

ENGINEERING GRAPHICS

UNIT- 2

Topic:
Projection of Points

ORTHOGRAPHIC PROJECTIONS:

IT IS A TECHNICAL DRAWING IN WHICH DIFFERENT VIEWS OF AN OBJECT ARE
PROJECTED ON DIFFERENT REFERENCE PLANES
OBSERVING PERPENDICULAR TO RESPECTIVE REFERENCE PLANE

Different Reference planes are

**Horizontal Plane (HP),
Vertical Frontal Plane (VP)
Side Or Profile Plane (PP)**

And

Different Views are Front View (FV), Top View (TV) and Side View (SV)

**FV is a view projected on VP
TV is a view projected on HP
SV is a view projected on PP**

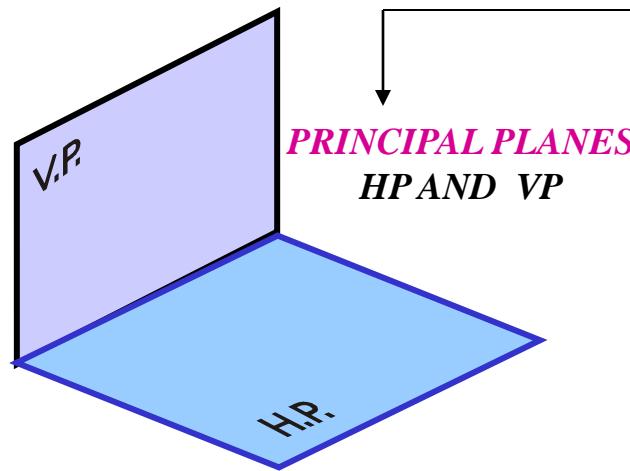
IMPORTANT TERMS OF ORTHOGRAPHIC PROJECTIONS:

1 Planes.

2 Pattern of planes & Pattern of views

3 Methods of drawing Orthographic Projections

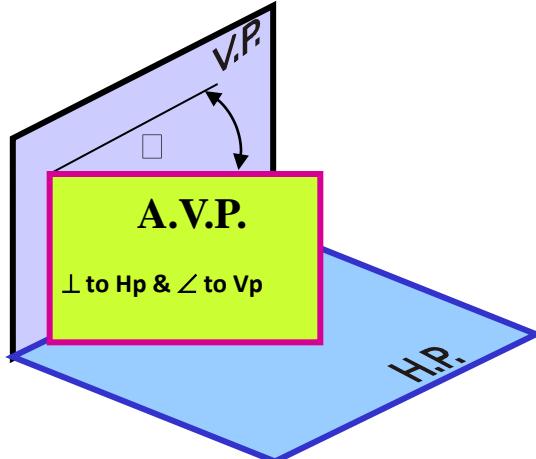
PLANES



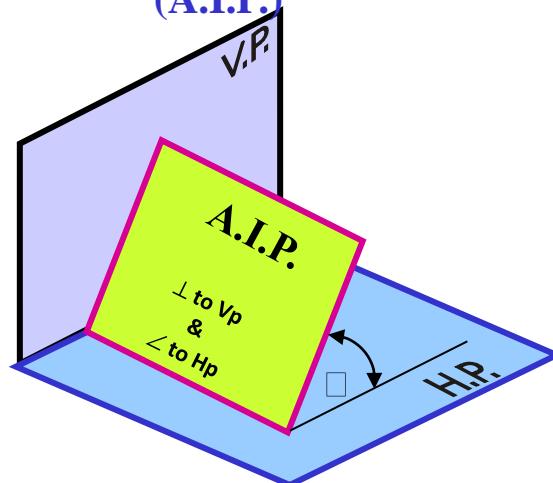
**PRINCIPAL PLANES
HP AND VP**

AUXILIARY PLANES

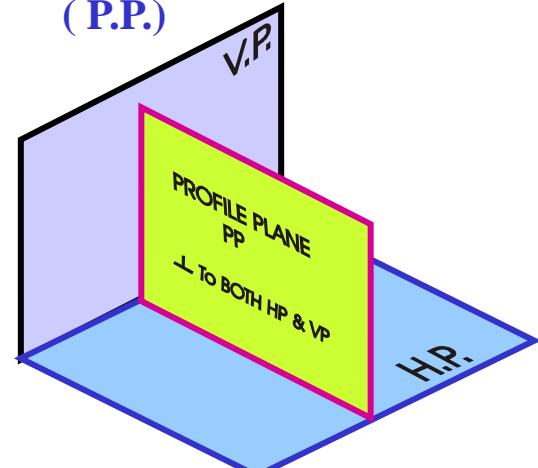
**Auxiliary Vertical Plane
(A.V.P.)**



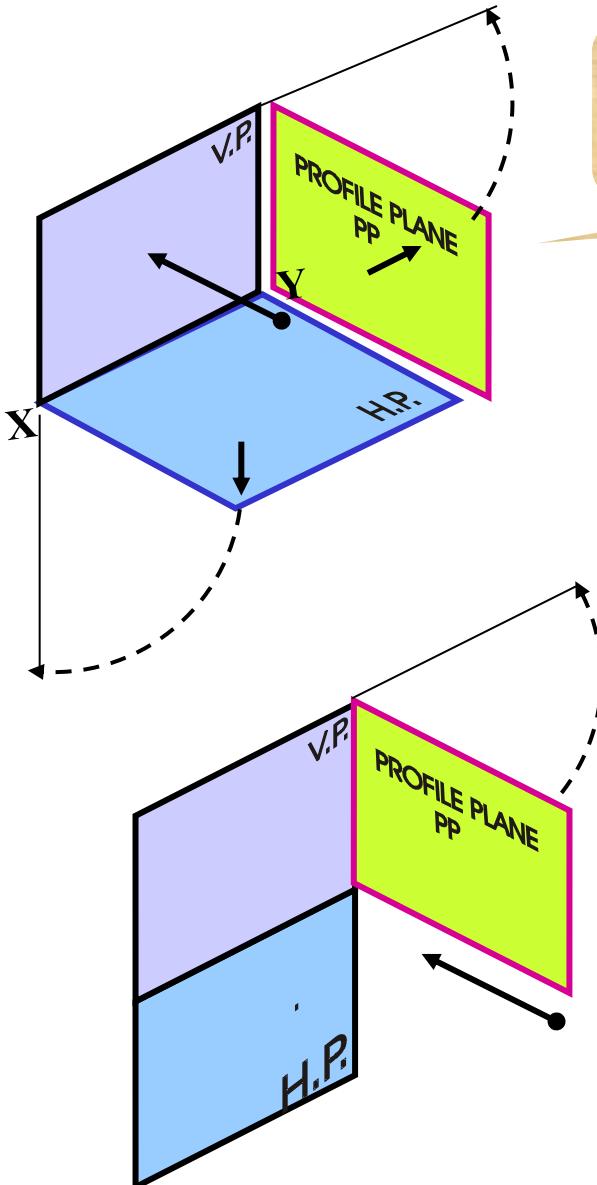
**Auxiliary Inclined Plane
(A.I.P.)**



**Profile Plane
(P.P.)**



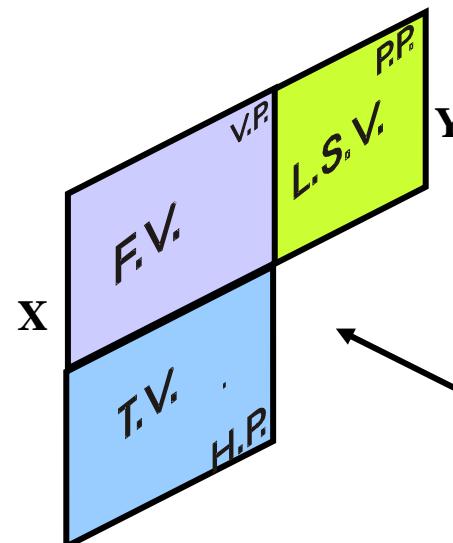
PATTERN OF PLANES & VIEWS (First Angle Method)



THIS IS A PICTORIAL SET-UP OF ALL THREE PLANES.
ARROW DIRECTION IS A NORMAL WAY OF OBSERVING THE OBJECT.
BUT IN THIS DIRECTION ONLY VP AND A VIEW ON IT (FV) CAN BE SEEN.
THE OTHER PLANES AND VIEWS ON THOSE CAN NOT BE SEEN.

