

# Projections of Solids



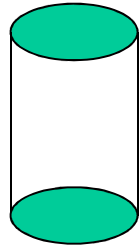
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**Associate Professor**  
**Department of Mechanical Engineering**  
**Indian Institute of Technology Madras, Chennai**

# Introduction (Solids)

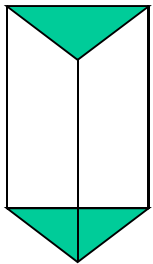
## Group A

Solids having top and base of same shape

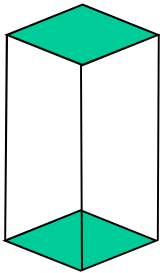
*Cylinder*



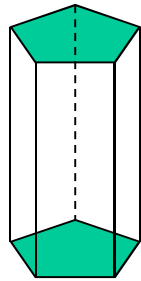
*Prisms*



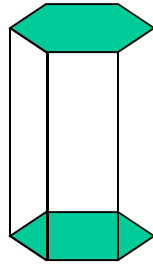
Triangular



Square



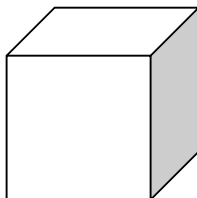
Pentagonal



Hexagonal

*Cube*

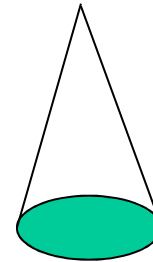
( A solid having  
six square faces)



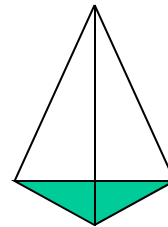
## Group B

Solids having base of some shape  
and just a point as a top, called apex.

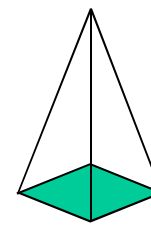
*Cone*



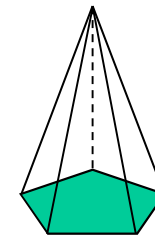
*Pyramids*



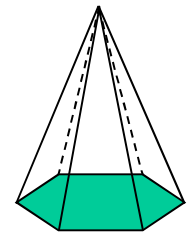
Triangular



Square



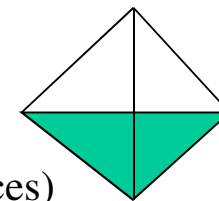
Pentagonal



Hexagonal

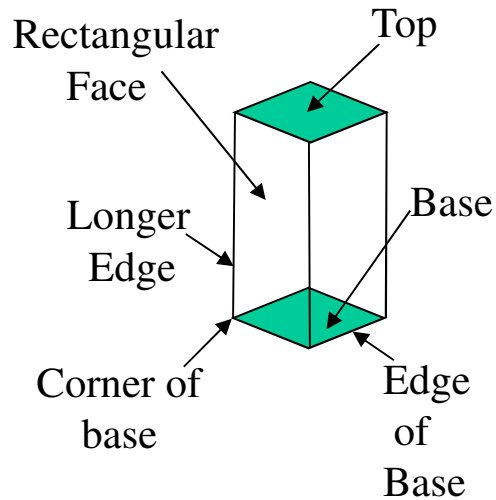
*Tetrahedron*

( A solid having  
Four triangular faces)

