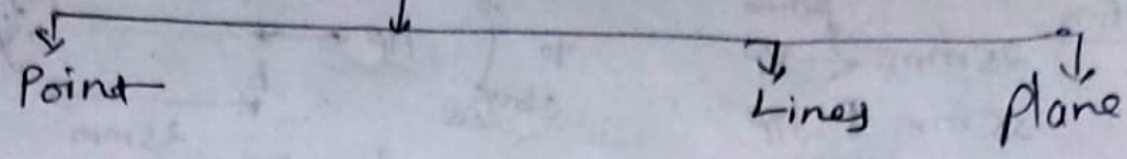


# Engineering Drawing

Projection ⇒ The shadow of an object obtained on a piece of paper is known as projection.

## Projection

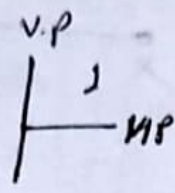


Point ⇒ Point is circle with zero radius.

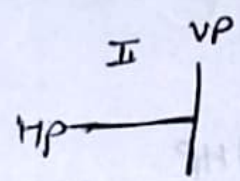
→ Point is line with zero length.

### Point Projection ⇒

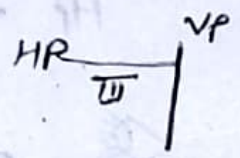
1st → In front of VP and above HP



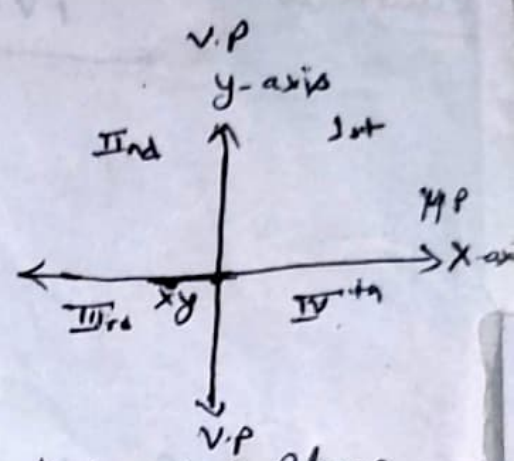
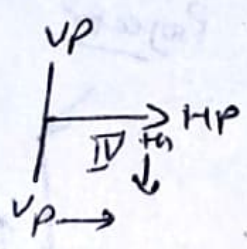
2nd → Behind VP above HP



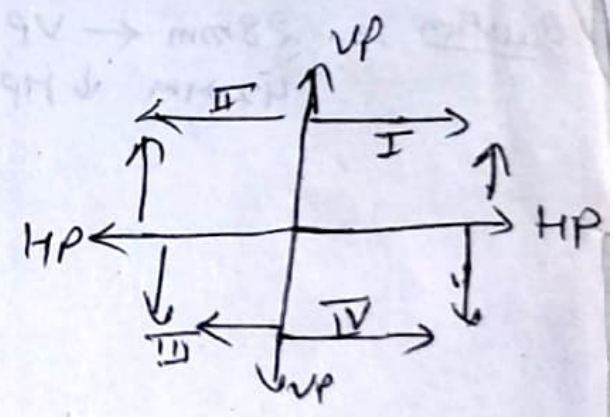
3rd → Behind VP Below HP



4th → In front VP Below HP



H.P. = Horizontal Plane  
 V.P. = Vertical Plane  
 xy = Auxiliary Plane

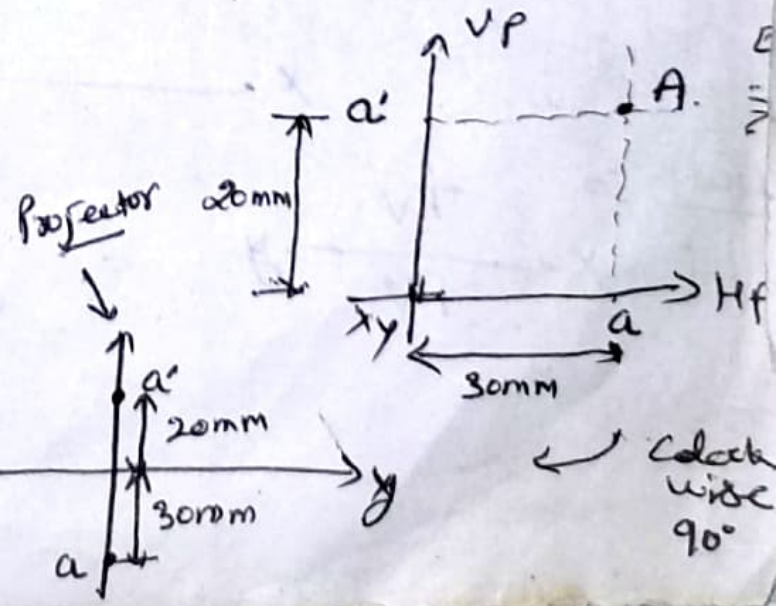


### Case - 1, Quadrant - 1

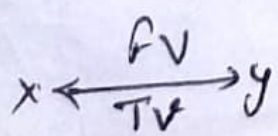
Condition ⇒ → VP and ↑ HP

Dimension = 30mm → VP  
 20mm ↑ HP

Front view = Small letter with dash



Clockwise 90°

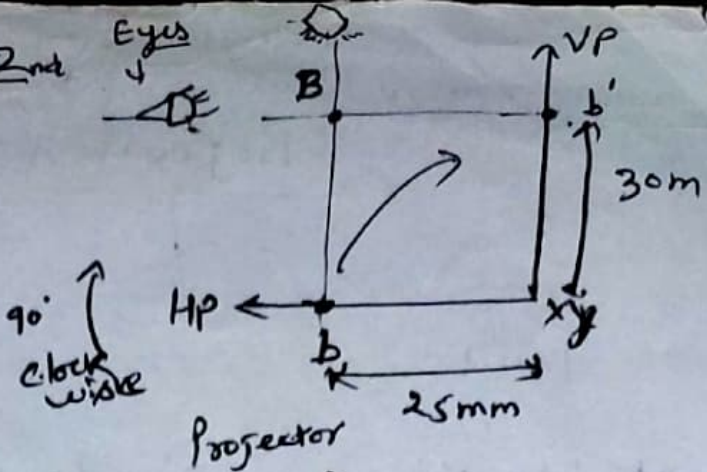


(Top view ⇒ TV)

