

Intersection of Surfaces:

1. Essential Information:
2. Display of Engineering Applications:
3. Solution Steps to solve Problem:
4. Case 1: Cylinder to Cylinder:
5. Case 2: Prism to Cylinder:
6. Case 3: Cone to Cylinder
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8. Case 5: Triangular Prism to Cylinder
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10. Case 7 Prism to Cone: from top:
11. Case 8: Cylinder to Cone:

ENGINEERING APPLICATIONS OF THE PRINCIPLES OF PROJECTIONS OF SOLIDES.

1. INTERSECTIONS.

**STUDY CAREFULLY
THE ILLUSTRATIONS GIVEN ON
NEXT *SIX* PAGES !**

INTERPENETRATION OF SOLIDS

WHEN ONE SOLID PENETRATES ANOTHER SOLID THEN THEIR SURFACES INTERSECT
AND
AT THE JUNCTION OF INTERSECTION A TYPICAL CURVE IS FORMED,
WHICH REMAINS COMMON TO BOTH SOLIDS.

THIS CURVE IS CALLED **CURVE OF INTERSECTION**
AND
IT IS A RESULT OF INTERPENETRATION OF SOLIDS.

PURPOSE OF DRAWING THESE CURVES:-

WHEN TWO OBJECTS ARE TO BE JOINED TOGETHER, MAXIMUM SURFACE CONTACT BETWEEN BOTH BECOMES A BASIC REQUIREMENT FOR STRONGEST & LEAK-PROOF JOINT.

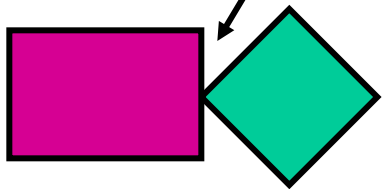
Curves of Intersections being common to both intersecting solids, show exact & maximum surface contact of both solids.

Study Following Illustrations Carefully.

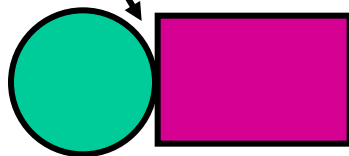


Minimum Surface Contact.

(Point Contact)



Square Pipes.

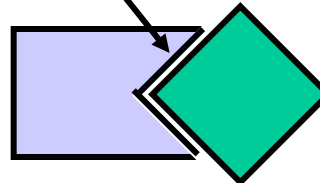


Circular Pipes.

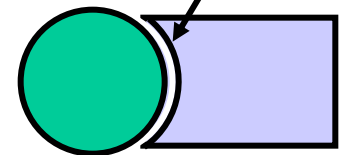
(Maximum Surface Contact)

Lines of Intersections.

Curves of Intersections.

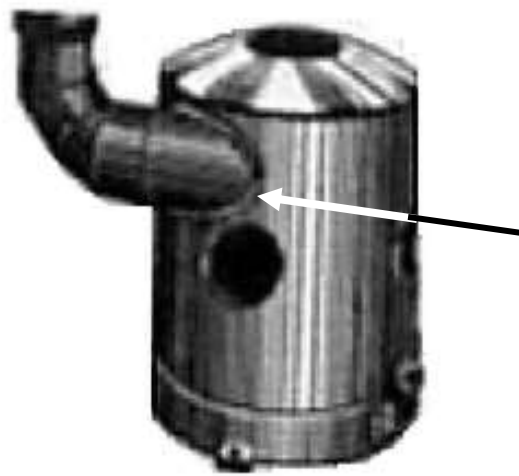
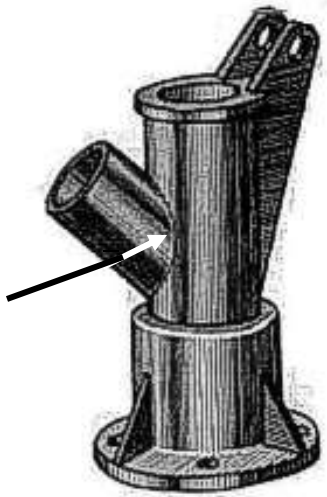


Square Pipes.



Circular Pipes.

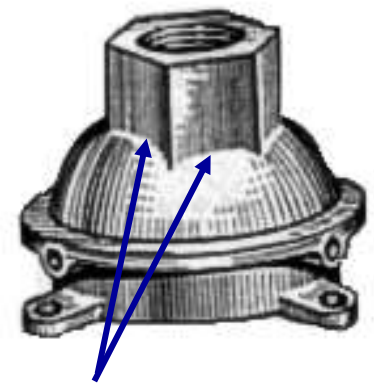
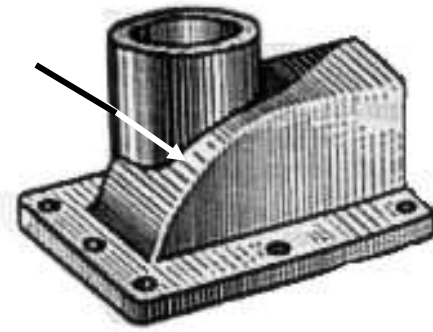
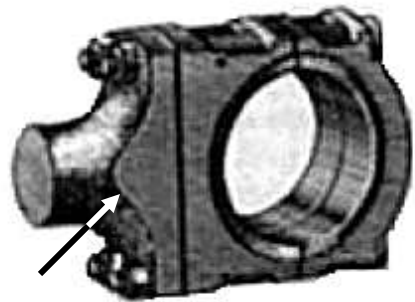
SOME ACTUAL OBJECTS ARE SHOWN, SHOWING CURVES OF INTERSECTIONS. BY WHITE ARROWS.



