

## University Institute of Engineering

### Academic Unit-1

Bachelor of Engineering (CSE, IT, CSE-IBM)

Computer Graphics using CAD Lab. (20MEP114)

**Experiment No. 5 & 6**

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**PROJECTIONS OF PLANES**

DISCOVER . **LEARN** . EMPOWER

# PROJECTION OF PLANES

## Course Outcome

CO Number	Title After completion of the course the students may be able to:	Level
CO1	Sketch the different conventions and representations of engineering graphics on AutoCAD software.	Remember & Understand
CO2	Explain the use of engineering drawing, compare and predict the geometrical details of common engineering objects.	Understand
<b>CO3</b>	<b>Classify, examine and draw the dimensioned figures expressing information about the shape and size of physical objects</b>	<b>Understand</b>
CO4	Identify and express the geometrical features of a product on AutoCAD software.	Understand
CO5	Draw orthographic views of computer components.	Understand

Will be covered in this  
lecture

# COURSE OBJECTIVES

Students may be able to

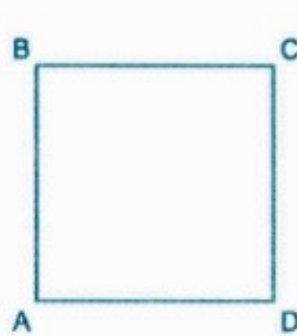
- Draw 2-D figures of different polygons
- Build an understanding level of imagination to represent 2D plane figures with respect to H.P & V.P
- Draw front and top views of the plane figures in various orientations w.r.t. the principal planes

# Plane and Lamina

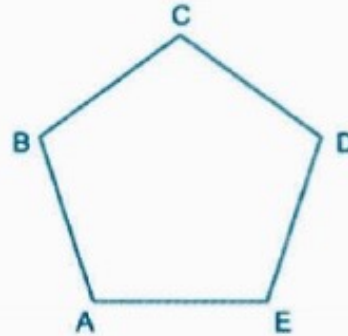
- Plane: Plane is a 2D figure with infinite length and width (Eg. H.P & V.P)
- Lamina:-Lamina is 2D plane figure with specific length and width (Eg. Triangle, Pentagon.etc)

# Examples of Lamina

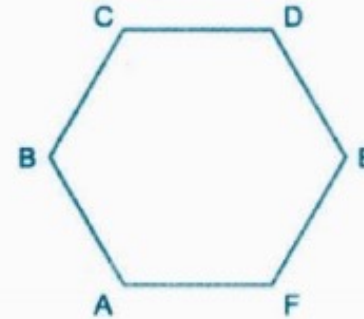
- A lamina can be of triangle, square, pentagon, hexagon, etc.



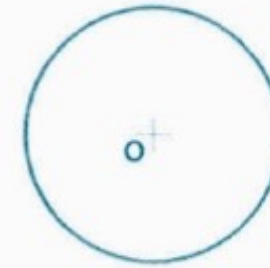
(i) SQUARE



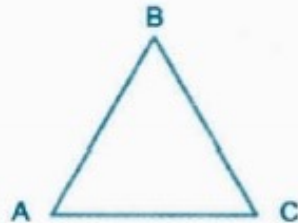
(ii) PENTAGON



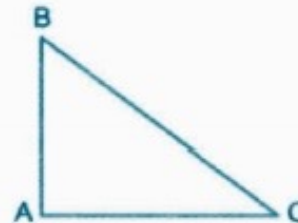
(iii) HEXAGON



(iv) CIRCLE



(v) EQUILATERAL TRIANGLE



(vi) RIGHTANGLE TRIANGLE



(vii) RECTANGLE

# Orientations of the planes

- Basic information required to draw the projections of the planes
  1. Size of one side of the plane/ diameter of a circular plane
  2. Orientation of the plane as a whole ( Plane is parallel/ perpendicular/ inclined to the principal planes)
  3. Orientation of the plane w.r.t. its edge, corner, diameter, etc.