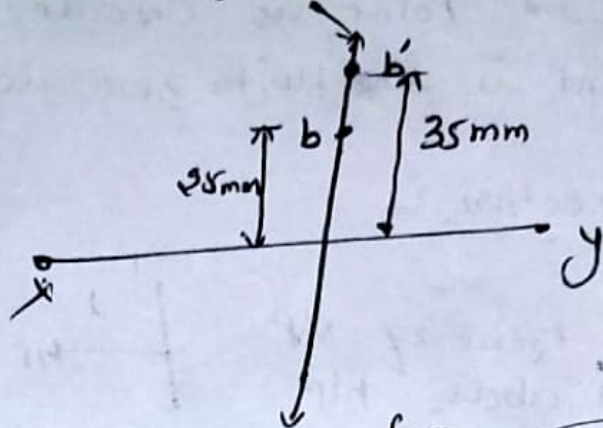
view denoted by Small Letters

Case 2 ⇒ Quadrant - 2nd

Condition = ← VP  
 ↑ HP  
 Behind VP  
 25 mm ← VP  
 35 mm ↑ HP  
 above



Result ⇒ FV & TV  
 x ← y

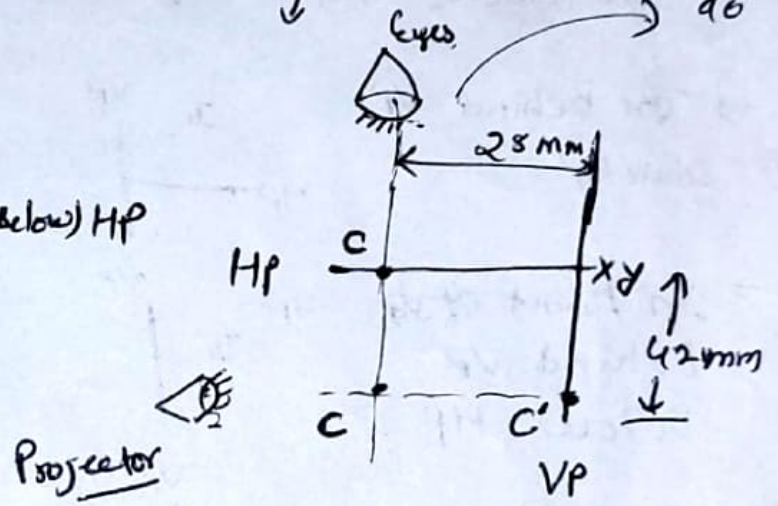


clockwise 90°

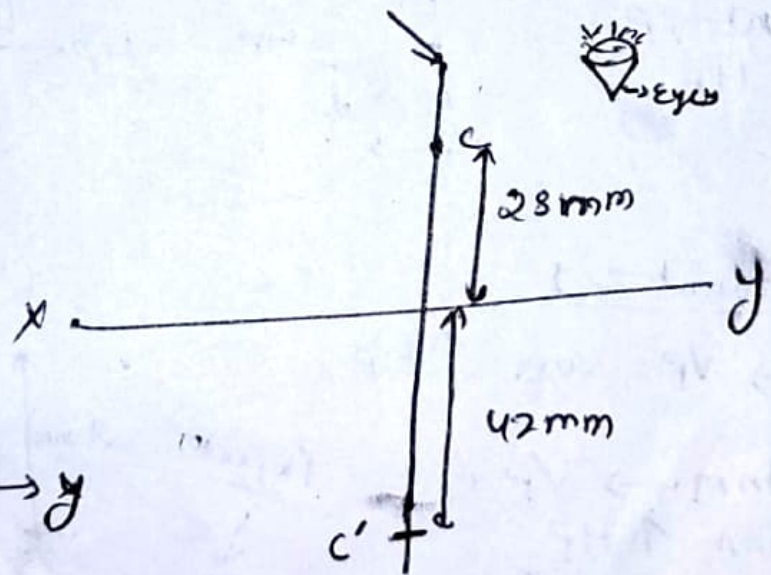
Case - 3 ⇒ Quadrant - 3rd

Condition = ← (Behind) VP & ↓ (Below) HP

Question ⇒ 28 mm ← VP  
 42 mm ↓ HP



Projector



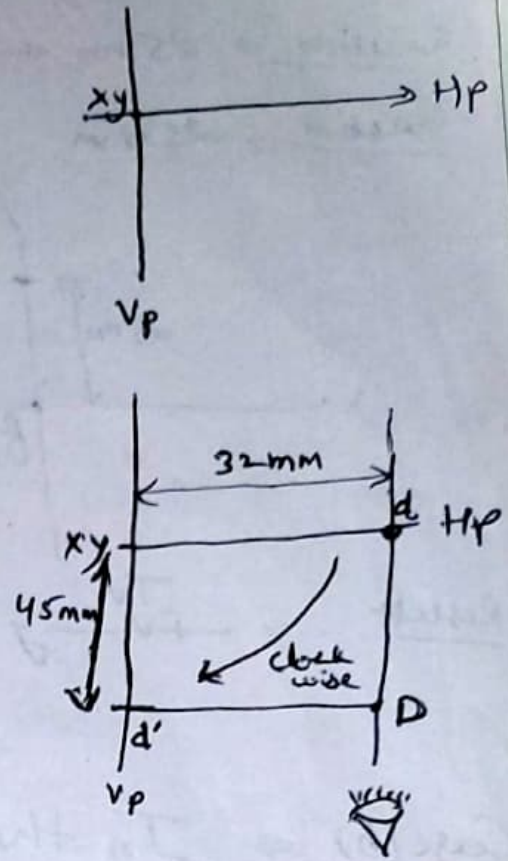
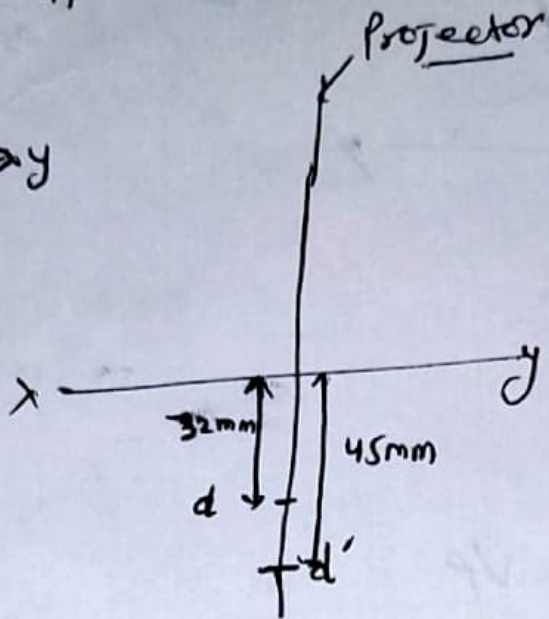
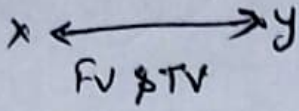
ult ⇒ TV  
 FV  
 x ← y

