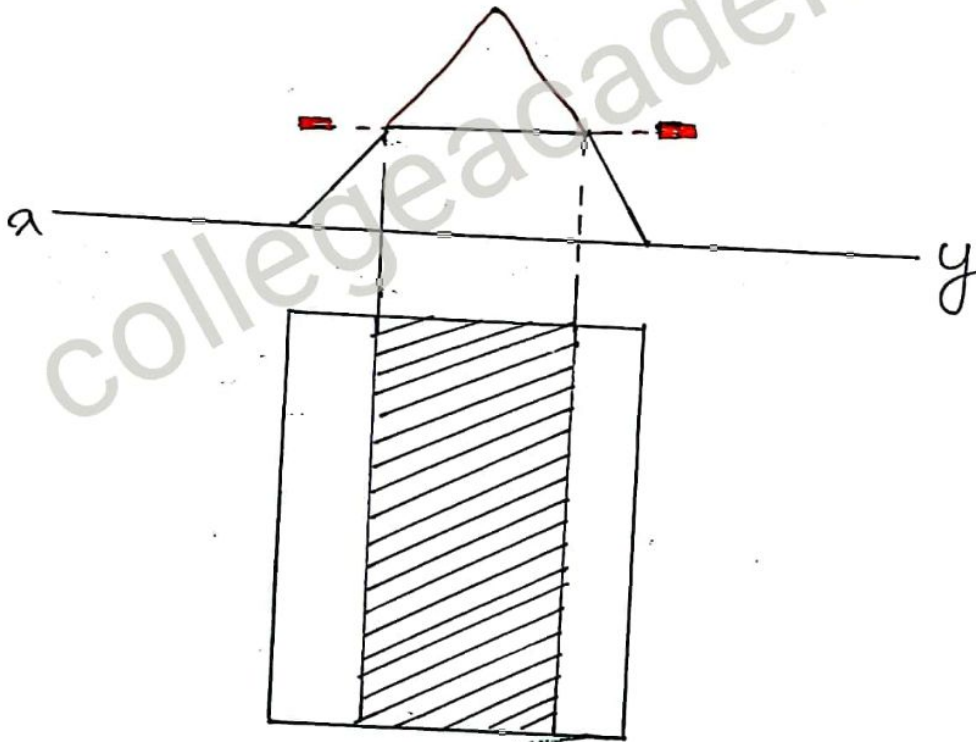


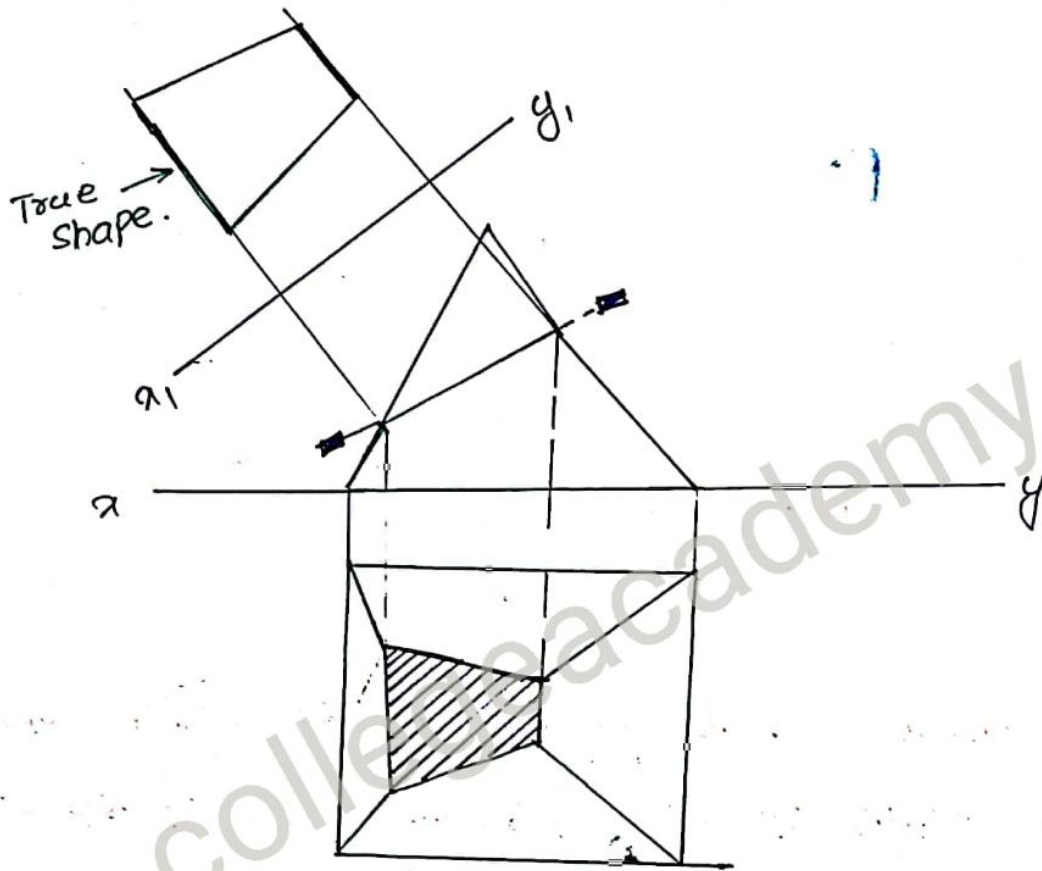
## chapter - 7

# \* Section of Solids \*

- ⑥ An equilateral triangular prism is resting on of the rectangular faces on H.P and its axis is ~~per~~ to V.P It is cut by a section plane  $\parallel$  to H.P and passing through the centroid. Draw its projections.