A machine component having two intersecting cylindrical surfaces with the axis at acute angle to each other.

An Industrial Dust collector. Intersection of two cylinders.

Intersection of a Cylindrical main and Branch Pipe.



A Feeding Hopper In industry.

Forged End of a Connecting Rod.

Two Cylindrical surfaces.

Pump lid having shape of a hexagonal Prism and Hemi-sphere intersecting each other.

**FOLLOWING CASES ARE SOLVED.
REFER ILLUSTRATIONS
AND
NOTE THE COMMON
CONSTRUCTION
FOR ALL**



1. CYLINDER TO CYLINDER
2. SQ. PRISM TO CYLINDER
3. CONE TO CYLINDER
4. TRIANGULAR PRISM TO CYLINDER
5. SQ. PRISM TO SQ. PRISM
6. SQ. PRISM TO SQ. PRISM
(SKEW POSITION)
7. SQUARE PRISM TO CONE (*from top*)
8. CYLINDER TO CONE

COMMON SOLUTION STEPS

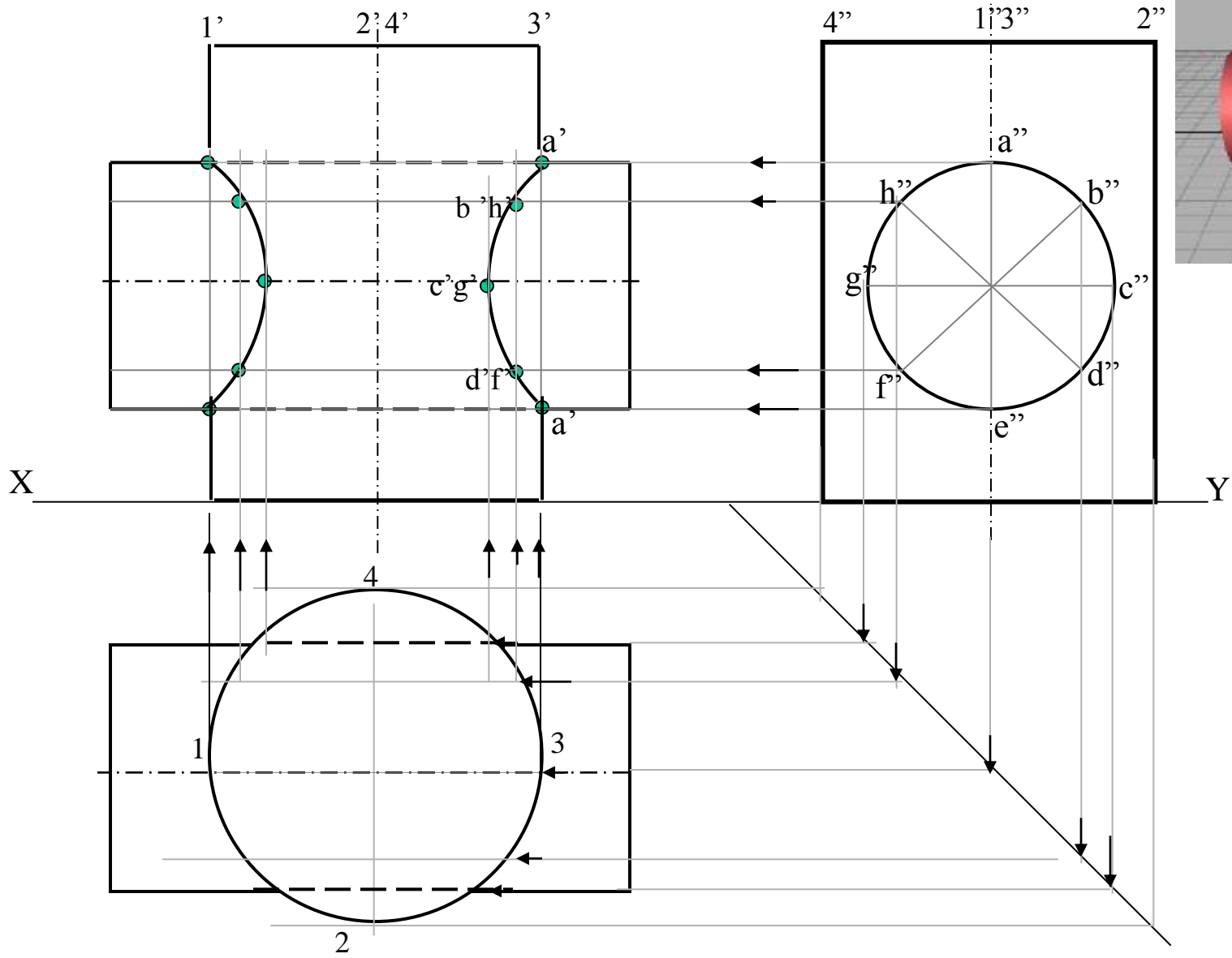
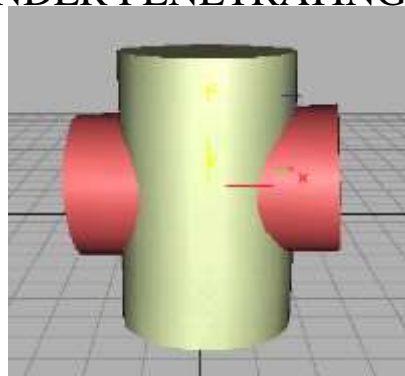
**One solid will be standing on HP
Other will penetrate horizontally.
Draw three views of standing solid.
Name views as per the illustrations.
Beginning with side view draw three
Views of penetrating solids also.
On its S.V. mark number of points
And name those (either letters or nos.)
The points which are on standard
generators or edges of standing solid,
(in S.V.) can be marked on respective
generators in Fv and Tv. And other
points from SV should be brought to
Tv first and then projecting upward
To Fv.
Dark and dotted line's decision should
be taken by observing side view from
its right side as shown by arrow.
Accordingly those should be joined
by curvature or straight lines.**