\* Case-4, Quadrant - 4<sup>th</sup>

Condition:  $\rightarrow$  (In front of) VP,  $\downarrow$  (Below) HP

Question: 32mm  $\rightarrow$  VP  
45mm  $\downarrow$  HP

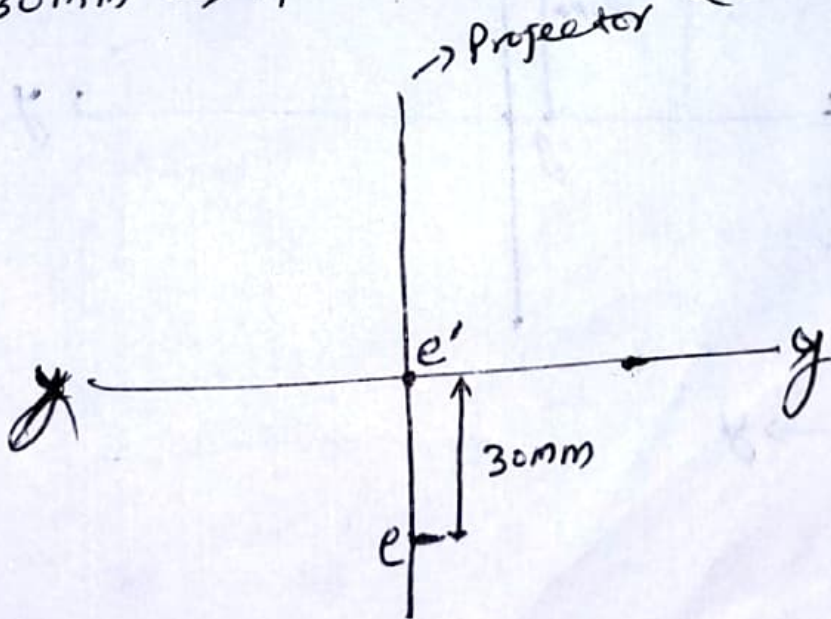
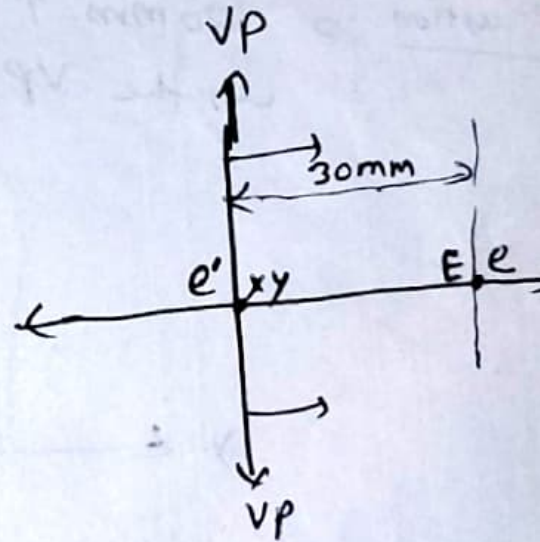
Result



\* Sub case

(a) In the HP  
(i)  $\rightarrow$  VP (In front of) VP

Question: 30mm  $\rightarrow$  VP in the HP  
 $\rightarrow$  Projector



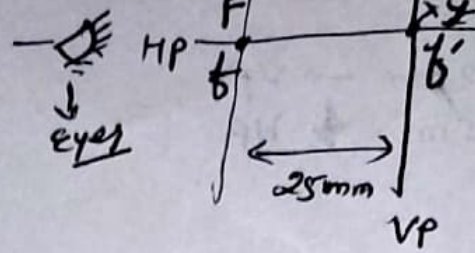
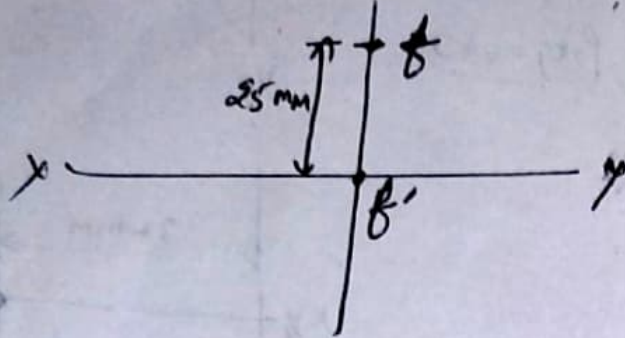
Result  $\Rightarrow$  x  $\leftarrow$  FV  $\rightarrow$  y  
TV

Industrial

(ii) ← (Behind) VP

Question ⇒ 25mm ← VP in the HP

~~Question~~ ⇒ 25mm

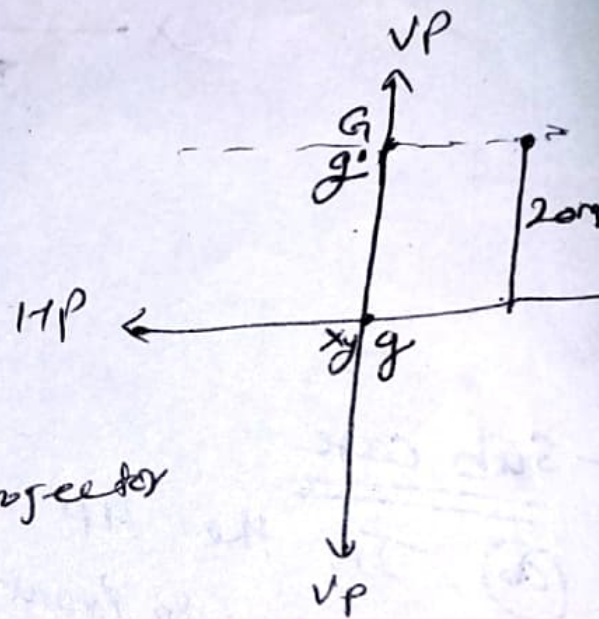
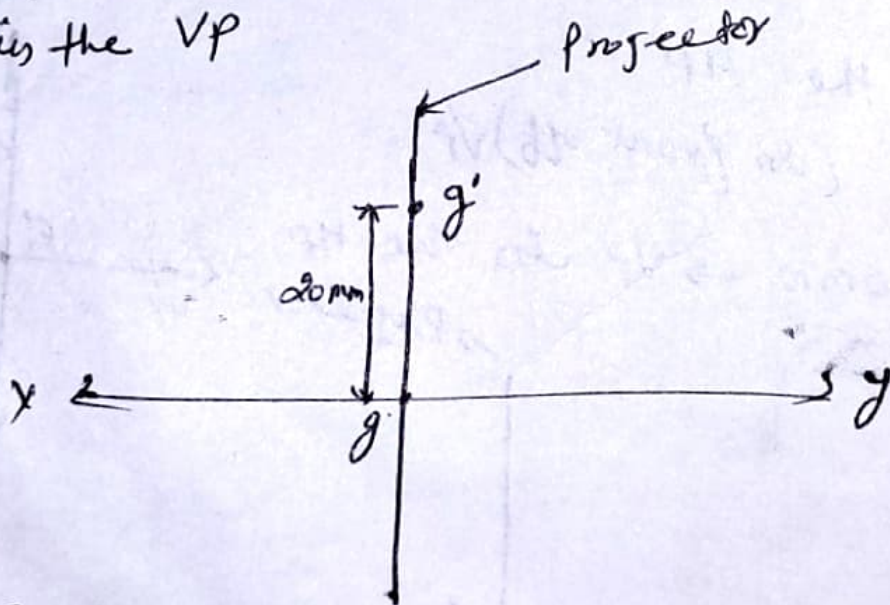


Result X  $\xrightarrow{\text{TV}}$  Y

Case (b) ⇒ In the VP

(i) ↑ HP (above HP)

