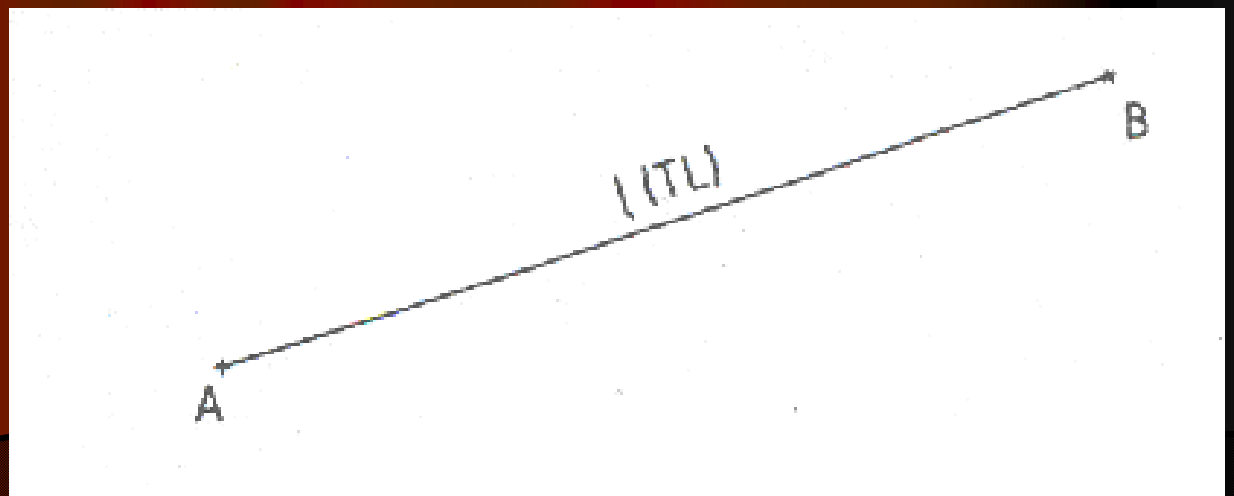# Projections of Straight Lines

PROJECTIONS OF STRAIGHT LINES

STRAIGHT LINE

It is the shortest distance between two given points. Thus, the two ends of a straight line are points. St. lines are also called simply as lines.

POSITIONS OF LINE WITH RESPECT TO HP AND VP

1. Line perpendicular to HP and parallel to VP
2. Line perpendicular to VP and parallel to HP
3. Line parallel to both HP and VP
4. Line inclined to HP and parallel to VP
5. Line inclined to VP and parallel to HP
6. Line inclined to both HP and VP