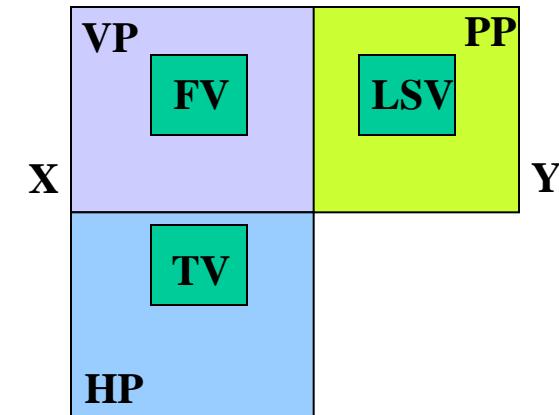
PROCEDURE TO SOLVE ABOVE PROBLEM:-

TO MAKE THOSE PLANES ALSO VISIBLE FROM THE ARROW DIRECTION,
A) HP IS ROTATED 90° DOWNDWARD
B) PP, 90° IN RIGHT SIDE DIRECTION.
THIS WAY BOTH PLANES ARE BROUGHT IN THE SAME PLANE CONTAINING VP.



HP IS ROTATED DOWNWARD 90°
AND
BROUGHT IN THE PLANE OF VP.

PP IS ROTATED IN RIGHT SIDE 90°
AND
BROUGHT IN THE PLANE OF VP.



ACTUAL PATTERN OF PLANES & VIEWS
OF ORTHOGRAPHIC PROJECTIONS
DRAWN IN
FIRST ANGLE METHOD OF PROJECTIONS

Projection of Points

- A “Point” may be situated, in space, in any one of the “four quadrants” formed by the “two reference/ principal planes” or a point may lie in any one or both of them,
- The projections of a “Point” are obtained by extending projectors perpendicular to the reference/ principal planes,
- One of the reference/ principal planes is then rotated so that the first and third quadrants are opened out,
- The projections of point are shown on a flat surface in their respective positions either above or below or in xy line.

Projection of Points

The position of a point in engineering drawing is defined with respect to its distance from the three principle planes i.e., with respect to the VP, HP, & PP.

VP: The plane in front of observer is the vertical plane.
(VP) or it is also called a Frontal plane.

HP: The plane which is Horizontal and perpendicular to VP is Horizontal Plane.

Note: The planes HP and VP are called Principal Planes.

Reference Line: The line of intersection of HP and VP is called reference line, which is denoted by X-Y

PROJECTIONS OF POINTS

TO DRAW PROJECTIONS OF ANY OBJECT (Eg. POINT),
ONE MUST HAVE FOLLOWING INFORMATION

- A) **OBJECT (POINT)**
{ WITH IT'S DESCRIPTION, WELL DEFINED}
- B) **OBSERVER**
{ ALWAYS OBSERVING PERPENDICULAR TO RESP. REF. PLANE}
- C) **LOCATION OF OBJECT**
{ MEANS IT'S POSITION WITH REFFERENCE TO H.P. & V.P.}

TERMS 'ABOVE' & 'BELOW' WITH RESPECTIVE TO H.P.
AND TERMS 'INFRONT' & 'BEHIND' WITH RESPECTIVE TO V.P
FORM 4 QUADRANTS.

OBJECTS CAN BE PLACED IN ANY ONE OF THESE 4 QUADRANTS.

IT IS INTERESTING TO LEARN THE EFFECT ON THE POSITIONS OF VIEWS (FV, TV)
OF THE OBJECT WITH RESP. TO X-Y LINE, WHEN PLACED IN DIFFERENT QUADRANTS.

TO MAKE IT EASY, HERE A POINT **A** IS TAKEN AS AN OBJECT. BECAUSE IT'S ALL VIEWS ARE JUST POINTS.

Types of Views

Front View (FV): The projection on the VP is called the Front View (FV) or Vertical Projection or front elevation

Top View (TV): The projection on the HP is called the Top View (TV) or Horizontal Projection or Plan. or Elevation.

Side View: The projection on the side from the object is called the side views.