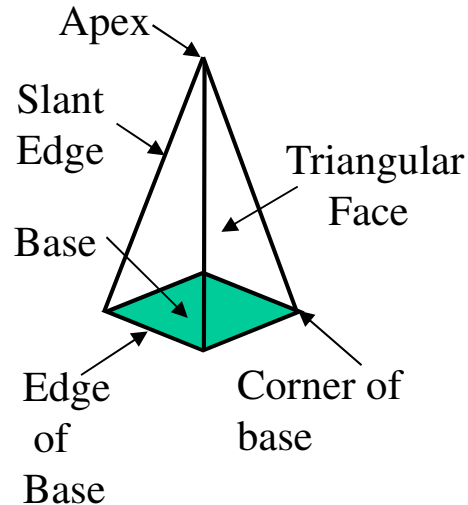


# Dimensional Parameters (Solids)

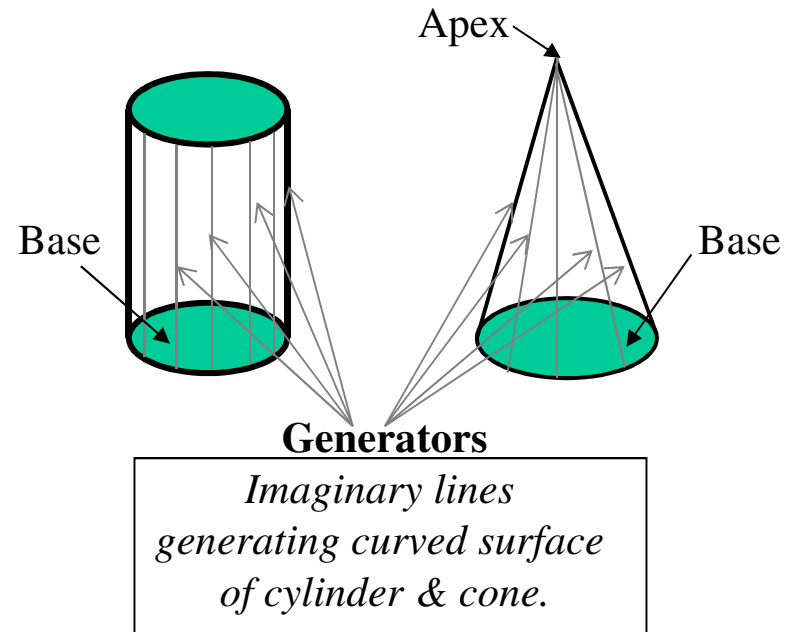
## Square Prism



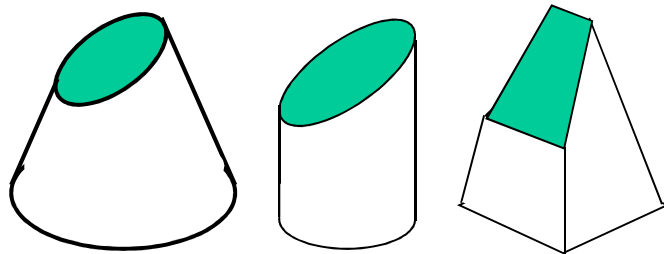
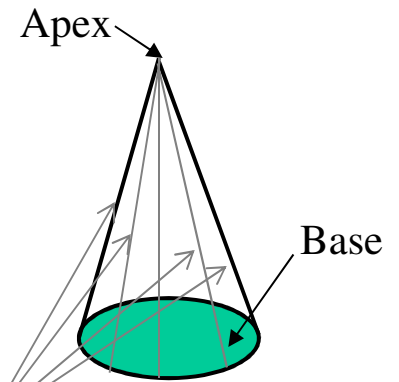
## Square Pyramid



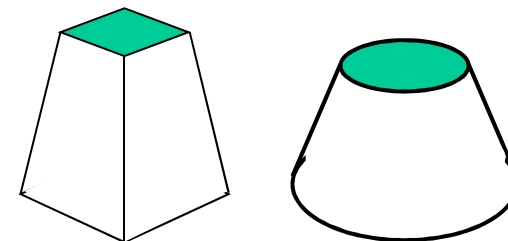
## Cylinder



## Cone

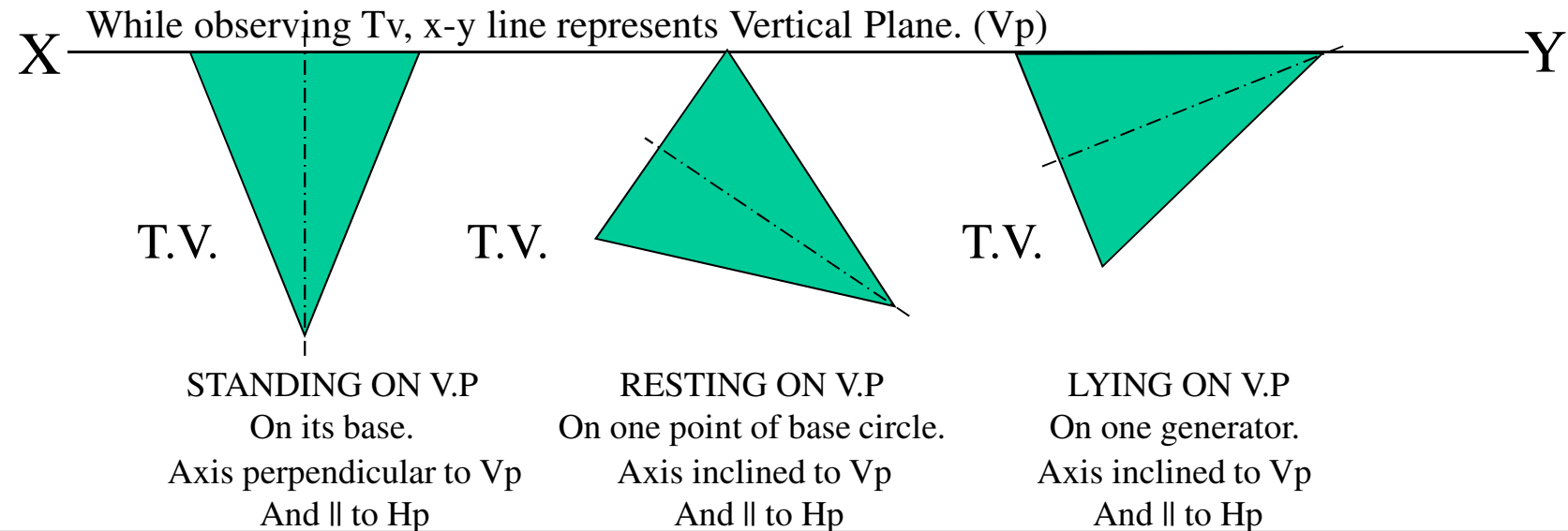
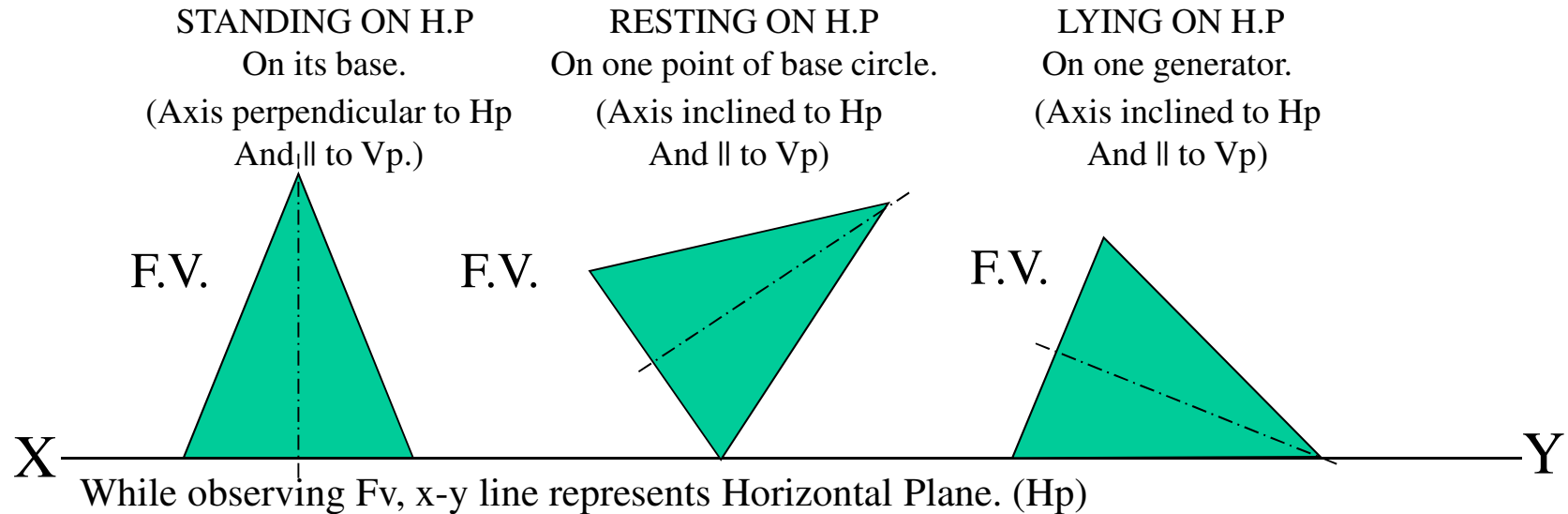


