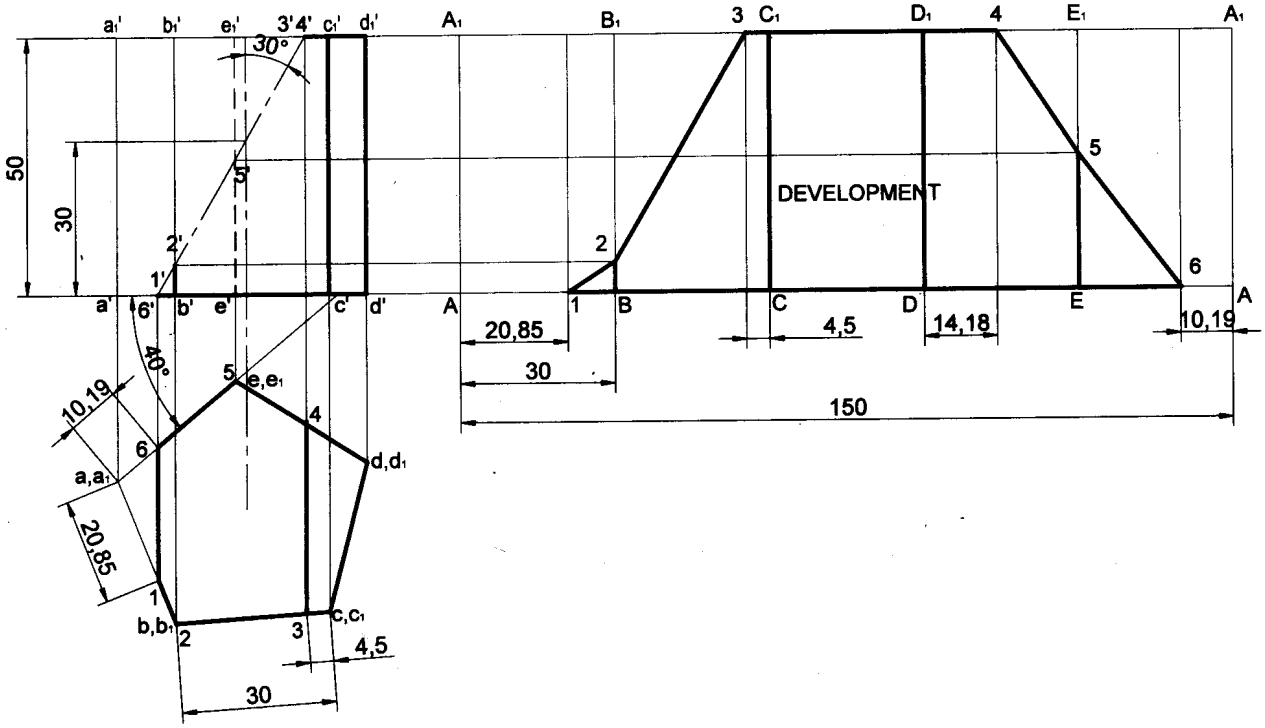
Problem 11 A regular pentagonal prism of height 60mm and base edge 30mm rests with its base on HP. The vertical face closest to VP is 30° to it. Draw the development of the truncated prism with its truncated surface inclined at 60° to its axis and bisecting it.

Solution



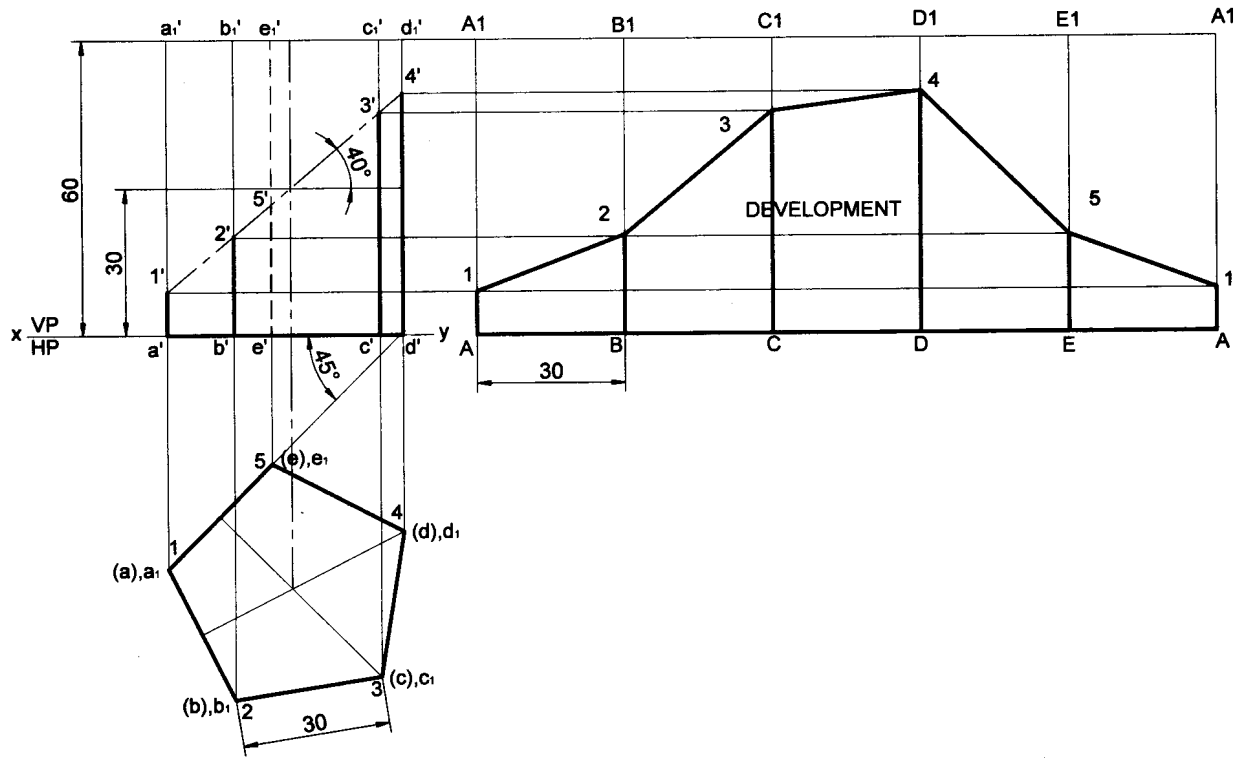
Problem 12 A pentagonal prism of 30mm side of base and height 50mm lies with its base on HP such that one of the rectangular faces is inclined at 40° to VP. It is cut to the shape of a truncated pyramid with the truncated surface inclined at 30° to the axis so as to pass through a point on it 30mm above the base. Develop the truncated portion of the prism so as to produce a one piece development.

Solution



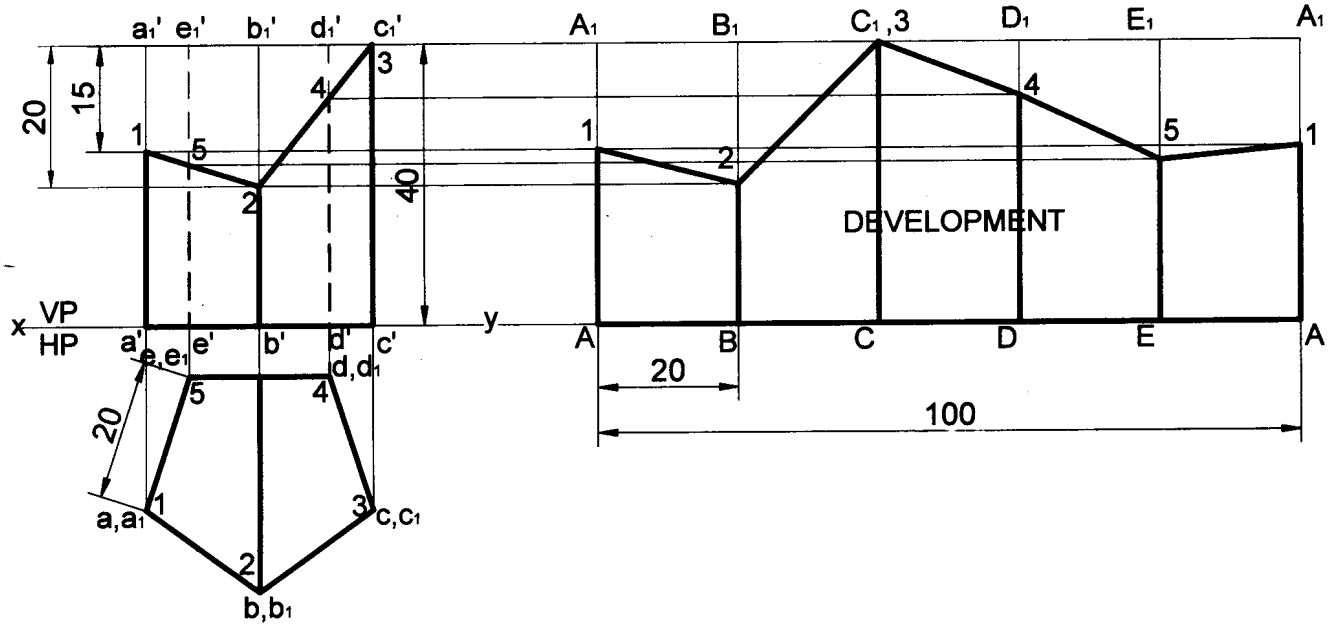
Problem 13 A pentagonal prism of base sides 30mm and axis length 60mm rests with its base on HP and an edge of the base inclined at 45° to VP. It is cut by a plane perpendicular to VP, inclined at 40° to HP and passing through a point on the axis, at a distance of 30 mm from the base. Develop the remaining surfaces of the truncated prism.

Solution



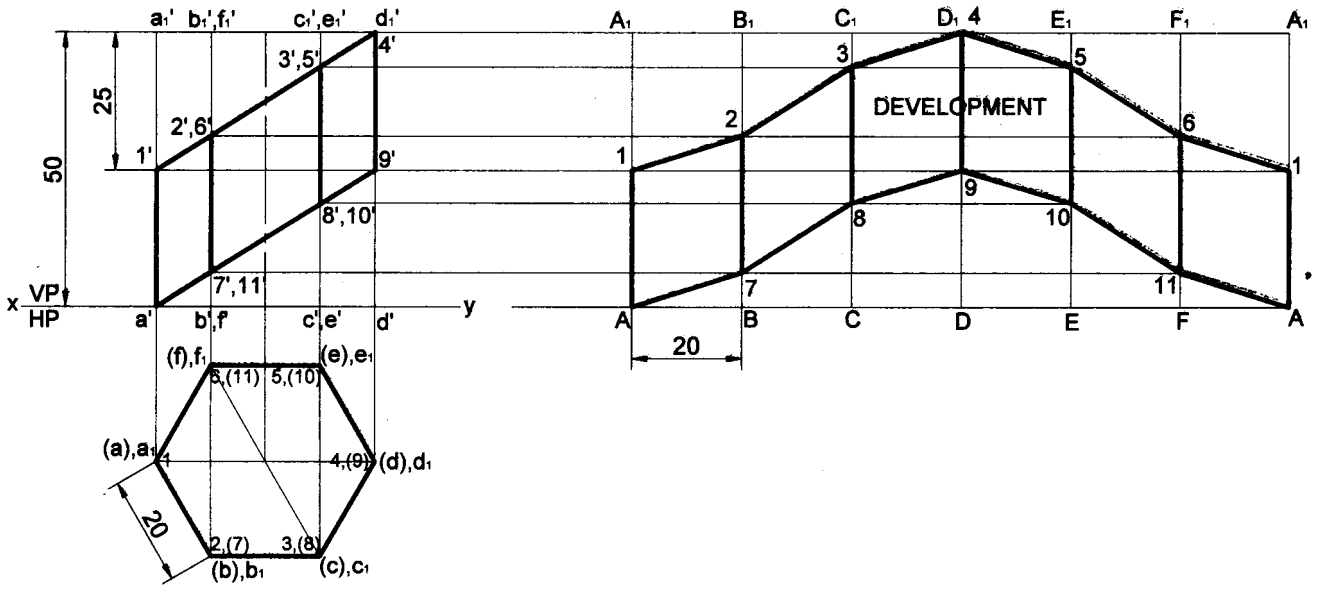
Problem 14 A pentagonal prism of base sides 20mm and height 40mm is resting with its base on HP and base edge parallel to the VP. The prism is cut as shown in the following front view. Draw the development of the lateral surface of the prism.

Solution



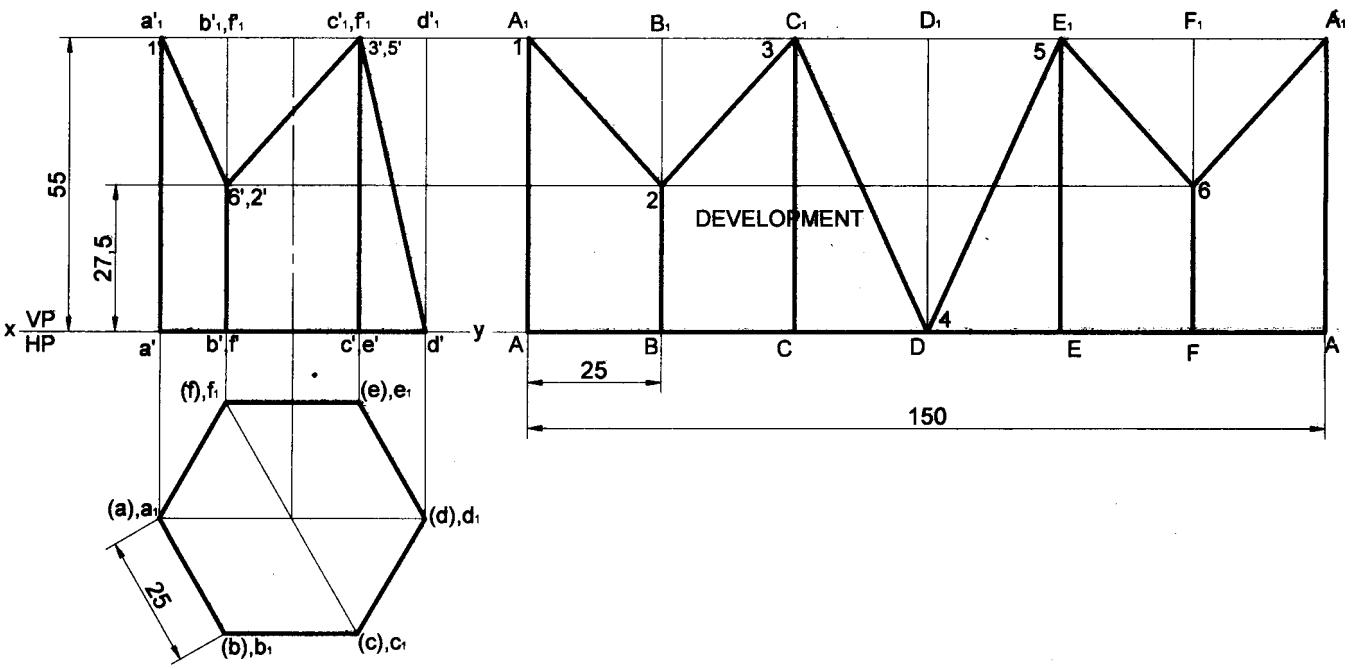
Problem 15 A hexagonal prism of base side 20mm and height 50mm is resting on HP on its base, such that one of its base edge is parallel to VP. The prism is cut in this position as shown in the following front view. Draw the development of the lateral surface of the prism.