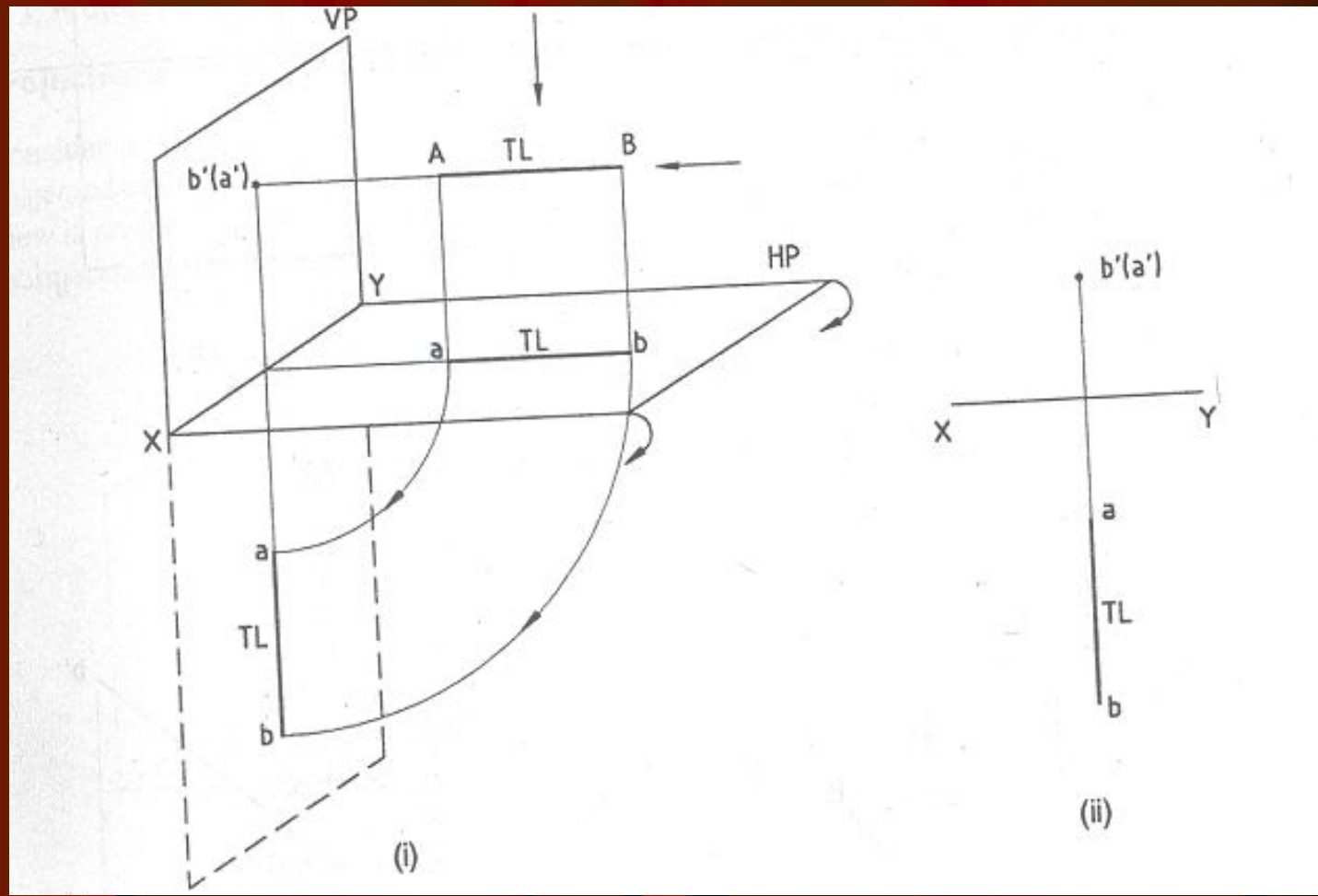# Projections of a Line kept Perpendicular to HP and Parallel to VP
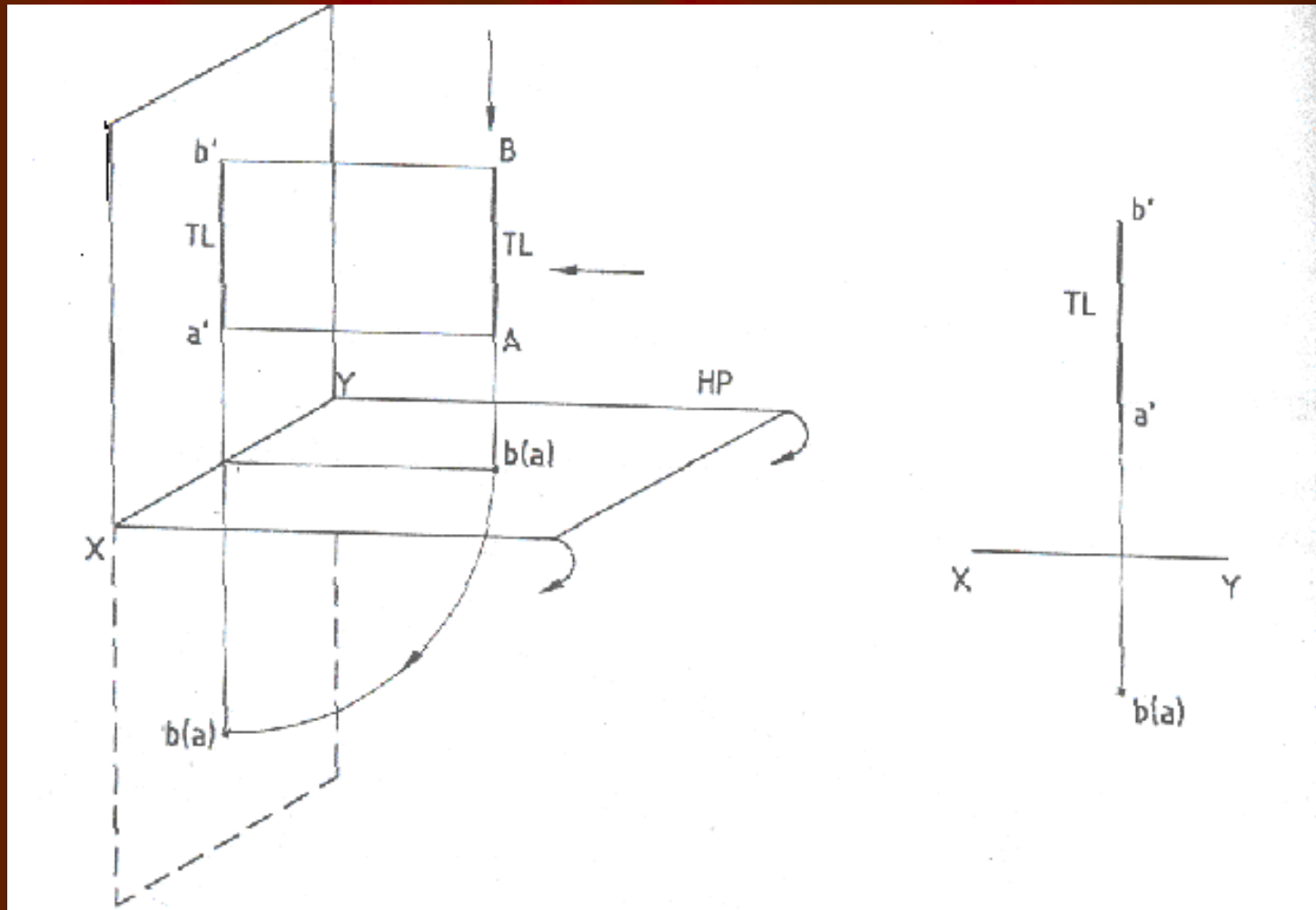
Line perpendicular to HP and parallel to VP

