

PROJECTION OF PLANES

Introduction

- Planes are two dimensional objects which has breadth and width

TYPES OF PLANES

SQUARE



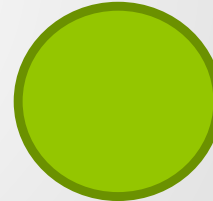
RECTANGLE



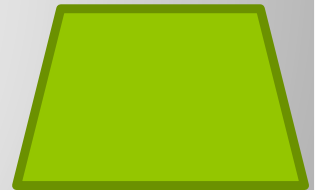
TRIANGLE



CIRCLE



TRAPEZOID



PENTAGON



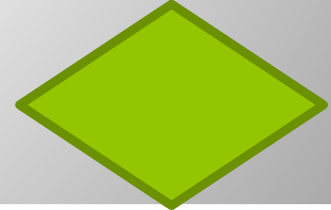
HEXAGON



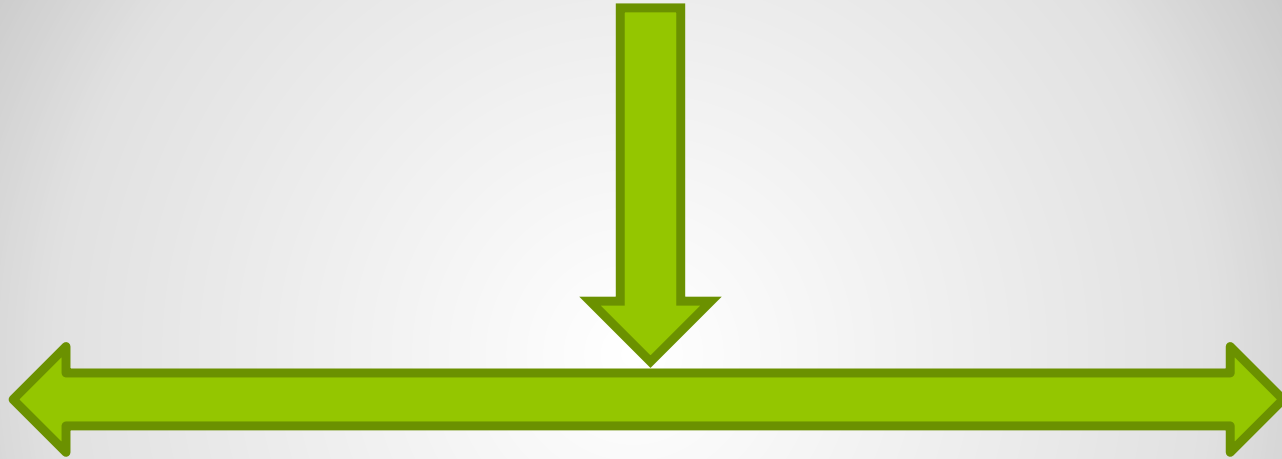
PARALLELOGRAM



DIAMOND



Classification of Planes



**PERPENDICULAR
PLANES**

OBLIQUE PLANES

PERPENDICULAR PLANES

- *Perpendicular to both planes*
- *Perpendicular to one plane and parallel to another plane*
- *Perpendicular to one plane and inclined to another plane*

Traces of Planes

- A plane, extended will meet the reference plane in lines unless it is parallel to any one of them. These lines are called the traces of the plane.
- The line in which the plane meets the H.P. is called the horizontal trace or H.T
- The line in which the plane meets the V.P. is called the vertical trace or V.T

Traces (Contd...)

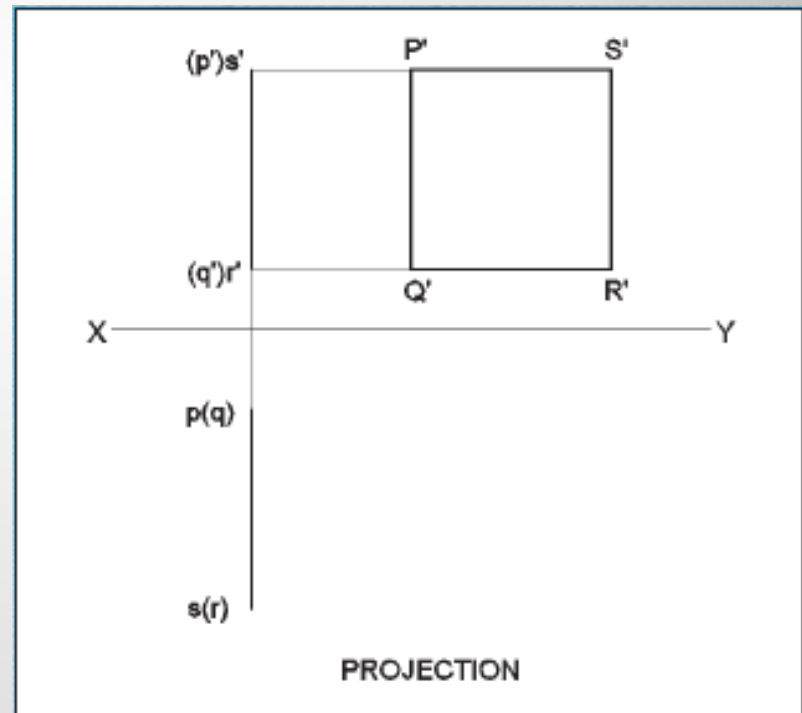
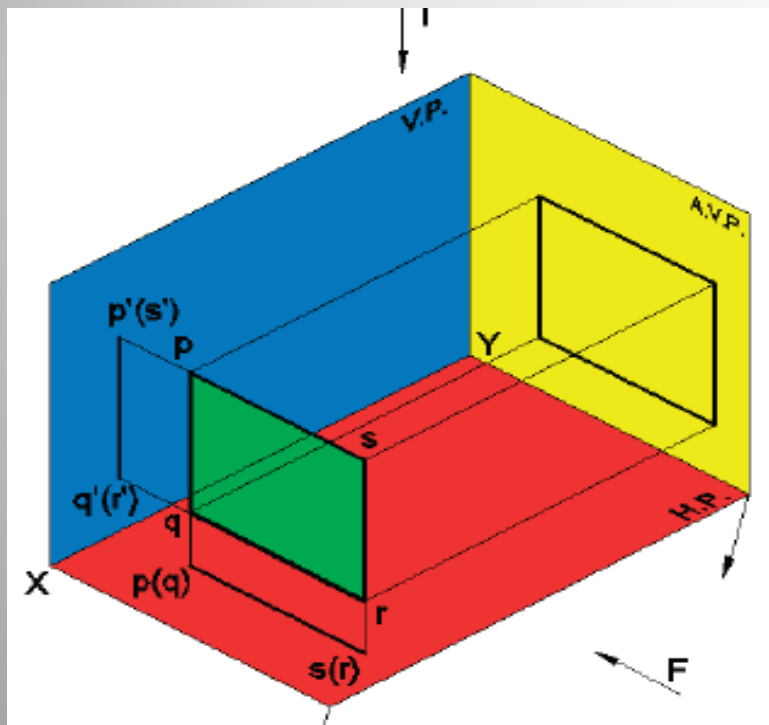
- When a plane is perpendicular to one of the reference planes, its traces upon the other plane is perpendicular to XY (except when it is parallel to other plane).
- When a plane is parallel to one reference plane, it has no trace on that plane. Its trace on other reference plane, to which it is perpendicular is parallel to XY.