⑥ A square pyramid is resting on its base on H.P. with one of the waist lengths  $\parallel$  to V.P. It is cut by a section plane  $\parallel$  to A.P. Such that the true shape of the section is Trapezium. Draw its projections.



When a section plane cuts polyhedra then the No of edges in largest possible section will be

1)  $n + 2 \rightarrow$  for prisms

2)  $n + 1 \rightarrow$  for pyramids.

where 'n' is number of edges in the base polygon.

# \* Development of Surfaces \*

When the solid is cut open and laid on flat sheet then we say that surface of solid has been developed and the figure obtained is known as development of that solid.

## Important points :-

① The Lengths on the development of solid represents the True Length of corresponding edge of the solid.

② When we are asked to develop the lateral surface of the solid then end bases need not to be developed. They can be conveniently added whenever required.

③ Development of a section / cone / cylinder represents a smooth free hand curve.

④. Development of a section prism (or) pyramid represents a straight line segmented curve.



#### ④ Selection design

In this the design task consists of selecting the standard components with required performance, quality and cost. eg. some standard components like pumps, bearings, motors, screw sizes need not to be designed again.

#### 4 C's of Design

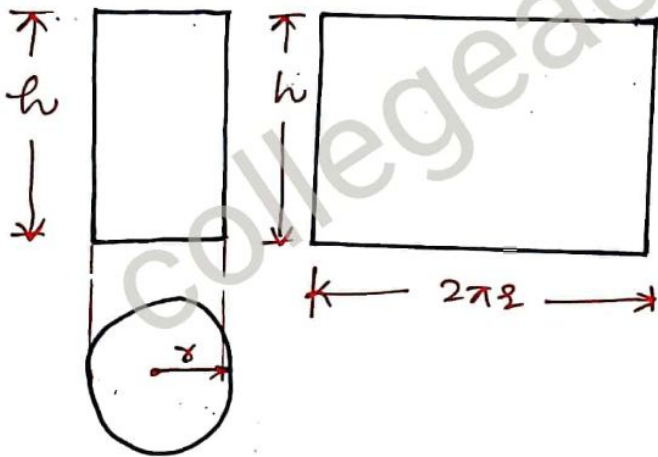
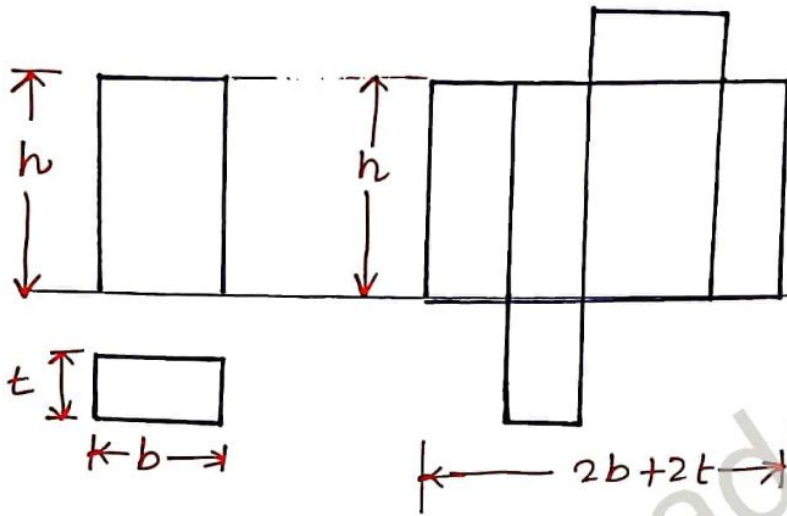
The challenges of a design problem can be summarized into 4 C's of design.

- ① Creativity - It requires creation of something that does not exist.
- ② Complexity - It requires making decisions on many variables or parameters
- ③ Choice - It requires making choices between many possible solutions at all levels.
- ④ Compromise - It requires balancing multiple and sometimes conflicting requirements

## Methods of developments :-

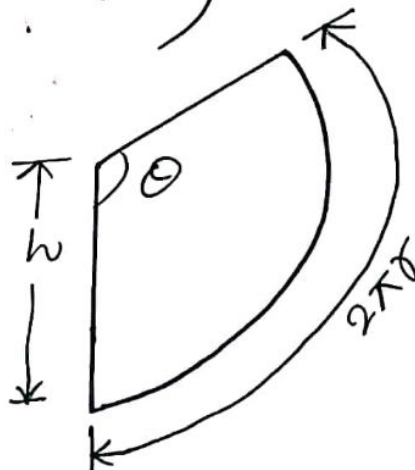
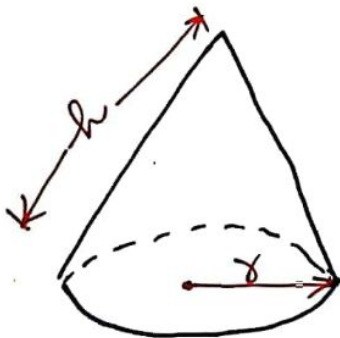
### ① Parallel Line Method :-

It is used for development of cylinders and prism.