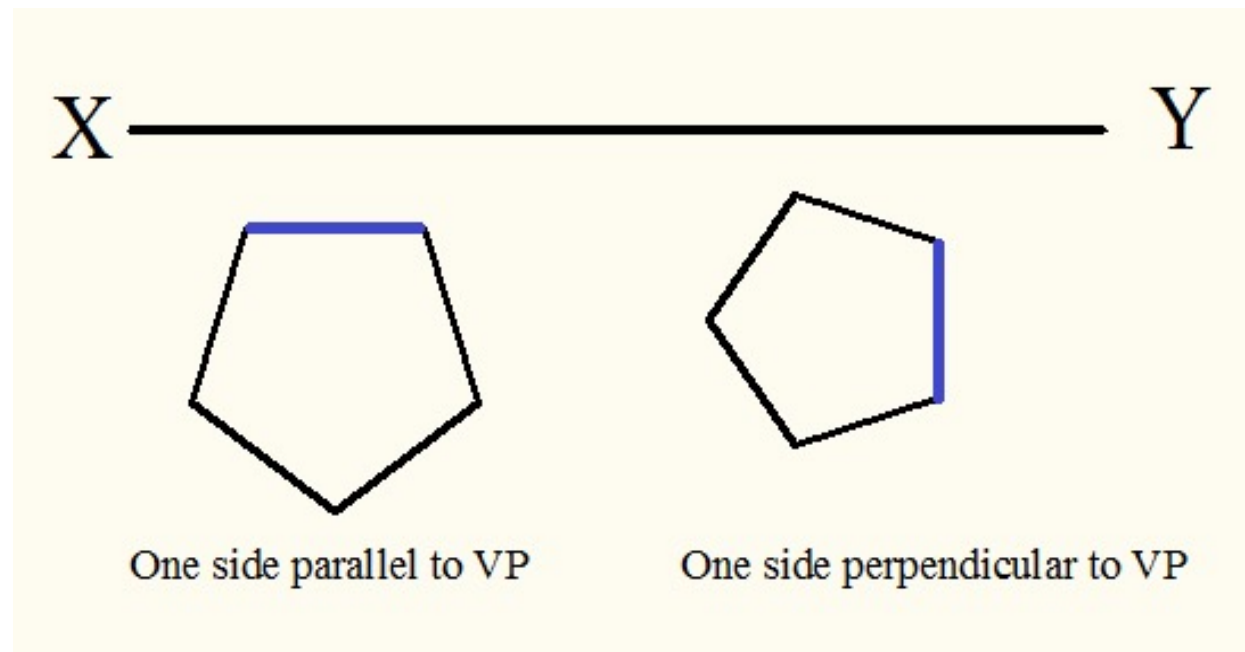
# Orientations of the plane as a whole

A rule is followed for this condition

- If the plane is parallel to one principal plane, the figures drawn will only be single stage i.e. one FV and one TV
- If the plane is inclined to one of the principal planes
  1. In 1st step assume the plane parallel to that principal plane and draw the projections
  2. In the 2nd step make it inclined to that principal plane

# Orientations of the plane w.r.t. edge

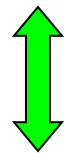
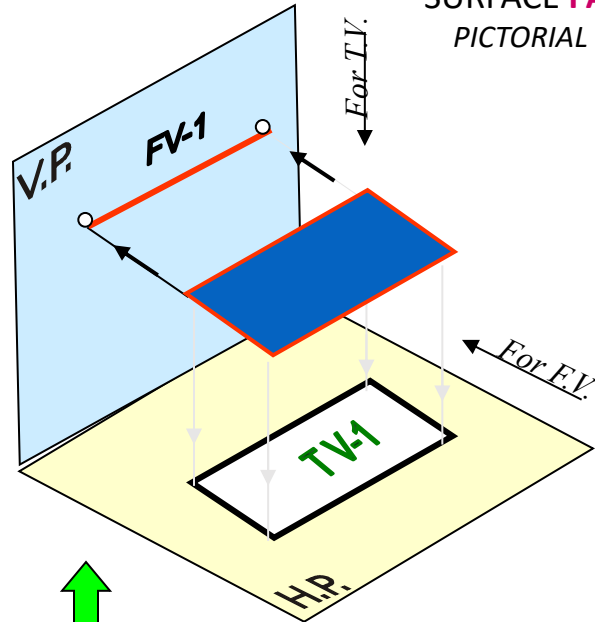
- Let us consider a pentagonal plane parallel to HP as a whole
- The 2 cases of how the plane can be placed w.r.t. its edge are given below