Sections of solids (Top & base are not parallel)



Frustum of cone & pyramids.  
( Top & base are parallel to each other)

# Example (Cone, Simple Cases)



# Steps

**STEP 1:** Assume that the solid stands on the plane with which it inclines

( If it inclines to HP, assume it standing on HP)

If solid stands on HP, its TV will be the true shape of its base or top

(If it inclines to VP, assume it standing on VP)

If solid stands on VP, its FV will be the true shape of its base or Top

Begin with this view:

(i) Its other view will be a **rectangle** (for Group A solids) **Cylinders and Prisms.**

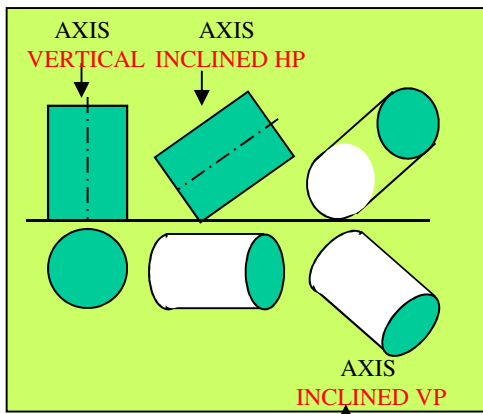
(ii) Its other view will be a **triangle** (for Group B solids) **Cone and Pyramids.**

**STEP 2:** Considering Solid's inclination (axis position) draw its FV &TV.

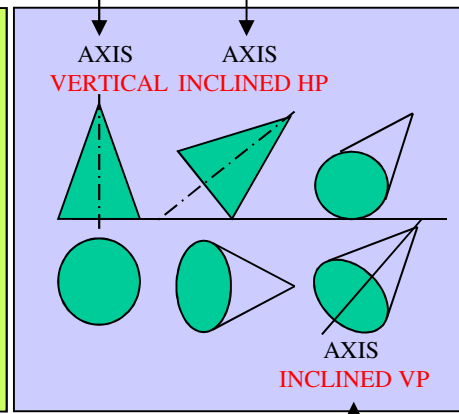
**STEP 3:** In the last step, consider the remaining inclination and draw its final FV &TV.