### ② Radial Line method :-

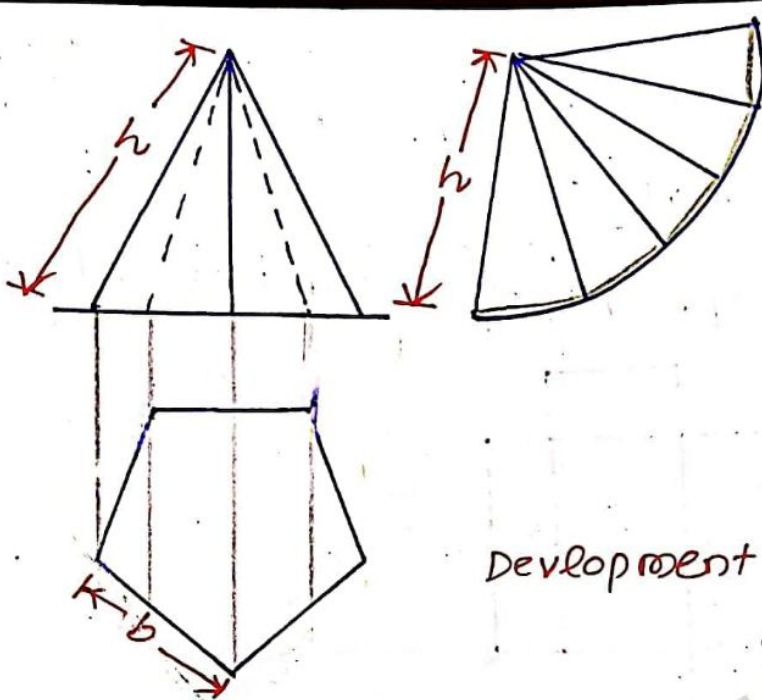
It is used for the development of pyramids and cones (singly curved surface)



$$\theta = \frac{2\pi r}{h}$$

$$\theta = 360 \left( \frac{r}{h} \right)$$





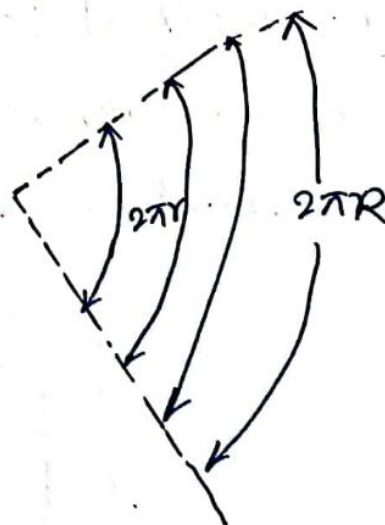
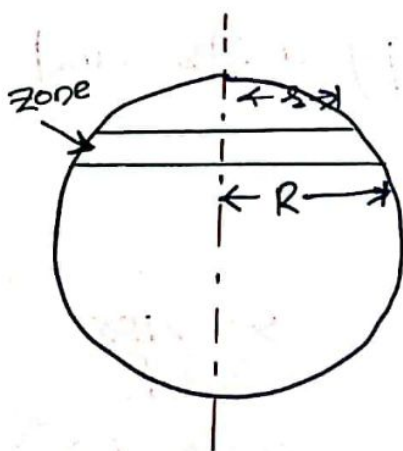
Development of pentagonal pyramid.

### ③ Approximate method :-

It is used for development of spheres, ellipsoide, paraboloid, hyperboloid etc. (doubly curved surfaces).

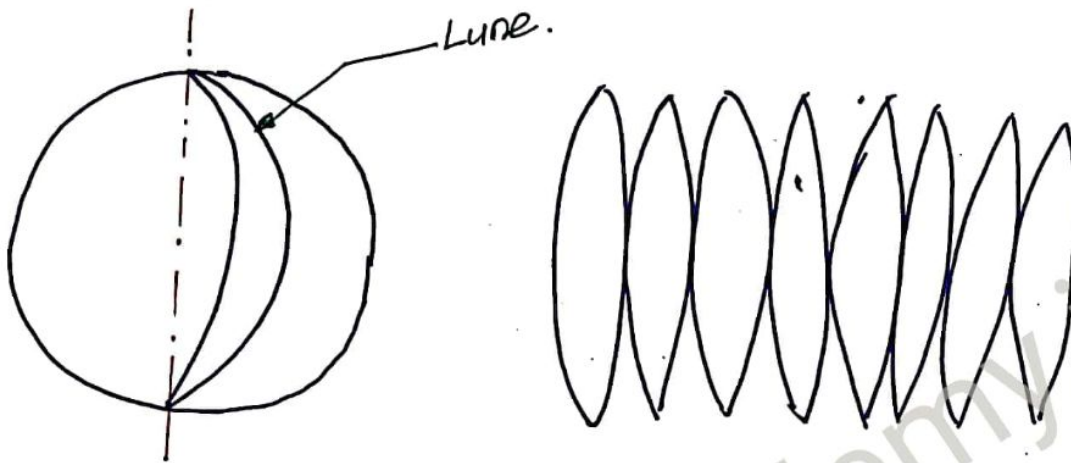
#### ① Zone method :-

Zone is a portion of sphere between two planes that are perpendicular to axis.