Traces (Contd...)

- When a plane is inclined to H.P. and perpendicular to V.P, its inclination is shown by the angle which V.T makes with XY.
- When a plane is inclined to V.P. and perpendicular to H.P, its inclination is shown by the angle which H.T makes with XY.

TRACES (Contd....)

When a plane is perpendicular to both the reference planes, its traces will lie on a straight line perpendicular to XY



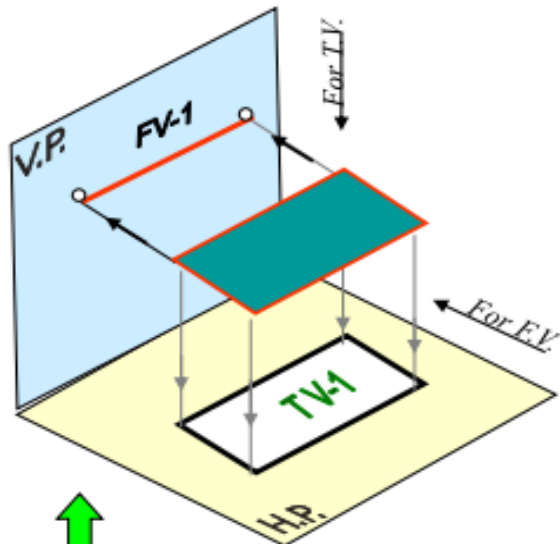
Projections

- When a plane is perpendicular to a reference plane, its projection on that plane is a straight line.
- When a plane is parallel to a reference plane, its projection on that plane shows its true shape and size.

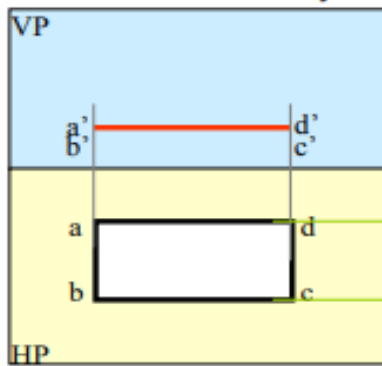
Projections (Contd...)

- When a plane is perpendicular to one of the reference planes and inclined to other, its inclination is shown by the angle which its projection on the plane to which it is perpendicular, makes with XY.
- Its projection on the plane to which it is inclined, is smaller than the plane itself.

SURFACE PARALLEL TO HP
PICTORIAL PRESENTATION

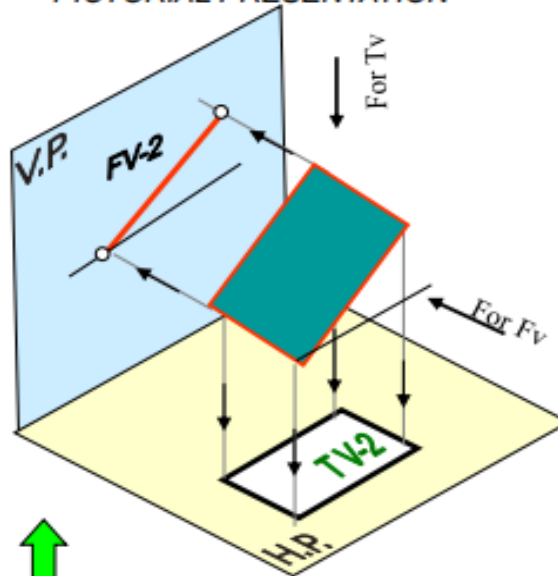


↑
ORTHOGRAPHIC
TV-True Shape
FV- Line // to xy

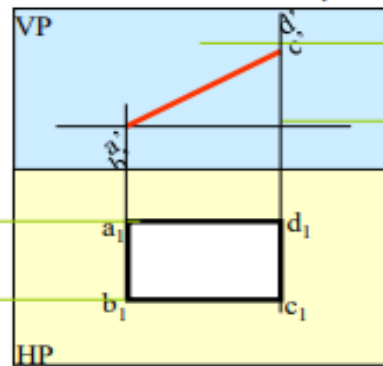


A

SURFACE INCLINED TO HP
PICTORIAL PRESENTATION

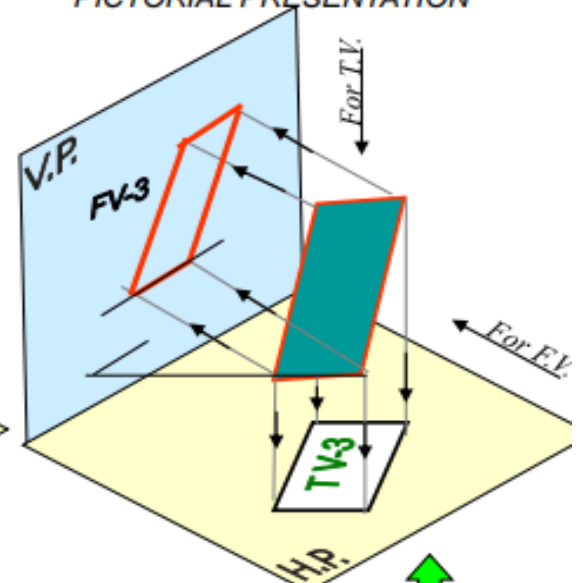


↑
ORTHOGRAPHIC
FV- Inclined to XY
TV- Reduced Shape

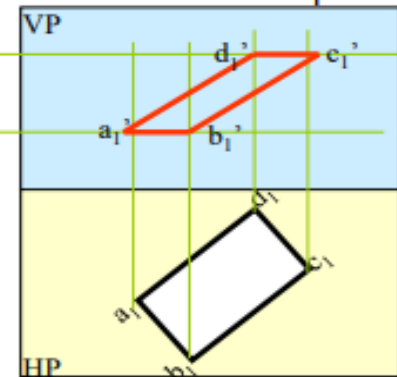


B

ONE SMALL SIDE INCLINED TO VP
PICTORIAL PRESENTATION



↑
ORTHOGRAPHIC
FV- Apparent Shape
TV-Previous Shape



C

Projections of planes parallel to RP (Contd...)