Solution



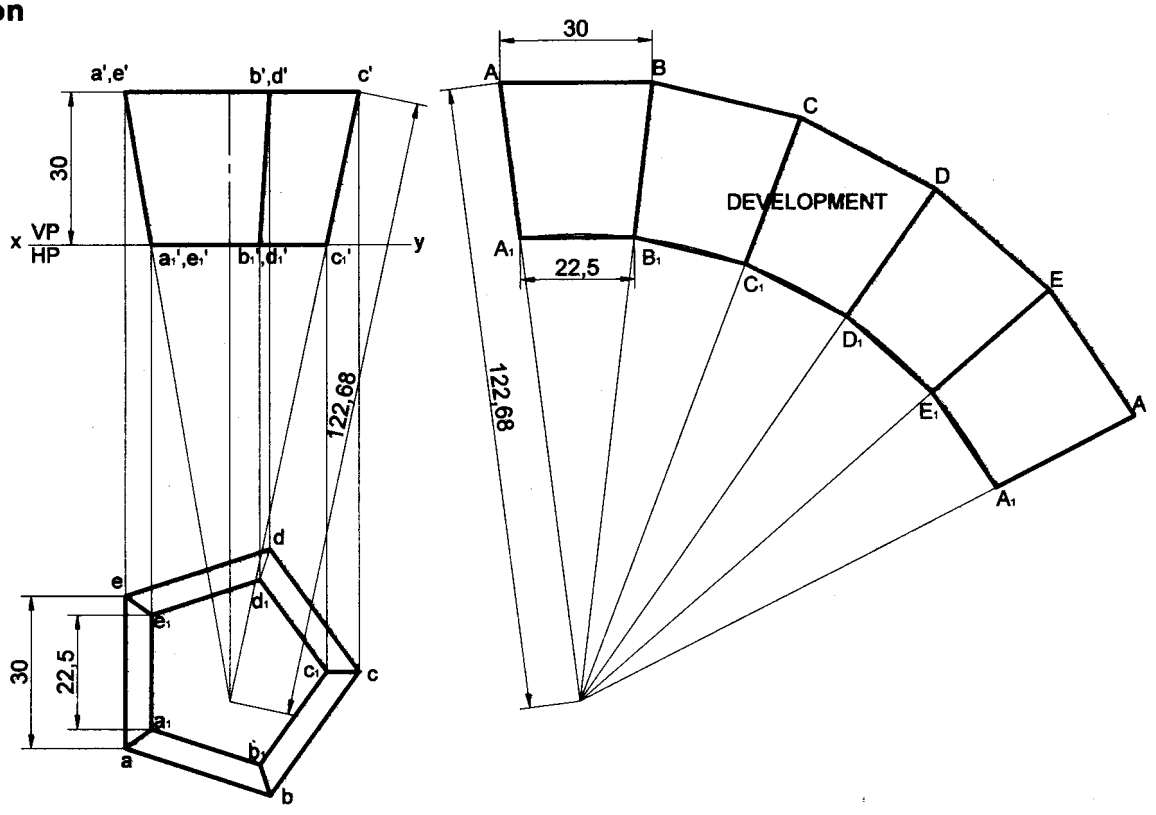
Problem 16 A hexagonal prism of base side 25mm and height 55mm is resting on HP on its base, such that one of its base edges is parallel to VP. The prism is cut in this position as shown in the following front view. Draw the development of the lateral surface of the prism.

Solution



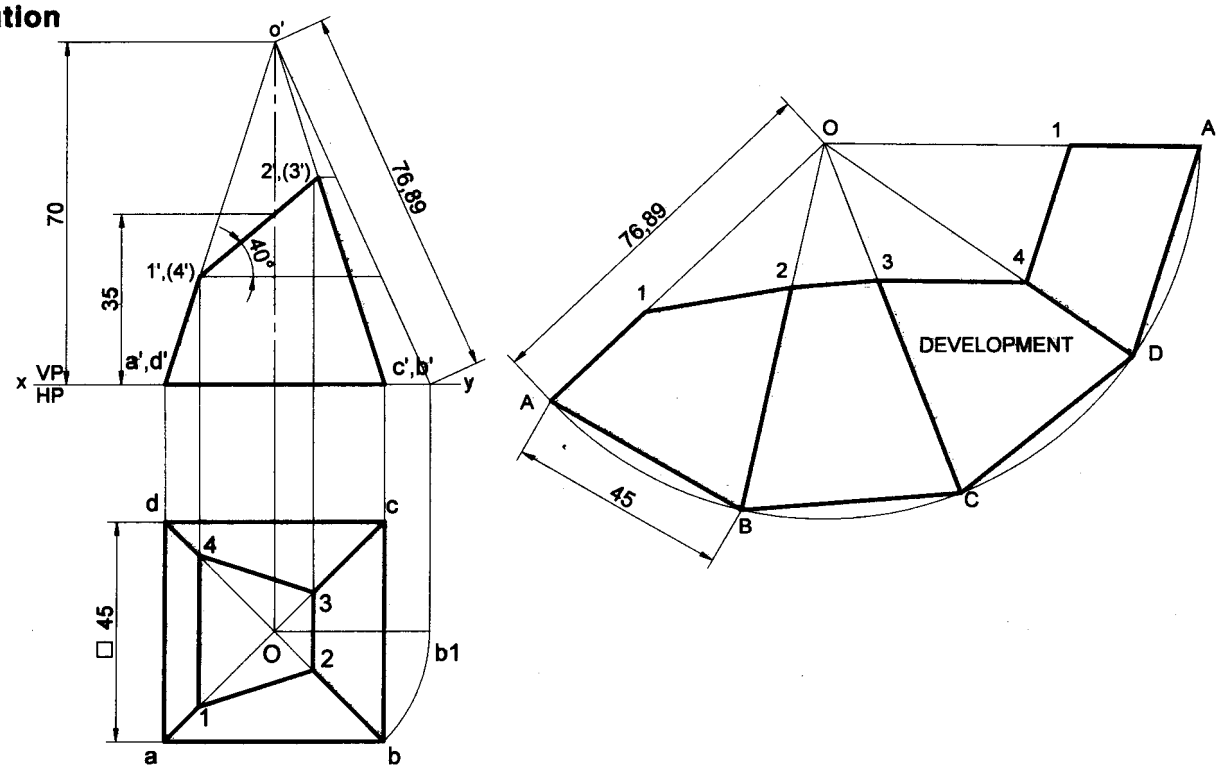
Problem 17 The inside of a hopper of a flour mill is to be lined with thin sheet. The top and bottom of the hopper are regular pentagons with each side equal to 30 mm and 22.5mm respectively. The height of the hopper is 30mm. Draw the shape of the sheet to which it is to be cut so as to fit into the hopper.

Solution



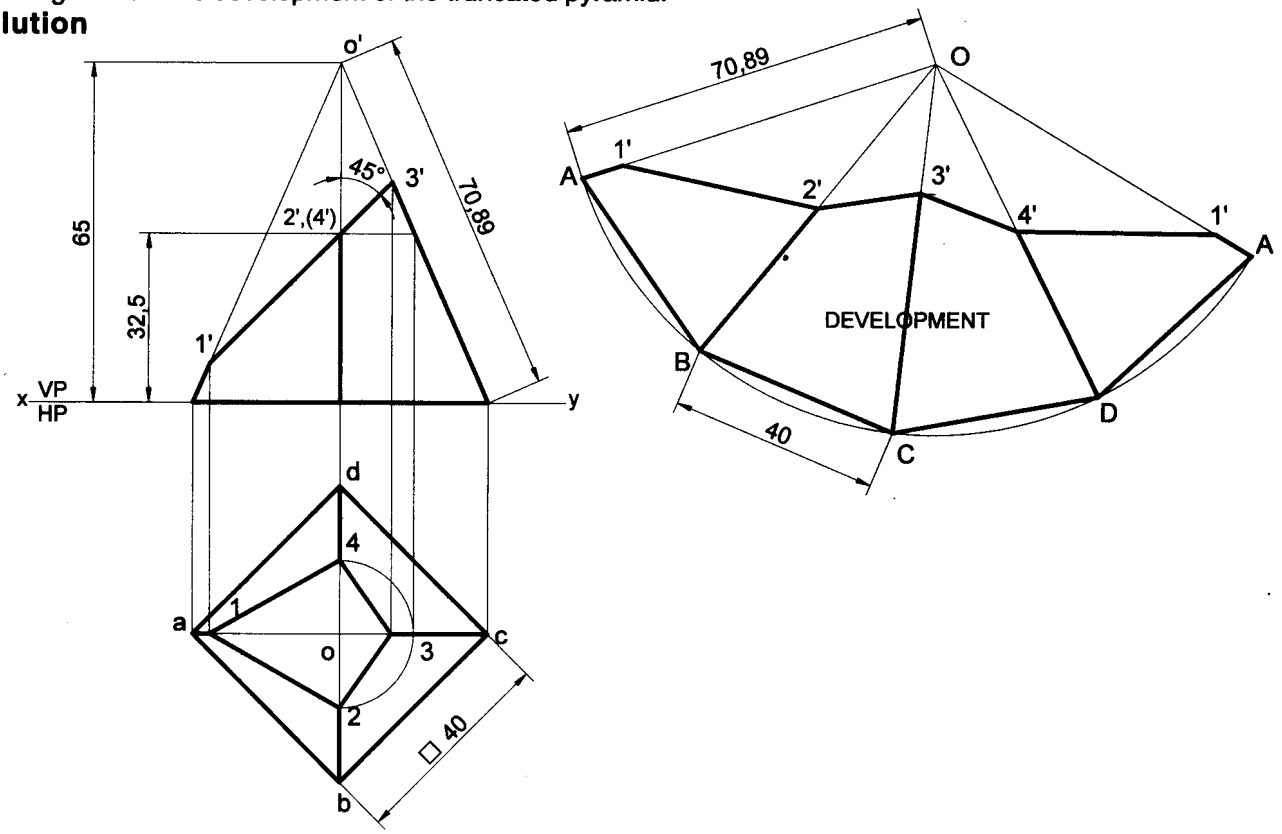
Problem 18 A square pyramid of side of base 45mm, altitude 70mm is resting with its base on HP with two sides of the base parallel to VP. The pyramid is cut by a section plane which is perpendicular to the VP and inclined at 40° to the HP. The cutting plane bisects the axis of the pyramid. Obtain the development of the lateral surfaces the truncated pyramid.

Solution



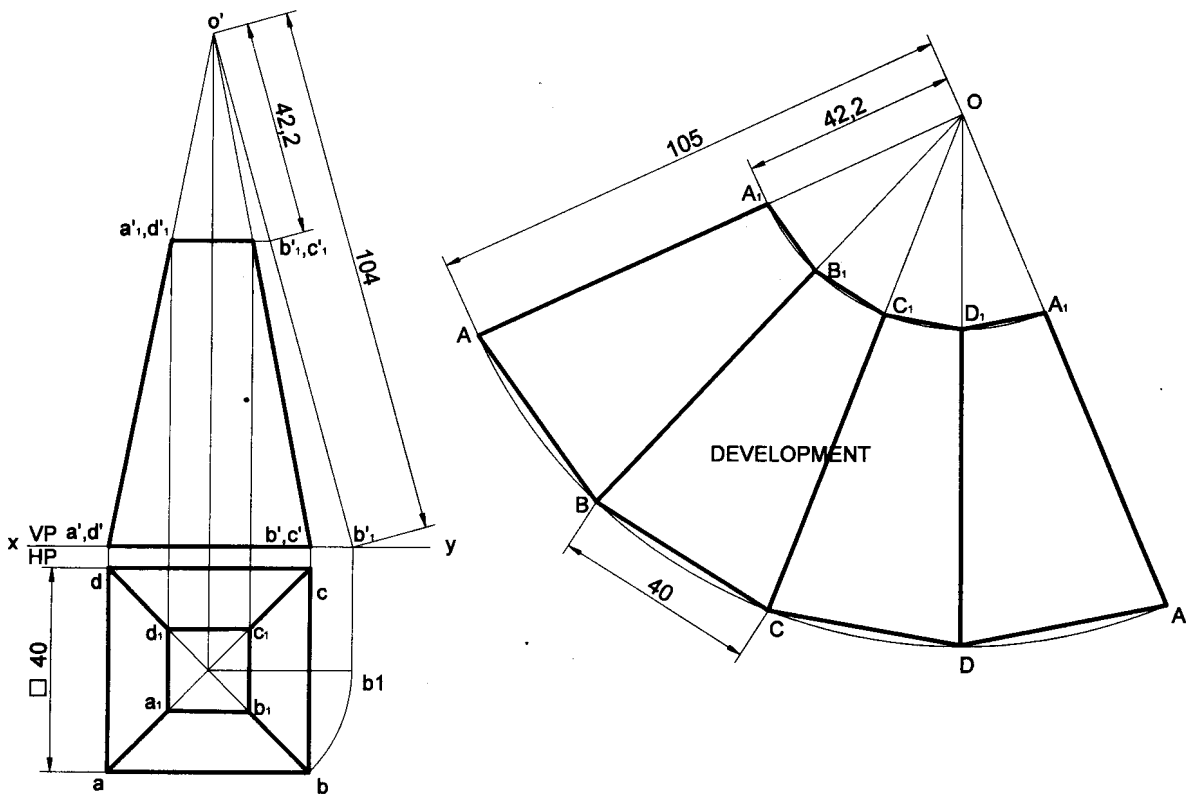
Problem 19 A square pyramid base 40mm side and axis 65mm long has its base on HP and all the edges of the base are equally inclined to VP. It is cut to with an inclined section plane so as the truncated surface at 45° to its axis, bisecting it. Draw the development of the truncated pyramid.