Question ⇒ 20mm ↑ HP in the VP

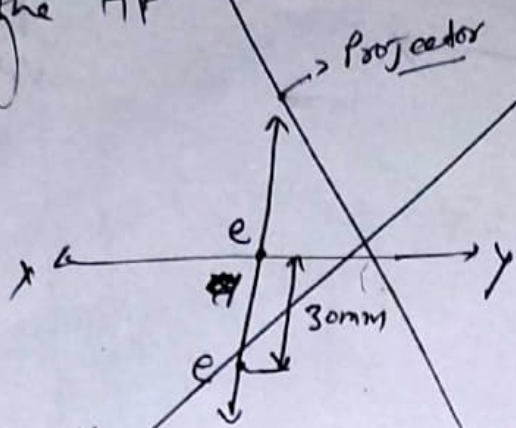
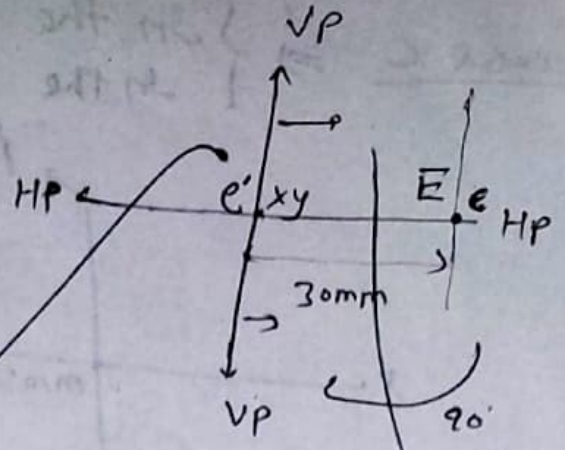


Result

FV  
X  $\xrightarrow{\text{TV}}$  Y

Sub - Case - (a) In the HP

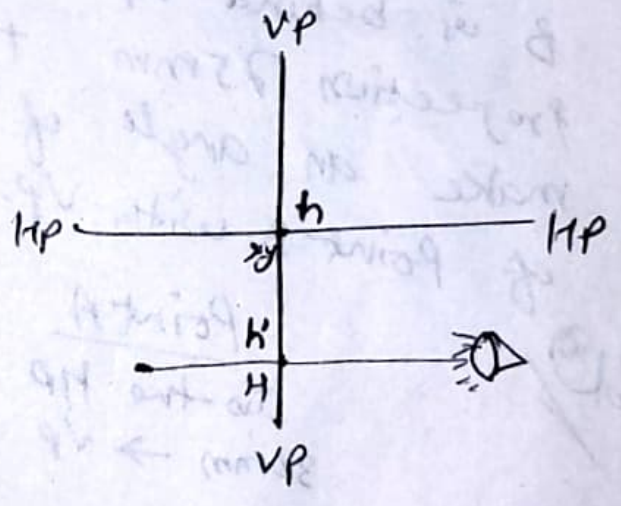
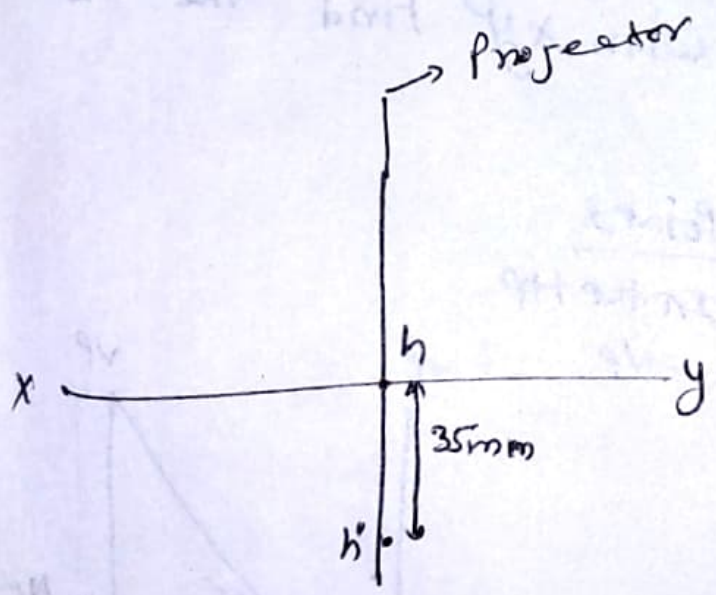
① → VP (In front of b)  
 30mm → VP  
 in the HP



Result  
 x — FV — y  
           TV

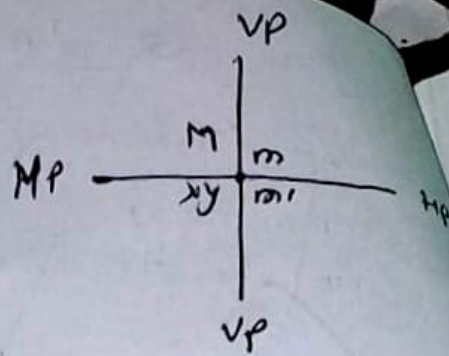
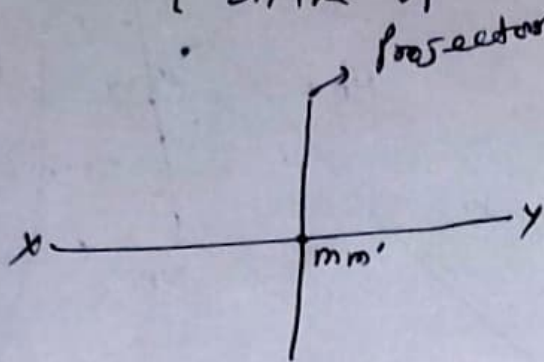
② ← (Behind) VP  
 Question 25mm ← VP in the HP

Case(b) (ii) ↓ (Below) HP, 35mm ↓ HP in the VP



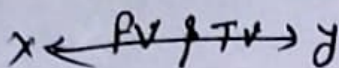
Result  
 x — TV — y  
           FV

Case C  $\Rightarrow$   $\left\{ \begin{array}{l} \text{In the HP } \& \\ \text{In the VP} \end{array} \right.$



\* Line  
\* Case - 1

Result



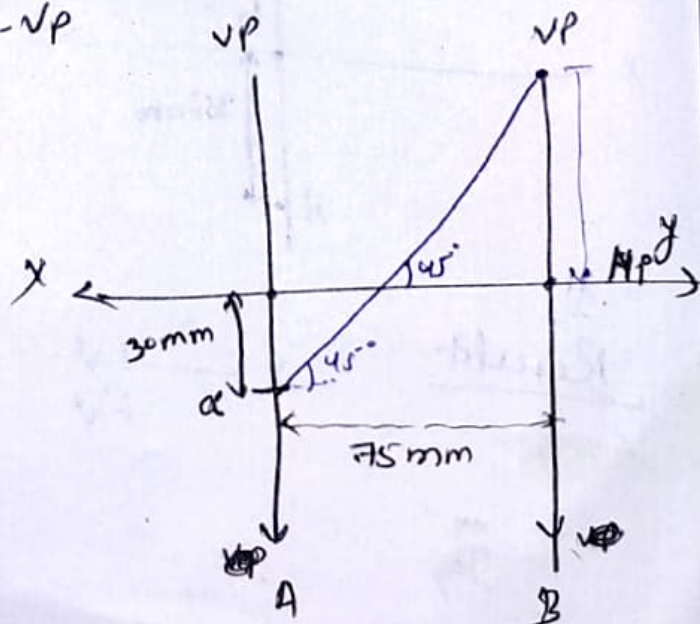
~~\* Question Based on projection~~

Question  $\Rightarrow$  Two point A and B are in the HP Point A is 30mm in front of VP. where as point B is behind VP the distance between their projection 75mm. the line joining their top views make an angle of  $45^\circ$  with  $xy$ . find the distance of point B with VP.