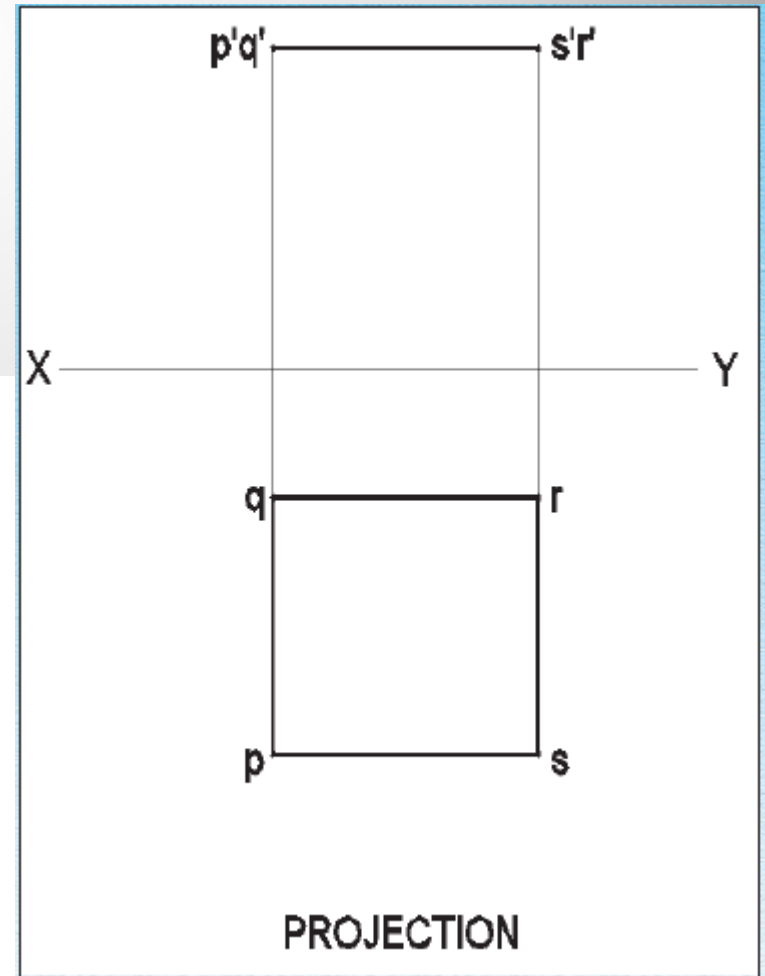
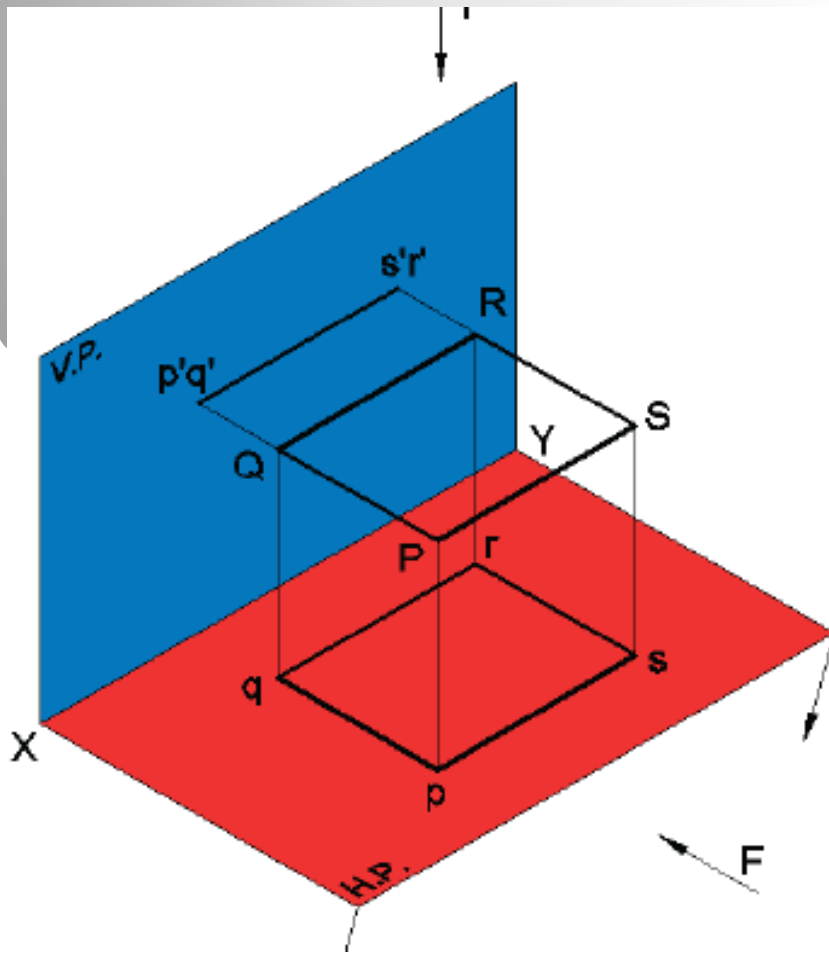
PLANE parallel to H.P

- Top view shows the true dimensions of plane
- Top view should be drawn first

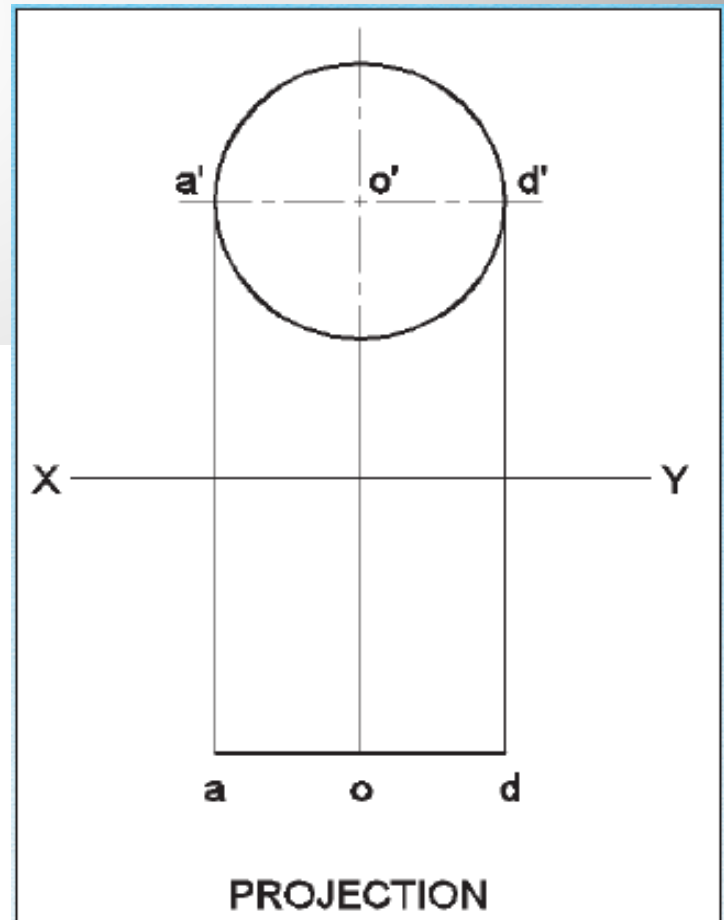
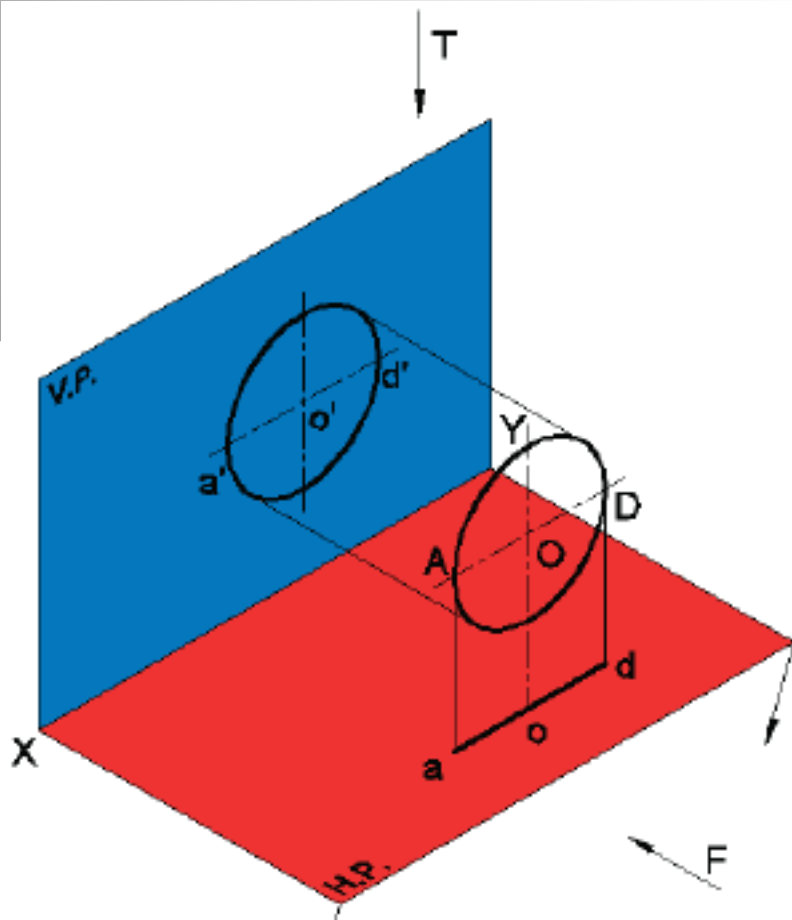
PLANE parallel to V.P