PROBLEM 1

- A line AB 25mm long is parallel to VP and perpendicular to HP. Point A is 35mm above HP and 20mm in front of VP. Point B is 10mm above Hp. Draw the projections of the line AB.

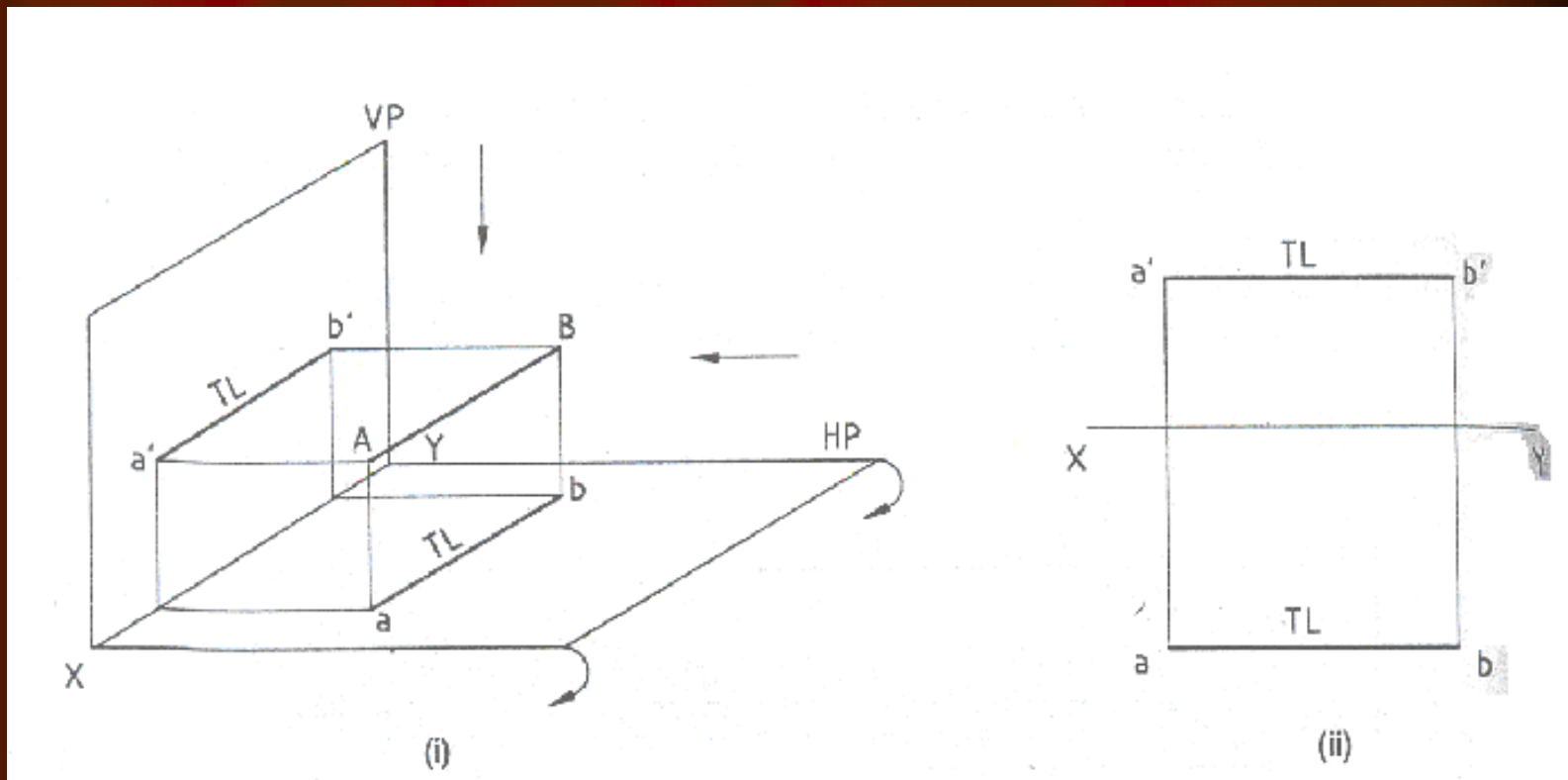# Projections of a Line kept Perpendicular to VP and Parallel to HP