## If solid is inclined to Hp

### Group A Solid Cylinder

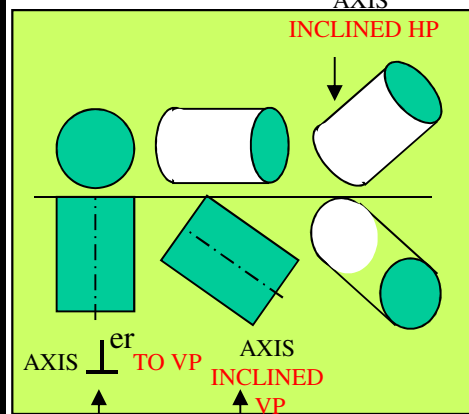


### Group B Solid Cone

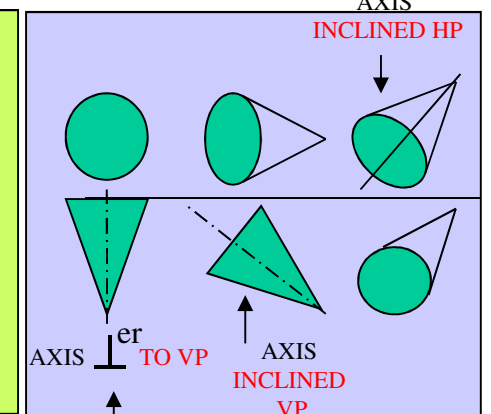


## If solid is inclined to Vp

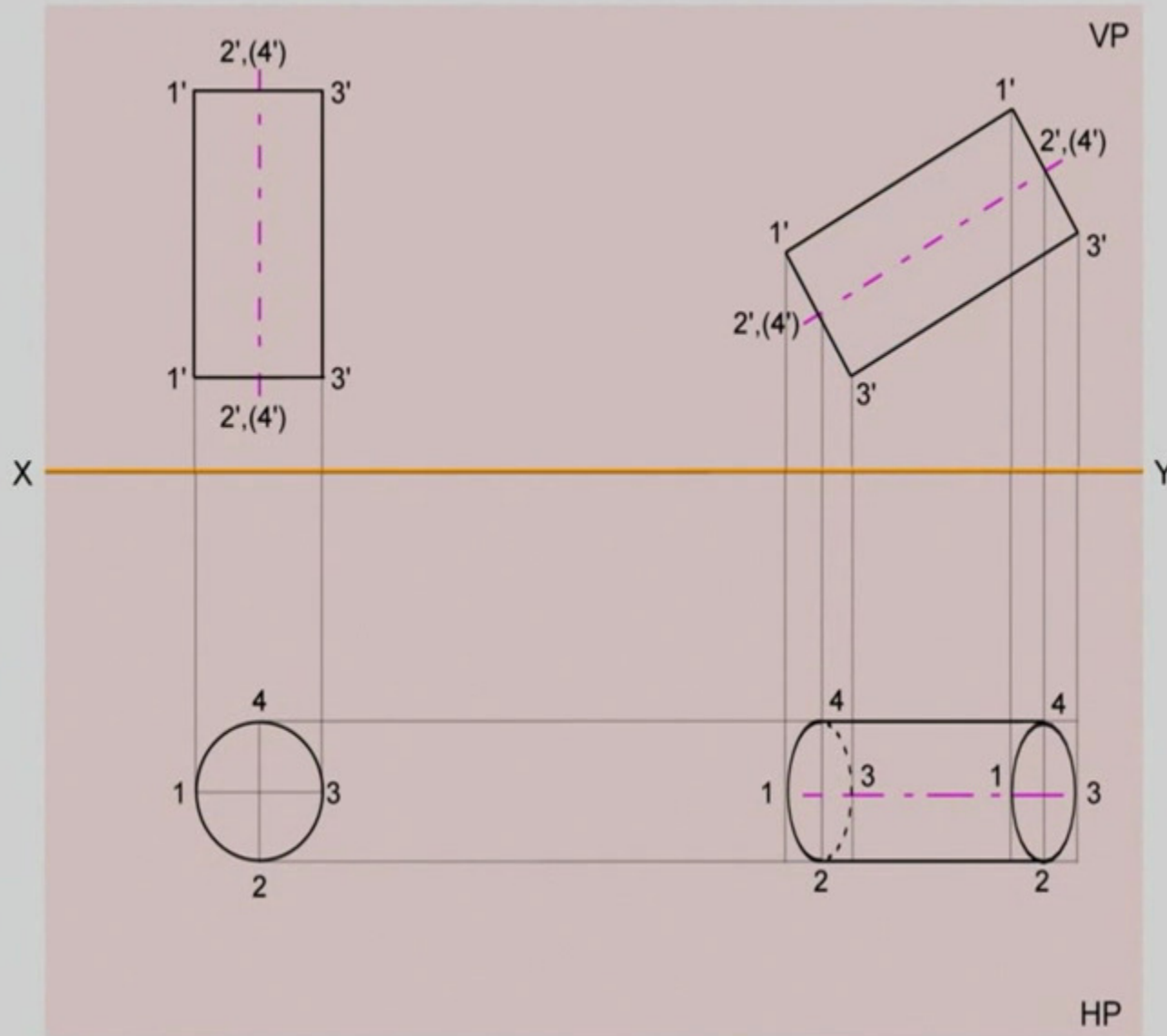
### Group A Solid Cylinder



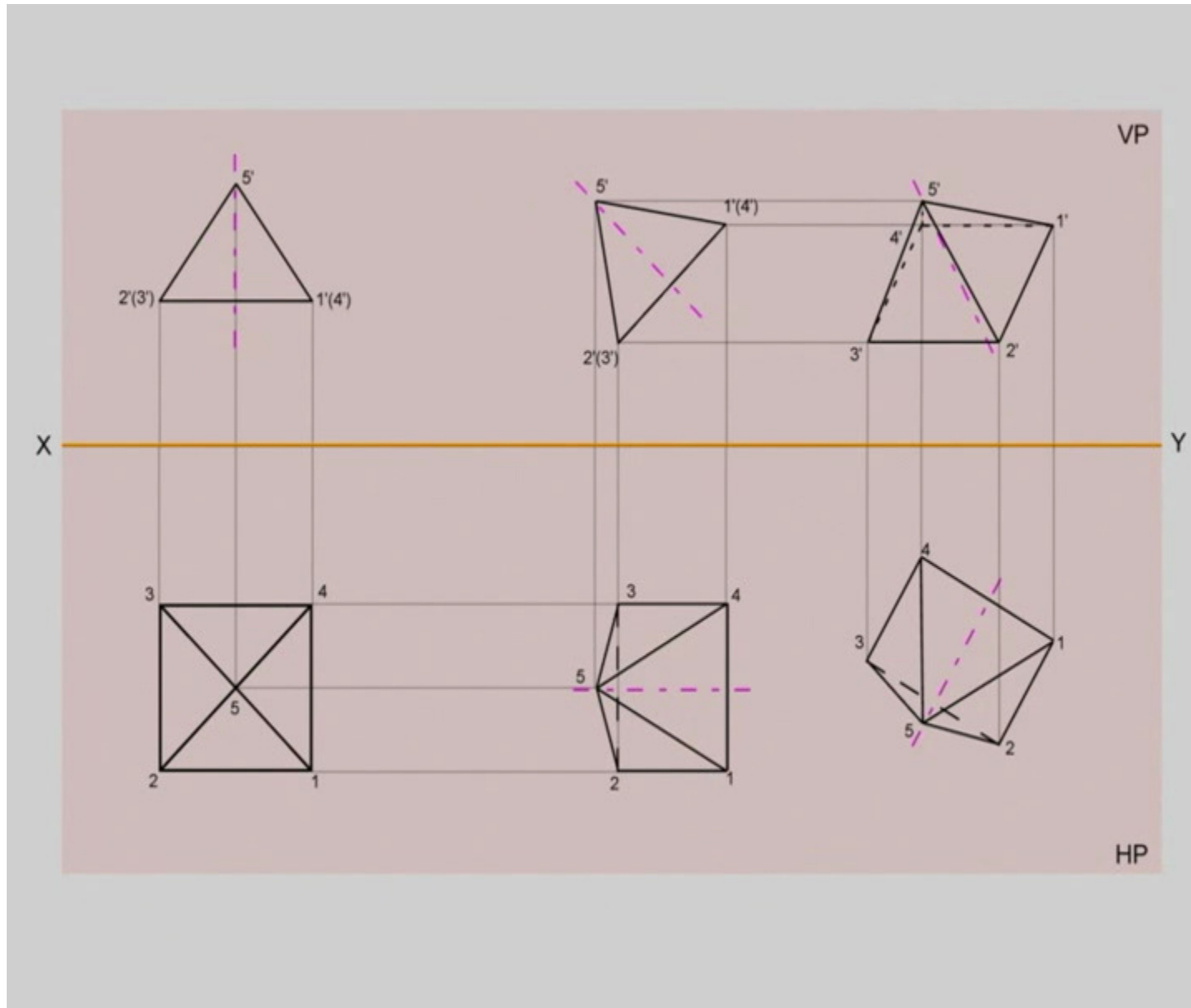