- Front view shows the true dimensions of plane
- Front view should be drawn first

PROJECTION OF PLANE PERPENDICULAR TO V.P AND PARALLEL TO H.P



PROJECTION OF PLANE PERPENDICULAR TO H.P AND PARALLEL TO V.P



Projections of planes inclined to one RP and perpendicular to other

PLANE inclined to H.P and perpendicular to V.P

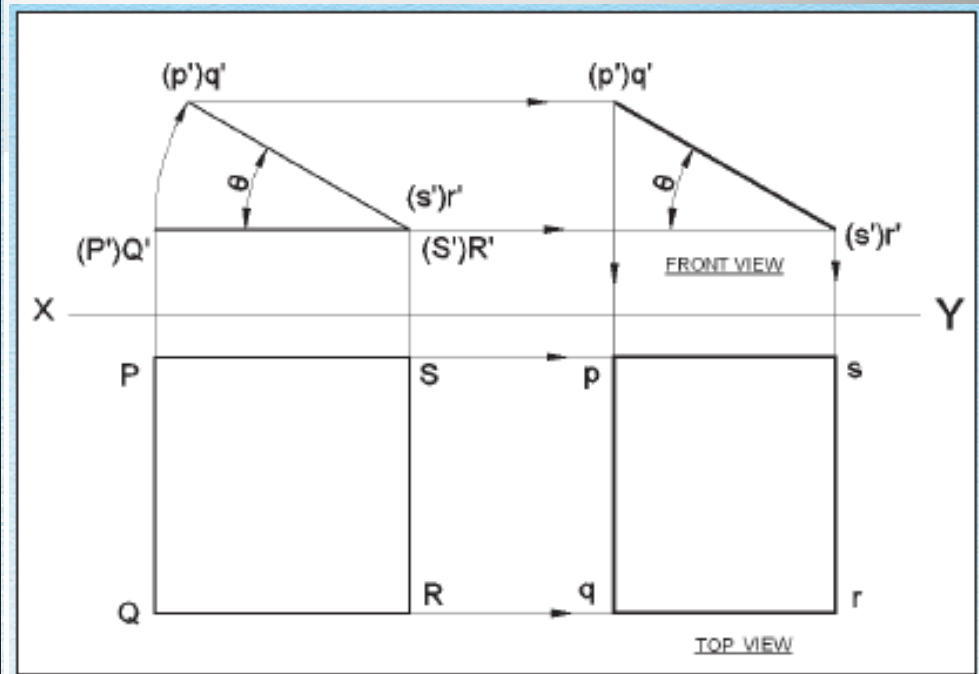
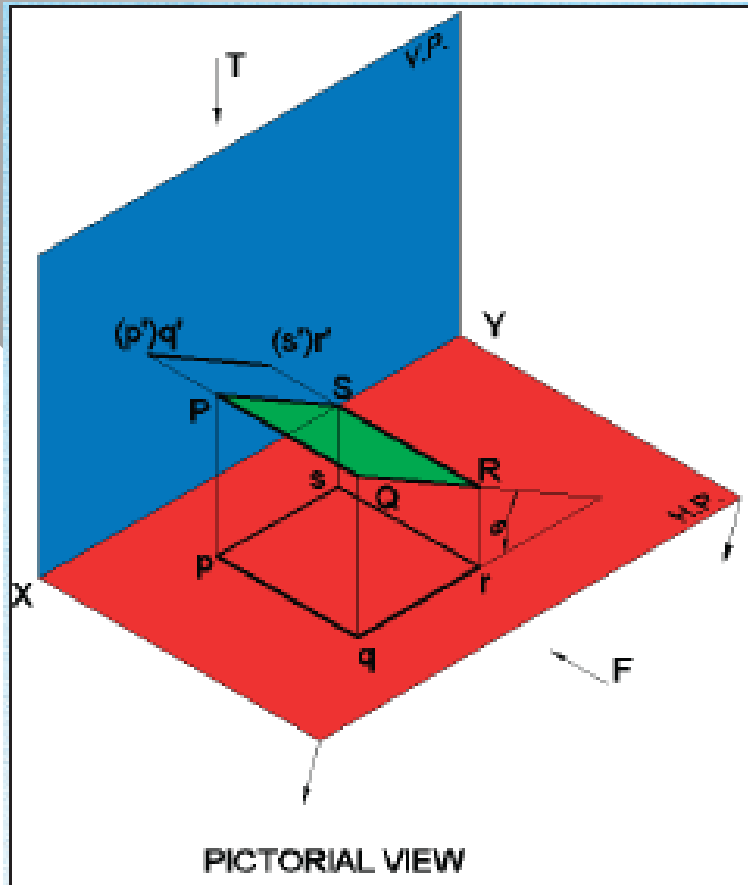
- Initially assumed parallel to H.P. Top view should be drawn first
- The front view will be a line parallel to XY
- The plane is tilted so that it is inclined to H.P

PLANE inclined to V.P and perpendicular to H.P

- Initially assumed parallel to V.P. Front view should be drawn first
- The top view will be a line parallel to XY
- The plane is tilted so that it is inclined to V.P

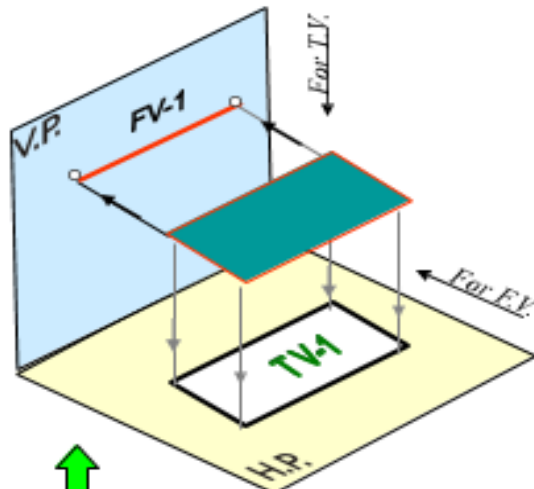
PROJECTION OF PLANE PERPENDICULAR TO V.P AND INCLINED TO H.P

- Step 1: Assume the initial position
- Step 2: Consider surface inclination



CASE OF A RECTANGLE – OBSERVE AND NOTE ALL STEPS.