Solution



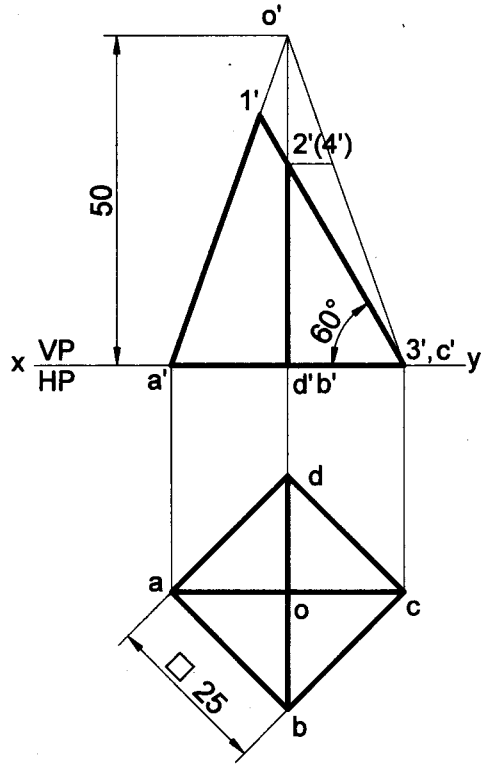
Problem 20 A frustum of a square pyramid has its base 40 mm sides, top 16 mm sides and height 60mm, its axis is vertical and a side of its base is parallel to VP. Draw the projections of the frustum and show the development of the lateral surfaces of it.

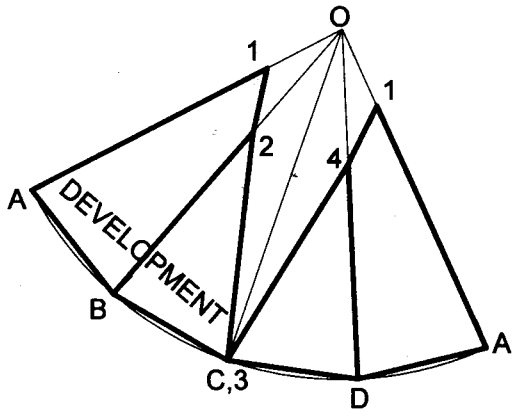
Solution



Problem 21 A square pyramid of 25mm base edge and 50mm height rests with its base on HP with all of its base edges equally inclined to VP. It is cut by a plane perpendicular to VP and inclined to HP at 60°, passing through the extreme right corner of base. Draw the development of the lateral surface of the pyramid.

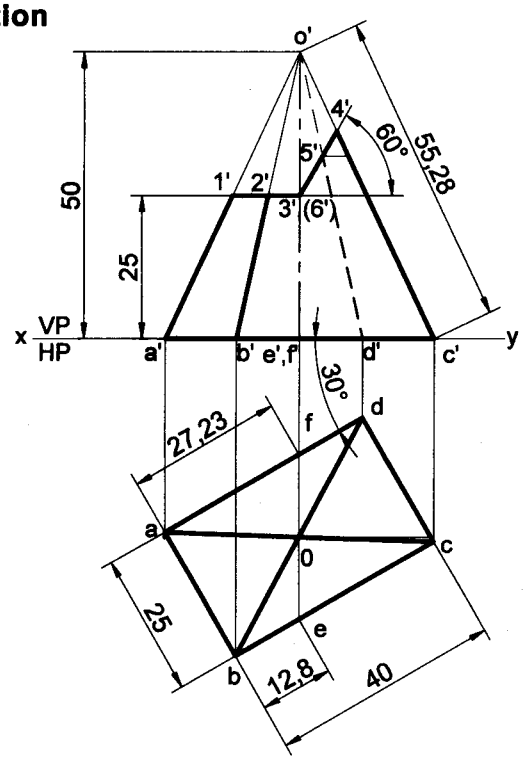
Solution

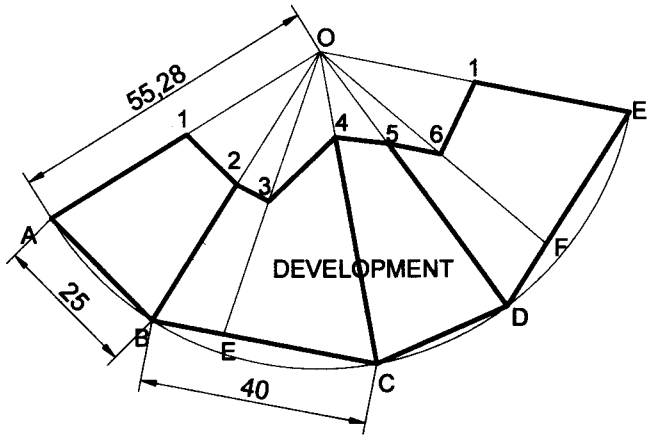




Problem 22 A rectangular pyramid, side of base 25mm x 40mm and height 50mm has one of the sides of the base is inclined at 30º to the VP. Draw the development of the lateral surface of the cut pyramid, whose front view is shown below.

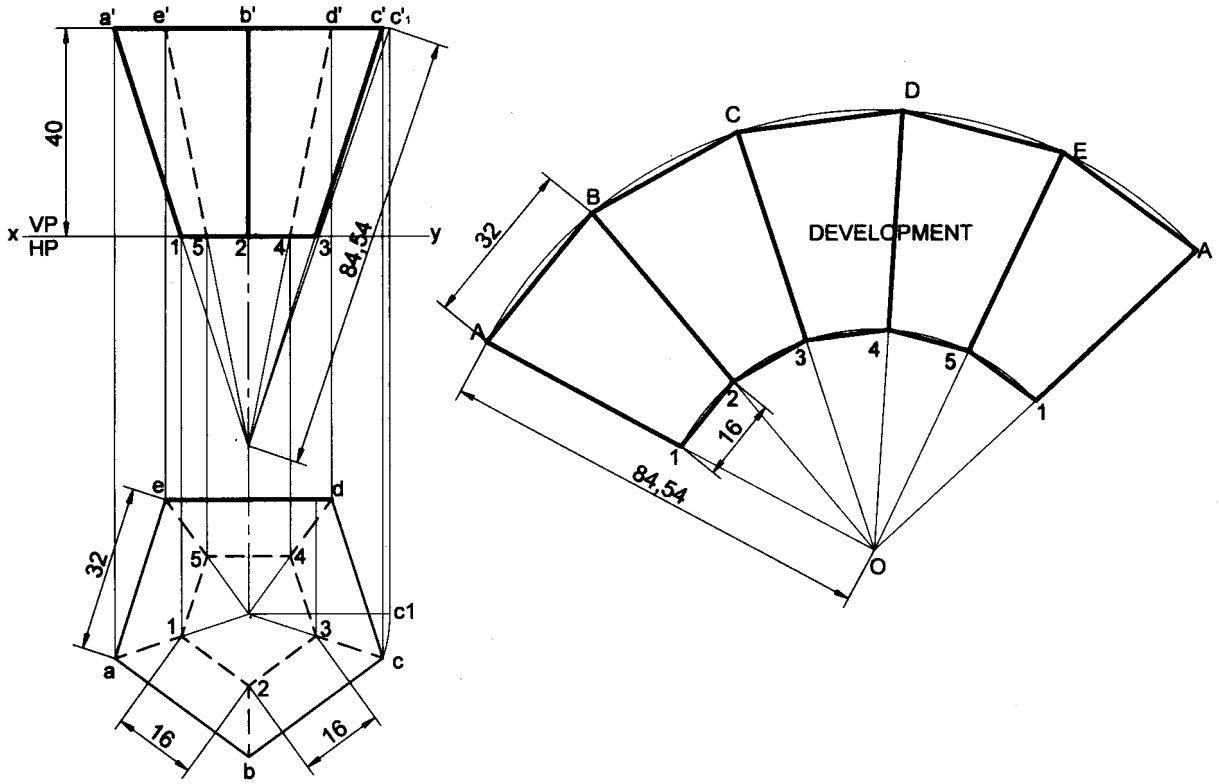
Solution





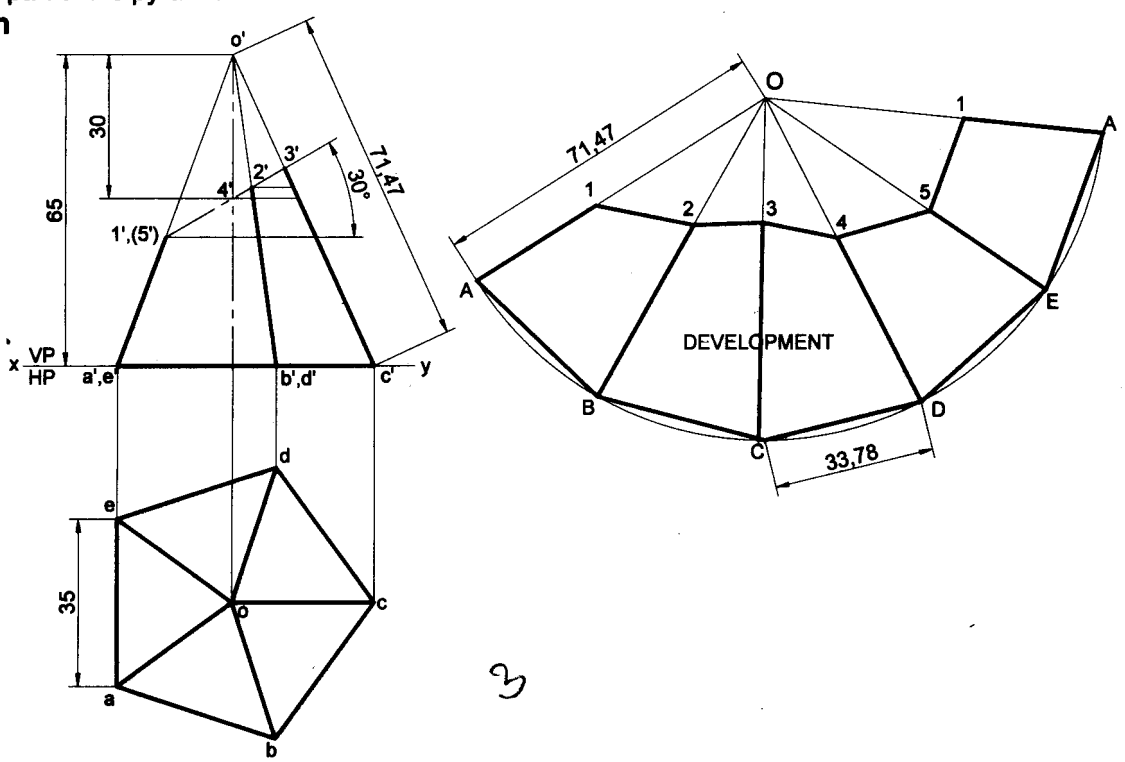
Problem 23 A frustum of a pentagonal pyramid, smaller base sides 16mm and bigger top face sides 32mm and height 40mm, is resting on the HP on its smaller base, with one of its base sides parallel to the VP. Draw the projections of the frustum and develop the lateral surface it.

Solution



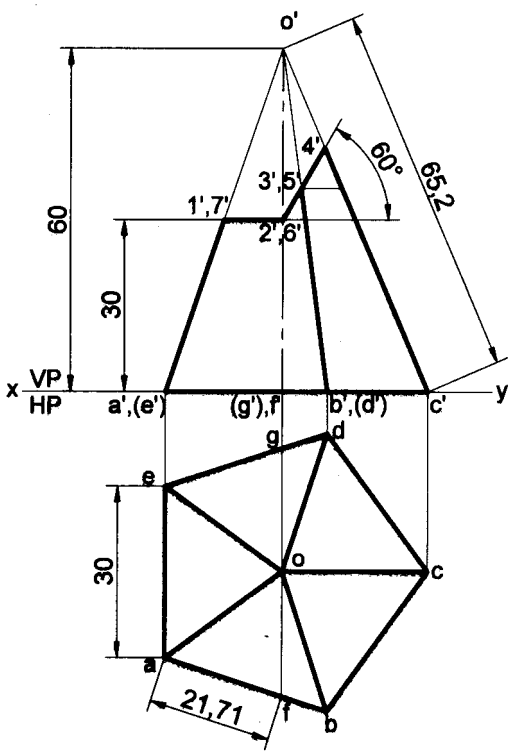
Problem 24 A regular pentagonal pyramid of side of base 35mm and altitude 65mm has its base on HP with a side of base perpendicular to VP. The pyramid is cut by a section plane which is perpendicular to the VP and inclined at 30° to HP. The cutting plane meets the axis of the pyramid at a point 30mm below the vertex. Obtain the development of the remaining part of the pyramid.

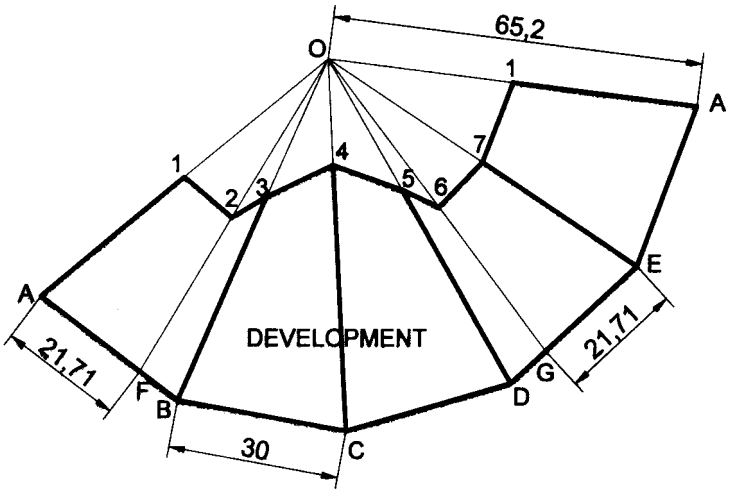
Solution



Problem 25 A pentagonal pyramid, 30mm sides, with a side of base perpendicular to VP. Draw the development of the lateral surfaces of the retained portion of the pyramid shown by the dark lines in the following figure.