### Group B Solid Cone



# Cylinder Inclined to One Plane

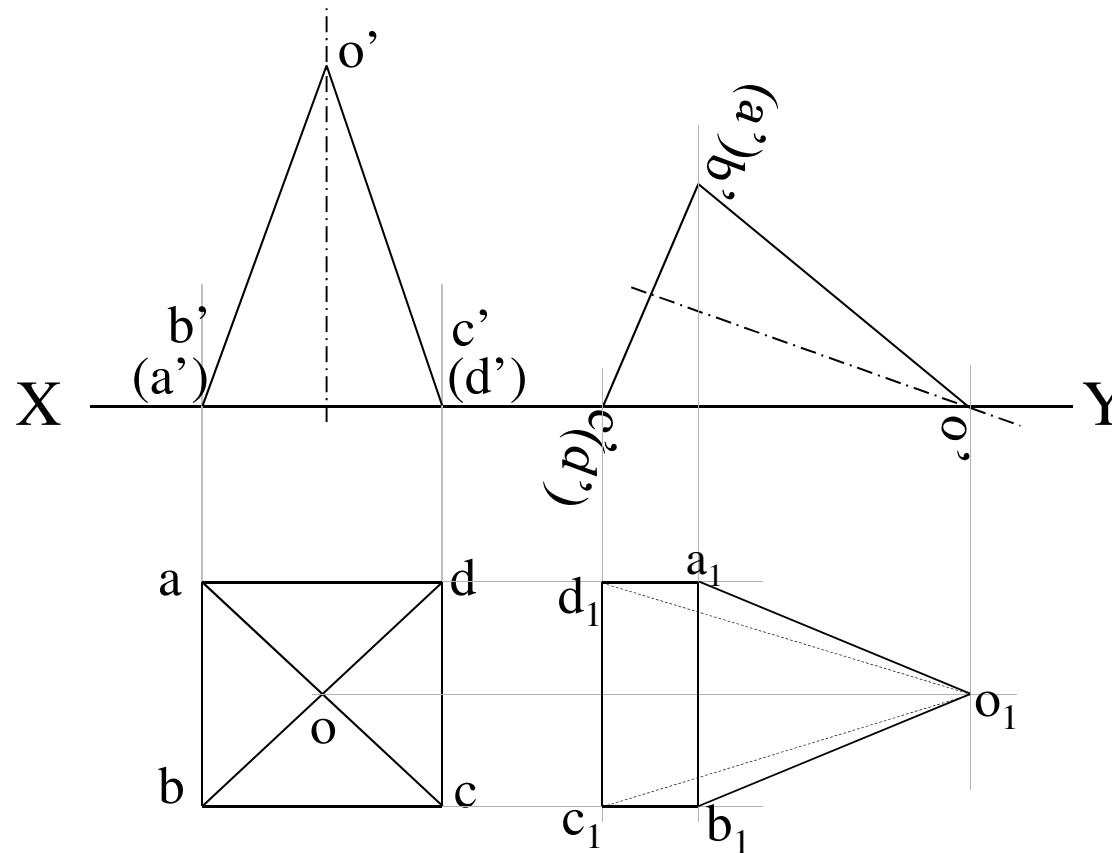


# Square Pyramid inclined to both planes



# Example 1

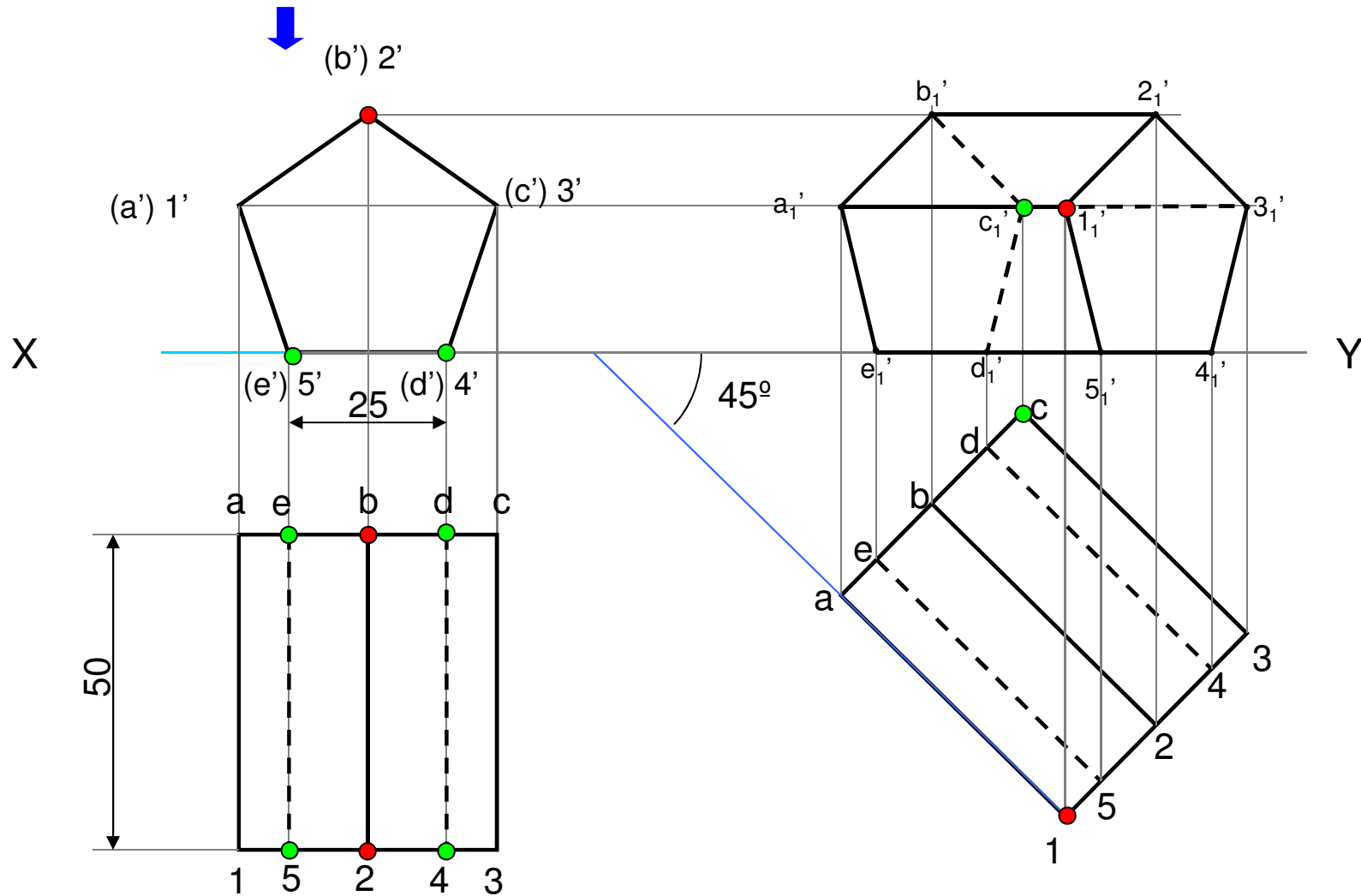
A square pyramid, 40 mm base sides and axis 60 mm long, has a triangular face