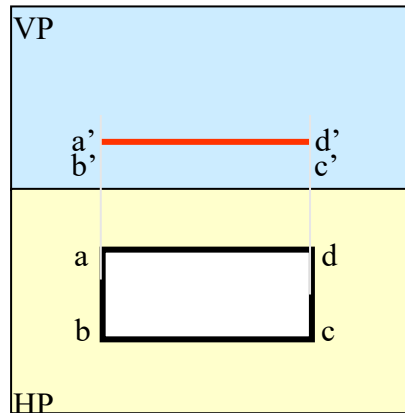


# Orientations of a plane

SURFACE **PARALLEL TO HP**  
PICTORIAL PRESENTATION

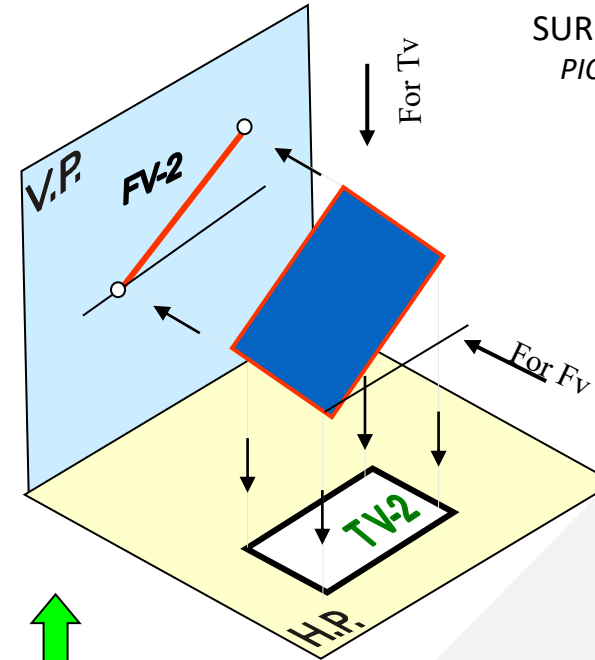


**ORTHOGRAPHIC**  
TV- True Shape  
FV- Line // to xy

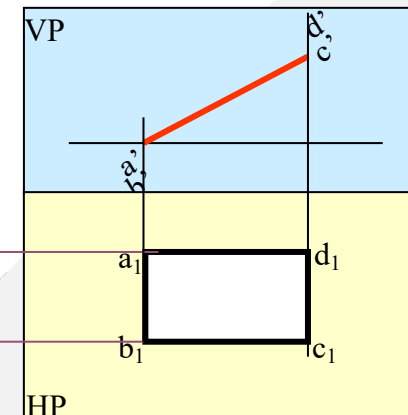