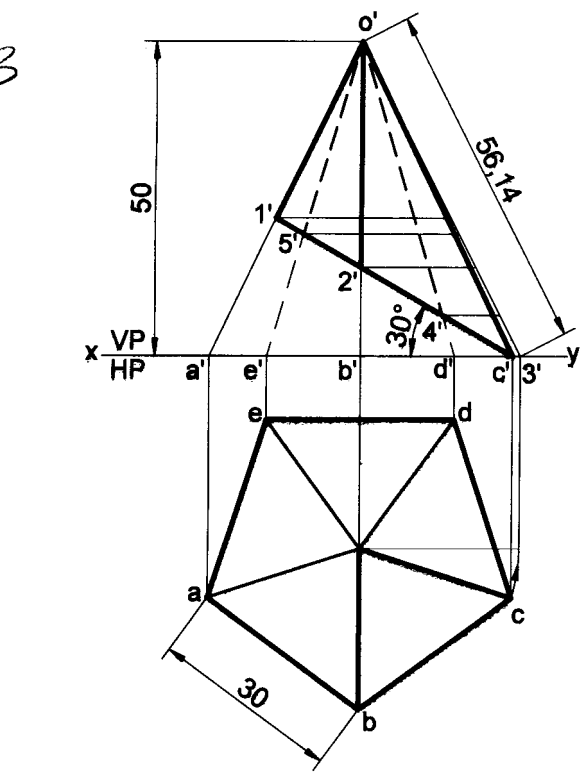
Solution

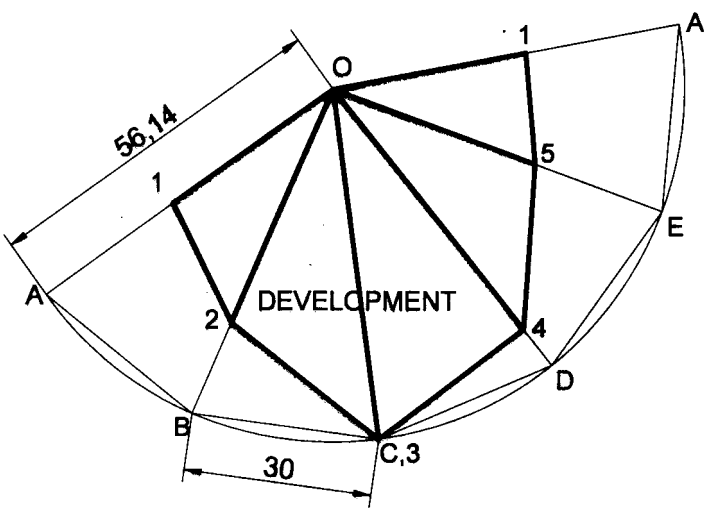




Problem 26 A pentagonal pyramid of 30mm edges of base and 50mm height rests vertically with one of its base edges parallel to VP and nearer to it. It is cut as shown in following figure. Draw the development of the lateral surfaces of the upper portion of the pyramid.

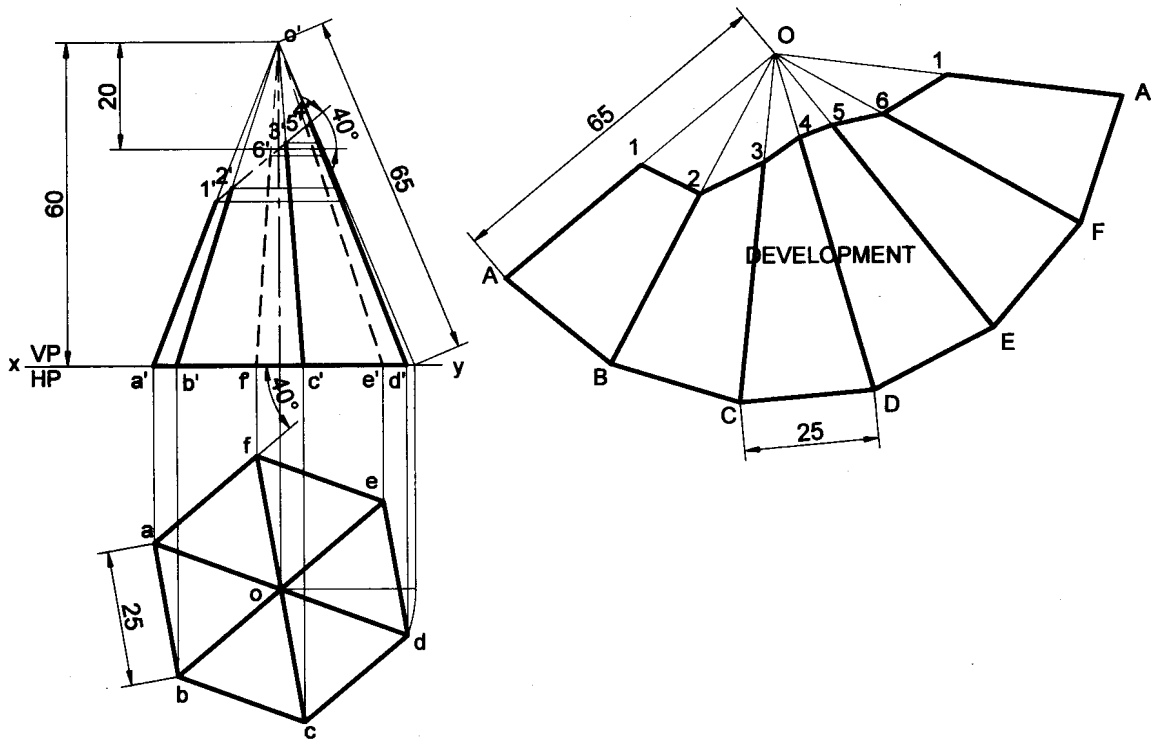
Solution





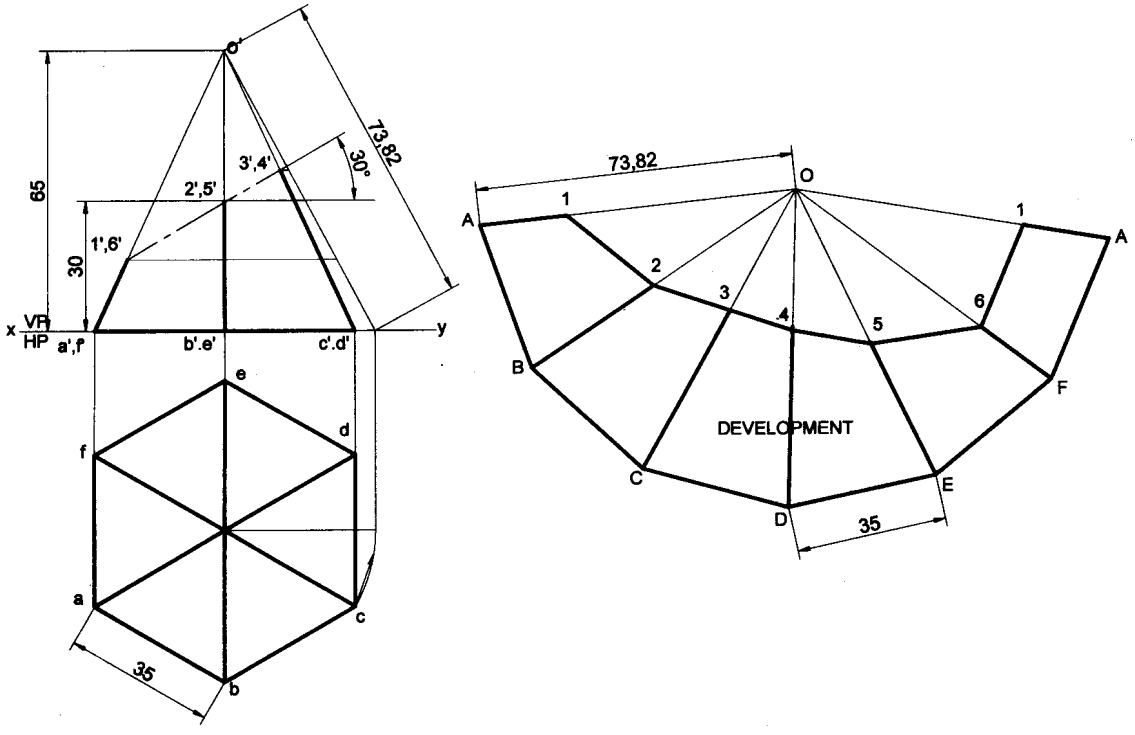
Problem 27 A hexagonal pyramid, base sides 25mm and height 60mm, is resting with its base on HP and an edge of base inclined at 40° to VP. It is cut to the shape of a truncated pyramid with the truncated surface indicated in the front view at a point on the axis 20mm from the apex and inclined at 40° to XY. Draw the projections and show the development of the lateral surface of the remaining portion of the pyramid.

Solution



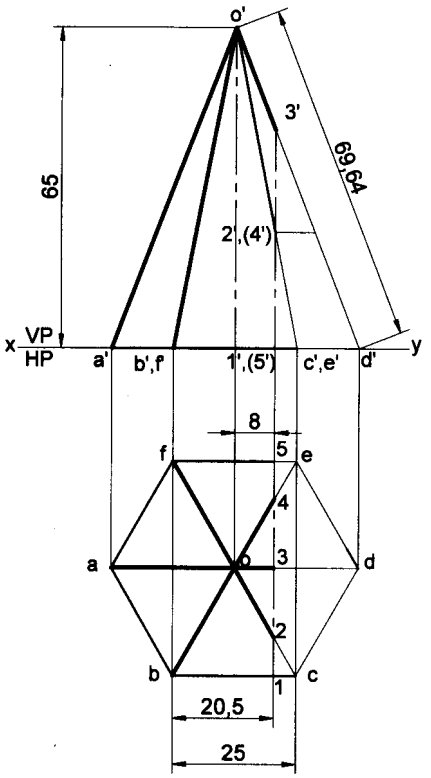
Problem 28 A hexagonal pyramid of sides 35mm and altitude 65mm is resting on HP on its base with two of the base sides perpendicular to VP. The pyramid is cut by a plane inclined at 30° to HP and perpendicular to VP and is intersecting the axis at 30mm above the base. Draw the development of the remaining portion of the pyramid.

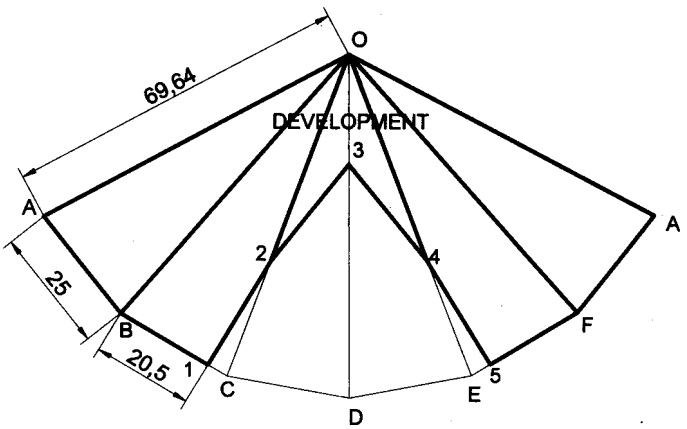
Solution



Problem 29 A hexagonal pyramid 25 mm side of base and axis 65 mm long is resting on its base on HP with one of the edges of the base parallel to VP. It is cut by a vertical section plane at a distance of 8 mm from the axis towards right side. Develop the lateral surface of the left part of the pyramid.

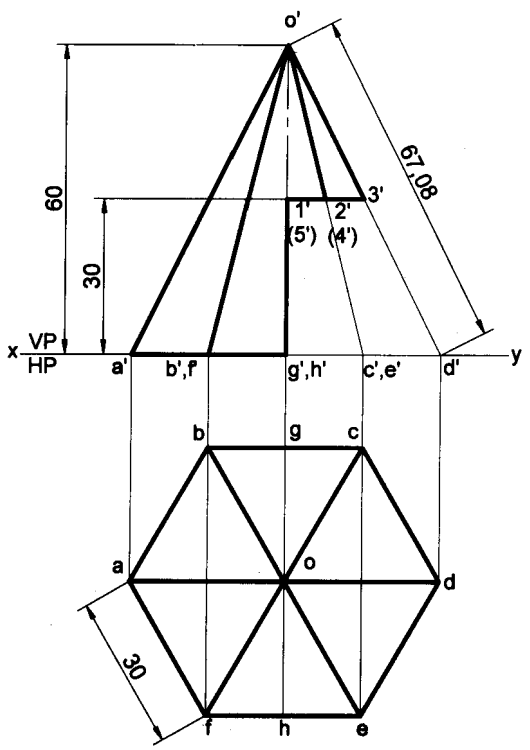
Solution

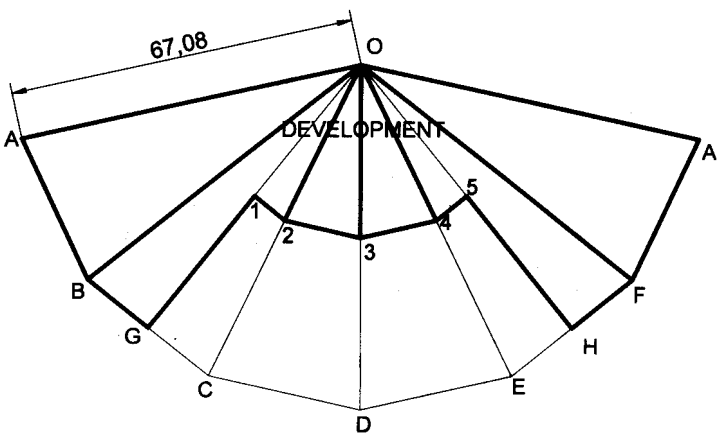




Problem 30 A hexagonal pyramid of 30mm base sides with a side of base parallel to VP. Draw the development of the lateral surfaces of the retained portions of the pyramid cut by two perpendicular planes shown by dark lines in the Fig.