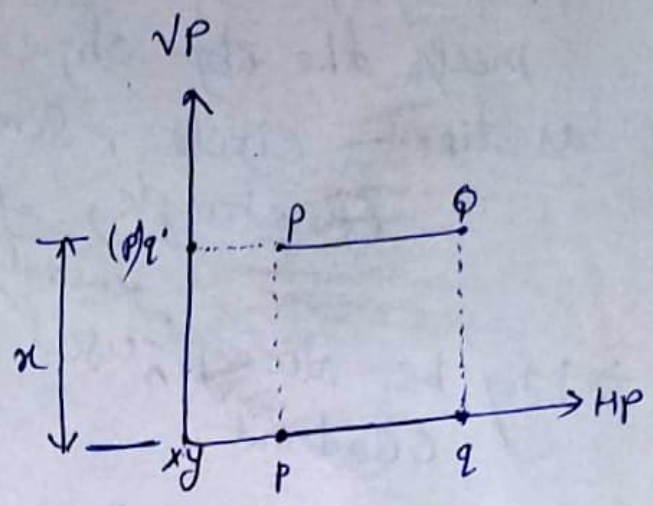
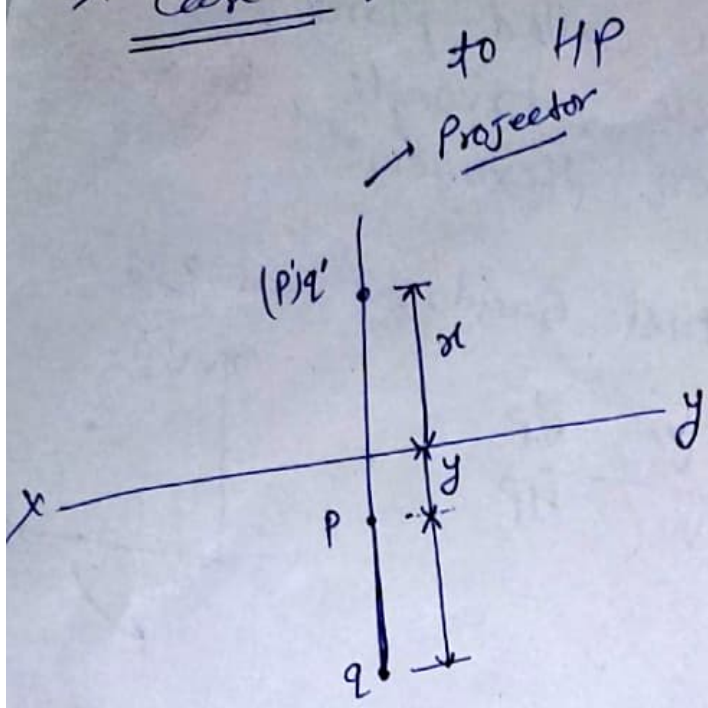
Sol<sup>n</sup>

Point A  
in the HP  
30mm  $\rightarrow$  VP

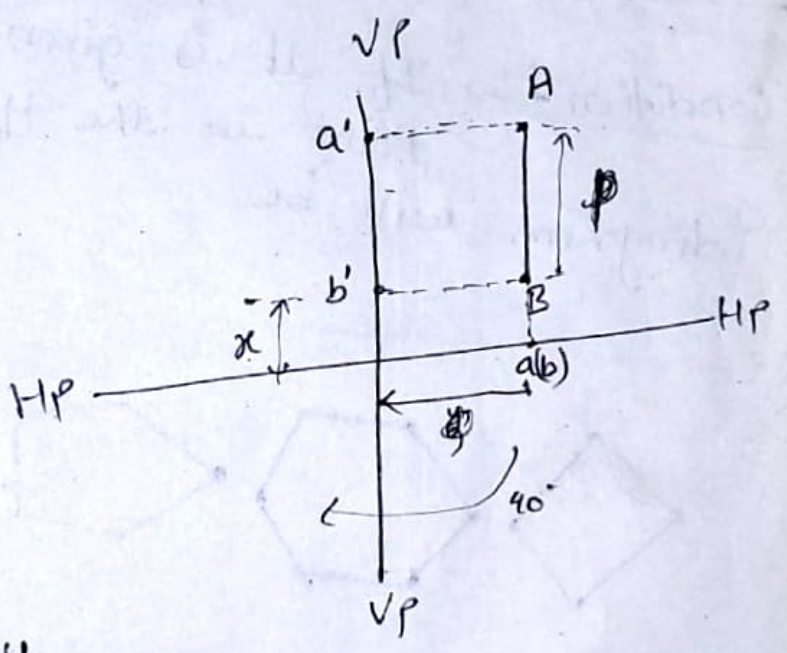
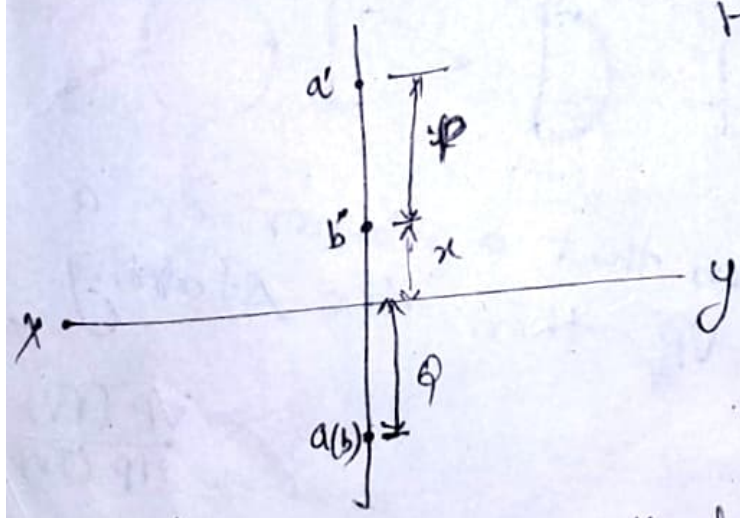
Point B  
In the HP  
?  $\leftarrow$  VP