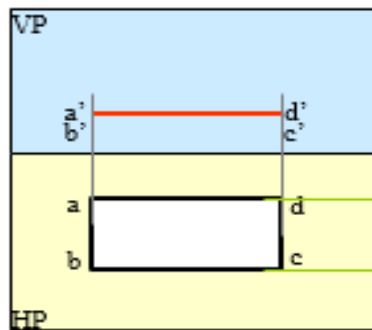
SURFACE PARALLEL TO HP
PICTORIAL PRESENTATION



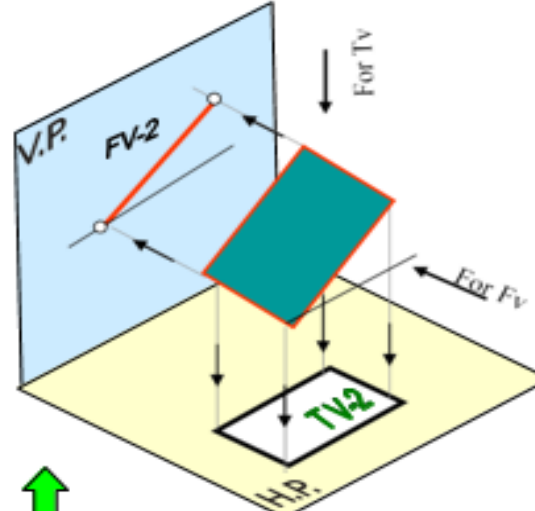
↑↓

ORTHOGRAPHIC

TV-True Shape
FV- Line // to xy



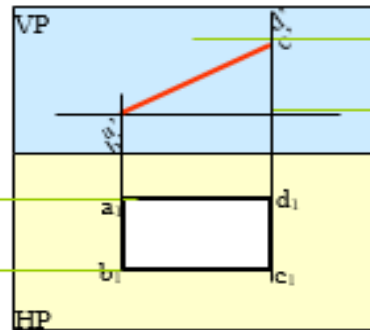
SURFACE INCLINED TO HP
PICTORIAL PRESENTATION