Note:

**In case cone is penetrating solid Side view is not necessary.
Similarly in case of penetration from top it is not required.**

CYLINDER STANDING
&
CYLINDER PENETRATING

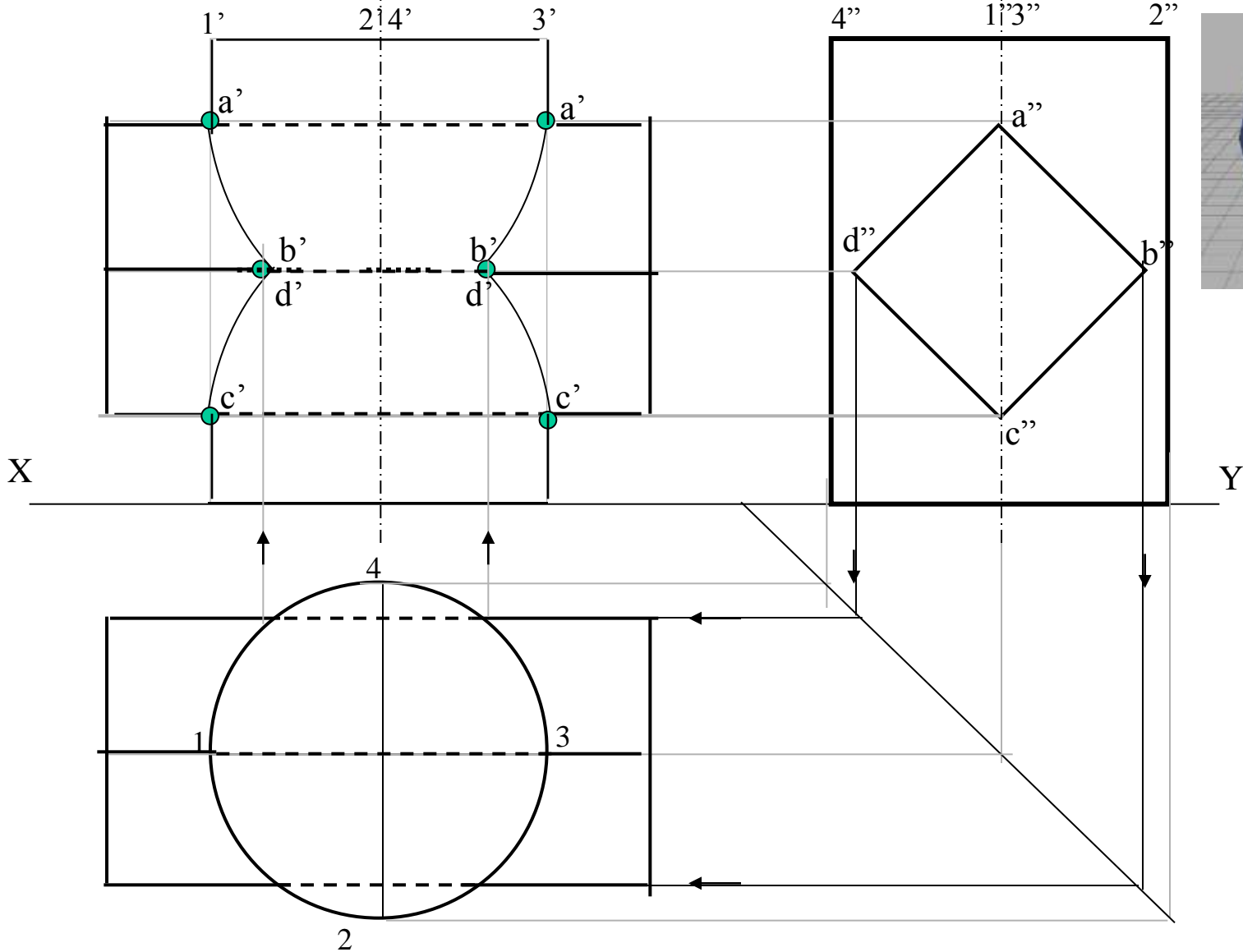
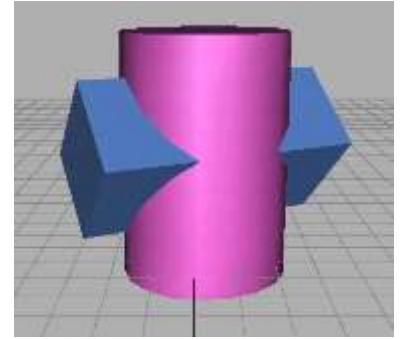
Problem: A cylinder 50mm dia. and 70mm axis is completely penetrated by another of 40 mm dia. and 70 mm axis horizontally Both axes intersect & bisect each other. Draw projections showing curves of intersections.





Problem: A cylinder 50mm dia. and 70mm axis is completely penetrated by a square prism of 25 mm sides and 70 mm axis, horizontally. Both axes intersect & bisect each other. All faces of prism are equally inclined to Hp. Draw projections showing curves of intersections.