on the ground. Draw its projections of the solid.





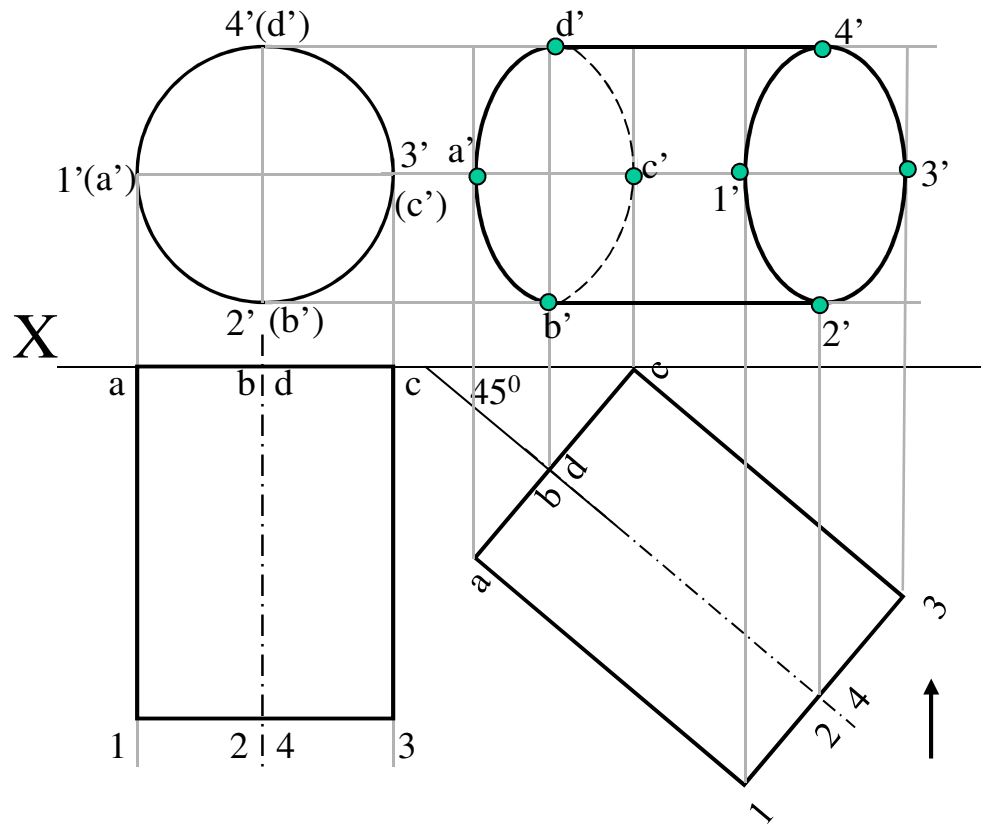
## Example 2

Draw the projections of a pentagonal prism, base 25 mm side and axis 50 mm long, resting on one of its rectangular faces on the H.P. with the axis inclined at  $45^\circ$  to the V.P.