Line perpendicular to VP and parallel to HP

Problem 2

- A line AB 25mm long is perpendicular to VP and parallel to HP. Its end A is 10mm in front of VP and the line is 20mm above HP. Draw the projections of the line.

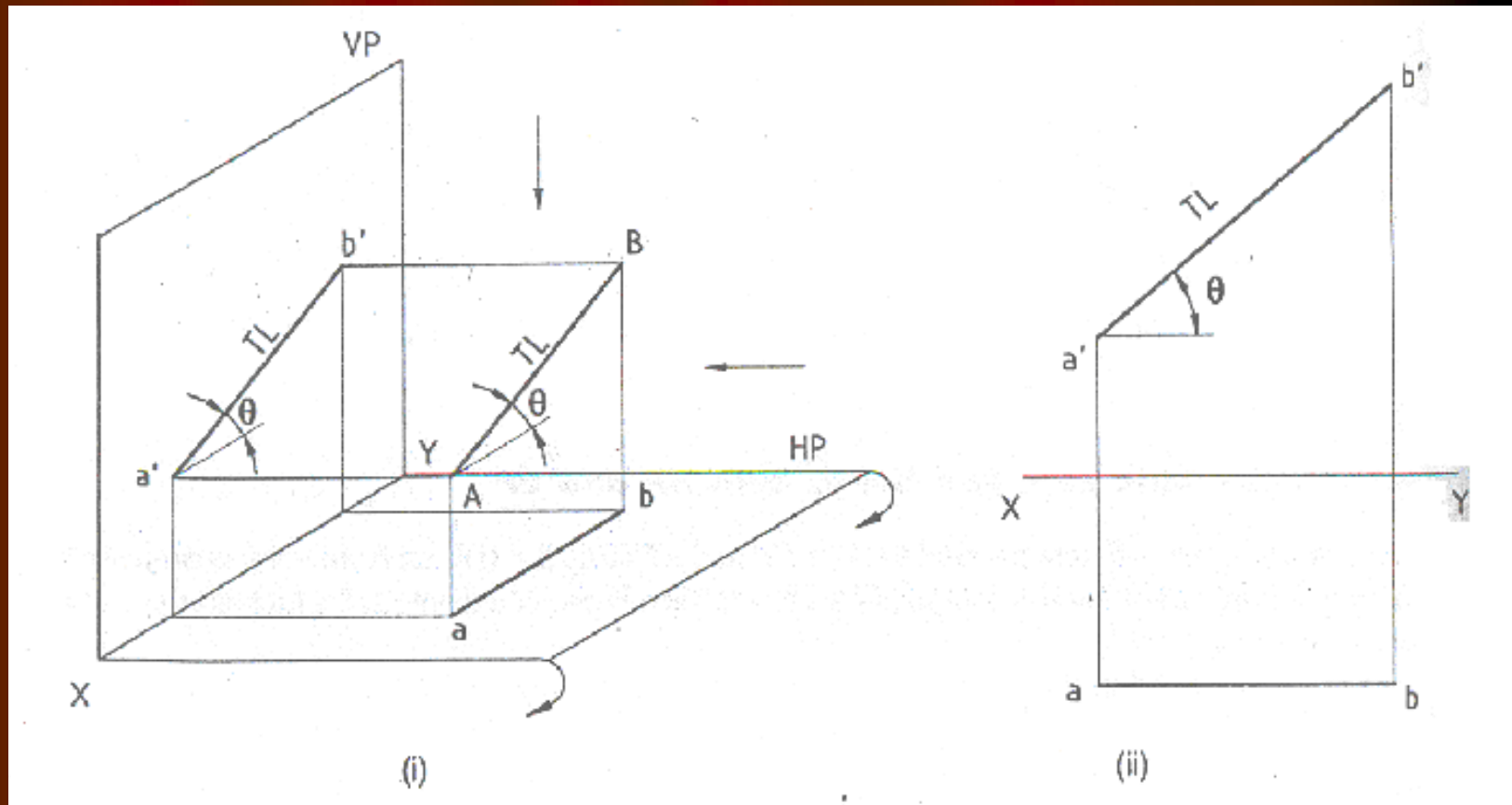# Projections of a Line kept Parallel to Both HP and VP

Projections of a Line kept Parallel to Both HP and VP

Problem 3

A line CD 30mm long is parallel to both the planes. The line is 40mm above HP and 25mm infront of VP. Draw its projections.