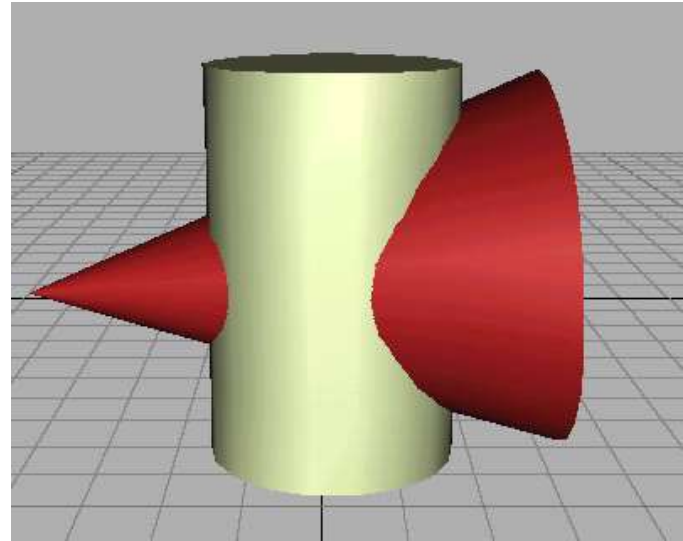
CASE 2.
CYLINDER STANDING
&
SQ. PRISM PENETRATING



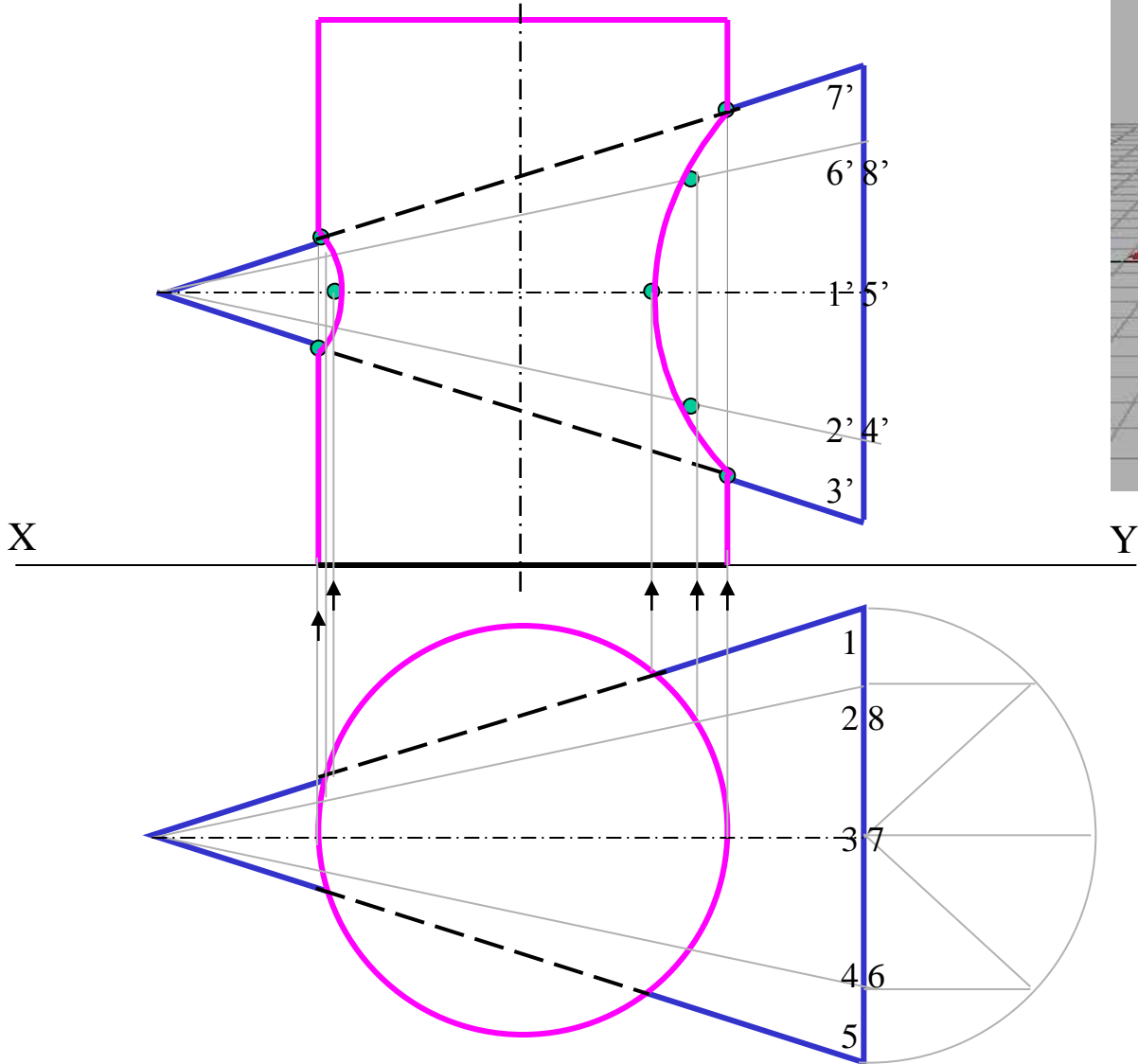


CASE 3.