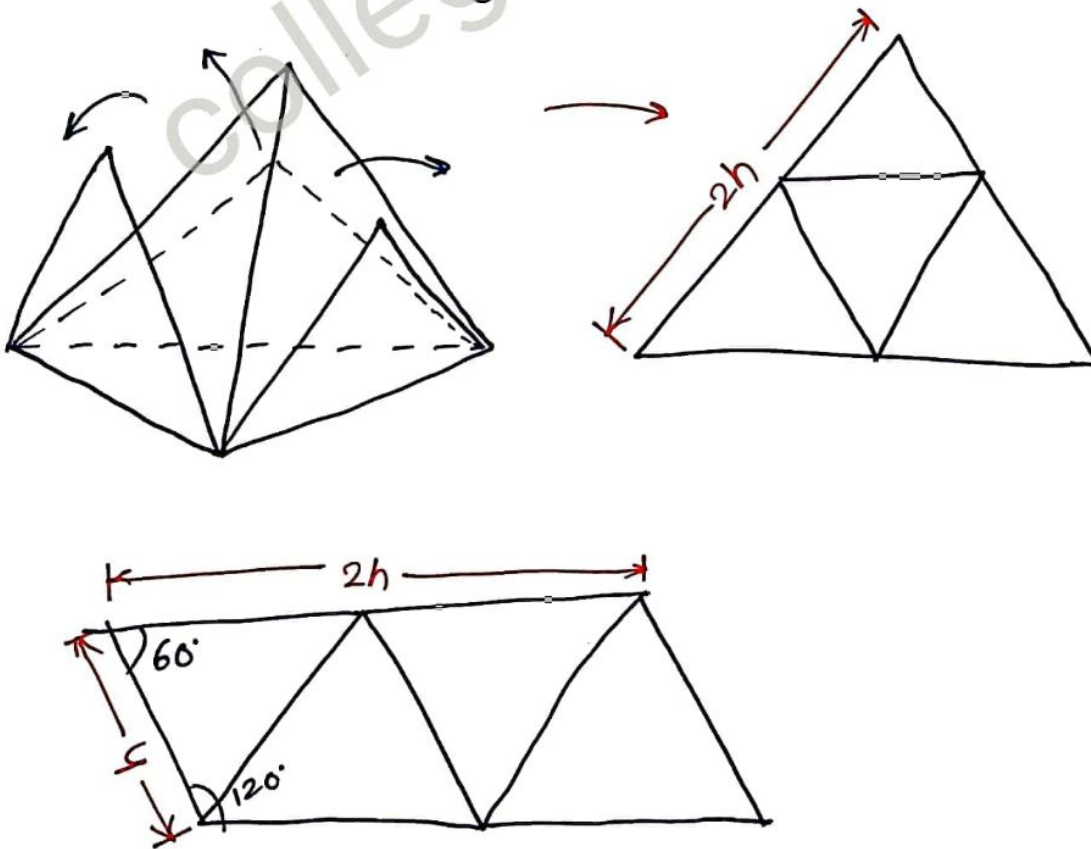
## (ii) Lune method :-

It is the portion of sphere b/w two planes that contain the axis.