Projections of a Line kept Inclined to HP and Parallel to VP

line Inclined to HP and parallel to VP

Problem 4

- A line PQ 40mm long is parallel to VP and inclined at an angle of 30° to HP. The lower end P is 15mm above HP and 20mm in front of VP. Draw the projections of the line.

Projections of a Line kept Inclined to VP and Parallel to HP
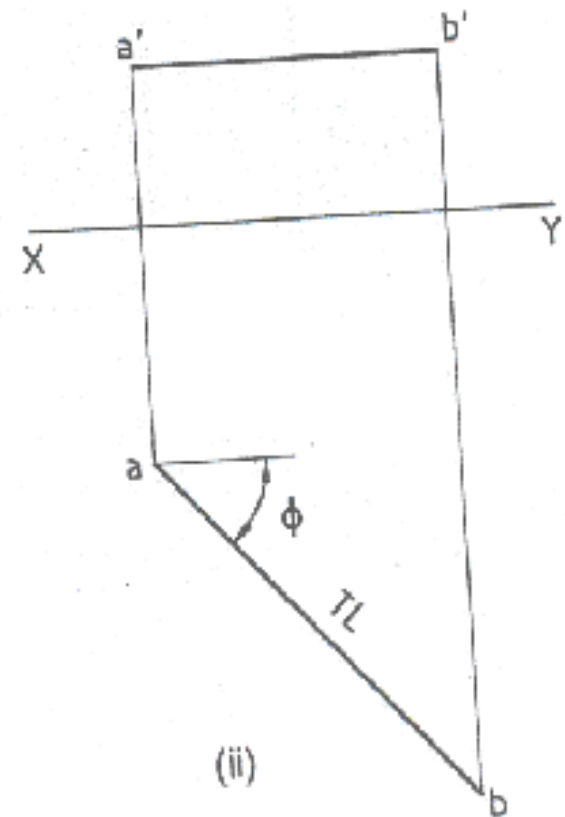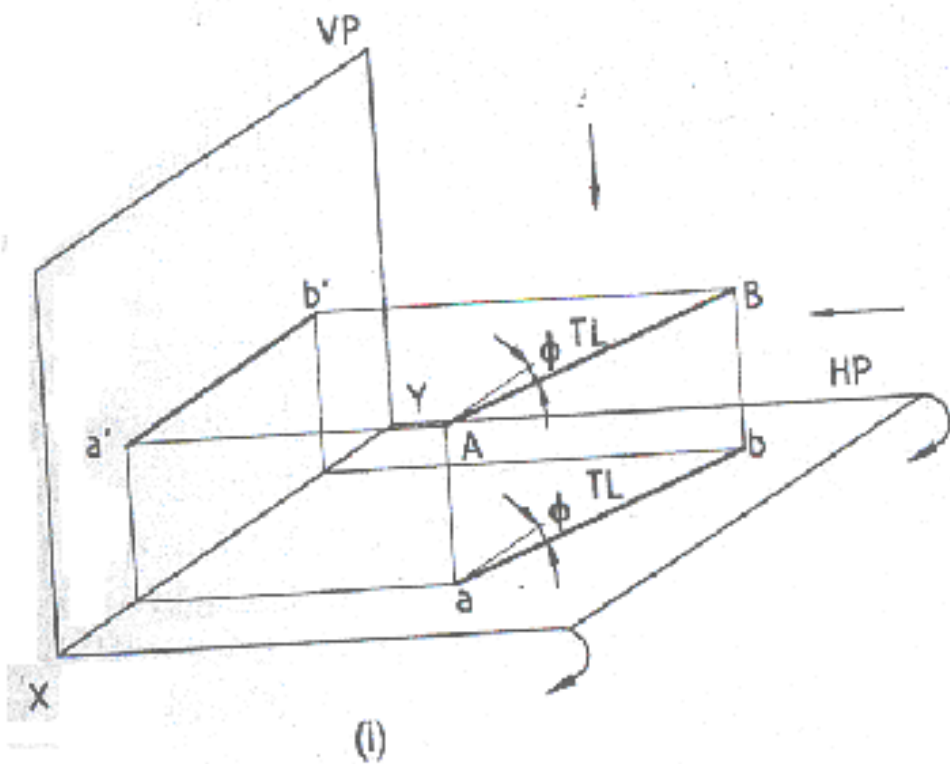
Line parallel to HP and Inclined to VP

Problem 5

- Draw the projections of a line EF 40mm long parallel to HP and inclined at 35° to VP. E is 20mm above HP and 15mm in front of VP.