CYLINDER STANDING & CONE PENETRATING



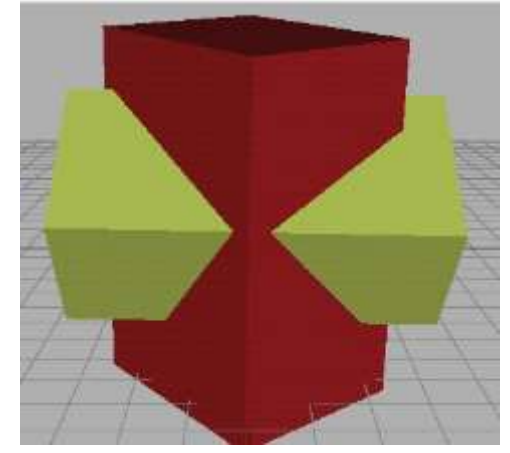
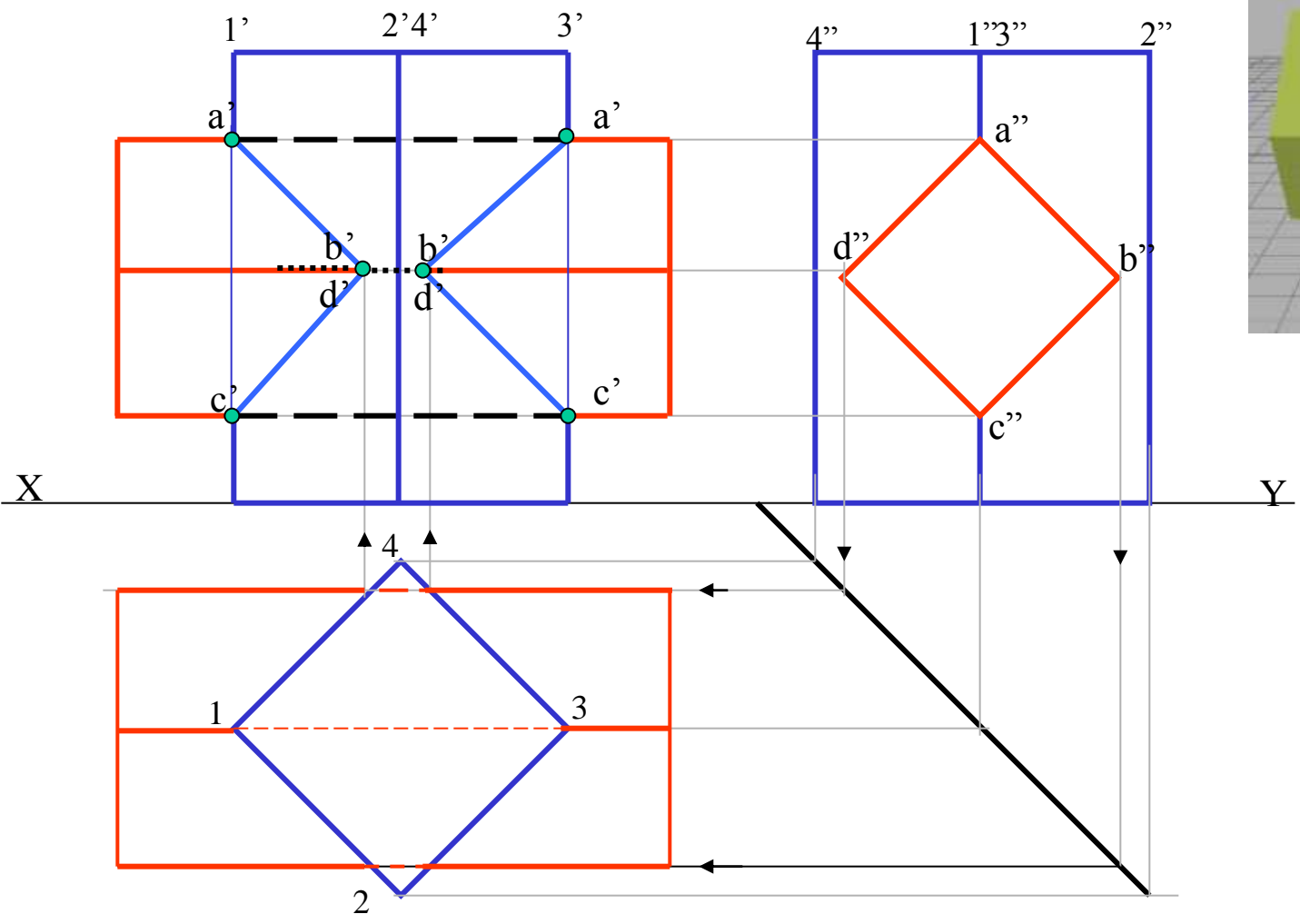
Problem: A cylinder of 80 mm diameter and 100 mm axis is completely penetrated by a cone of 80 mm diameter and 120 mm long axis horizontally. Both axes intersect & bisect each other. Draw projections showing curve of intersections.