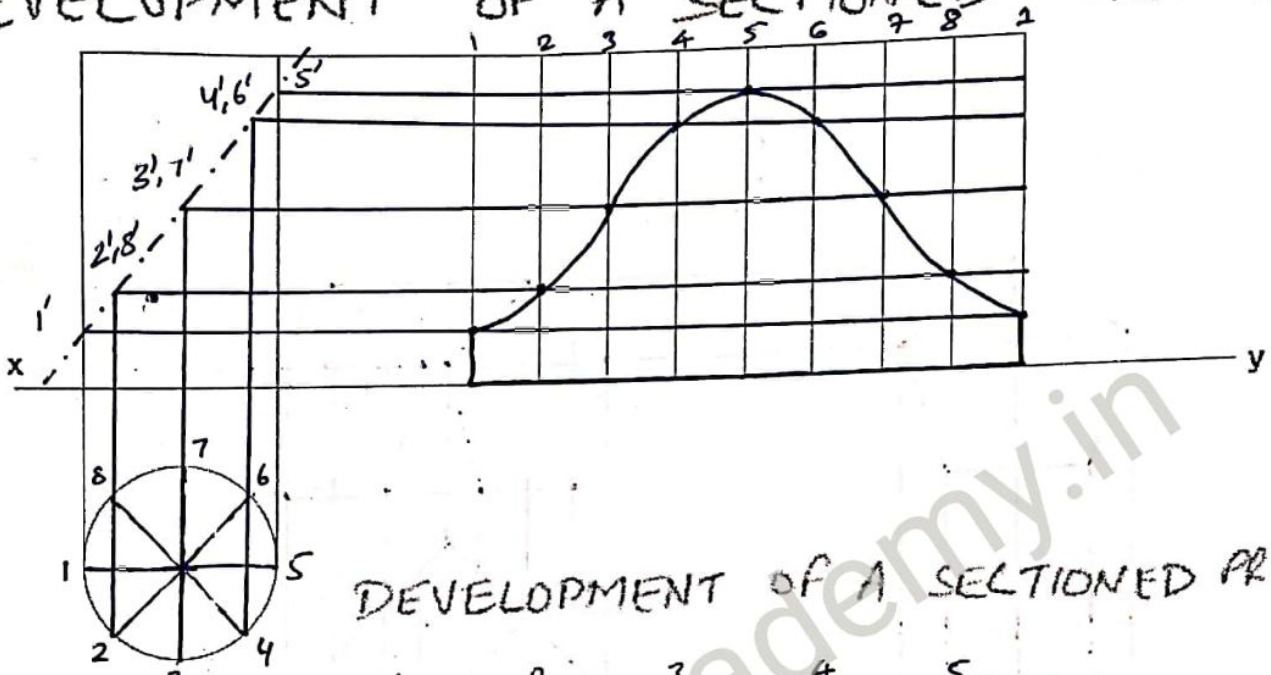


## (4) Triangulation Method :-

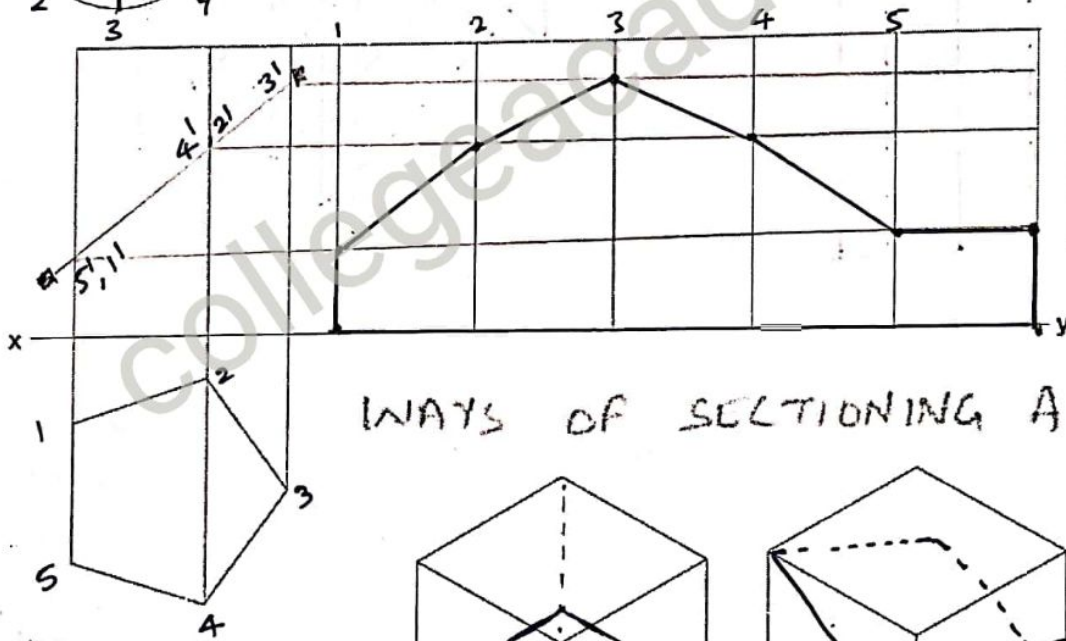
It is used for development of polyhedra, warped surfaces and Triangulation pieces.