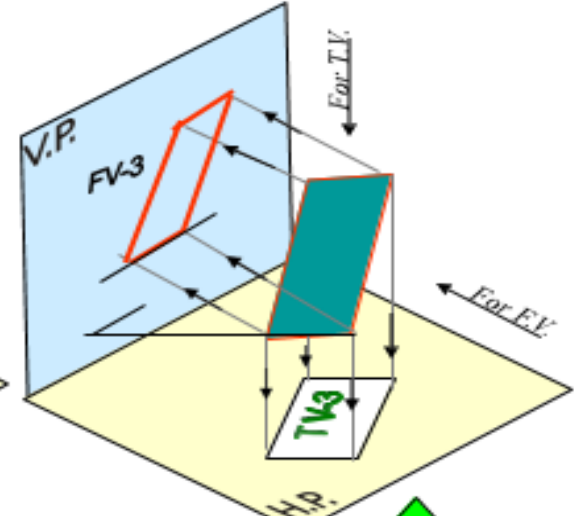
↑↓

ORTHOGRAPHIC

FV- Inclined to XY
TV- Reduced Shape



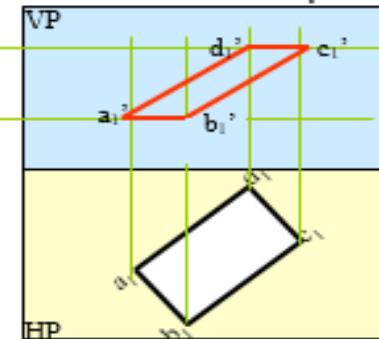
ONE SMALL SIDE INCLINED TO VP
PICTORIAL PRESENTATION



↑↓

ORTHOGRAPHIC

FV- Apparent Shape
TV-Previous Shape



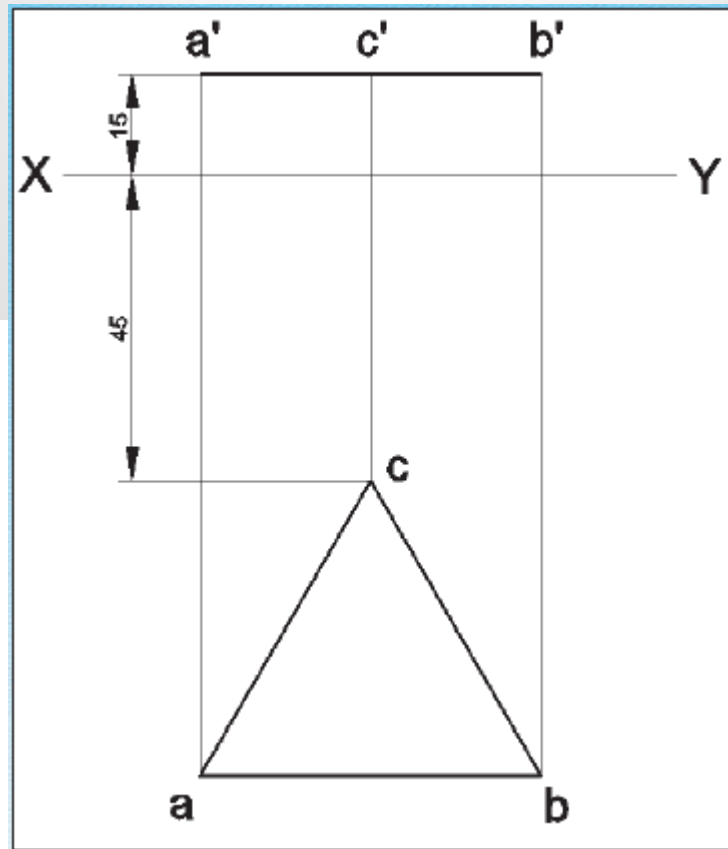
A

B

C

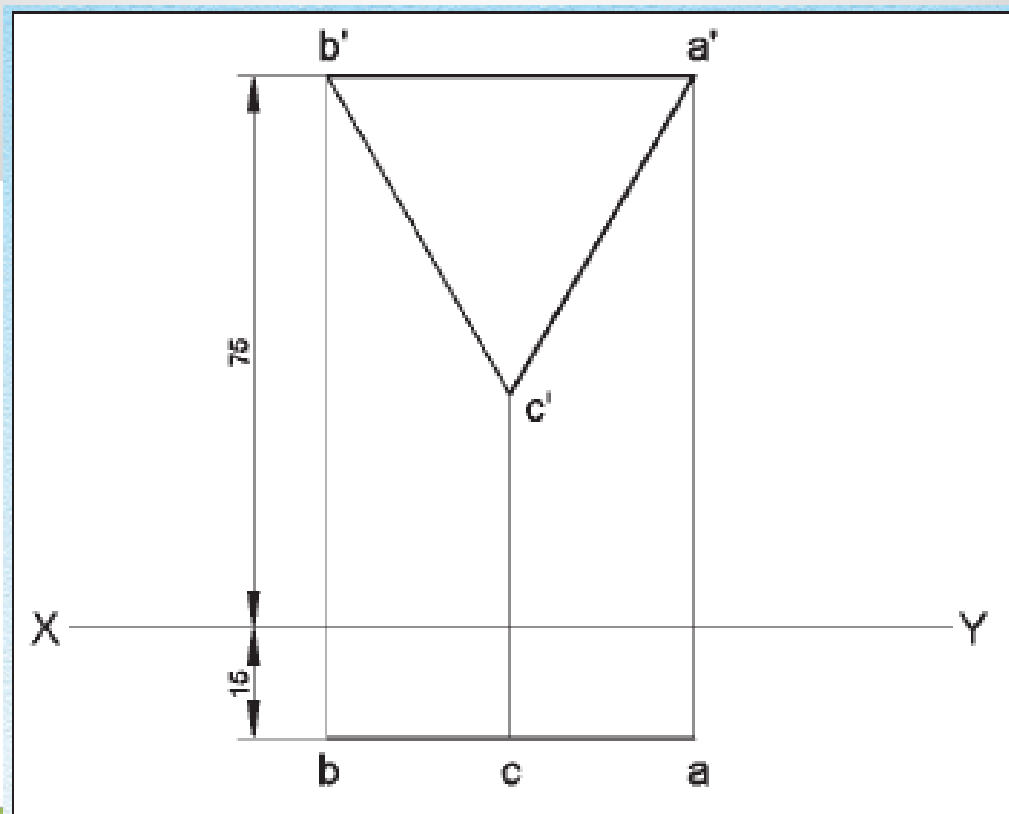
EXAMPLE:-

An equilateral triangle ABC of 50 mm side has its plane parallel to H.P and side AB parallel to V.P Draw its projections when the corner C is 15 mm from H.P and 45 mm from the V.P.



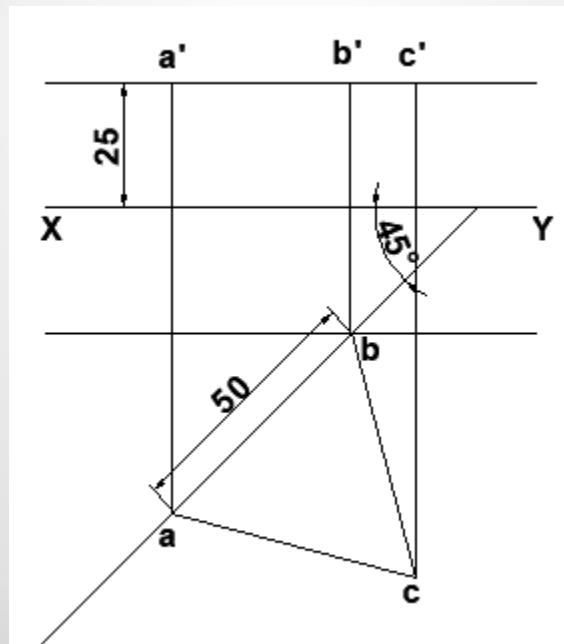
EXAMPLE:-

An equilateral triangle ABC of 50 mm side is parallel to and 15 mm in front of V.P, its base AB is parallel to and 75 mm above H.P, Draw the projections of the triangle when the corner is near the H.P



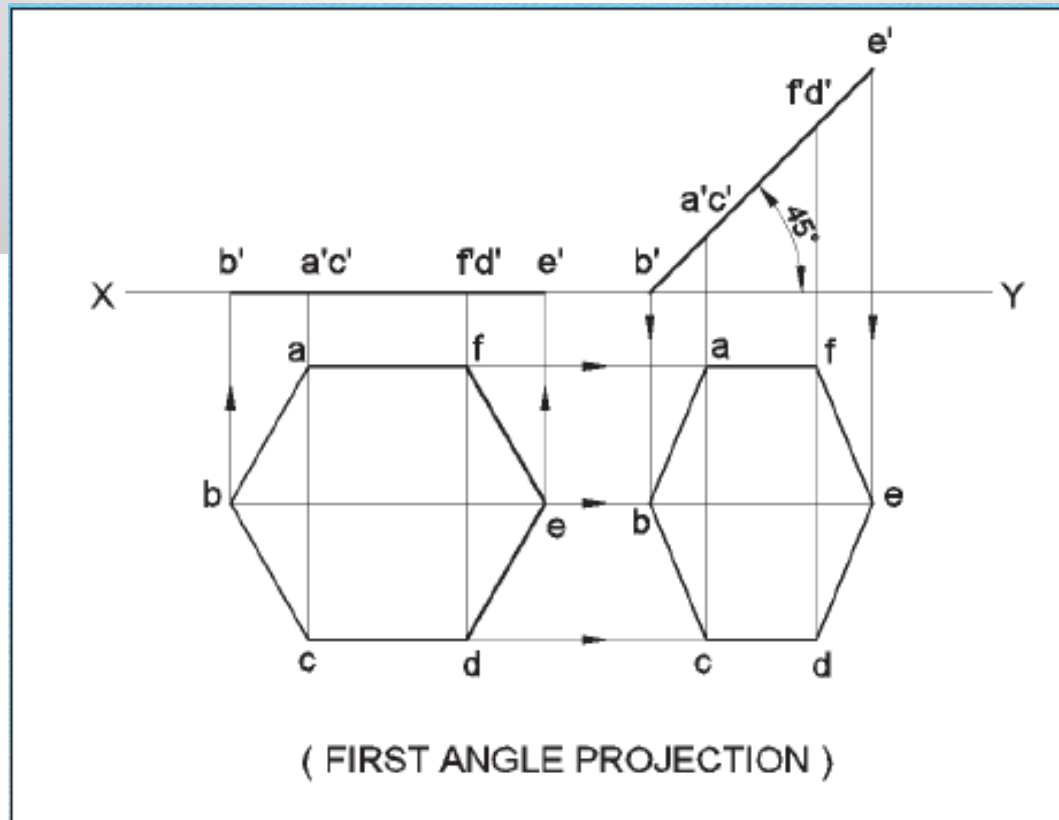
EXAMPLE:-

An equilateral triangle of 50 mm side has its V.T. parallel to and 25 mm above XY. It has no H.T. Draw its projections when one of its sides is inclined at 45 degree to the V.P.



EXAMPLE:-

A thin horizontal plate of 15 mm sides is inclined at 45° to the H.P. and perpendicular to V.P, two of its parallel edges is parallel to V.P.



Projection of Oblique Planes

A plane has its surface inclined to one plane and an edge/diameter/diagonal parallel to that plane and inclined to other plane.

Projection of Oblique Planes (Contd....)