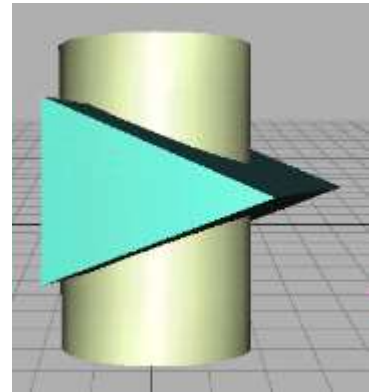
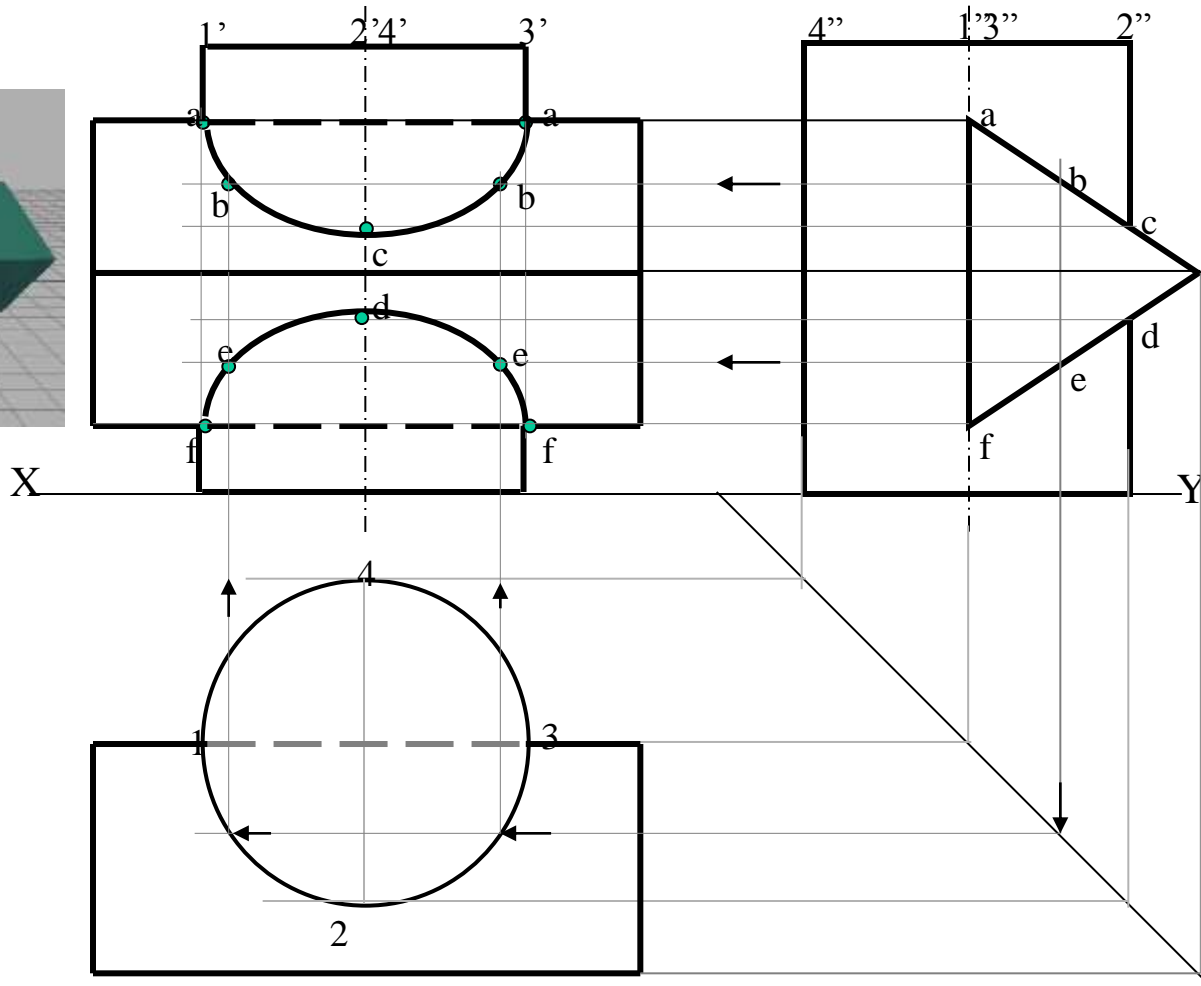
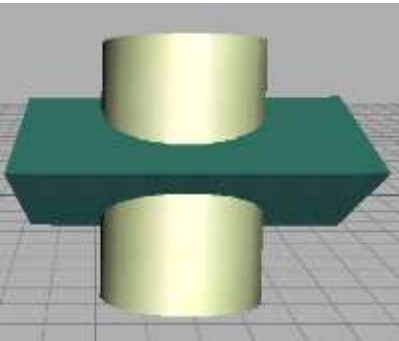
CASE 4.
SQ.PRISM STANDING
&
SQ.PRISM PENETRATING

Problem: A sq.prism 30 mm base sides.and 70mm axis is completely penetrated by another square prism of 25 mm sides.and 70 mm axis, horizontally. Both axes intersects & bisect each other. All faces of prisms are equally inclined to Vp. Draw projections showing curves of intersections.



Problem: A cylinder 50mm dia. and 70mm axis is completely penetrated by a triangular prism of 45 mm sides and 70 mm axis, horizontally. One flat face of prism is parallel to Vp and Contains axis of cylinder. Draw projections showing curves of intersections.