Side views is classified in to

- 1. Left side view and (LSV)**
- 2. Right side view(RSV)**

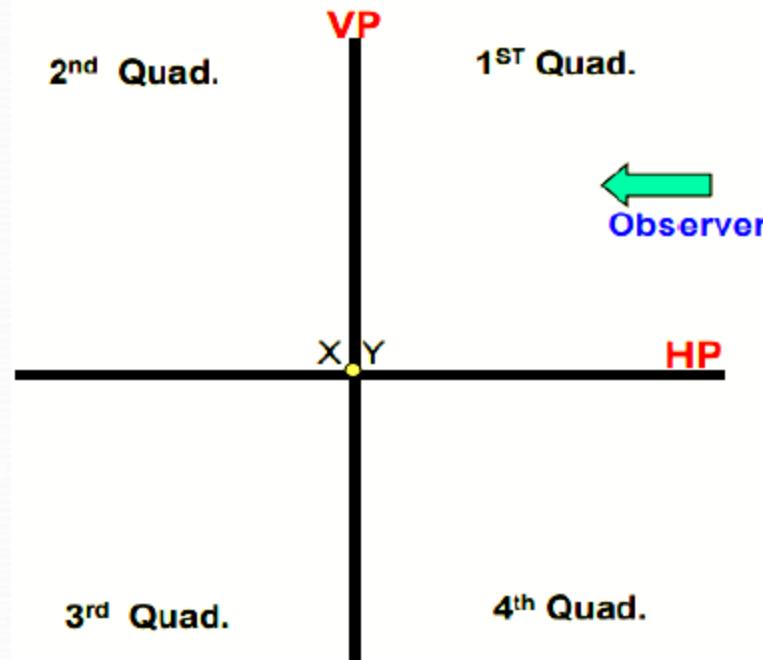
Positions of Points

First quadrant -- *Above HP & in front of VP*

Second quadrant -- *Above HP & behind VP*

Third quadrant -- *Below HP & behind VP*

Fourth quadrant -- *Below HP & in front of VP*

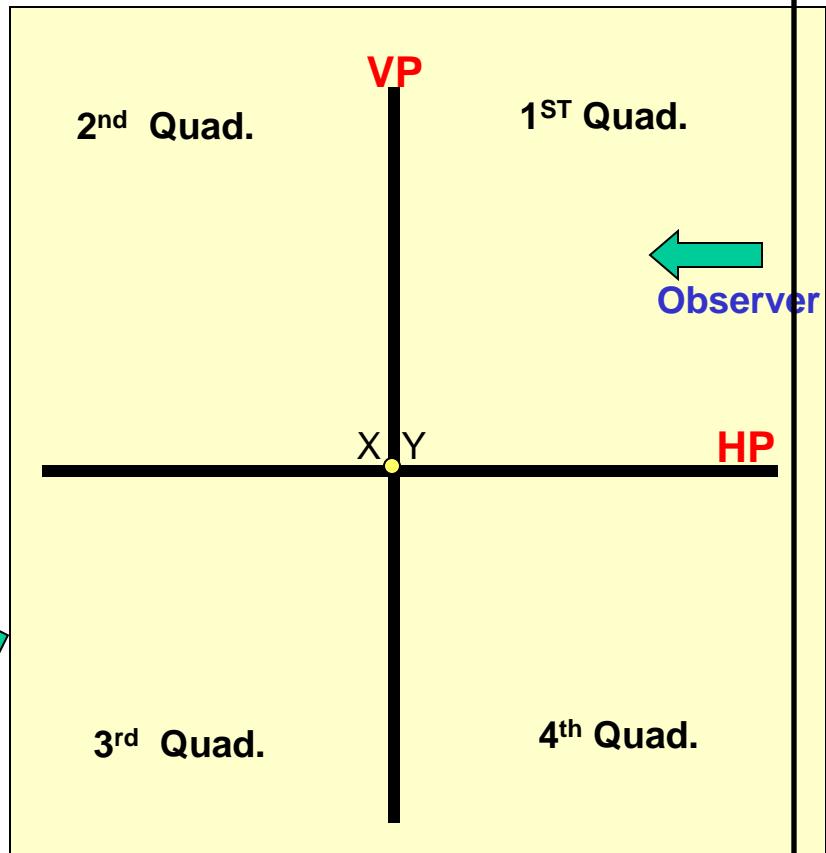
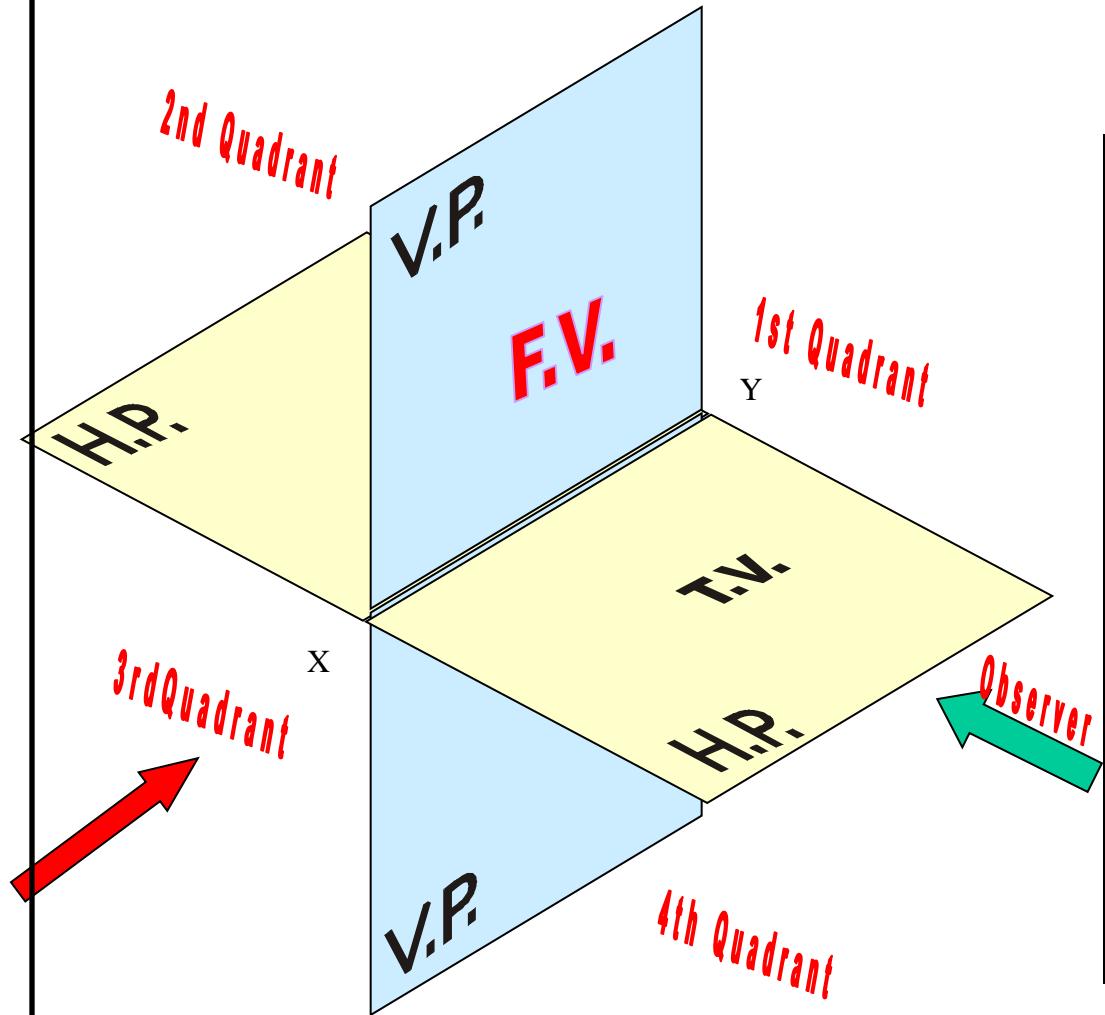


NOTATIONS

FOLLOWING NOTATIONS SHOULD BE FOLLOWED WHILE NAMEING DIFFERENT VIEWS IN ORTHOGRAPHIC PROJECTIONS.

OBJECT	POINT A	LINE AB
IT'S TOP VIEW	a	a b
IT'S FRONT VIEW	a'	a' b'
IT'S SIDE VIEW	a''	a'' b''

SAME SYSTEM OF NOTATIONS SHOULD BE FOLLOWED
INCASE NUMBERS, LIKE 1, 2, 3 – ARE USED.



THIS QUADRANT PATTERN,
IF OBSERVED ALONG X-Y LINE (IN RED ARROW DIRECTION)
WILL EXACTLY APPEAR AS SHOWN ON RIGHT SIDE AND HENCE,
IT IS FURTHER USED TO UNDERSTAND ILLUSTRATION PROPERLLY.

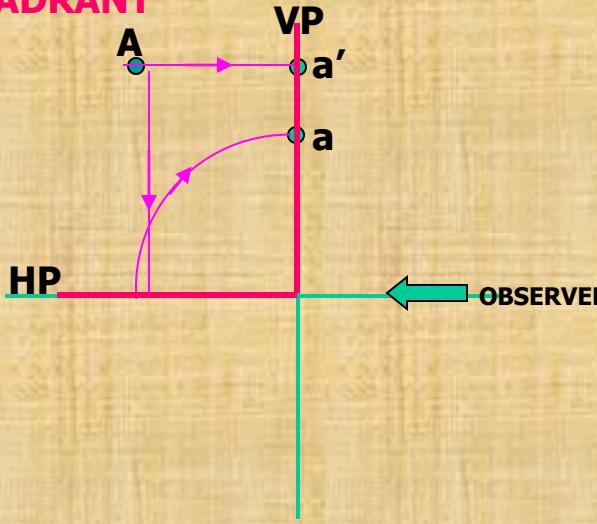
Point A is Placed In different quadrants and it's Fv & Tv are brought in same plane for Observer to see clearly.

Fv is visible as it is a view on VP. But as Tv is a view on Hp,

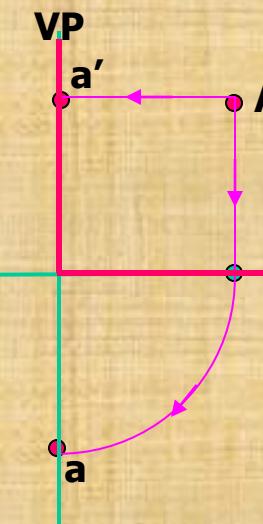
it is rotated downward 90°, In clockwise direction. The In front part of Hp comes below xy line and the part behind Vp comes above.

Observe and note the process.