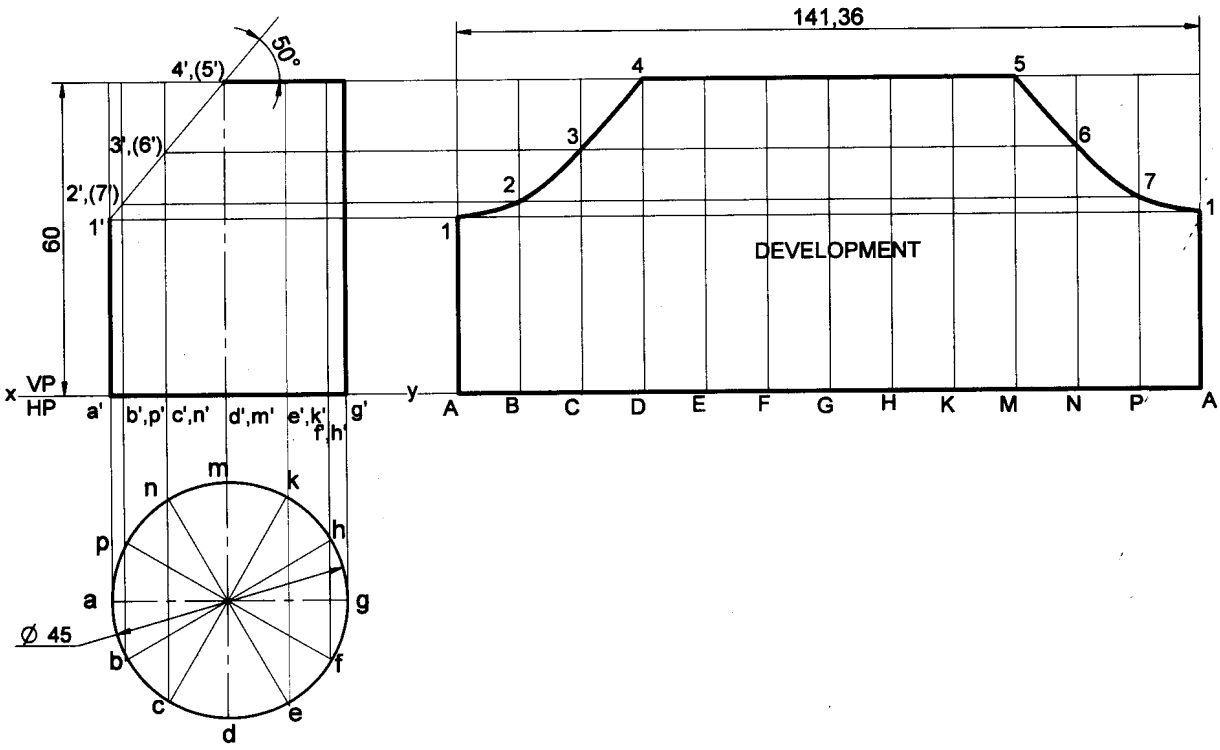
Solution





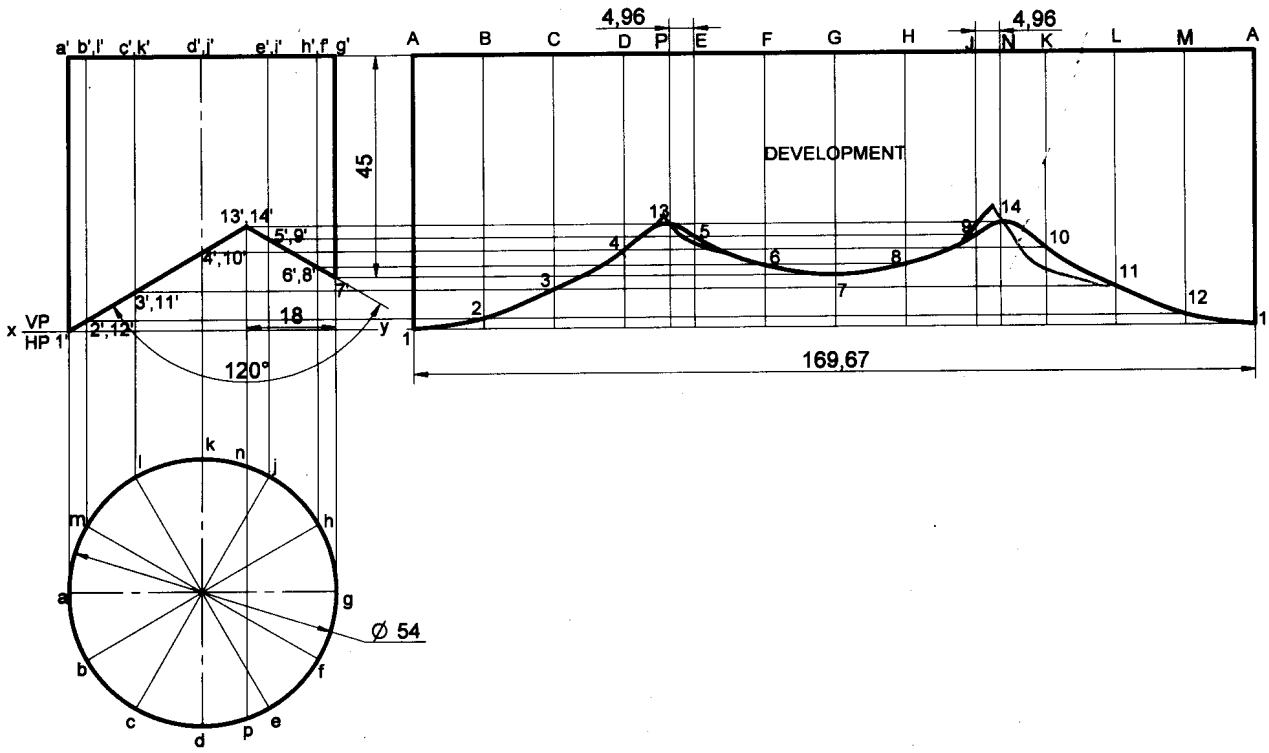
Problem 31 A vertical cylinder of base diameter 45mm and axis length 60mm is cut by a plane perpendicular to VP and inclined at 50° to HP, is passing through the centre point of the top face. Draw the development of the lateral surface of the cylinder.

Solution



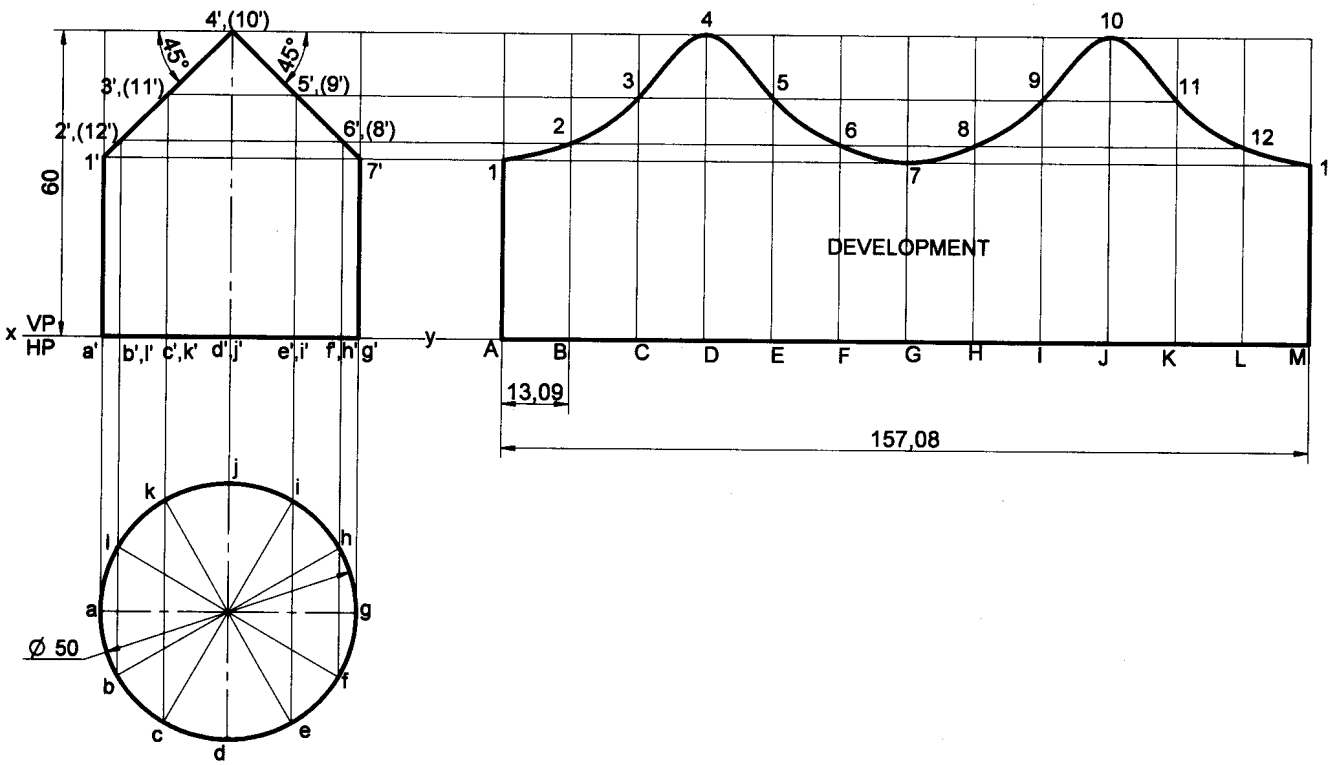
Problem 32 Following figure shows the front view of a model of a steel chimney of diameter 60mm made from a flat thin sheet metal fitted over an inclined plane roof. Develop the portion of the chimney.

Solution



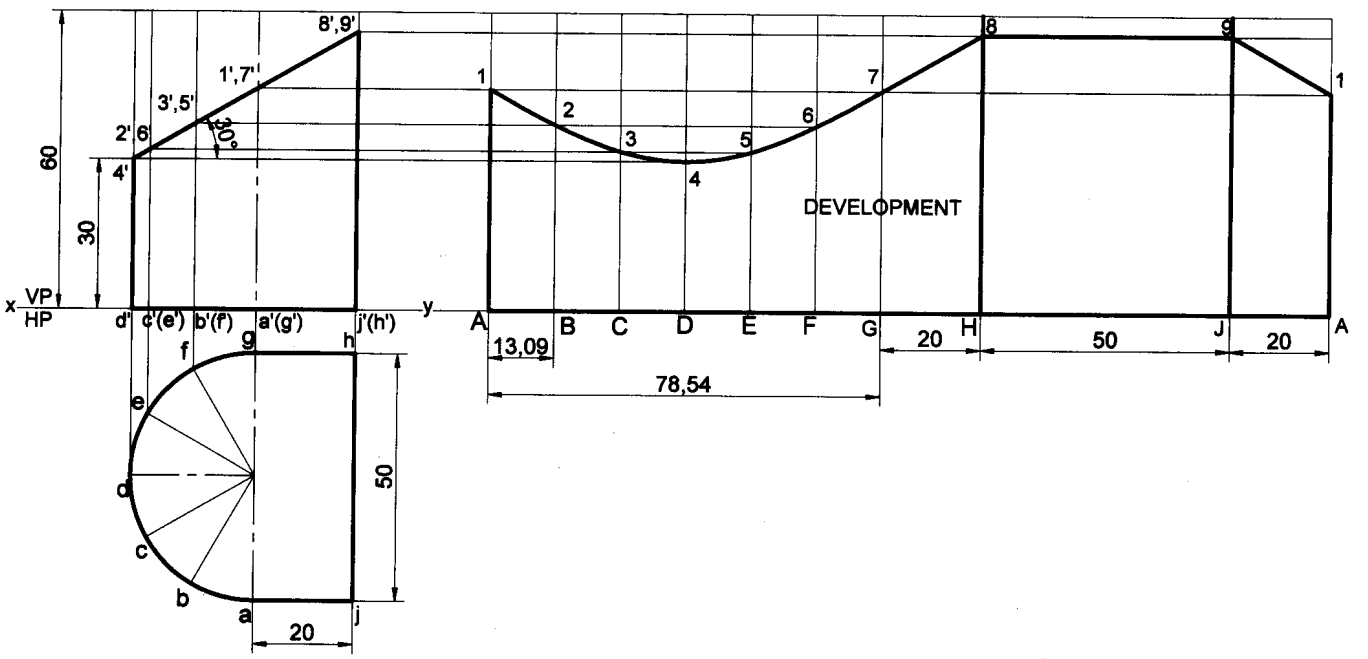
Problem 33 A vertical cylinder of base diameter 50mm and axis length 60mm is cut by a two planes which are perpendicular to VP and inclined at 45° to HP and passing through either side the centre point of the top face. Draw the development of the lateral surface of the cylinder.

Solution



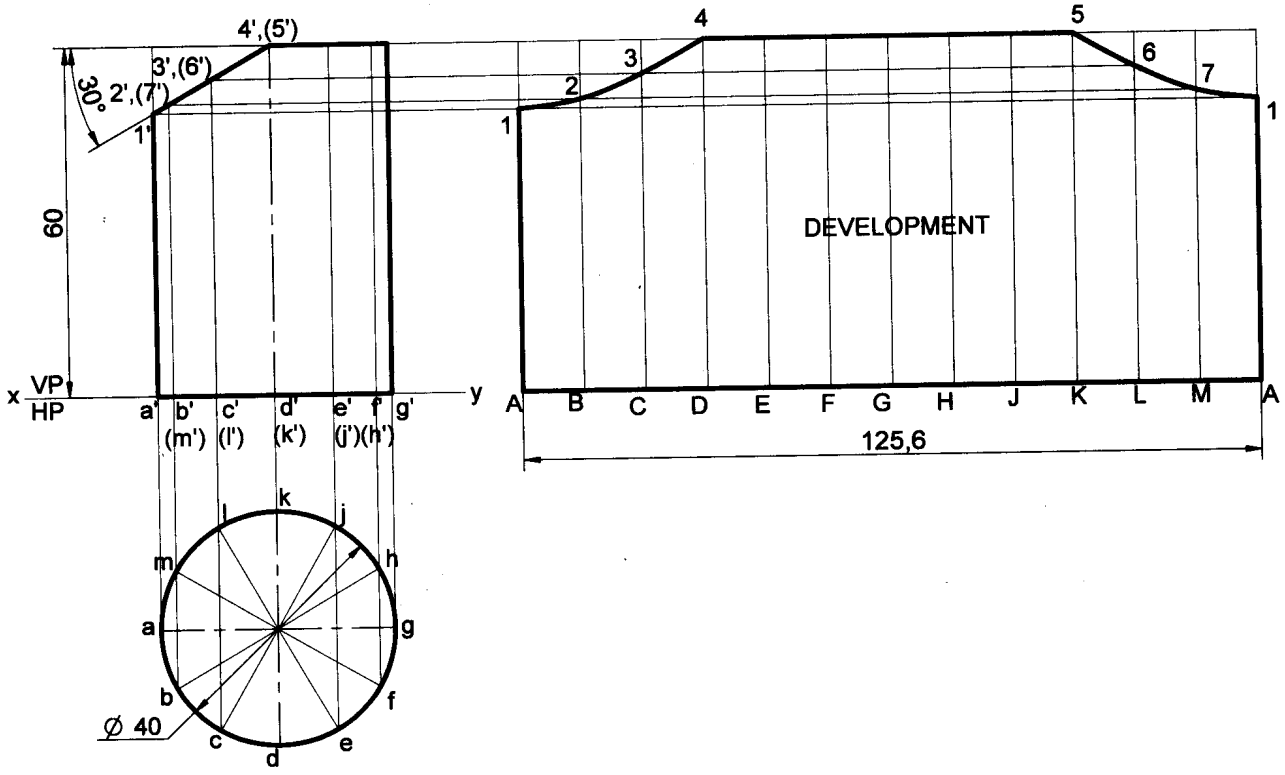
Problem 34 A pipe made of using a half tubular (circular) with a half square in shape is cut as shown in the following figure. Draw the development of the lateral surface of the object.