CASE 5. CYLINDER STANDING & TRIANGULAR PRISM PENETRATING

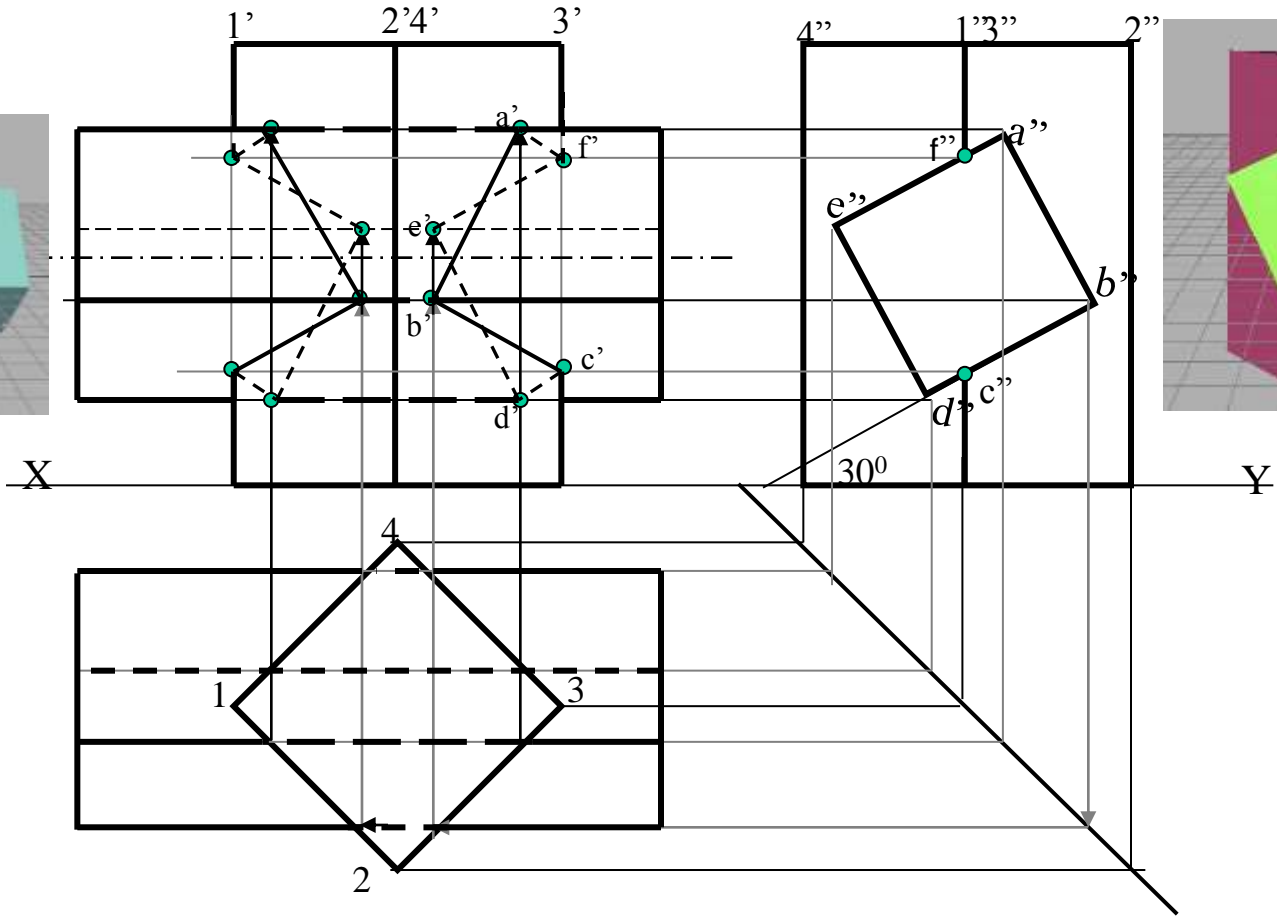
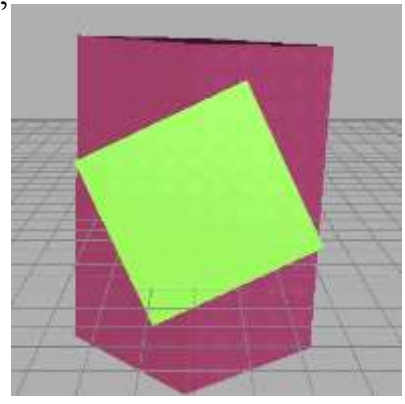
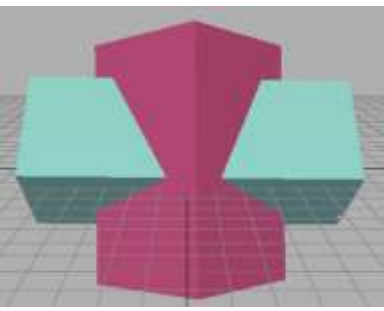