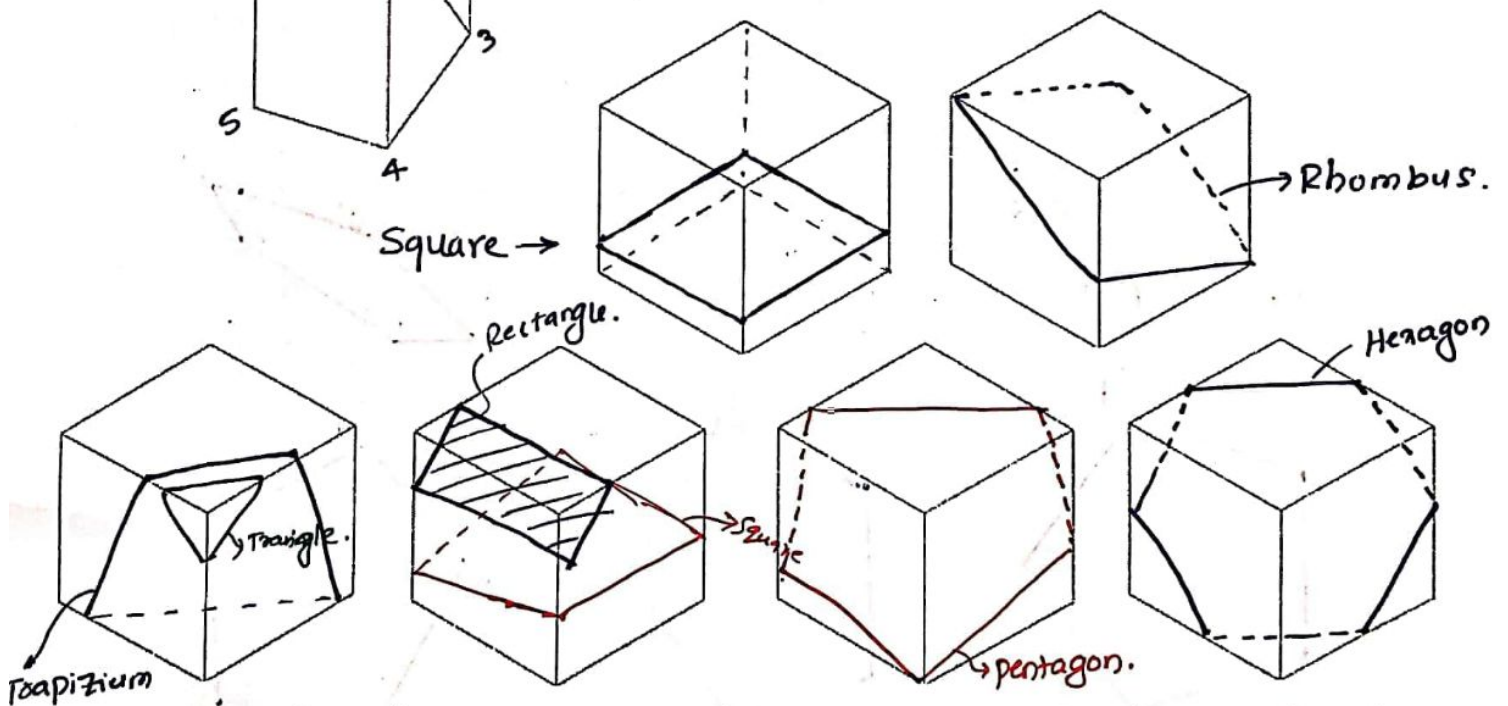
# DEVELOPMENT OF A SECTIONED CYLINDER



# DEVELOPMENT OF A SECTIONED PRISM