Solution



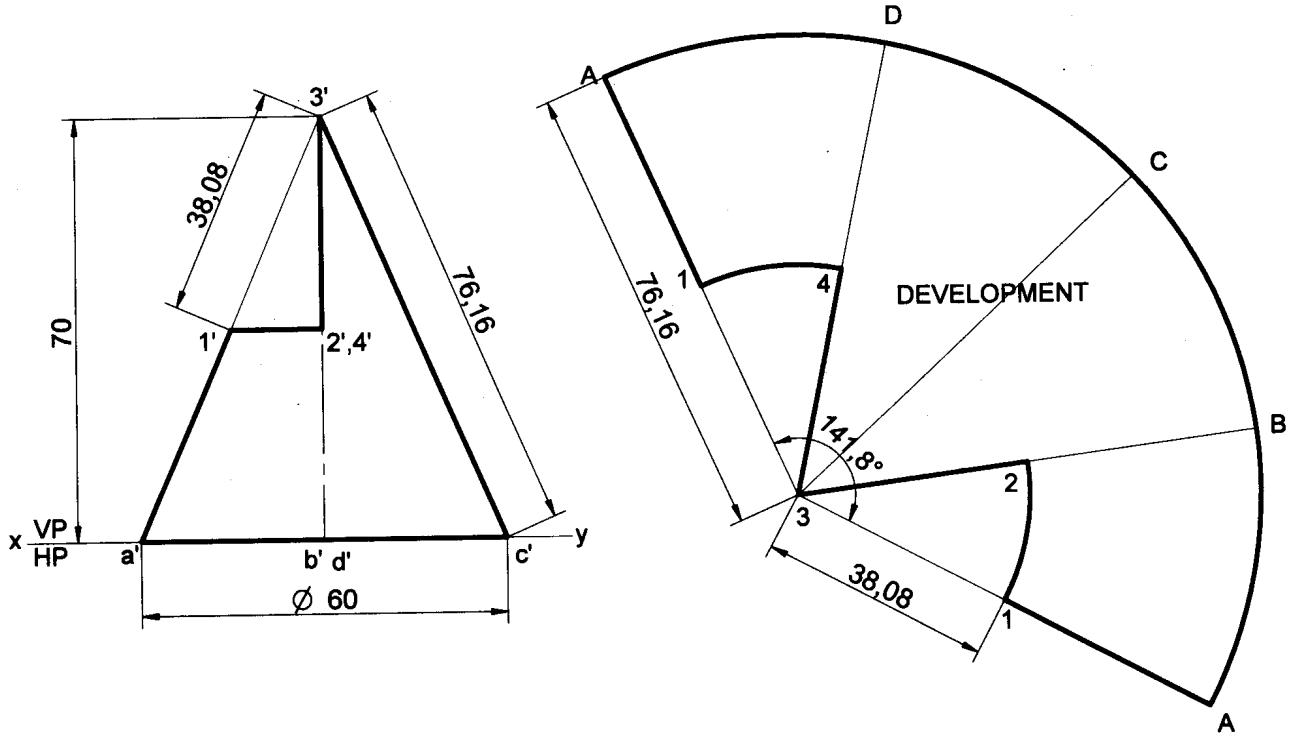
Problem 35 Develop the lateral surface of the cylinder of 40mm diameter and height 60mm which is cut in the following way.

Solution



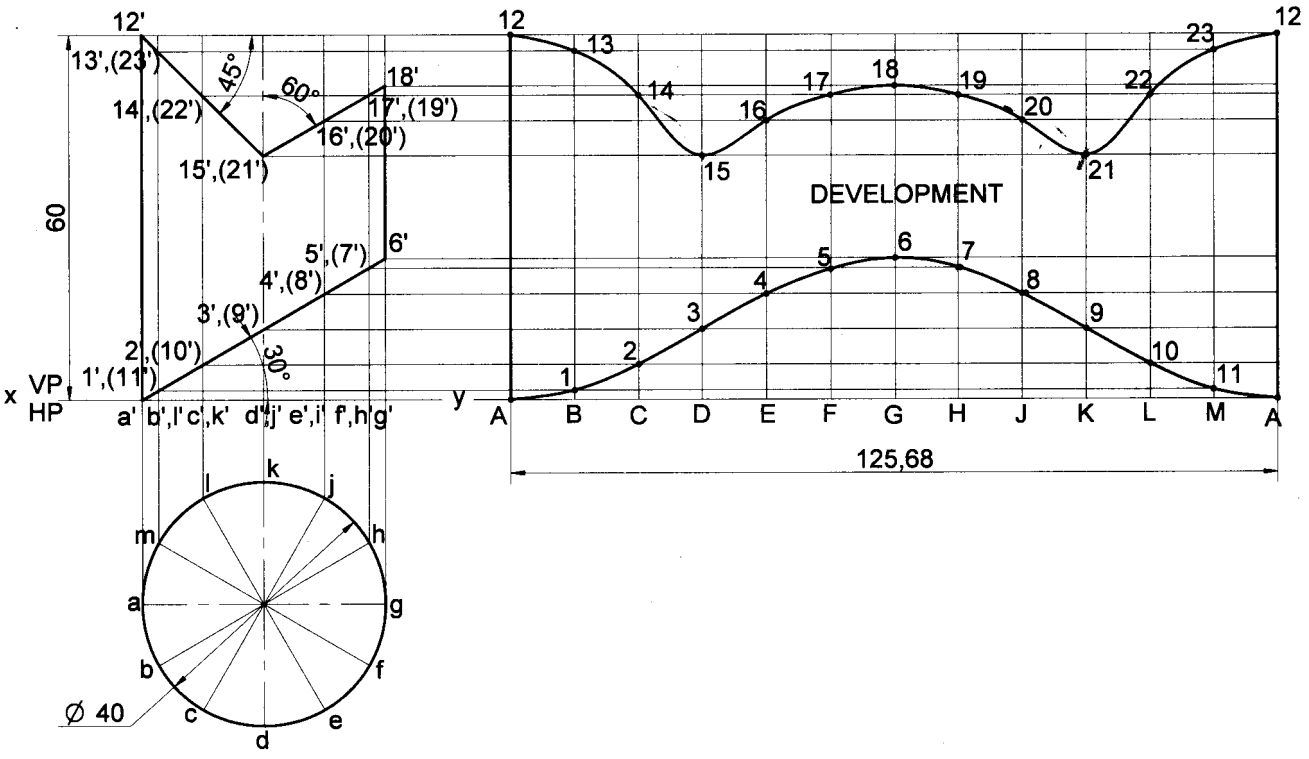
Problem 36 A cone of base diameter 60mm and height 70mm is resting on its base on HP. It is cut as shown in the following figure. Draw the development of the lateral surface of the remaining portion of the cone.

Solution



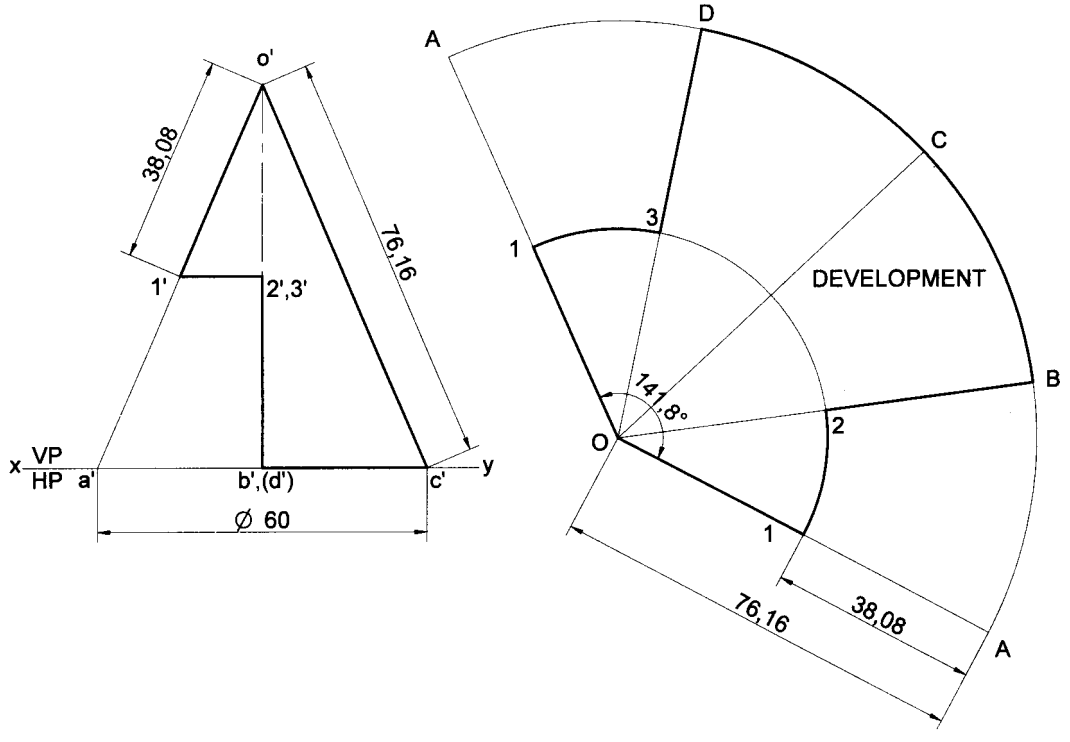
Problem 37 Develop the lateral surface of the cylinder of 40mm diameter and height 60mm which is cut in the following way.

Solution



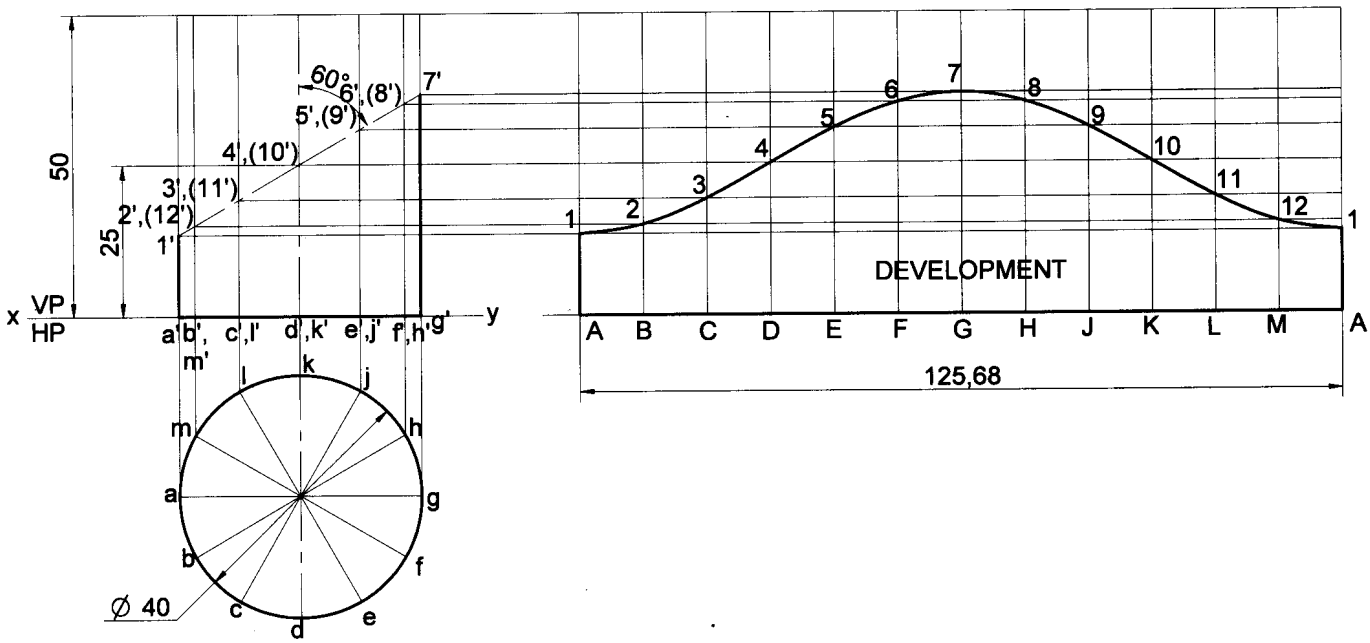
Problem 38 A cone of base diameter 60mm and height 70mm is resting on its base on HP. It is cut as shown in the following figure. Draw the development of the lateral surface of the remaining portion of the cone.

Solution



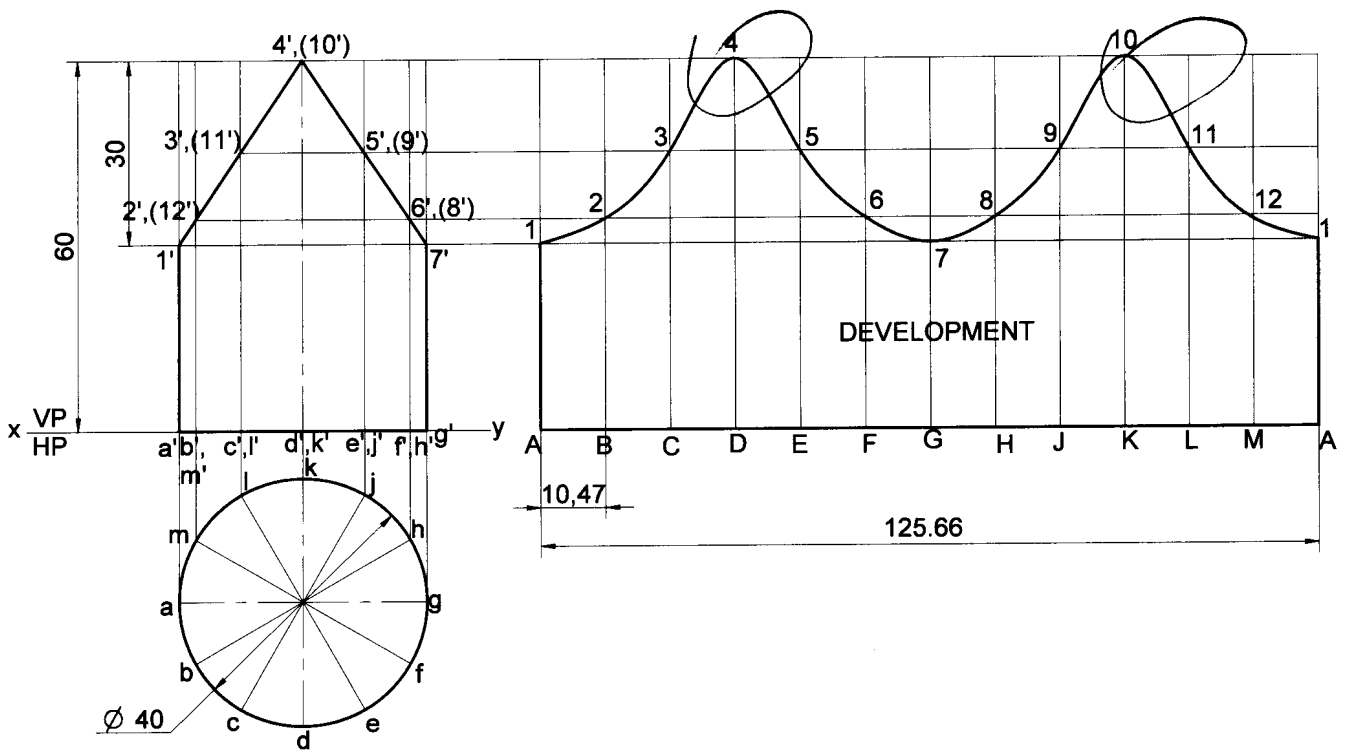
Problem 39 Draw the development of the lateral surface of a truncated vertical cylinder, 40mm diameter of base and height 50mm, the truncated flat surface of the cylinder bisects the axis at 60° to it.