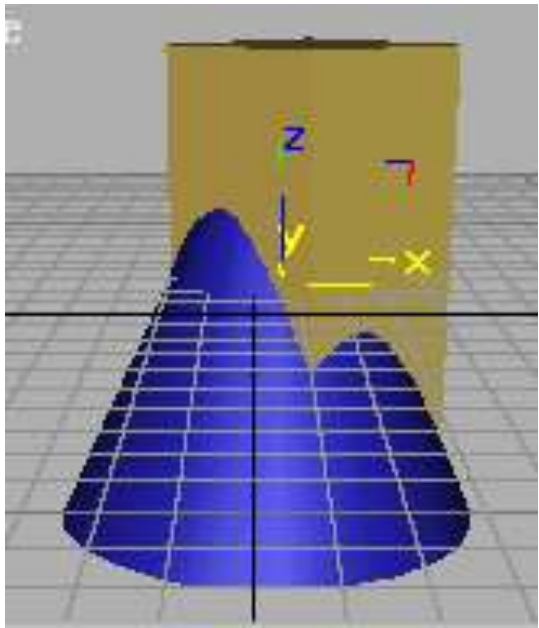
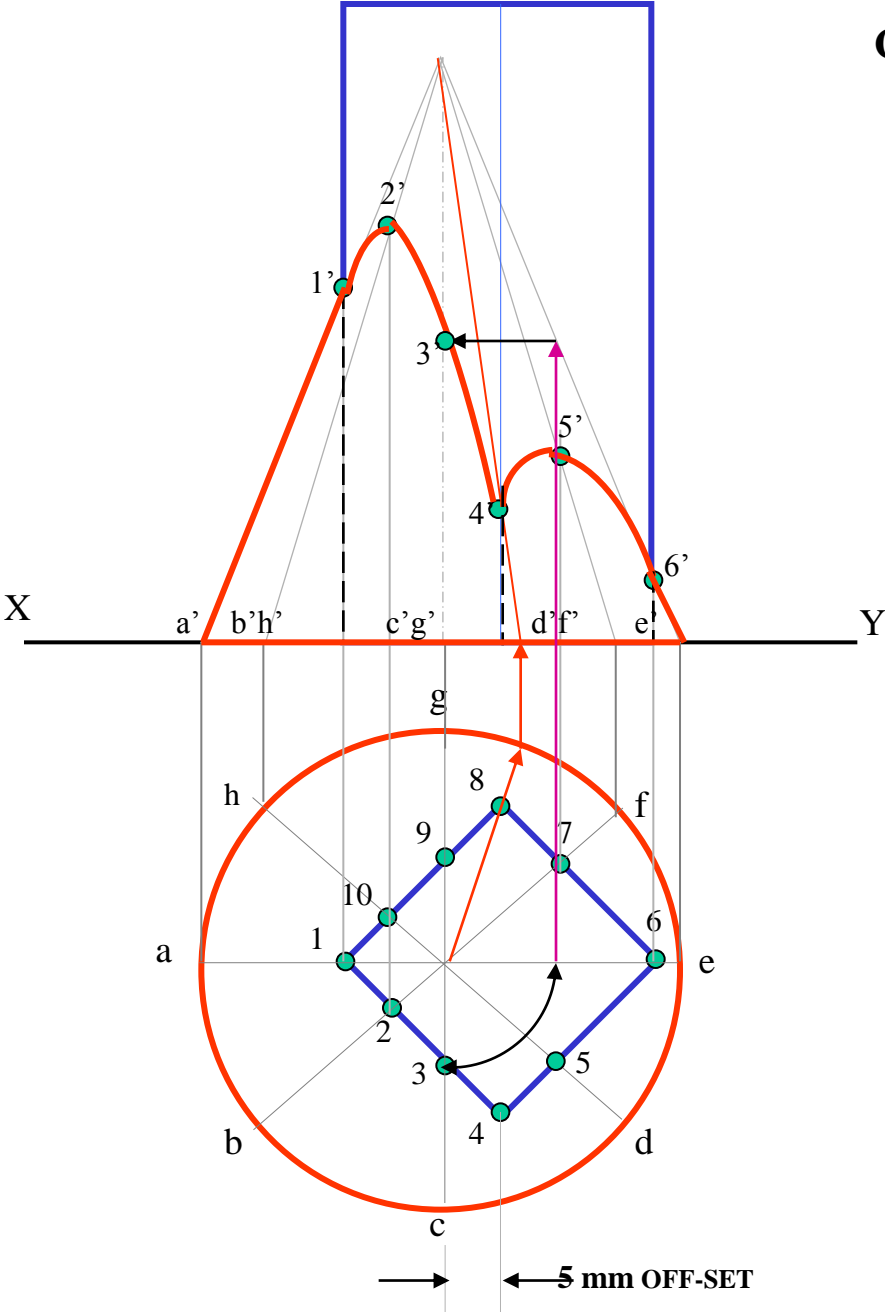
CASE 6.

SQ.PRISM STANDING
&
SQ.PRISM PENETRATING
(30° SKEW POSITION)

Problem: A sq.prism 30 mm base sides.and 70mm axis is completely penetrated by another square prism of 25 mm side s.and 70 mm axis, horizontally. Both axes Intersect & bisect each other. Two faces of penetrating prism are 30° inclined to Hp. Draw projections showing curves of intersections.

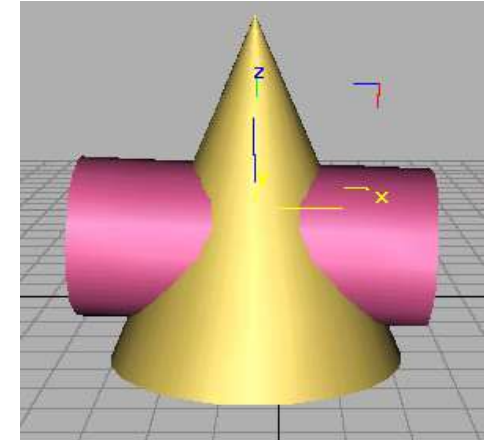


CASE 7.
CONE STANDING & SQ.PRISM PENETRATING
(BOTH AXES VERTICAL)



Problem: A cone 70 mm base diameter and 90 mm axis is completely penetrated by a square prism from top with its axis // to cone's axis and 5 mm away from it. a vertical plane containing both axes is parallel to Vp. Take all faces of sq.prism equally inclined to Vp. Base Side of prism is 0 mm and axis is 100 mm long. Draw projections showing curves of intersections.

**CONE STANDING
&
CYLINDER PENETRATING**



Problem: A vertical cone, base diameter 75 mm and axis 100 mm long, is completely penetrated by a cylinder of 45 mm diameter. The axis of the cylinder is parallel to Hp and Vp and intersects axis of the cone at a point 28 mm above the base. Draw projections showing curves of intersection.