**A**

SURFACE **INCLINED TO HP**  
PICTORIAL PRESENTATION



**ORTHOGRAPHIC**  
FV- Inclined to XY  
TV- Reduced Shape

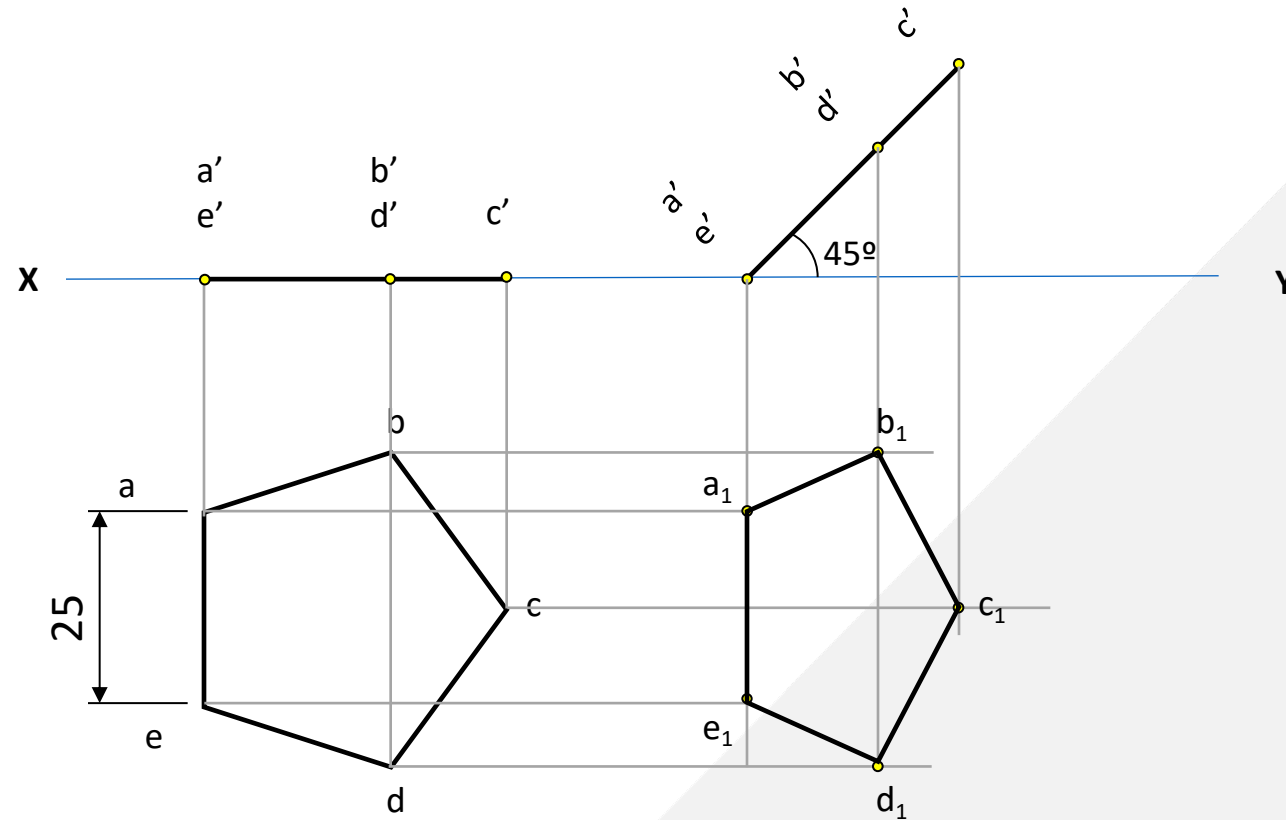


**B**

Animation Source:  
[www.slideshare.net](http://www.slideshare.net)