Projections of a Line kept Inclined to both HP and VP

Line Inclined to both H.P. and V.P.
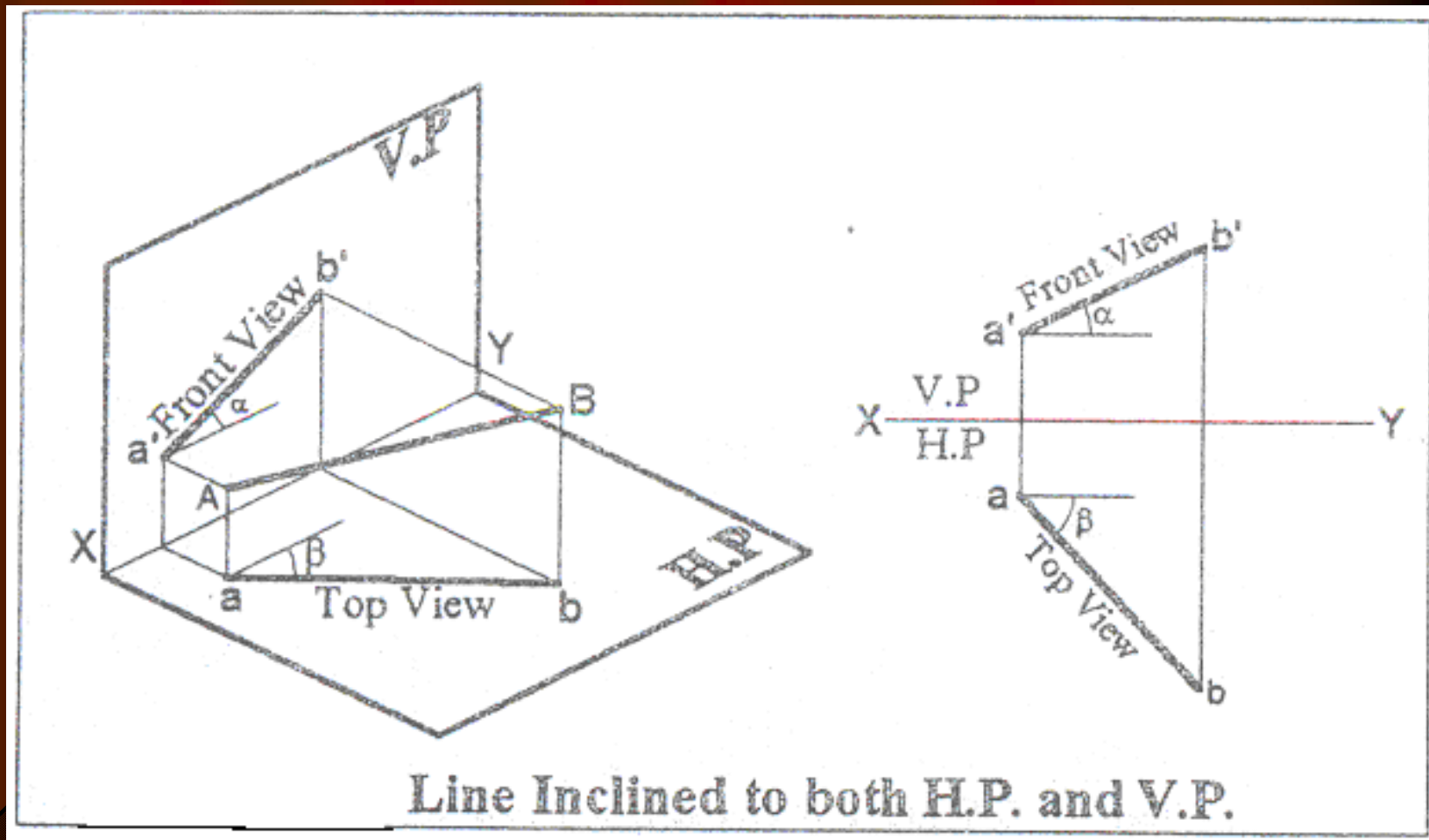