- If the surface of plane is inclined to H.P and an edge is parallel to H.P and inclined to V.P.
 - In the initial position plane is assumed to be parallel to H.P. and an edge perpendicular to V.P.
 - It is tilted to make angle with H.P. Front view will be a line. Top view will be smaller in size.
 - In the final position, when the plane is turned to get required inclination with V.P, position of top view will change. Its size and shape will not be affected.

Projection of Oblique Planes (Contd....)

- If the surface of plane is inclined to V.P and an edge is parallel to V.P and inclined to H.P.
 - In the initial position plane is assumed to be parallel to V.P. and an edge perpendicular to H.P.
 - It is tilted to make angle with V.P. Top view will be a line. Front view will be smaller in size.
 - In the final position, when the plane is turned to get required inclination with H.P, position of front view will change. Its size and shape will not be affected.

Problem 1:

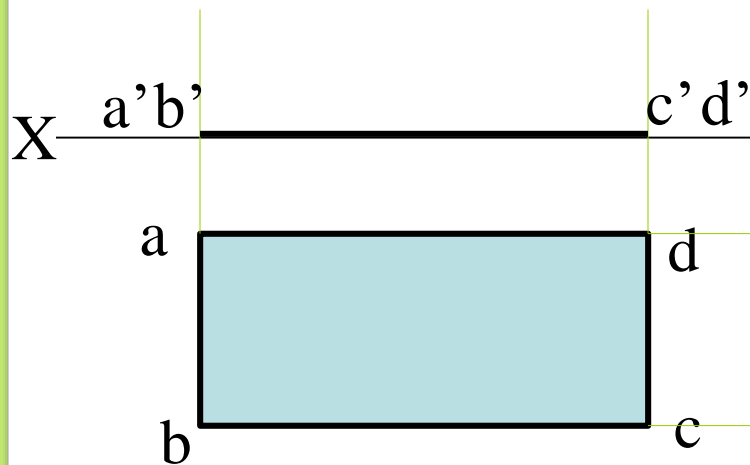
Rectangle 30mm and 50mm sides is resting on HP on one small side which is 30° inclined to VP, while the surface of the plane makes 45° inclination with HP. Draw its projections.

Read problem and answer following questions

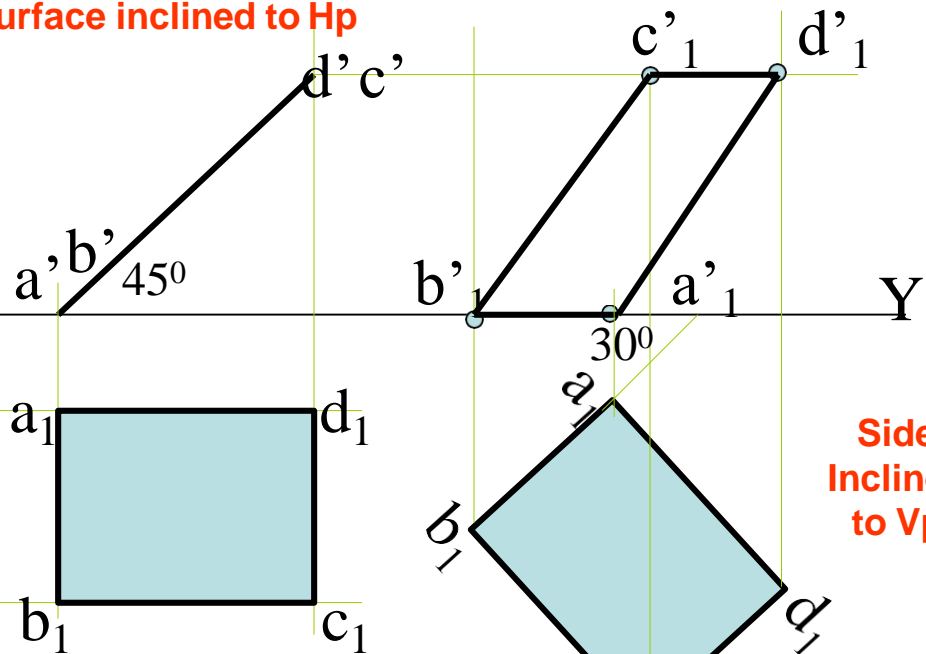
1. Surface inclined to which plane? ----- HP
2. Assumption for initial position? -----// to HP
3. So which view will show True shape? --- TV
4. Which side will be vertical? --- One small side.

Hence begin with TV, draw rectangle below X-Y drawing one small side vertical.

Surface // to Hp



Surface inclined to Hp



Side
Inclined
to Vp

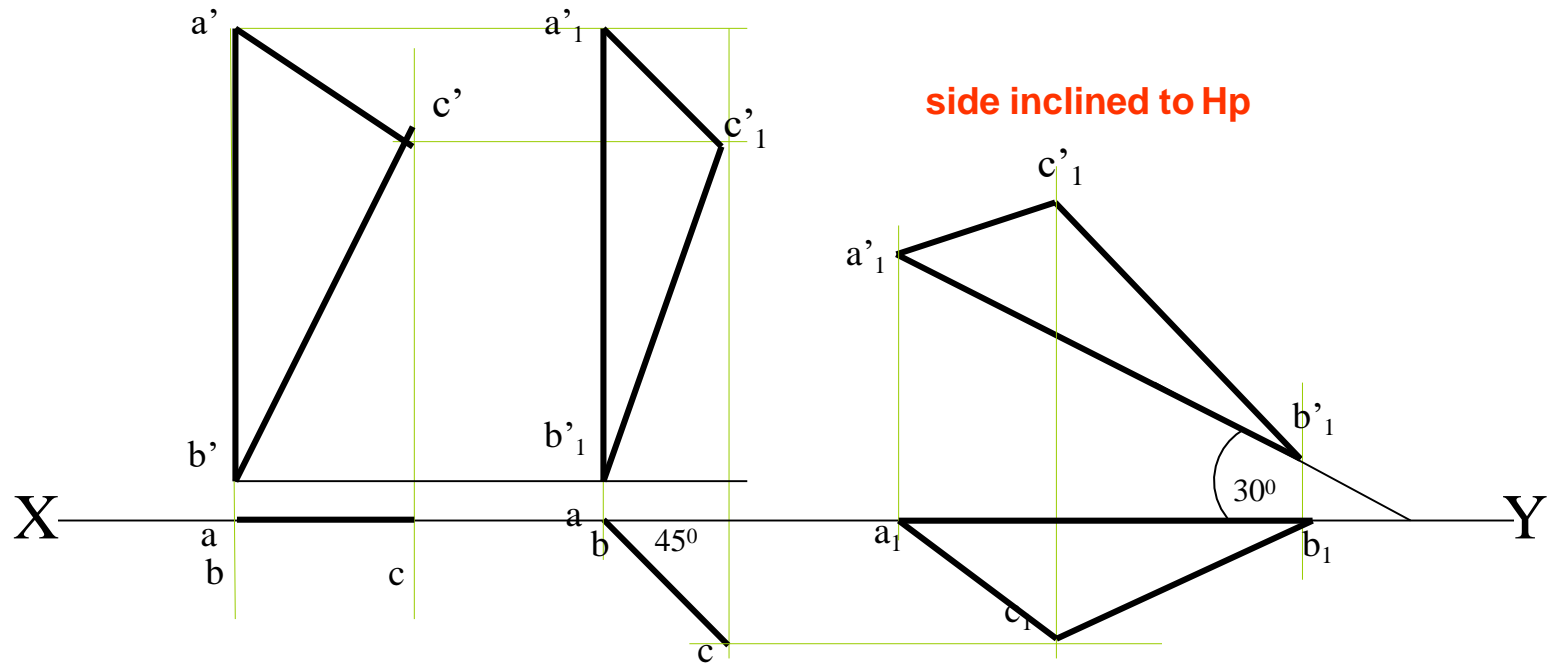
A $30^\circ - 60^\circ$ set square of longest side 100 mm long, is in VP and 30° inclined to HP while its surface is 45° inclined to VP. Draw its projections