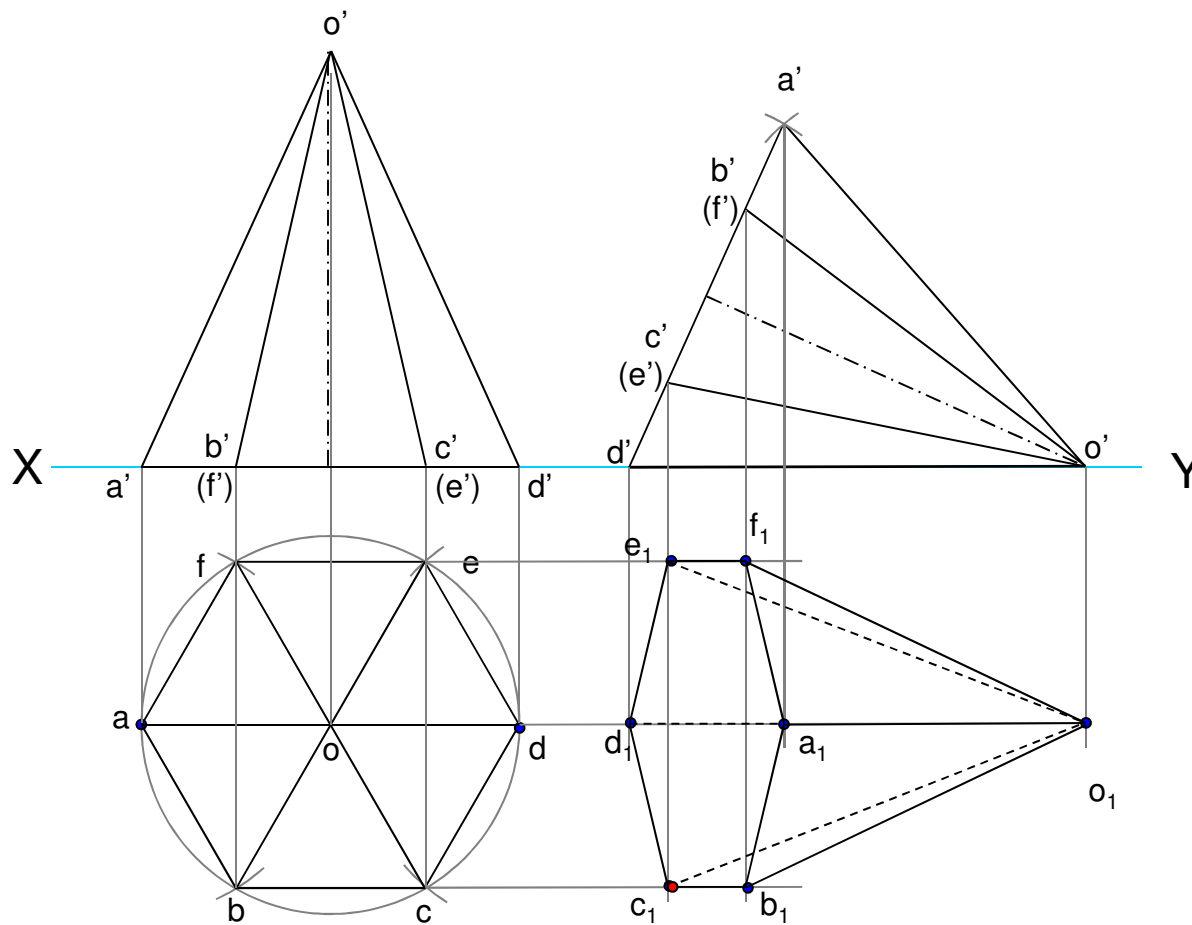
## Example 3

A cylinder 40 mm diameter and 50 mm axis is resting on one point of a base circle on VP while its axis makes  $45^\circ$  with VP. Draw its projections.