Inclined to both HP and VP (Rotating Line method)
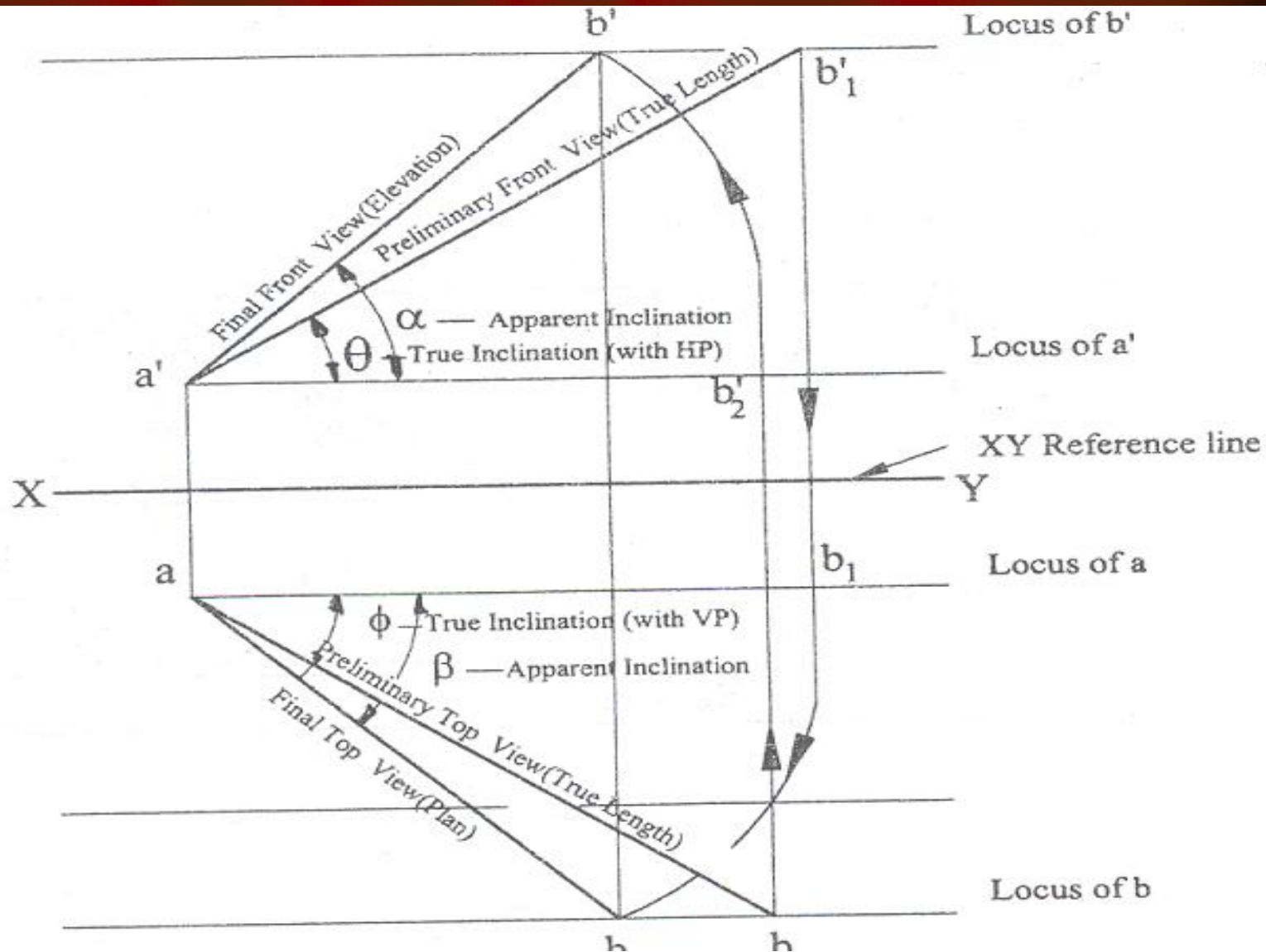
Line inclined to both HP and VP