\* Case-1  $\Rightarrow$  Line Perpendicular to VP & Parallel to HP



\* Case-2  $\Rightarrow$  Line Perpendicular to HP & Parallel to VP



Result  $\perp$  (Perpendicular) VP &  $\parallel$  (Parallel) to VP

FV as a point, TV as a line

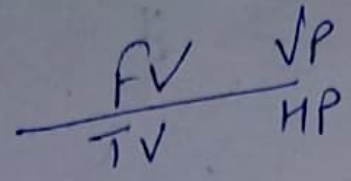
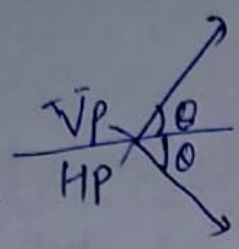
$\perp$  HP &  $\parallel$  VP  $\Rightarrow$  FV as a line, TV as a point

# Plane Projection

Plane Projection is number of points & line meets the ~~obj~~ objects are called plane.  
 as like - Circle, semi circle, triangle, square, rectangle, pentagon, hexagon;

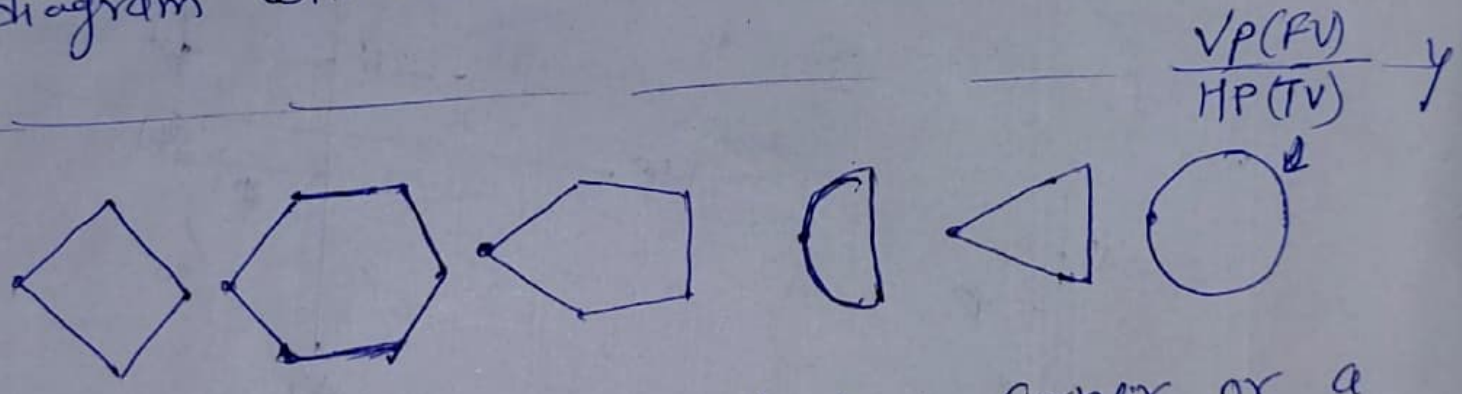
→ May be always <sup>generally</sup> used for First Quadrant and 3rd Quadrant.

→ angle

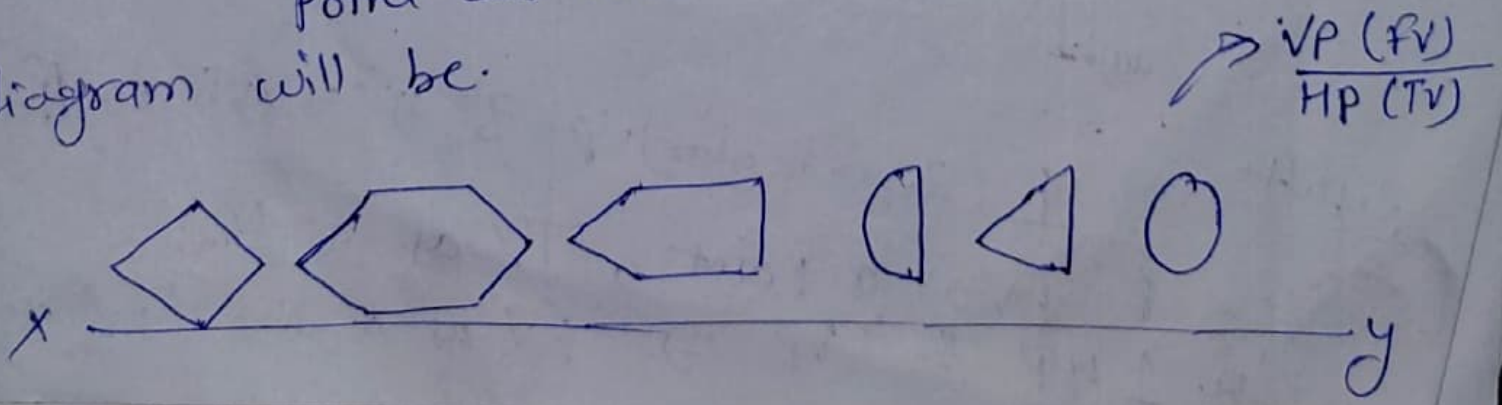


Condition - Left Side (fit)

Condition 1 ⇒ If it is given that a corner or a point in the HP then the starting diagram will be

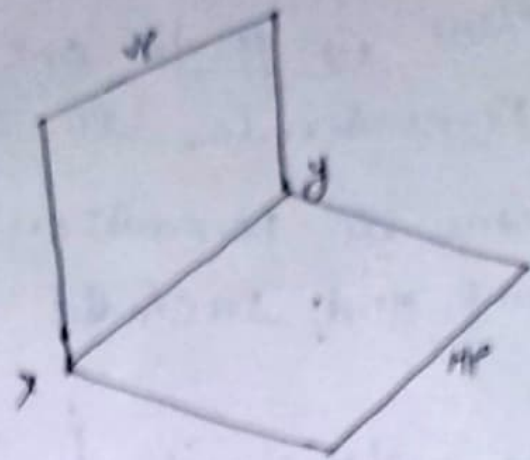
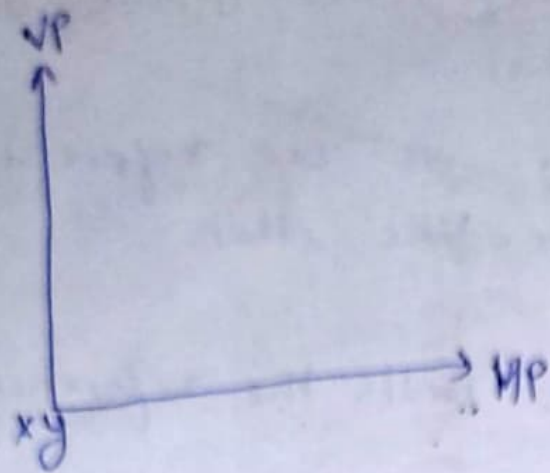


Condition-2 ⇒ If it is given that a corner or a point in the VP then the starting diagram will be.