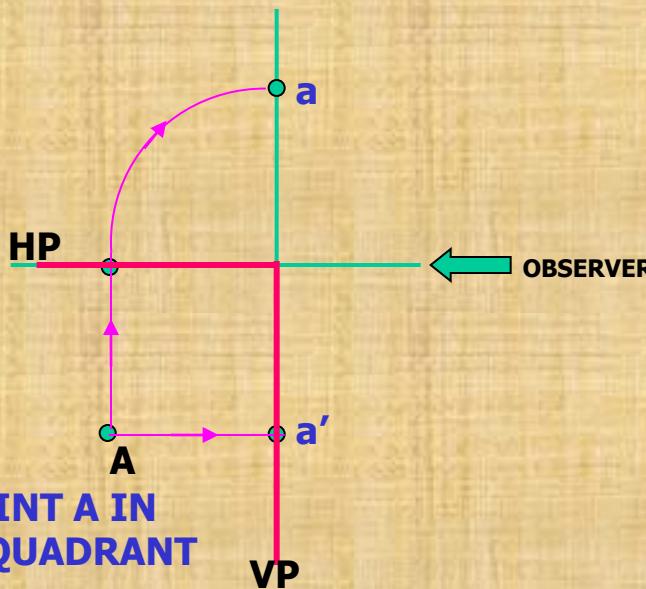
POINT A IN 2ND QUADRANT



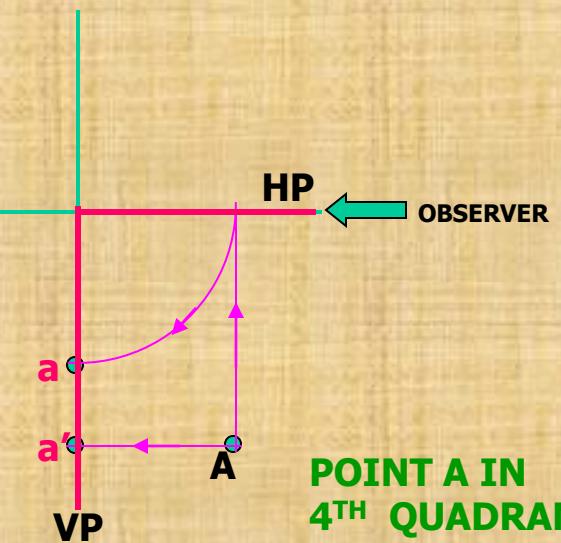
POINT A IN 1ST QUADRANT



POINT A IN 3RD QUADRANT

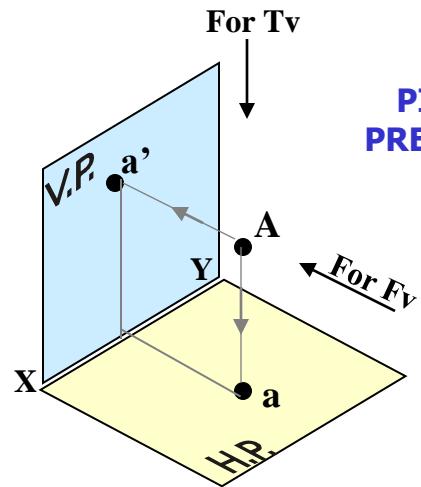


POINT A IN 4TH QUADRANT



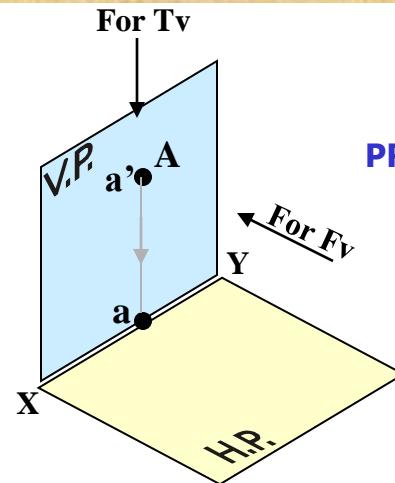
PROJECTIONS OF A POINT IN FIRST QUADRANT.

POINT A ABOVE HP & IN FRONT OF VP



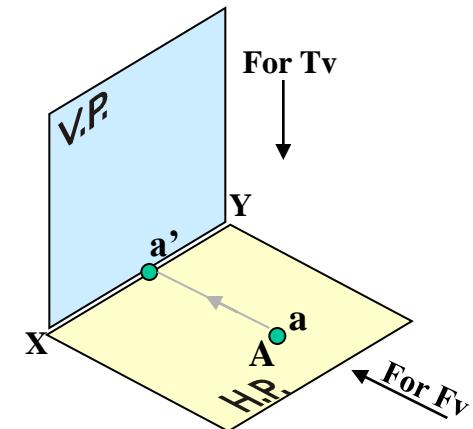
PICTORIAL PRESENTATION

POINT A ABOVE HP & IN VP



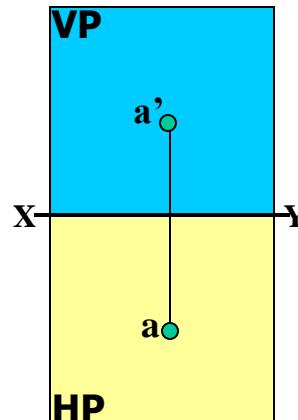
PICTORIAL PRESENTATION

POINT A IN HP & IN FRONT OF VP

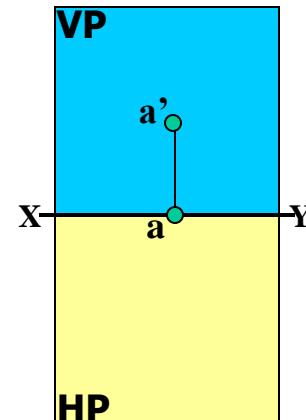


ORTHOGRAPHIC PRESENTATIONS
OF ALL ABOVE CASES.