Problem 1

- A line CD measuring 80mm is inclined at an angle of 30° to HP and 45° to VP. The point C is 20mm above HP and 30mm in front of VP. Draw the projections of the straight line.

Exercise:-

A line PQ 75mm long has its end P in both HP and VP. It is inclined at an angle of 30° to HP 45° to VP. Draw projections of the line.

Front view and Top view length measuring problem

Problem 2

- A line measuring 75mm long has one of its ends 50mm in front of V.P. and 15mm above H.P. The top view of the line is 50mm long. Draw and measure the front view. The end is 15mm in front of V.P. and is above H.P.

Exercise:-

- A line measuring 80mm long has one of its ends 60mm above H.P. and 20mm in front of V.P. The front view of the line is 60mm long. Draw and measure the top view

Distance b/w two projectors problem

Problem 3

- The distance between the projectors of two points A and B is 70mm. Point A is 10mm above H.P. and 15mm in front of V.P. Point B is 50mm above H.P. and 40mm in front of V.P. Find the shortest distance between A and B. Measure the true inclinations of the line AB with V.P and H.P.

One end rest on reference line problem

Problem 4

- One end S of a line SR, 70mm long is in both the HP and VP. The line is inclined at 40° to the HP and at 35° to the VP. Draw its projections.

Find its true inclinations with the HP and VP.

Problem 5

- A line NS, 80mm long has its end N, 10mm above the HP and 15mm in front of the VP. The other end S is 65mm above the HP and 50mm in front of the VP. Draw the projections of the line and find its true inclinations with the HP and VP.

Answer: $\theta = 42°$, $\varphi = 26°$

Find its true inclinations with the HP and VP. Cont…

- The end P of a line PQ, 70mm long is 15mm above the HP and 20mm in front of the VP. Q is 40mm above the HP. Its top view is inclined at 45° to the VP. Draw the projections of the line and find its true inclinations with the VP and the HP.

- A line EF, 85mm long has its end E, 25mm above the HP and 20mm in front of the VP. The top and front views of the line have lengths of 55mm and 70mm respectively. Draw the projections of the line and find its true inclinations with the VP and the HP.

Find its true inclinations with the HP and VP. Cont…

- The end A of a line AB is 10mm in front of VP and 20mm above HP. The line is inclined at 30º to HP and front view is 45º with XY. Top view is 60mm long. Draw the projections. Find the true length and inclination with VP.(TJ)

- A line AB measuring 75mm long has one of its ends 50mm in front of VP and 15mm above HP. The top view of the line is 50mm long. Draw and measure the front view. The other end is 15mm in front of VP and is above HP. Determine the true inclinations.(TJ)

Find the true length and its true inclinations problem

Problem 6

- A line PQ has its end P 1mm above the HP and 20mm in front of the VP. The end Q is 35mm in front of the VP. The front view of the line measures 75mm. The distance between the end projectors is 50mm. Draw the projections of the line and find its true length and its true inclinations with the VP and the HP.

Final front and top view (Apparent line) perpendicular to reference line.

Problem 7

- A line PF, 65mm long has its end P, 15mm above the HP and 15mm in front of the VP. It is inclined at 55° to the HP and 35° to the VP. Draw its projections.

Mid-point problem

Problem 8

- The mid-point of a straight line AB 90mm long is 60mm above HP and 50mm in front of VP. It is inclined at 30º to HP and 45º to VP. Draw its projections.(pro. From TJ)

- The mid-point of a straight line AB is 60mm above H.P. and 50mm in front of V.P. The line measures 80mm long and inclined at 30° to H.P. and 45° to V.P. Draw its projections(Pro. From venogopal)

QUICK REVIEW OF PROJECTIONS OF STRAIGHT LINES

QUICK REVIEW OF PROJECTIONS OF STRAIGHT LINES

S.No.	Position of line	Front view (Elevation)	Top view (Plan)
1.	Line perpendicular to H.P. and parallel to V.P.	The front view is perpendicular to XY line and having true length of the line	The top view is a point.
2.	Line perpendicular to V.P. and parallel to H.P.	The front view is a point.	The top view is perpendicular to XY line and having true length of the line.
3.	Line parallel to both H.P. and V.P.	The front view is parallel to XY and having true length of the line.	The top view is parallel to XY and having true length of the line.
4.	Line in H.P. and V.P.	Both the front view and top view coincides with the XY line and the length is equal to the true length of the line.	
5.	Line parallel to V.P. and inclined at $\theta°$ to H.P.	The front view is inclined at $\theta°$ to XY line and the length is equal to the true length of the line.	The top view is shorter than the true length of the line and parallel to XY line.

QUICK REVIEW OF PROJECTIONS OF STRAIGHT LINES

S.No.	Position of line	Front view (Elevation)	Top view (Plan)
6.	Line parallel to H.P.and inclined at ϕ° to V.P.	The front view is shorter than the true length of the line and parallel to the XY line.	The top view is inclined at ϕ° to XY line and the length is equal to the true length of the line.
7.	Line in V.P. and inclined at θ° to H.P.	The front view is inclined at θ° to XY line and the length is equal to the true length of the line.	The top view is shorter than the true length of the line and lies in XY line.
8.	Line in H.P. and inclined at ϕ° to V.P.	The front view is shorter than the true length of the line and lies in the XY line.	The top view is inclined at ϕ° to XY line and the length is equal to the true length of the line.
9.	Line inclined to both H.P. and V.P.	The front view is inclined at α° to XY line and the length is shorter than the true length (α° = The angle made by the final front view with XY line).	The top view is inclined at β° to XY line and the length is shorter than the true length. (β°=The angle made by the final top view with XY line).