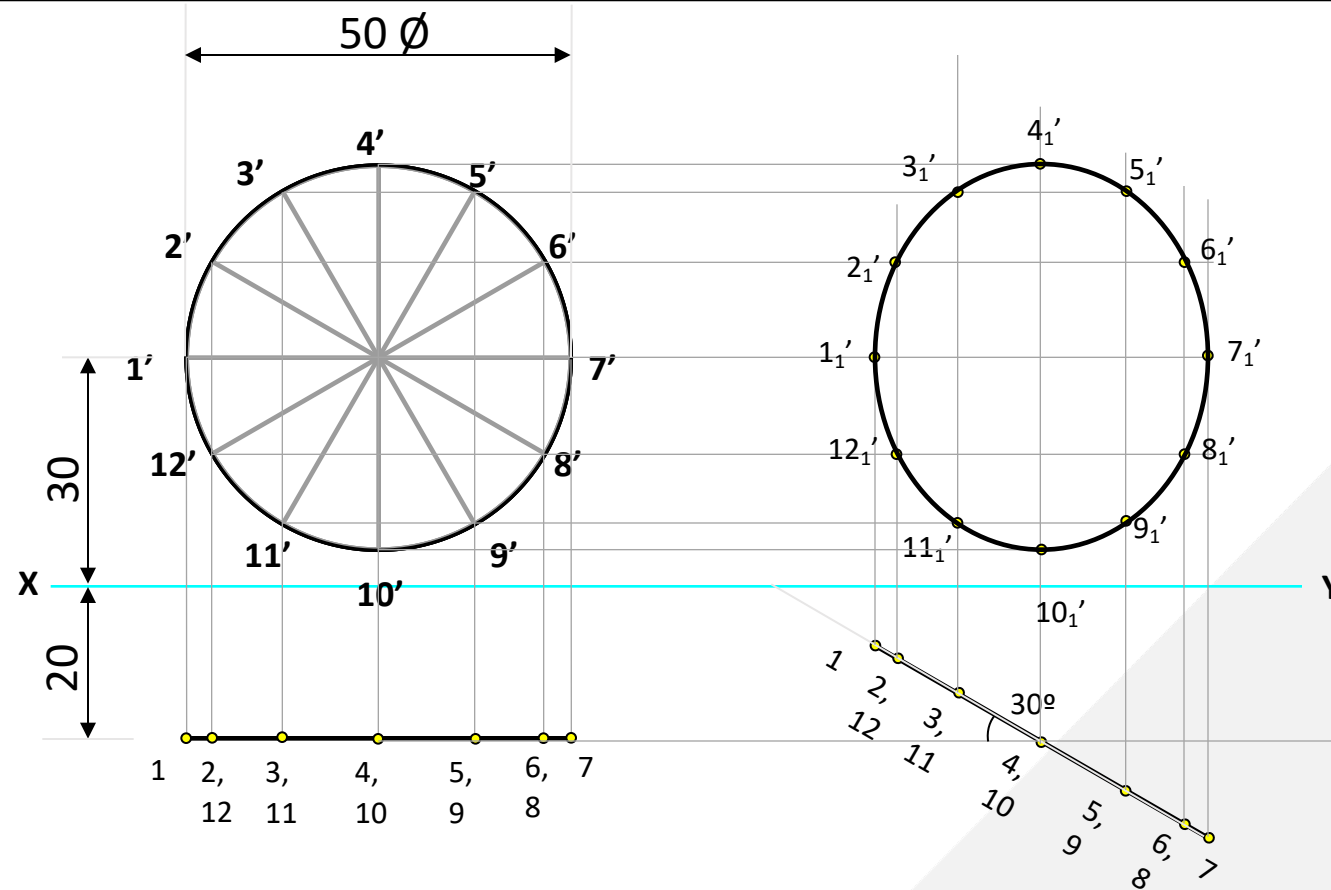
# Projections of Planes

A regular pentagon of 25mm side has one side on the ground. Its plane is inclined at  $45^\circ$  to the HP and perpendicular to the VP. Draw its projections.