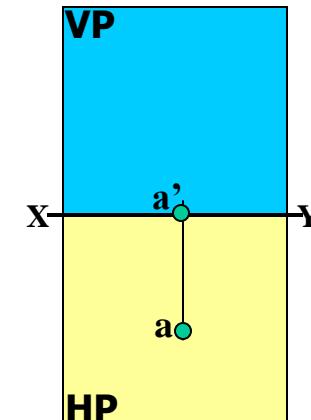
*Fv above xy,
 Tv below xy.*



*Fv above xy,
 Tv on xy.*

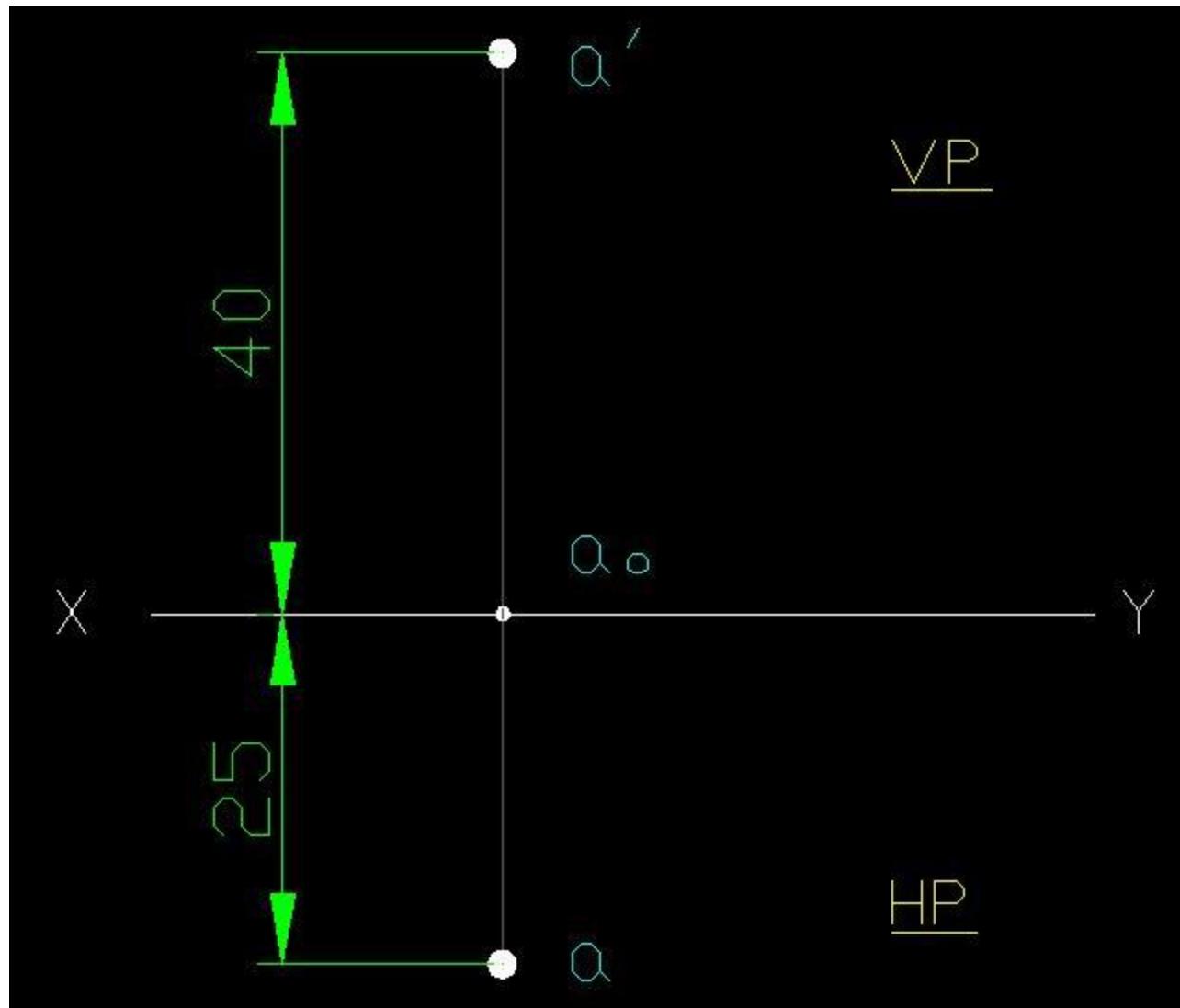


*Fv on xy,
 Tv below xy.*



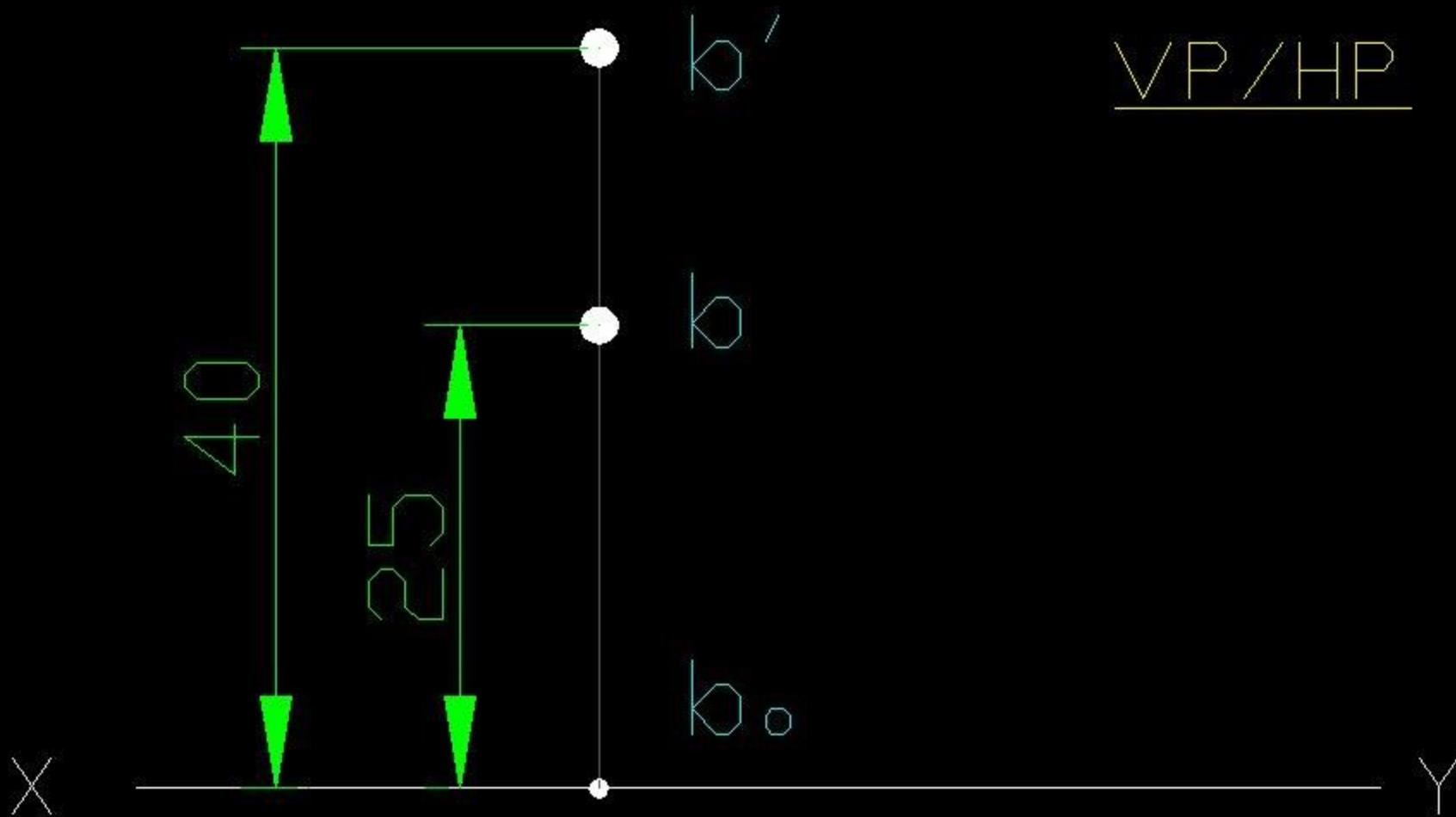
CASE 1: Point A is 40 mm above HP & 25 mm infront of VP. Draw Projections.

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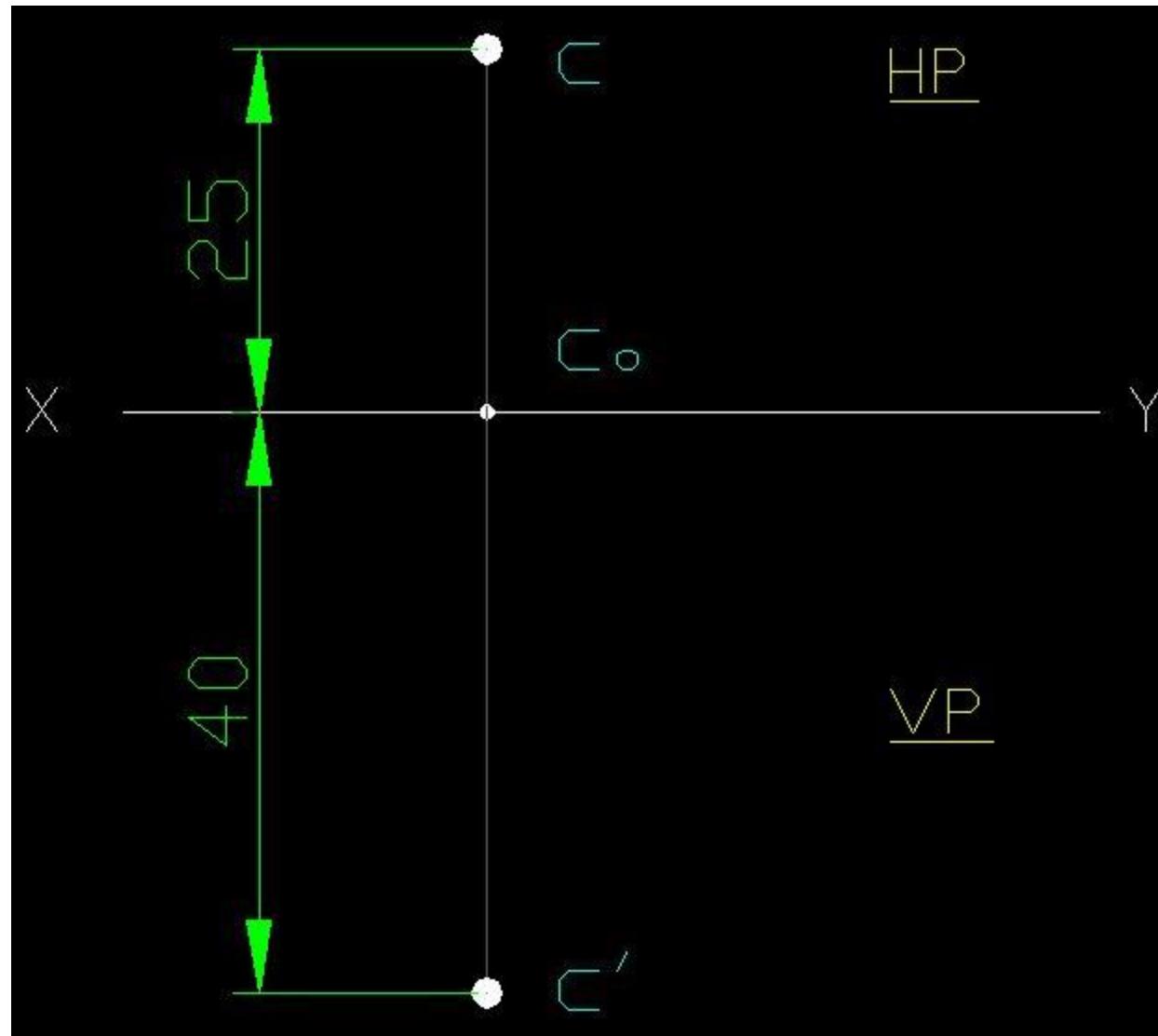
CASE 2: Point B is 40 mm above HP & 25 mm behind VP. Draw Projections.