Read problem and answer following questions

1. Surface inclined to which plane? ----- VP
2. Assumption for initial position? -----// to VP
3. So which view will show True shape? --- FV
4. Which side will be vertical? -----longest side.

(Surface & Side inclinations directly given)

Hence begin with FV, draw triangle above X-Y
keeping longest side vertical.



Surface // to Vp Surface inclined to Vp

Read problem and answer following questions

A regular pentagon of 30 mm sides is resting on HP on one of its sides with its surface 45° inclined to HP.

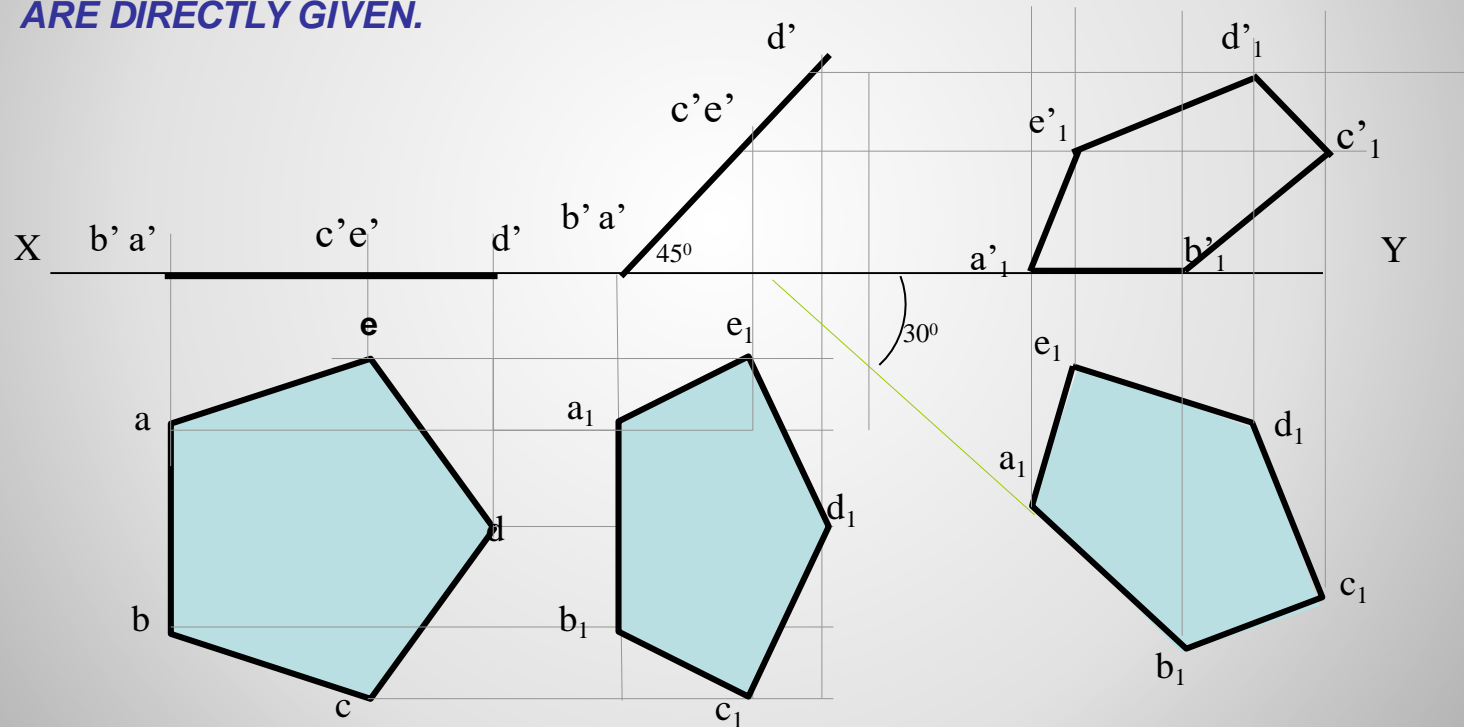
Draw its projections when the side in HP makes 30° angle with VP

**SURFACE AND SIDE INCLINATIONS
ARE DIRECTLY GIVEN.**

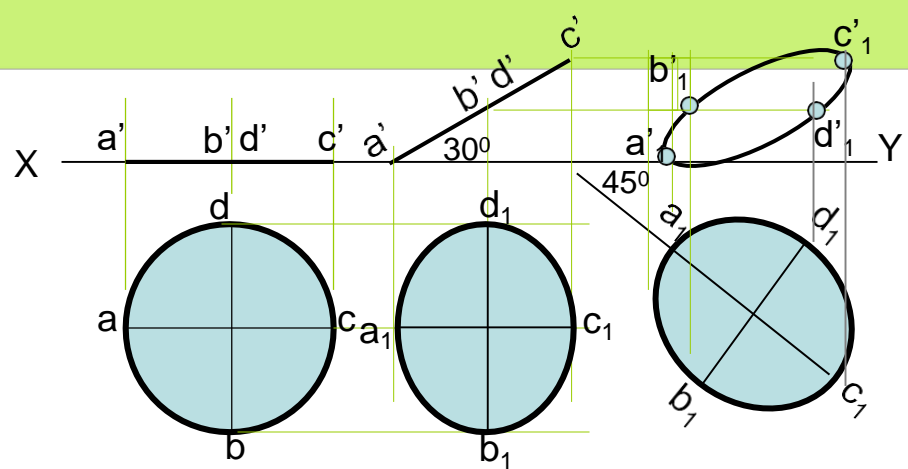
1. Surface inclined to which plane? ----- **HP**
2. Assumption for initial position? ----- **// to HP**
3. So which view will show True shape? --- **TV**
4. Which side will be vertical? ----- **any side.**

Hence begin with TV, draw pentagon below

X-Y line, taking one side vertical.



Problem 8: A circle of 50 mm diameter is resting on Hp on end A of it's diameter AC which is 30° inclined to Hp while it's Tv is 45° inclined to Vp. Draw it's projections.



Read problem and answer following questions

1. Surface inclined to which plane? ----- **HP**
2. Assumption for initial position? ----- // to **HP**
3. So which view will show True shape? --- **TV**
4. Which diameter horizontal? ----- **AC**

**Hence begin with TV, draw rhombus below
X-Y line, taking longer diagonal // to X-Y**

THANK YOU