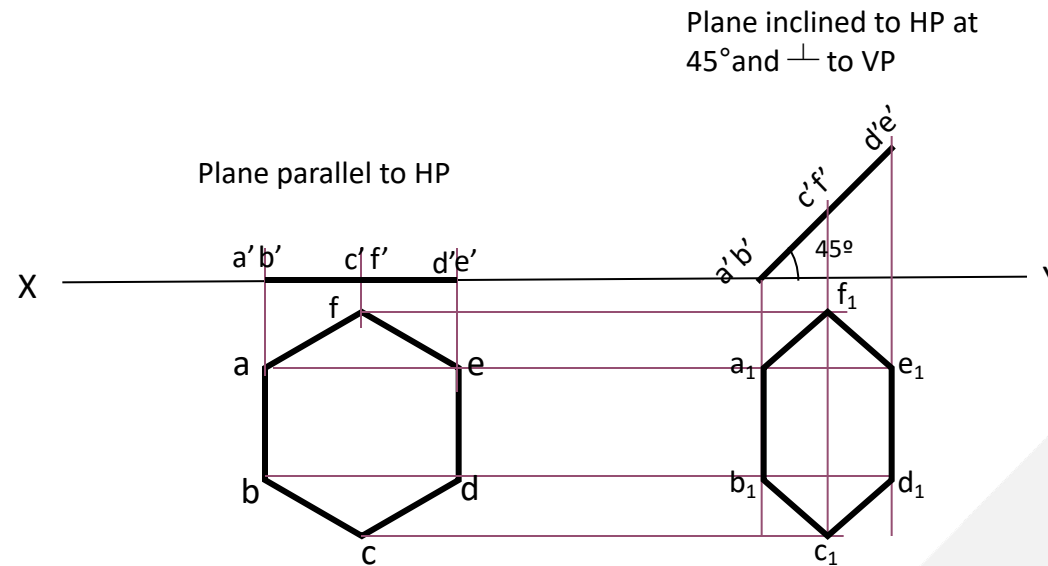
# Projections of Planes

Draw the projections of a circle of 5 cm diameter having its plane vertical and inclined at  $30^\circ$  to the V.P. Its centre is 3cm above the H.P. and 2cm in front of the V.P.



# Projections of Planes

Draw the projections of a regular hexagon of 25mm sides, having one of its side in the H.P. making an angle of  $45^\circ$  with the H.P.



# Assessment Pattern

Sr. No.	Type of Assessment Task	Weightage of actual conduct	Frequency of task	Final Weightage in Internal Assessment (Prorated Marks)	Remarks
1.	Practical Worksheet (In Journal Category) and Class-room Learning	20 marks for each experiment	8-10 experiments	40 marks	Depending upon no. of experiments
2.	Mid-Term Test	20 marks	1 per semester	12 marks	At-least after the completion of 5 experiments.
3.	Discussion Forum/Short Digital Assignment/Journal to submit design/Portfolio	4 marks for each task	1 per semester	4 marks	
4.	Presentation*	-----		Non Graded: Engagement Task	
5.	Attendance and BB Engagement Score	-----		4 marks	End Semester

# Applications

- Projection of planes are used to find out the true shape of different regular and irregular planes(Eg. triangle, pentagon, hexagon).
- Projection of planes are also used to find out the front, top & side views of planes.

# Frequently Asked Questions

- What is the difference between plane and lamina?
- What is the included angle of a pentagon and hexagon?
- Draw a pentagonal plane when one of its side is parallel to VP
- If a circular plane is inclined to HP and perpendicular to VP, what will be the shape of front view?

# Recommended Books

- Rhodes R.S, Cook L.B; Basic Engineering Drawing, Pitman Publishers,
- Rana and Shah; Engineering Drawing, Pearson Education India Publishers.
- Jolhe D.A; Engineering Drawing: With an Introduction to AutoCAD, Tata McGraw Hill
- Gill P.S; Engineering Drawing, S.K. Kataria and Sons Publications.
- Dhawan R. K; Engineering Drawing, S. Chand and Sons Publishers.



# References

- <http://www.brainkart.com/article/Projection-of-Straight-Lines-and-Planes--First-Angle- 6519/>
- Gill P.S; Engineering Drawing ,5th Edition, S.K. Kataria and Sons Publications, 2011.
- Aggarwal B; Engineering Drawing, 1st Edition, Tata McGraw Hill Publications,2008



# THANK YOU

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