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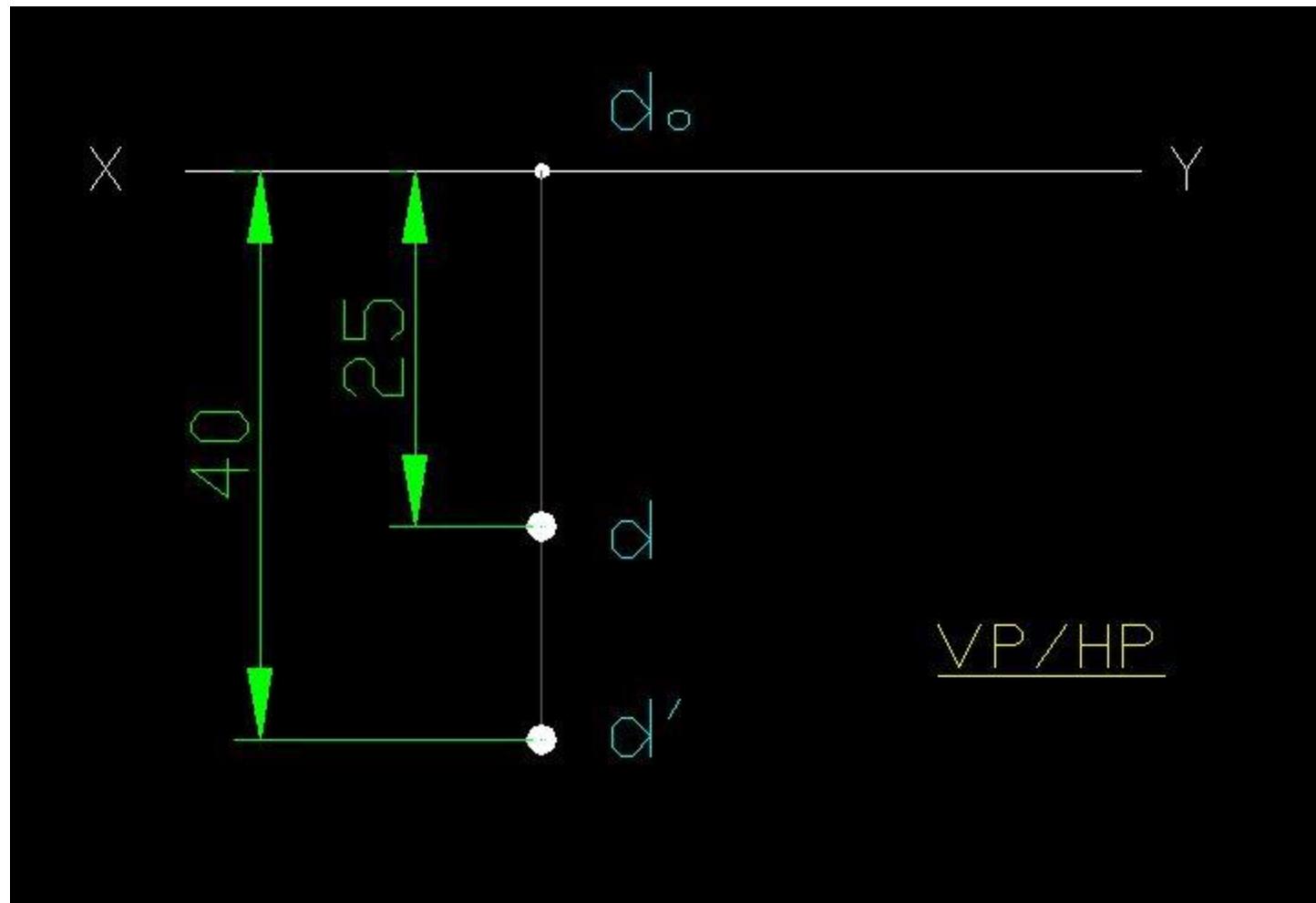
CASE 3: Point C is 40 mm below HP & 25 mm behind VP. Draw Projections.

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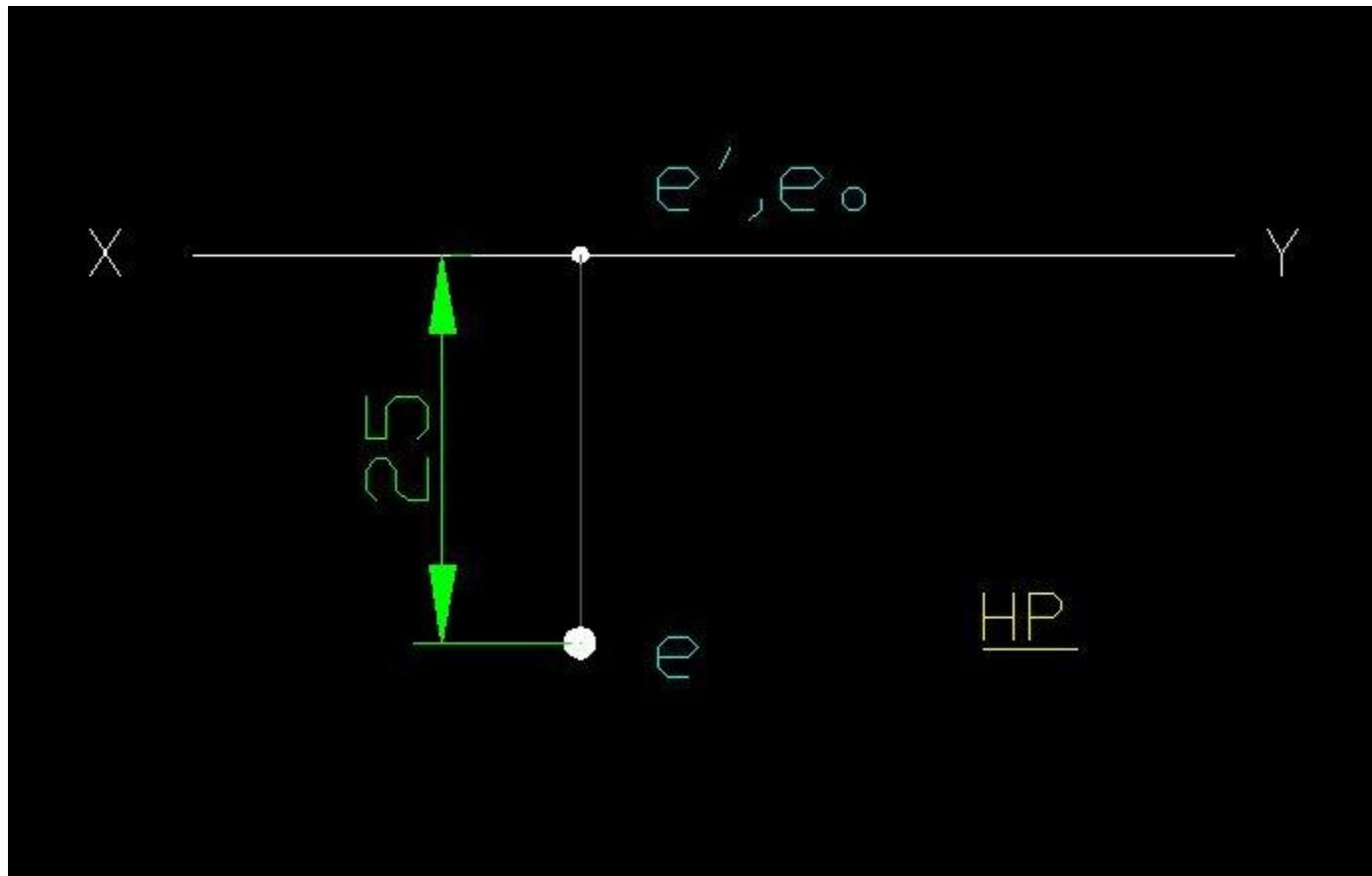
CASE 4: Point D is 40 mm below HP & 25 mm infront of VP. Draw Projections.