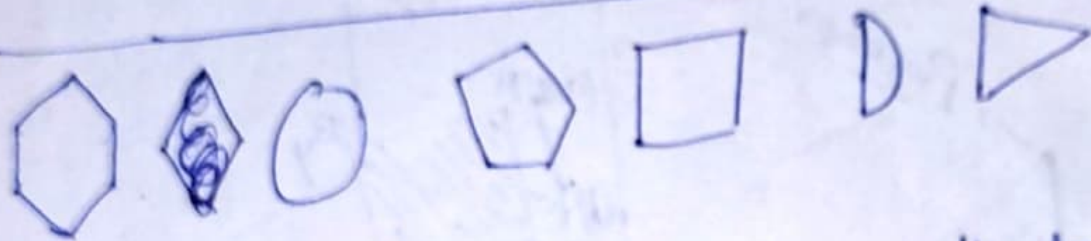


Condition-3: If it is given that a side or a face or a line is in the HP. then the starting diagram will be.

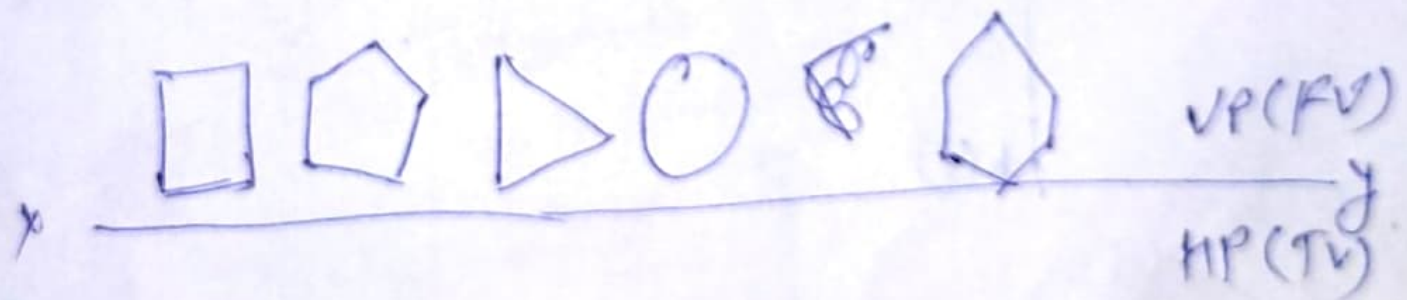


VP (FV)

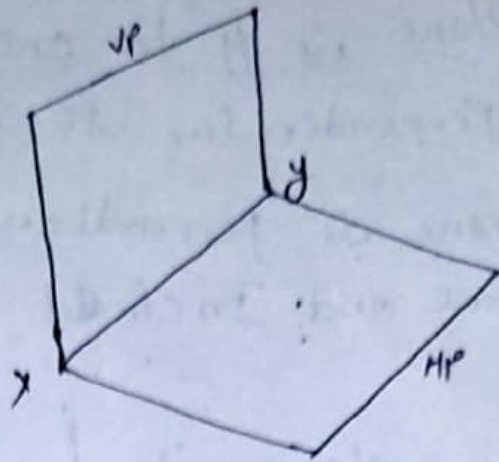
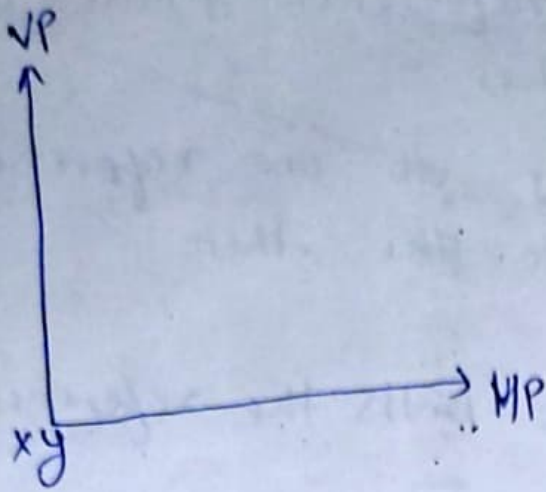
HP (TV)



Condition-4: If it is given that a side or a face or a line is in the VP. then the starting diagram will be.

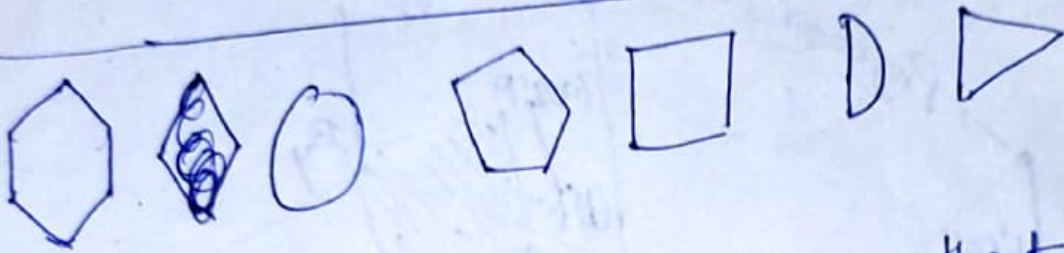


Condition-3 ⇒ If it is given that a side or a face or a line is in the HP. then the starting diagram will be.

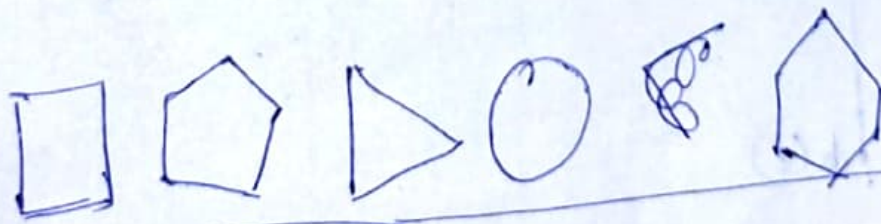


VP (FV)

HP (TV)



Condition-4 ⇒ If it is given that a side or face or a line is in the VP. then the starting diagram will be.



VP (FV)