Solution



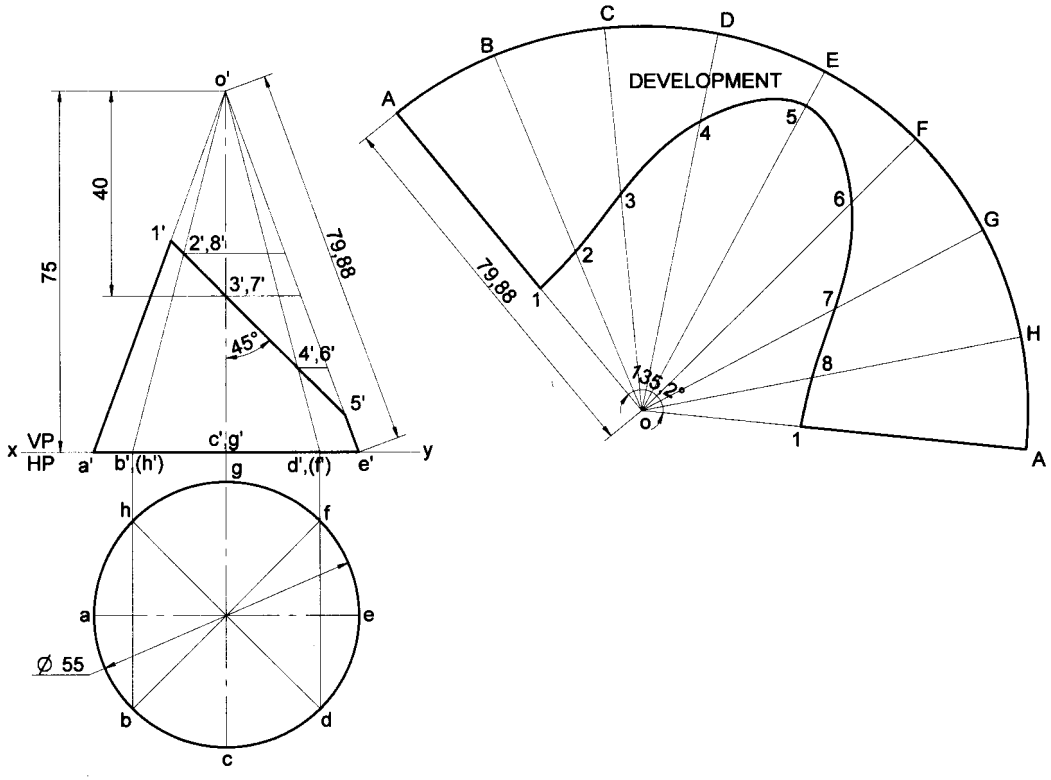
Problem 40 Develop the lateral surface of the cylinder of 40mm diameter and height 60mm cut in the following way.

Solution



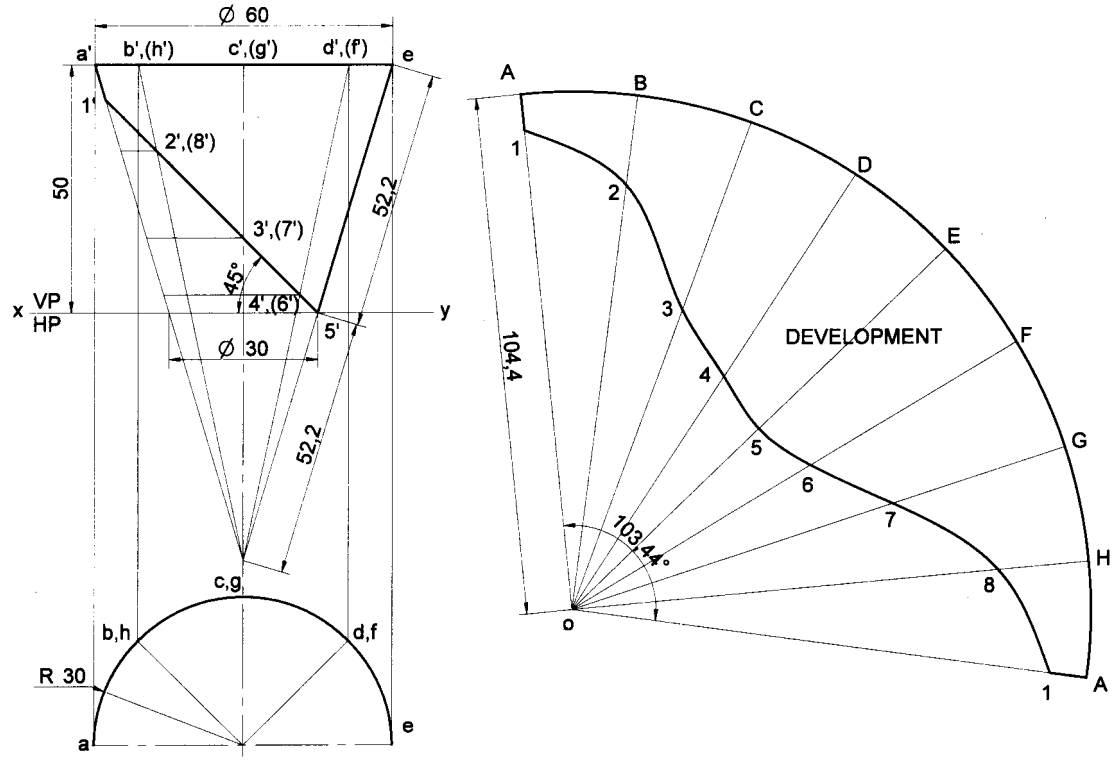
Problem 41 A right cone of 55mm diameter of base and 75mm height stands on its base on HP. It is cut to the shape of a truncated cone with its truncated surface inclined at 45° to the axis lying at a distance of 40mm from the apex of the cone. Obtain the development of the lateral surface of the truncated cone.

Solution



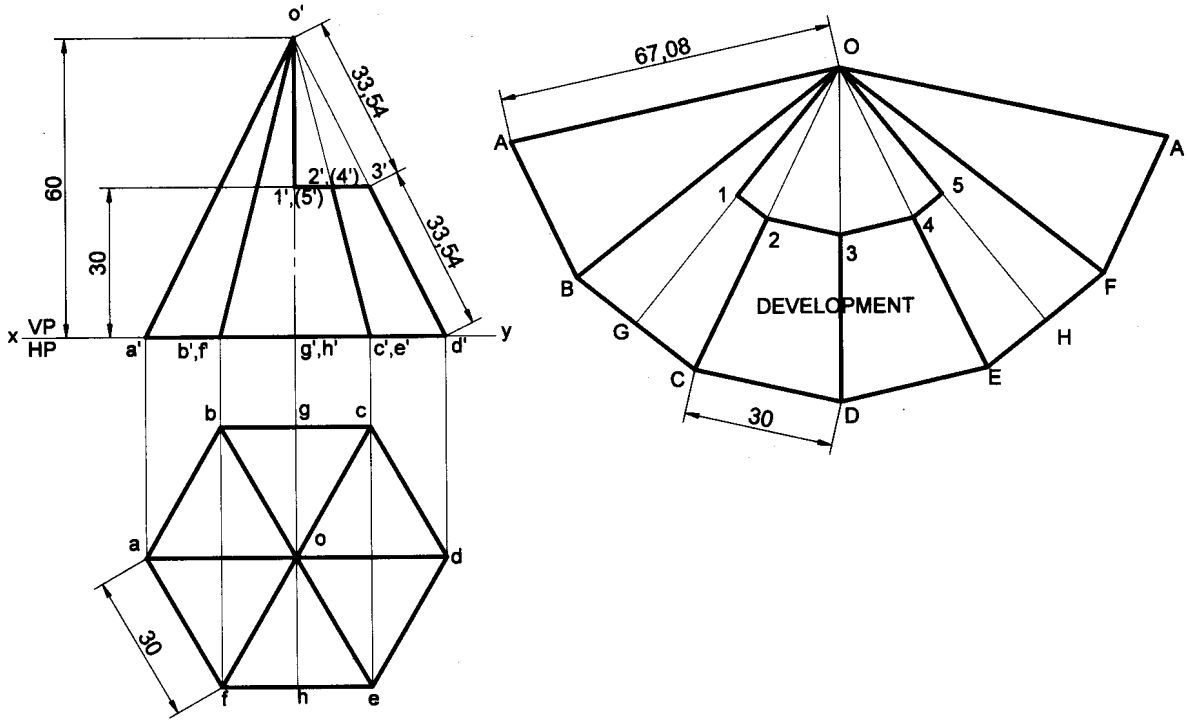
Problem 42 Draw the development of the following truncated cone.

Solution



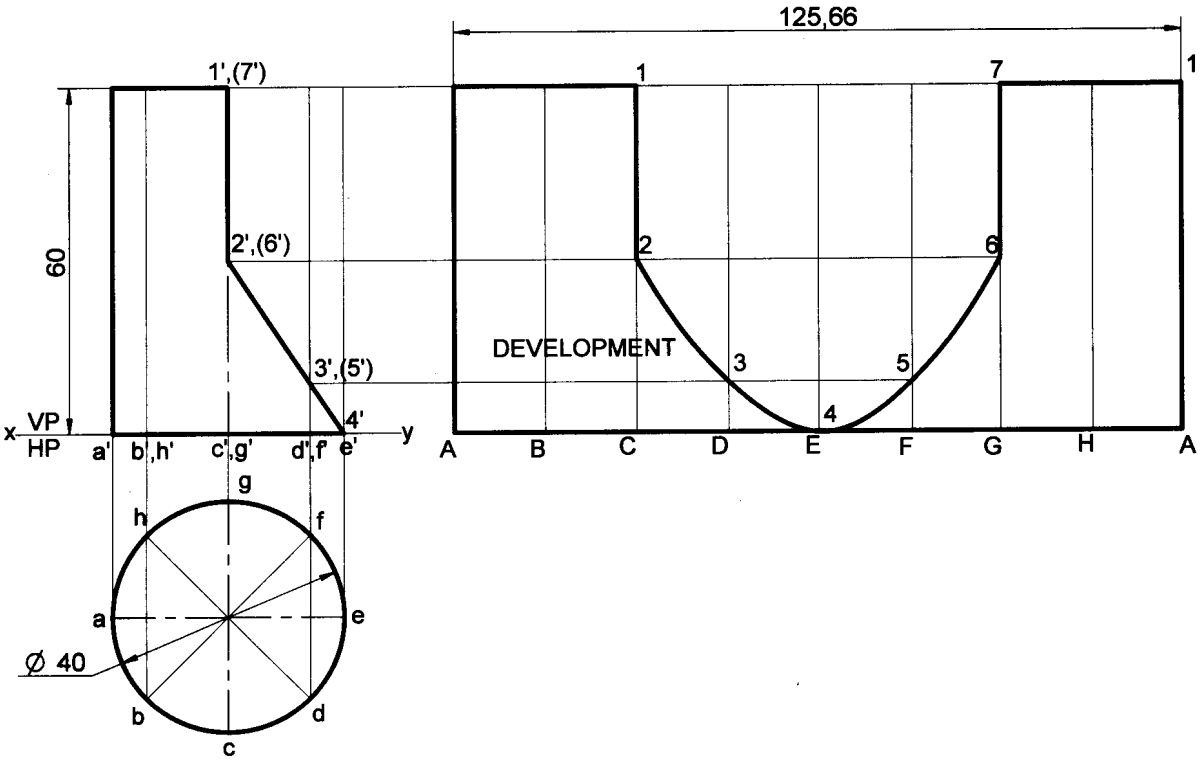
Problem 43 A hexagonal pyramid of 30mm sides of base with a side of base parallel to VP. Draw the development of the lateral surfaces of the retained portion of the pyramid which is shown by dark lines in the following figure.

Solution



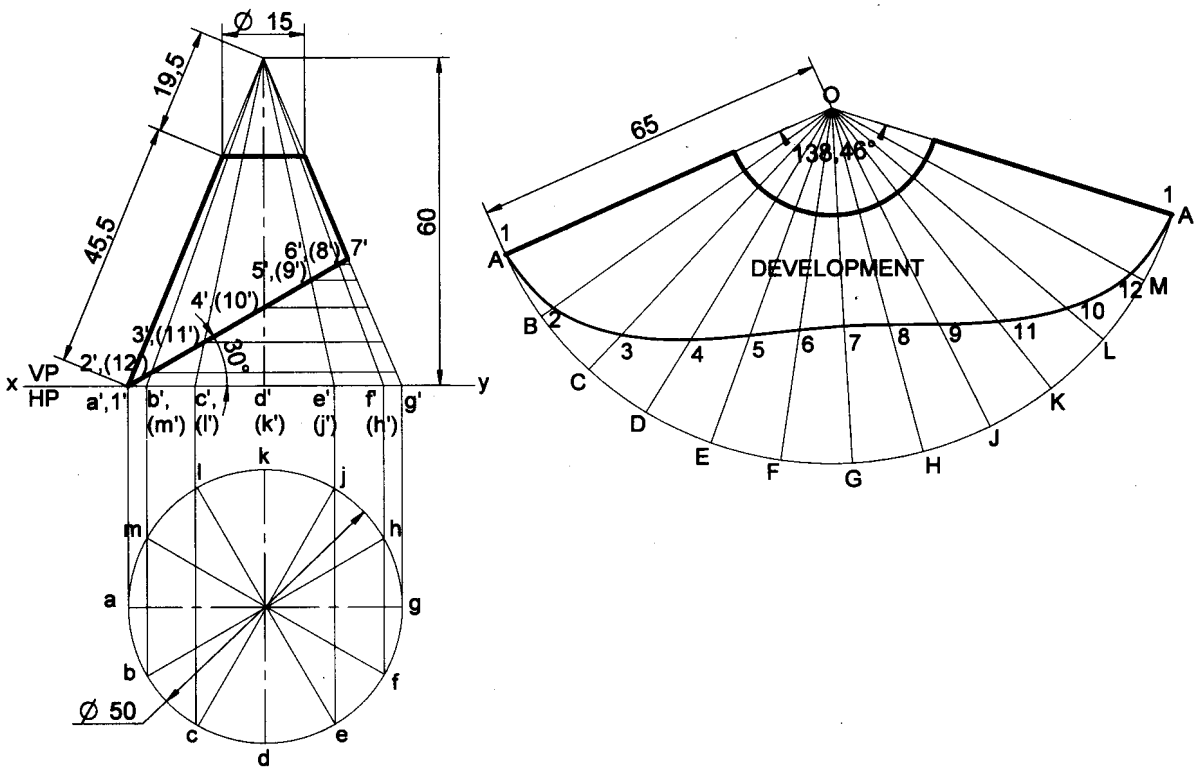
Problem 44 Develop the lateral surface of the cylinder of 40mm diameter and height 60mm which is cut in the following way.