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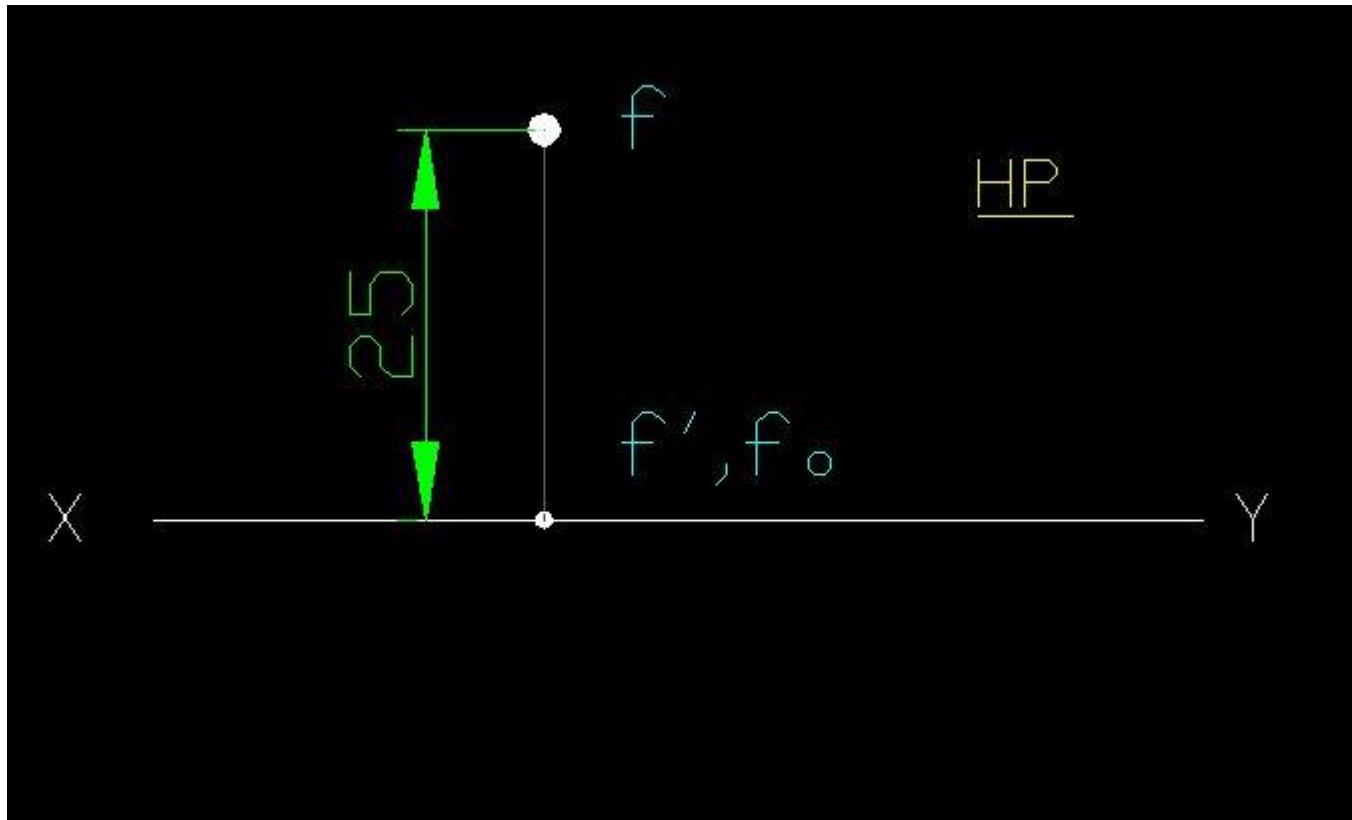
CASE 5: Point E is in HP & 25 mm infront of VP. Draw Projections.

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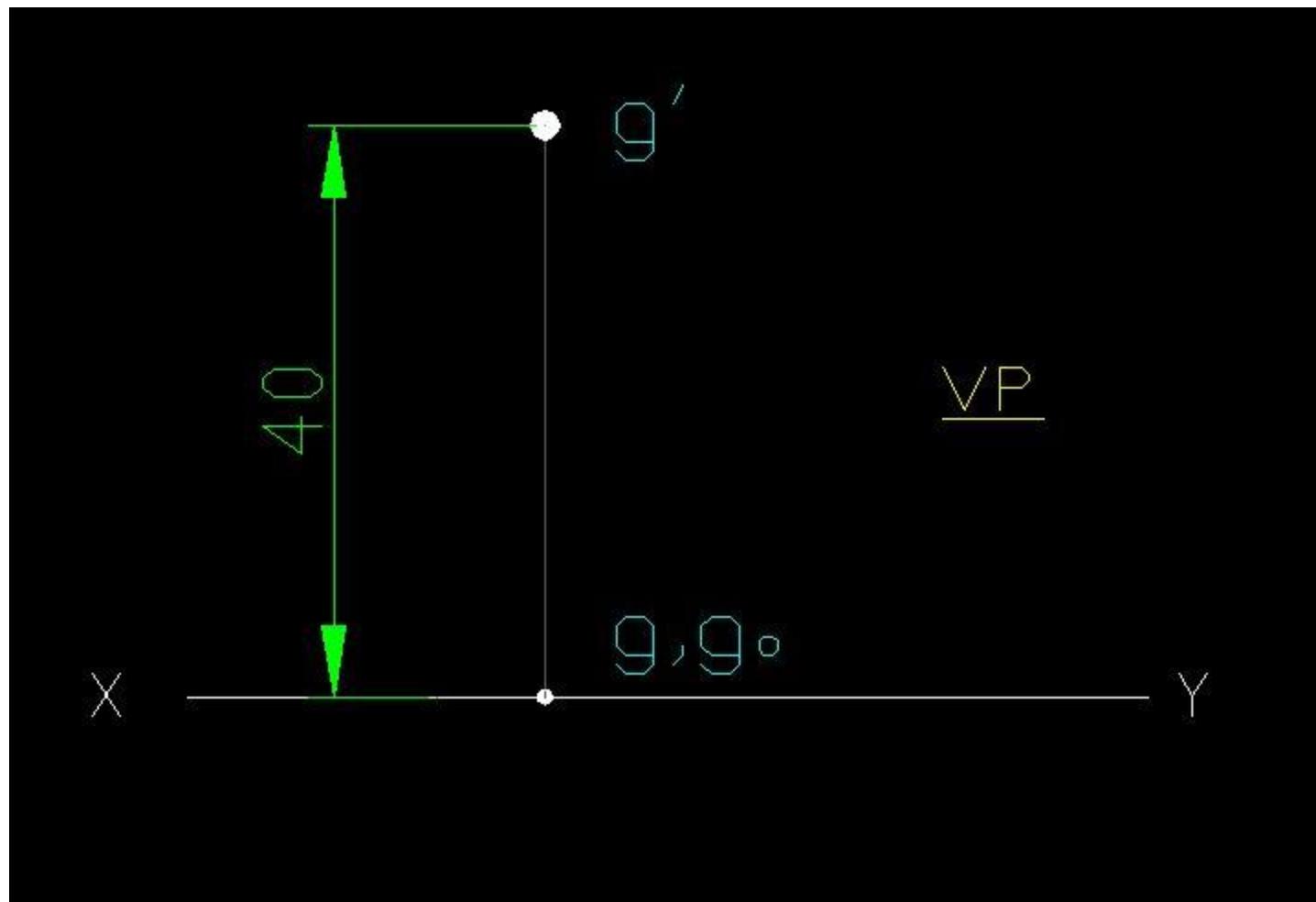
CASE 6: Point F is in HP & 25 mm behind VP. Draw Projections.