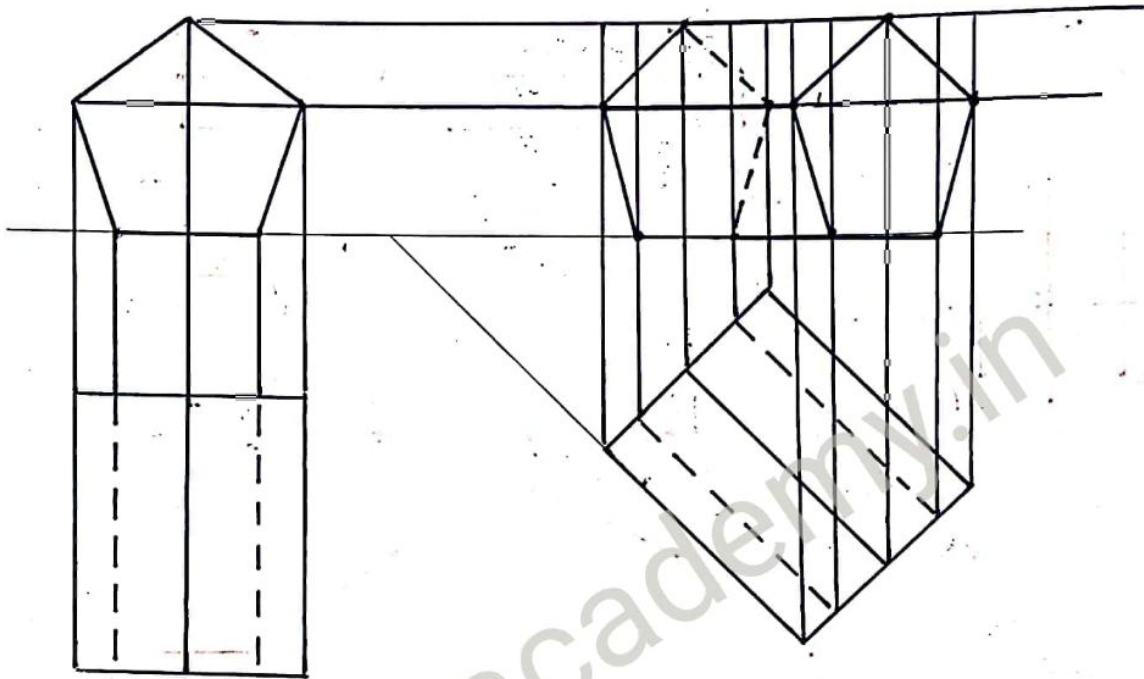
# WAYS OF SECTIONING A CUBE



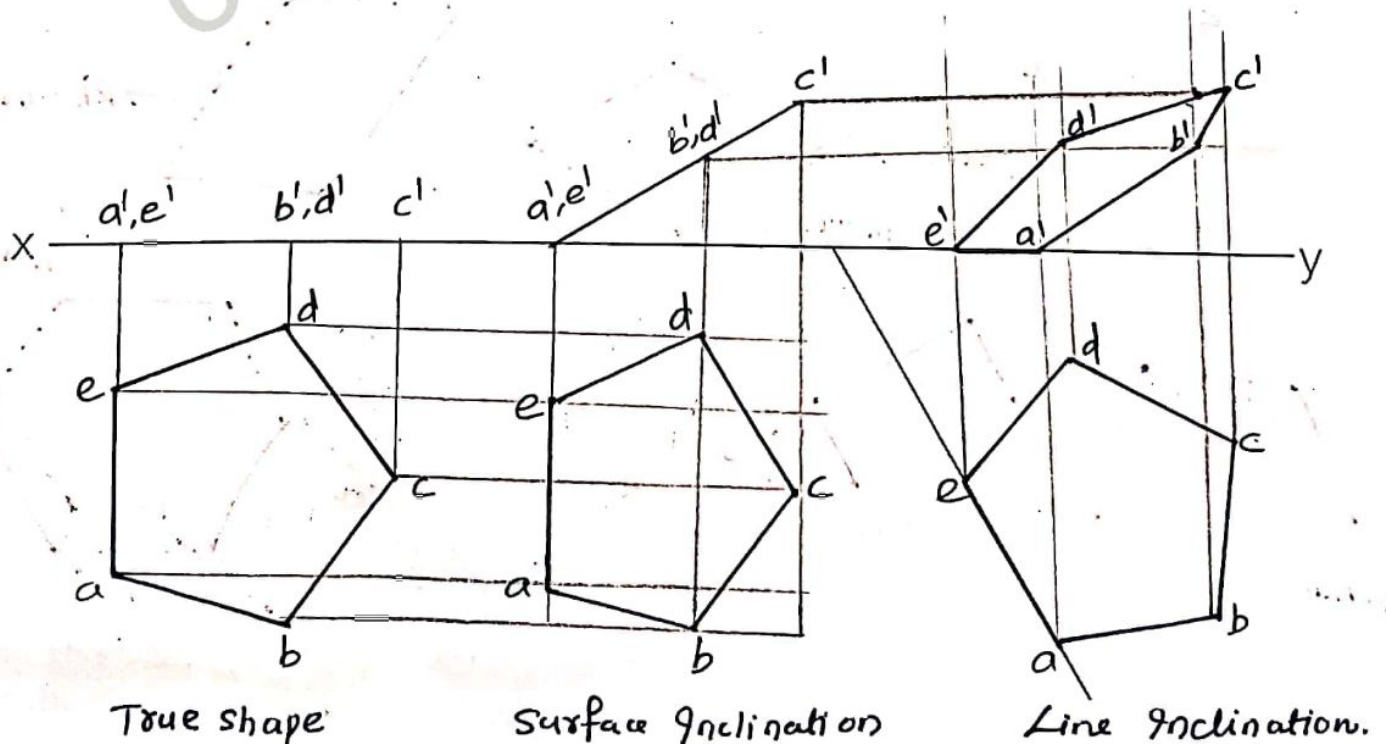
- ANIRUDH SINGH RATHORE (MADE EASY)