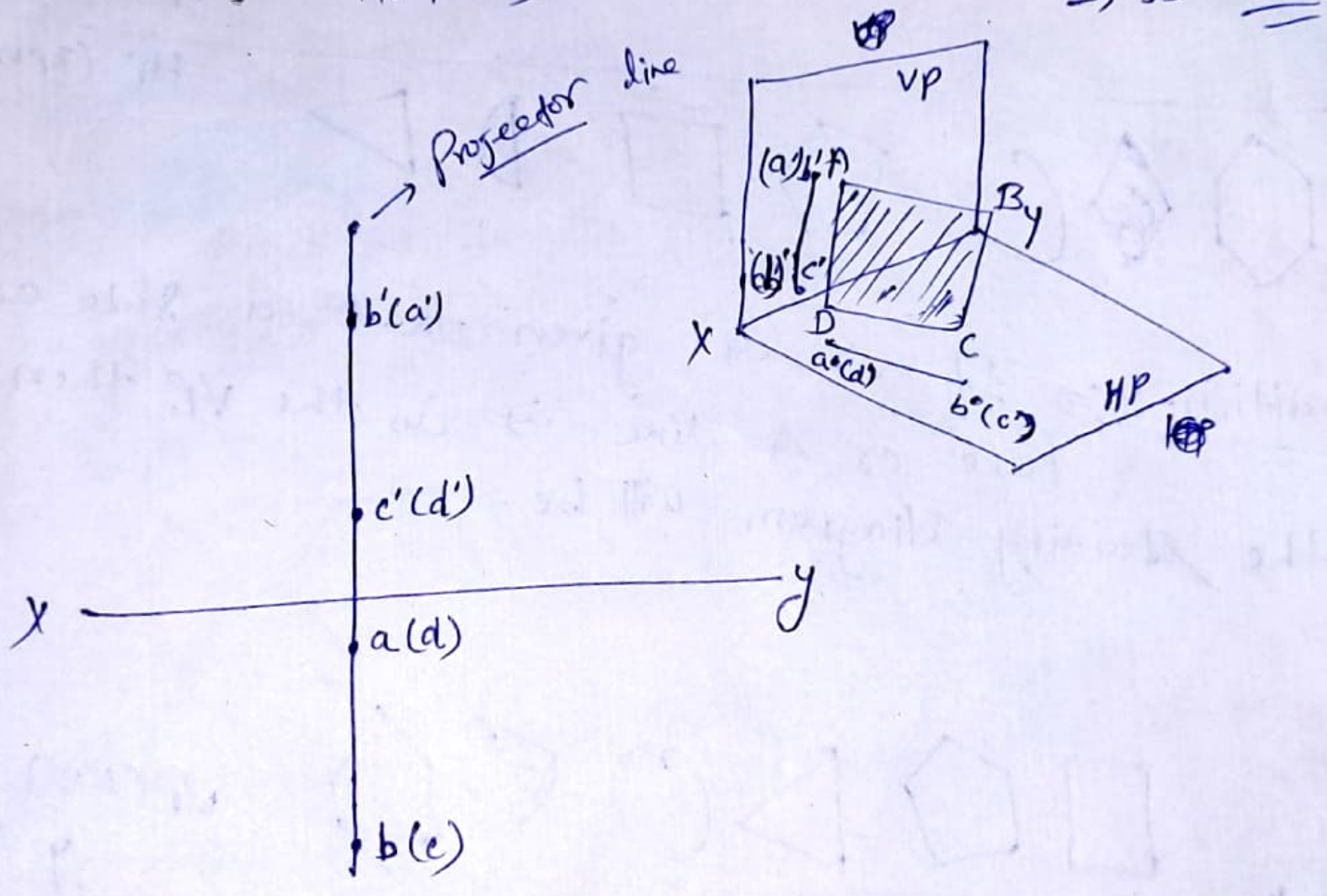
HP (TV)

Cases  $\Rightarrow$  (1) plane is  $\perp$  to both the reference planes (HP & VP)

(2) plane is  $\parallel$  to one reference plane and perpendicular to other.

(3) plane is perpendicular to one reference plane and inclined to the other.

Case 1  $\Rightarrow$  plane is  $\perp$  to both the reference plane (HP & VP).

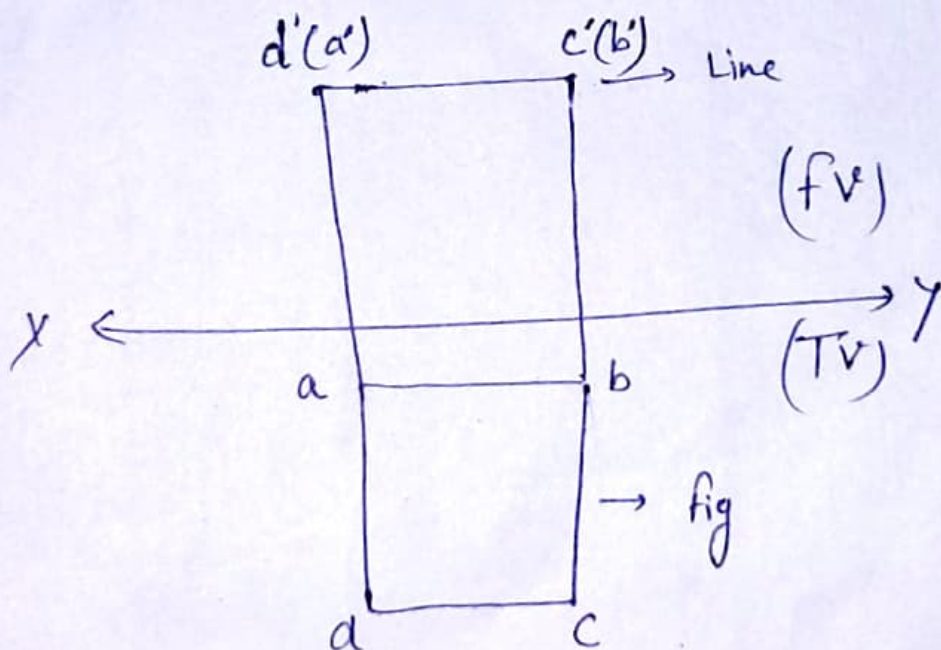
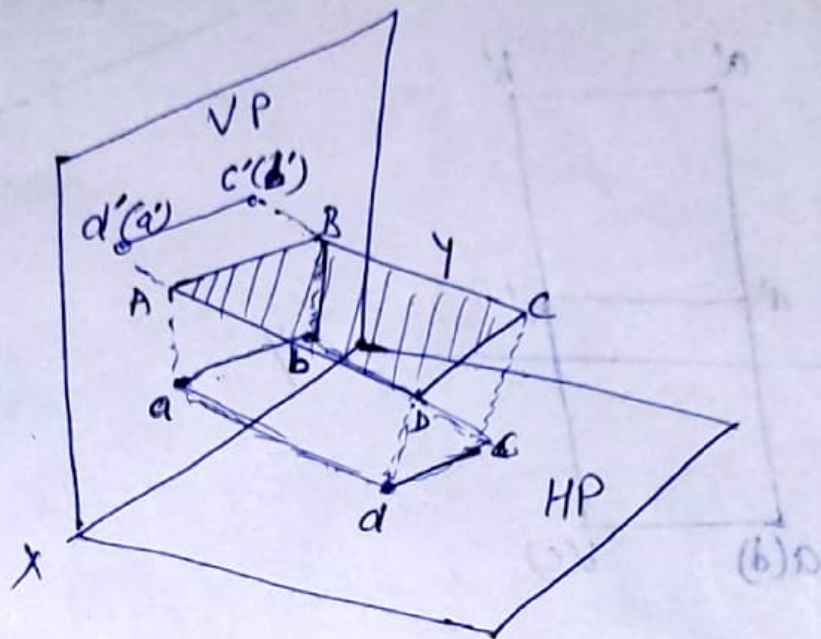


Case 2  $\Rightarrow$  Plane perpendicular to one reference  
Plane & parallel to the another.

(1) Plane  $\perp^r$  to VP &  $\parallel$  to HP

(2) plane  $\perp^r$  to HP &  $\parallel$  to VP

(i) Plane  $\perp^r$  to VP &  $\parallel$  to HP



(2) plane  $\perp^r$  to HP &  $\parallel$  to VP