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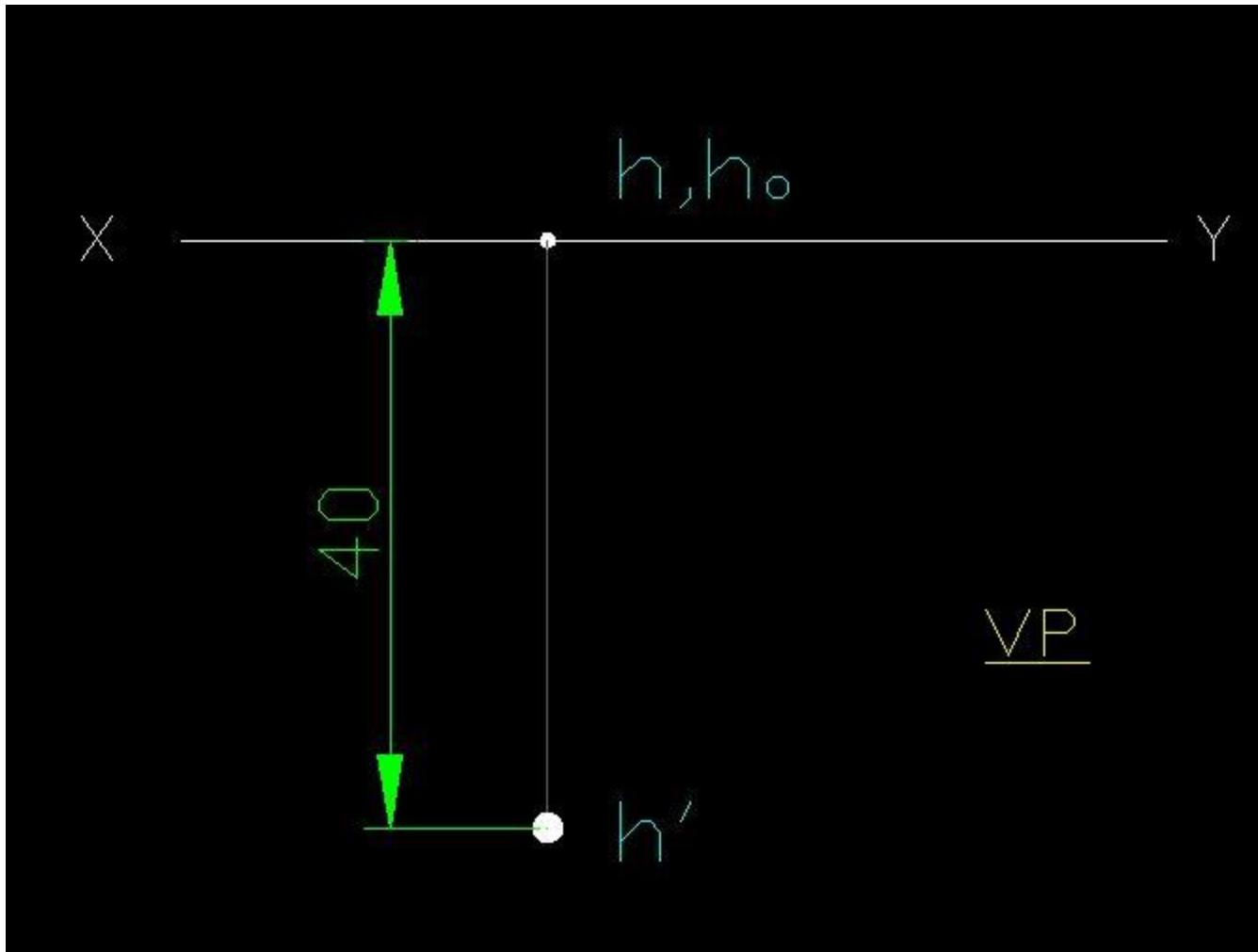
CASE 7: Point G is 40 mm above HP & in VP. Draw Projections.

CASE 7: Point G is 40 mm above HP & in VP. Draw Projections.



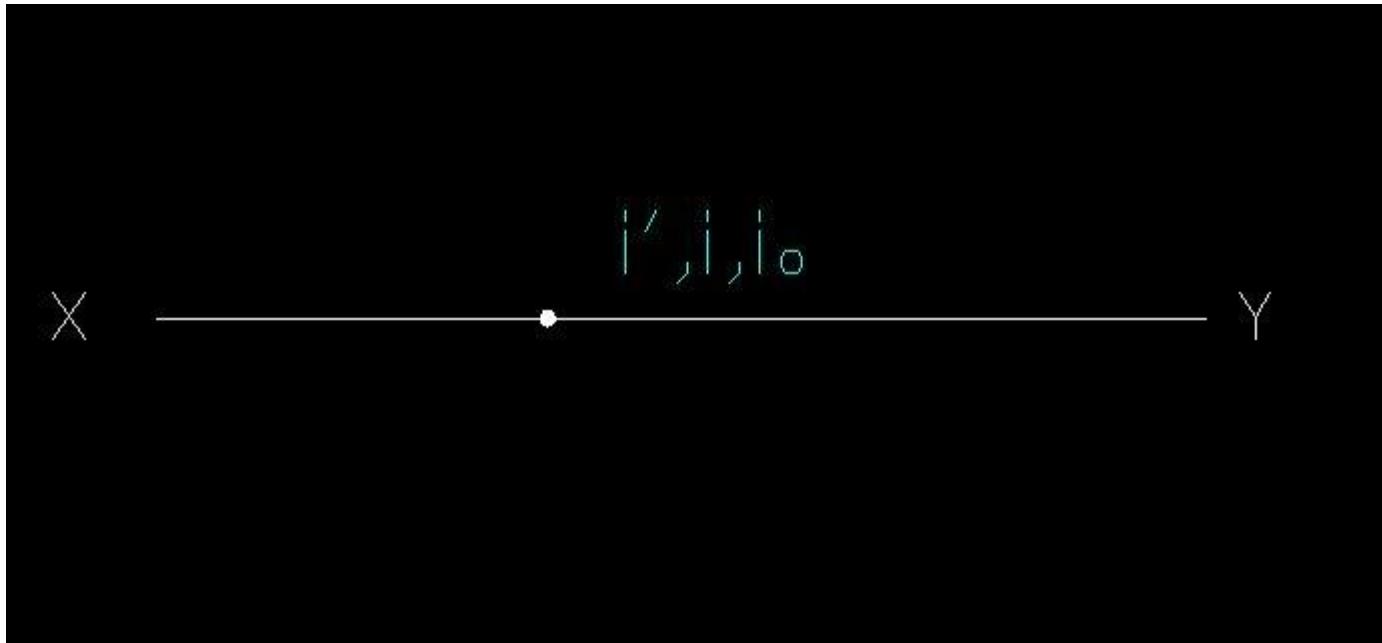
CASE 8: Point H is 40 mm below HP & in VP. Draw Projections.

CASE 8: Point H is 40 mm below HP & in VP. Draw Projections.



CASE 9: Point I is in HP & in VP. Draw Projections.

CASE 9: Point I is in HP & in VP. Draw Projections.



THANKS