Solution



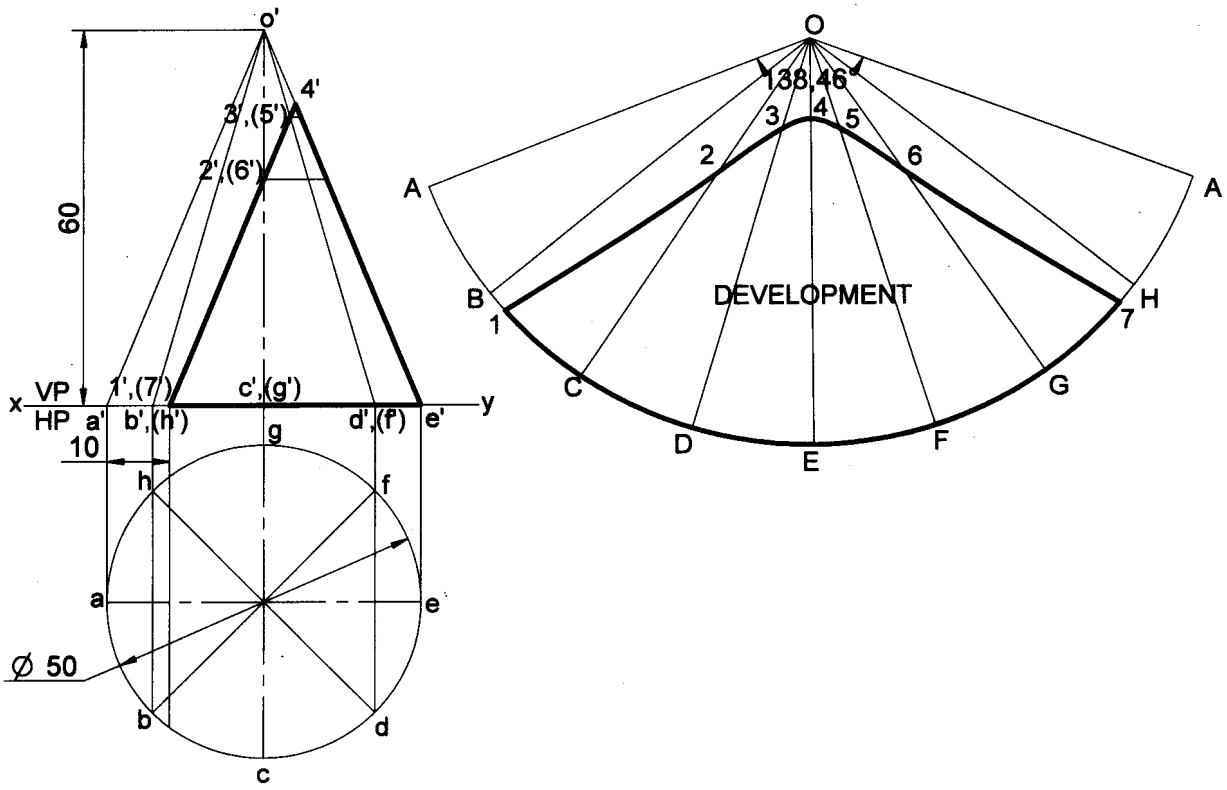
Problem 45 Draw the development of the lateral surface of the cone, whose front view is as shown in the following figure.

Solution



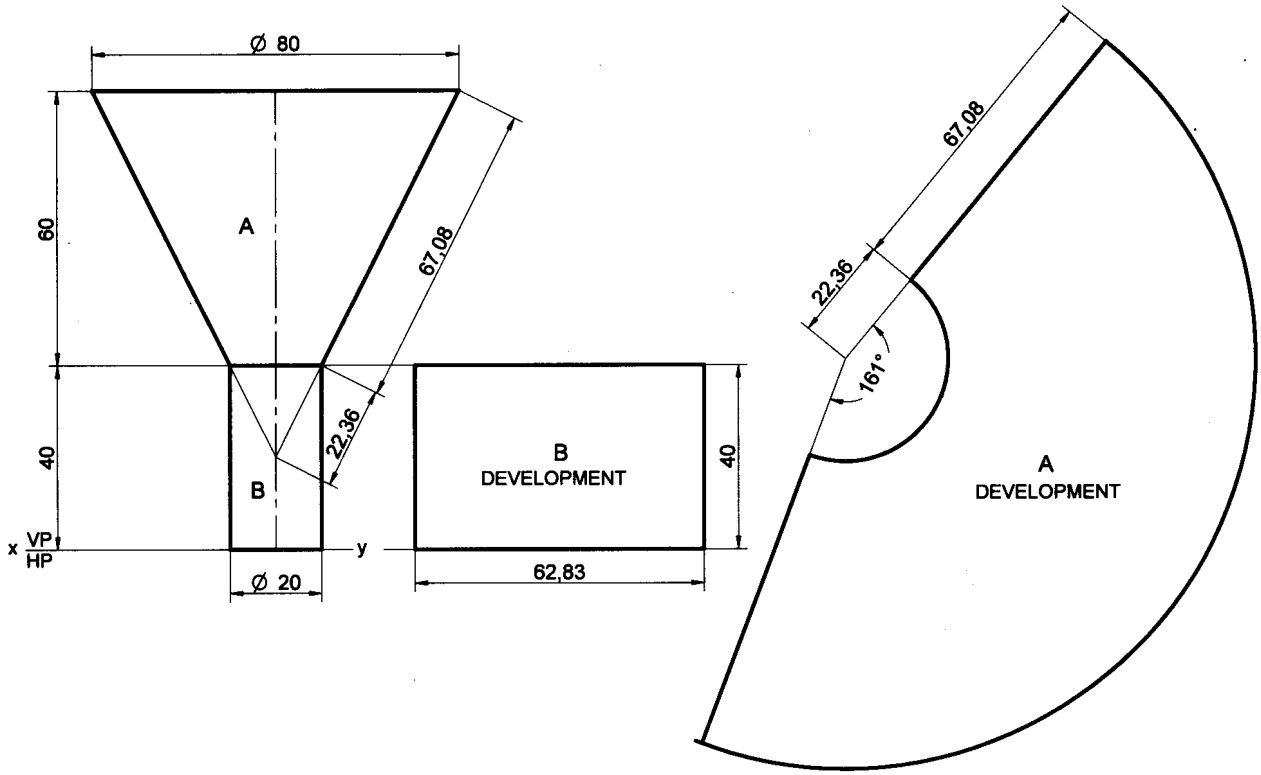
Problem 46 A cone of base diameter 50mm and height 60mm is resting with its base on HP. It is cut, as shown in the following front view of which is as shown in figure. Draw the development of the lateral surface of it.

Solution



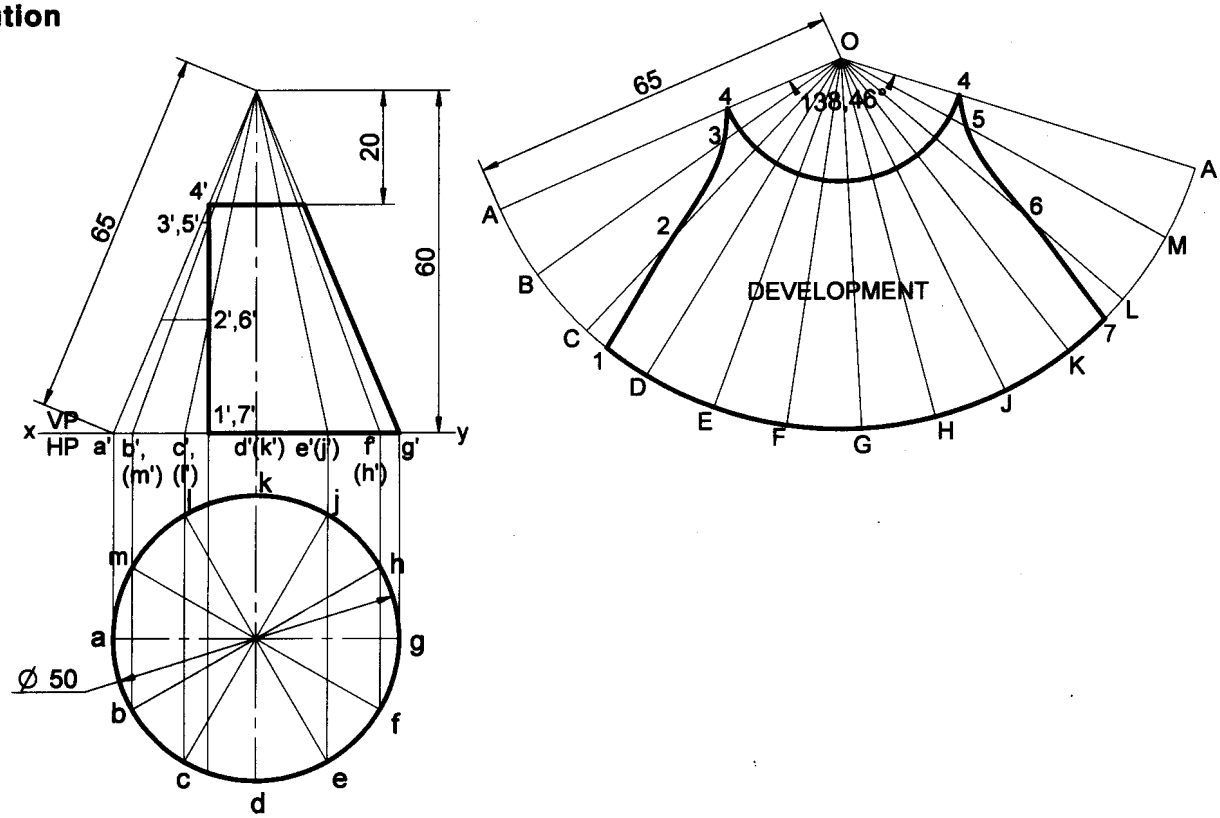
Problem 47 Draw the development of the lateral surface of a funnel consisting of a cylinder and a frustum of a cone. The diameter of the cylinder is 20mm and top face diameter of the funnel is 80mm. The height of frustum and cylinder are equal to 60mm and 40mm respectively.

Solution



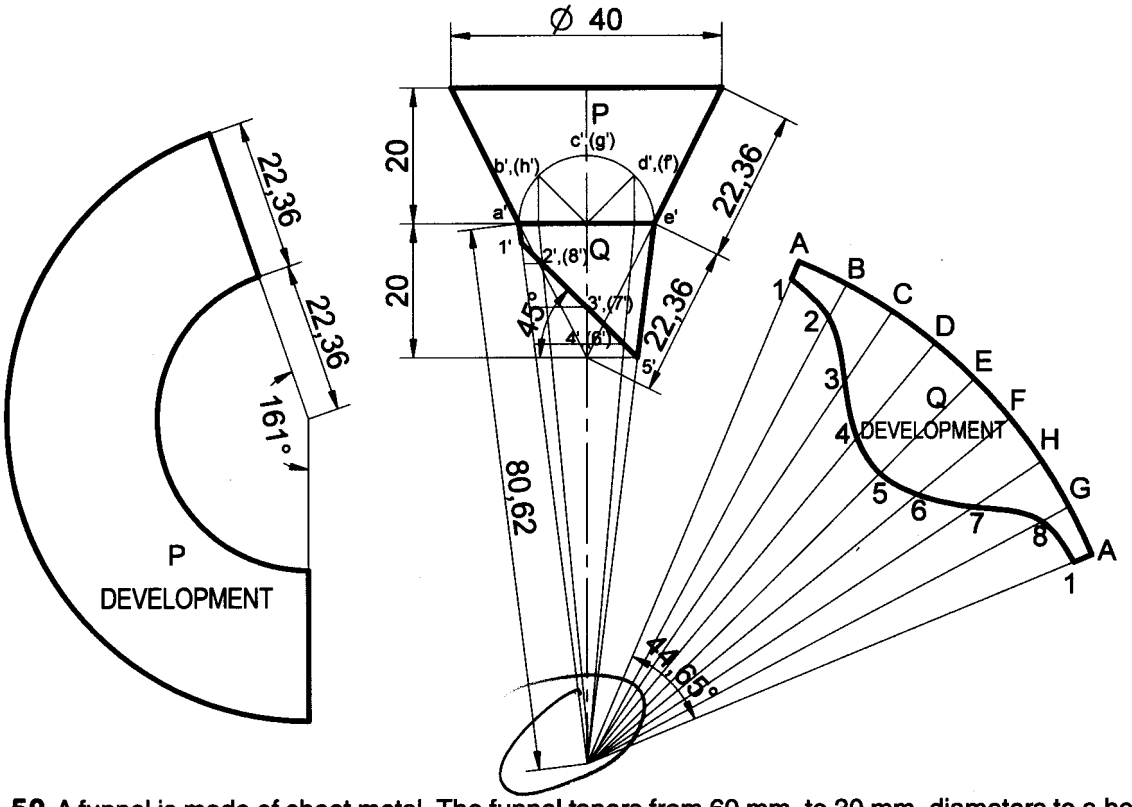
Problem 48 Draw the development of the lateral surface of the cut cone, whose front view is shown in the following figure.

Solution



Problem 49 A funnel is to be made of sheet metal. The funnel tapers from 40 mm to 20 mm diameter to a height of 20 mm and from 20 mm to 15 mm diameter, for the next 20 mm height. The bottom of the funnel is beveled off to a plane inclined at 45° to the axis. Draw the development of the funnel.

Solution



Problem 50 A funnel is made of sheet metal. The funnel tapers from 60 mm. to 30 mm. diameters to a height of 25 mm. and then forms to a cylinder with a height of 50 mm. Bottom of funnel is beveled off completely at an angle of 45° to axis Draw the development of funnel.

Solution