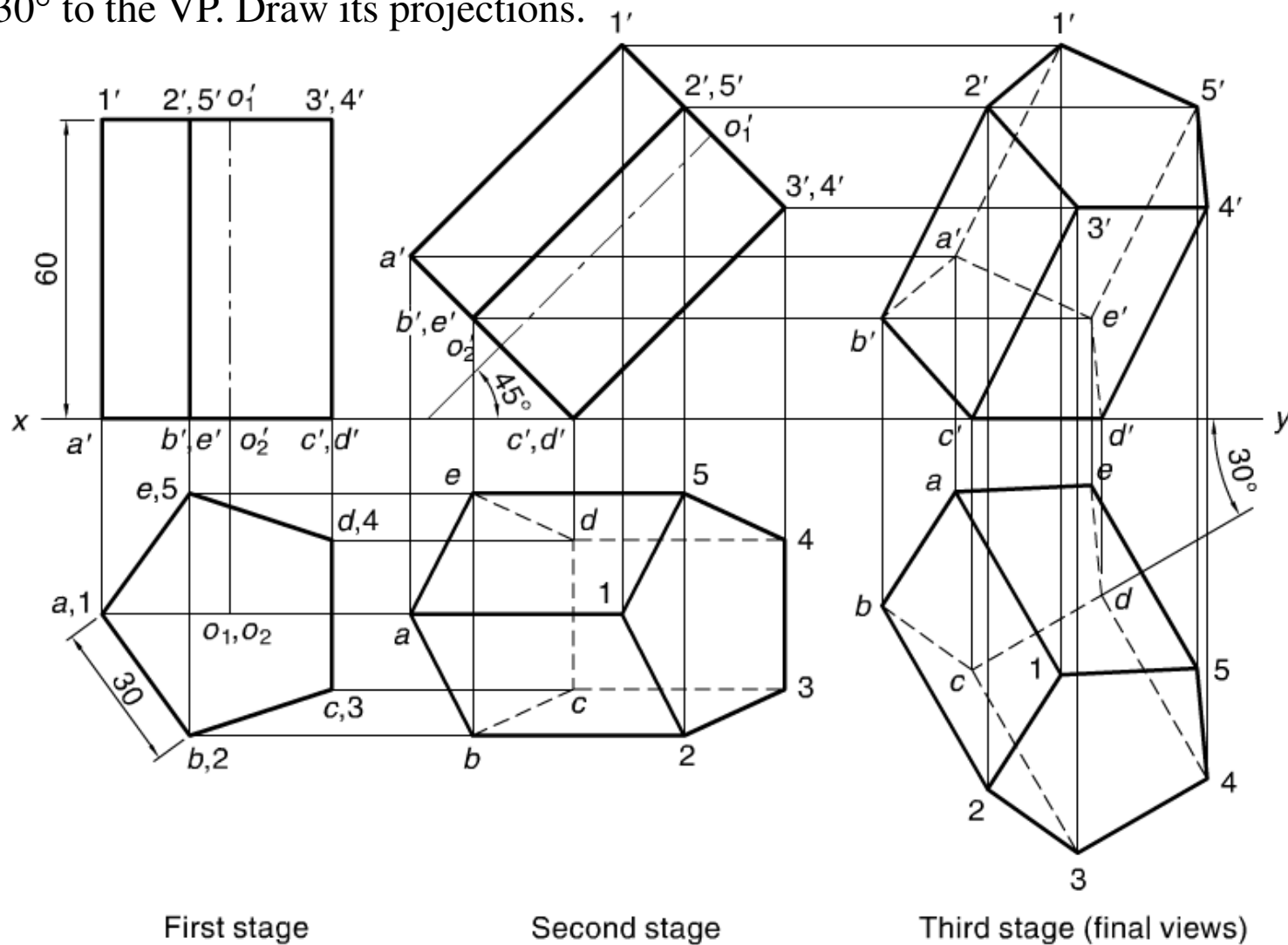
## Example 4

A hexagonal pyramid base 25 mm side and axis 55 mm long has one of its slant edge resting on the ground and with its axis is parallel to VP. Draw its projections .



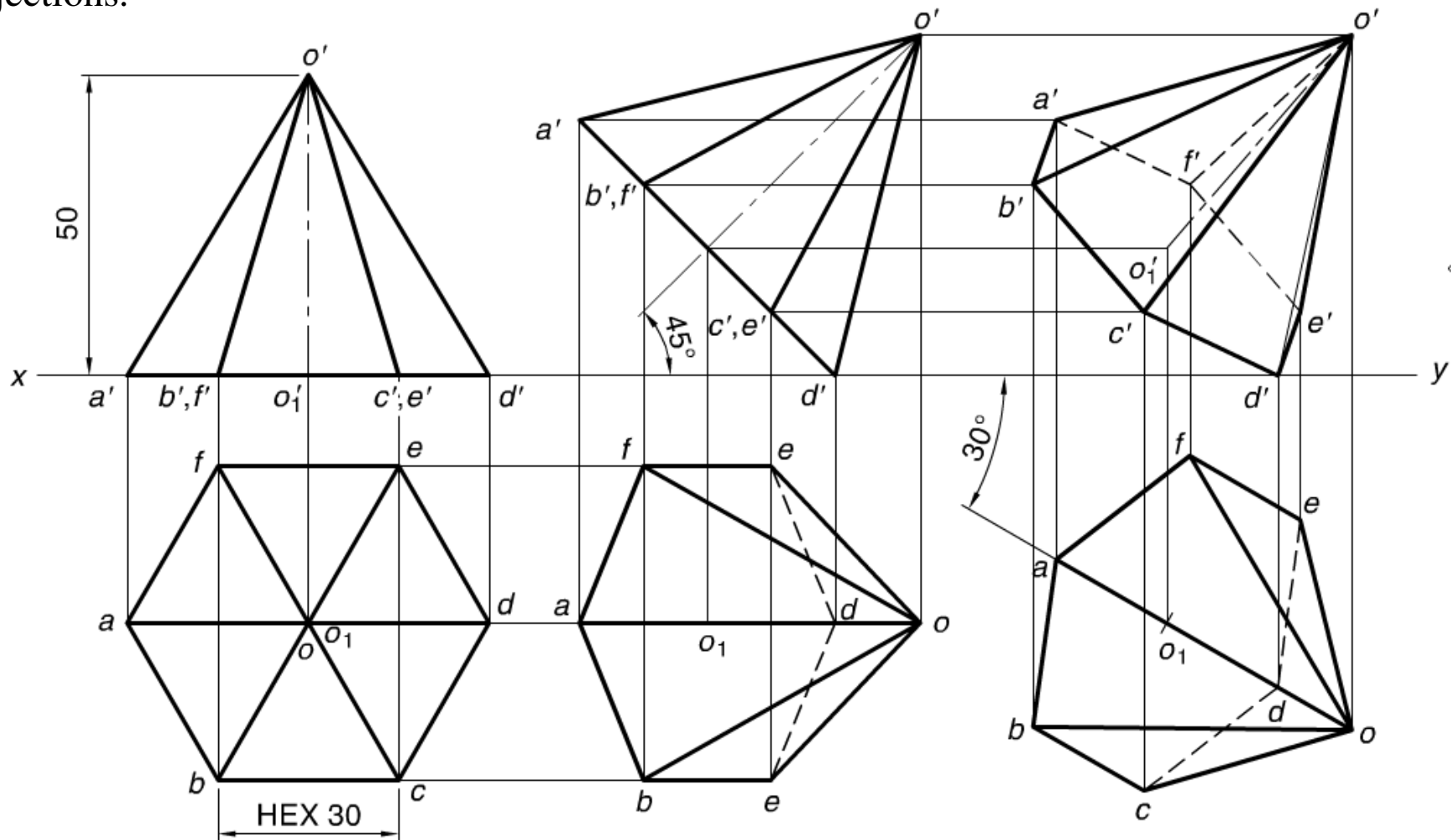
## Example 5

A pentagonal prism, having a base with a 30 mm side and 60 mm height, rests on the H.P. on one of its base edges. Its axis is inclined at  $45^\circ$  to the HP and the edge of the base on which it rests is inclined at  $30^\circ$  to the VP. Draw its projections.



## Example 6

A hexagonal pyramid, having a base with a 30 mm side and a 50 mm long axis, rests on one of its base corners on the ground with axis inclined at  $45^\circ$  to the HP. Draw its projections when the vertical plane containing the axis and the corner that lies in the HP makes  $30^\circ$  to the VP. Draw its projections.





**Thank you**