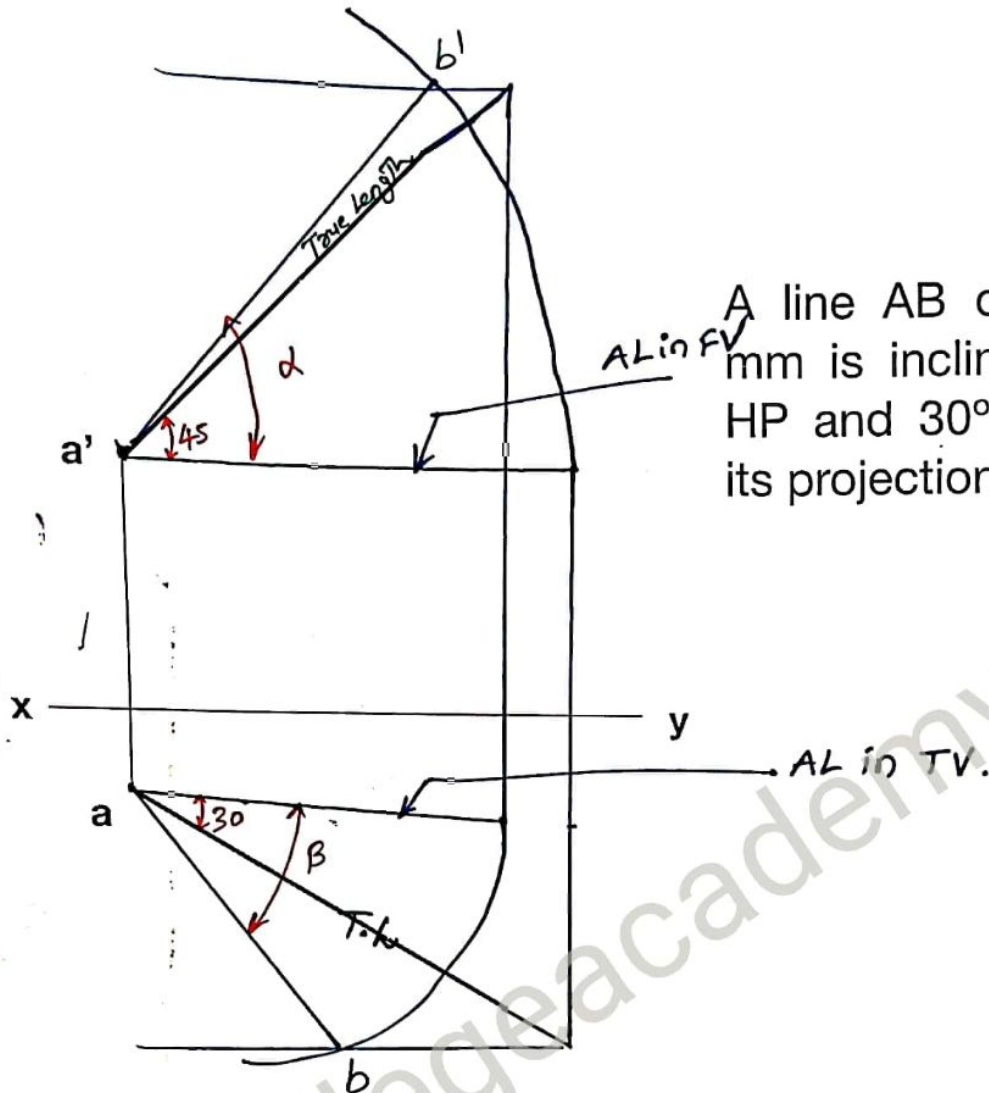


Draw the projections of a pentagonal prism, base 25 mm and axis 50 mm long, resting on one its rectangular faces on the HP with the axis inclined at 45 degrees to the VP.



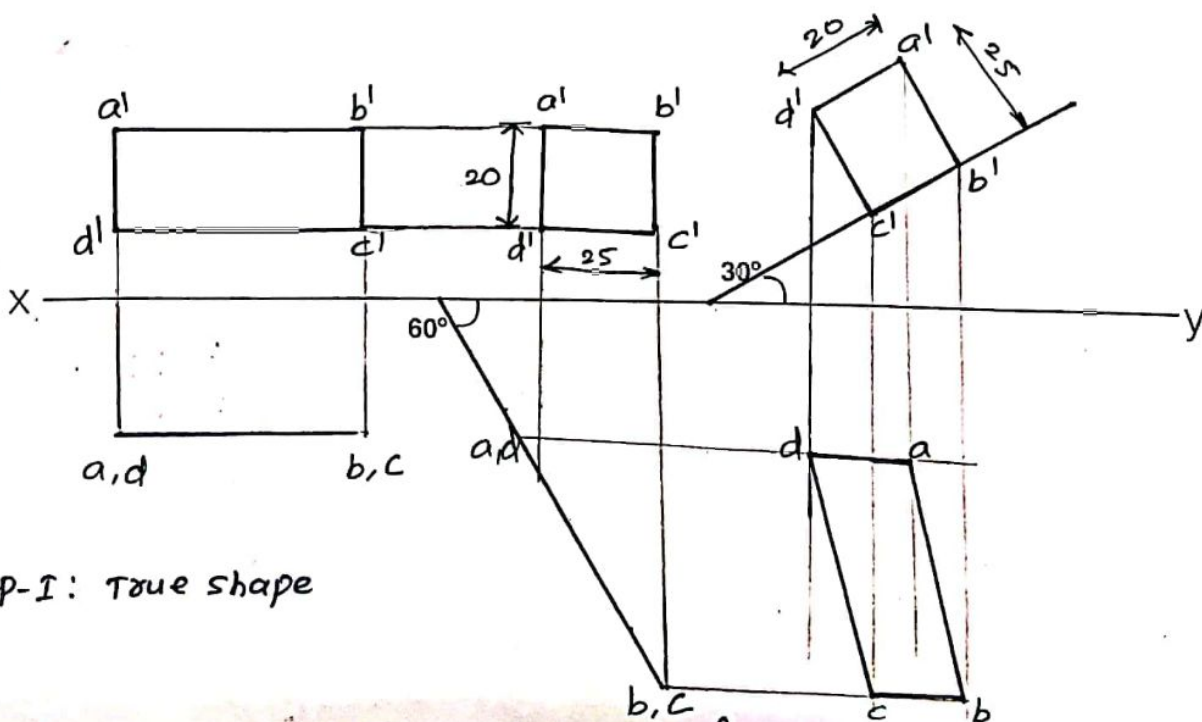
Draw the projections of a regular pentagon of 25 mm side, having its surface inclined at 30 degrees to the HP and a side parallel to the HP and inclined at an angle of 60 degrees to the VP.





A line AB of length 100 mm is inclined at  $45^\circ$  to HP and  $30^\circ$  to VP. Draw its projections.

A rectangular plate of size 20 mm x 50 mm has its surface inclined to VP at 60 degree and one of the smaller sides is inclined to HP at 30 degree. Draw its projections.



Step-I: True shape

Step-2:- Surface Inclination

Step-3 Line Inclination.