

# **2.0 Projection of Points (Manual Drawing)**

**SEMESTER: I/II**

**COURSE TITLE: COMPUTER AIDED ENGINEERING  
GRAPHICS**

**COURSE CODE: 22MED13/23**

**Solution Manual**

**Prepared by :**

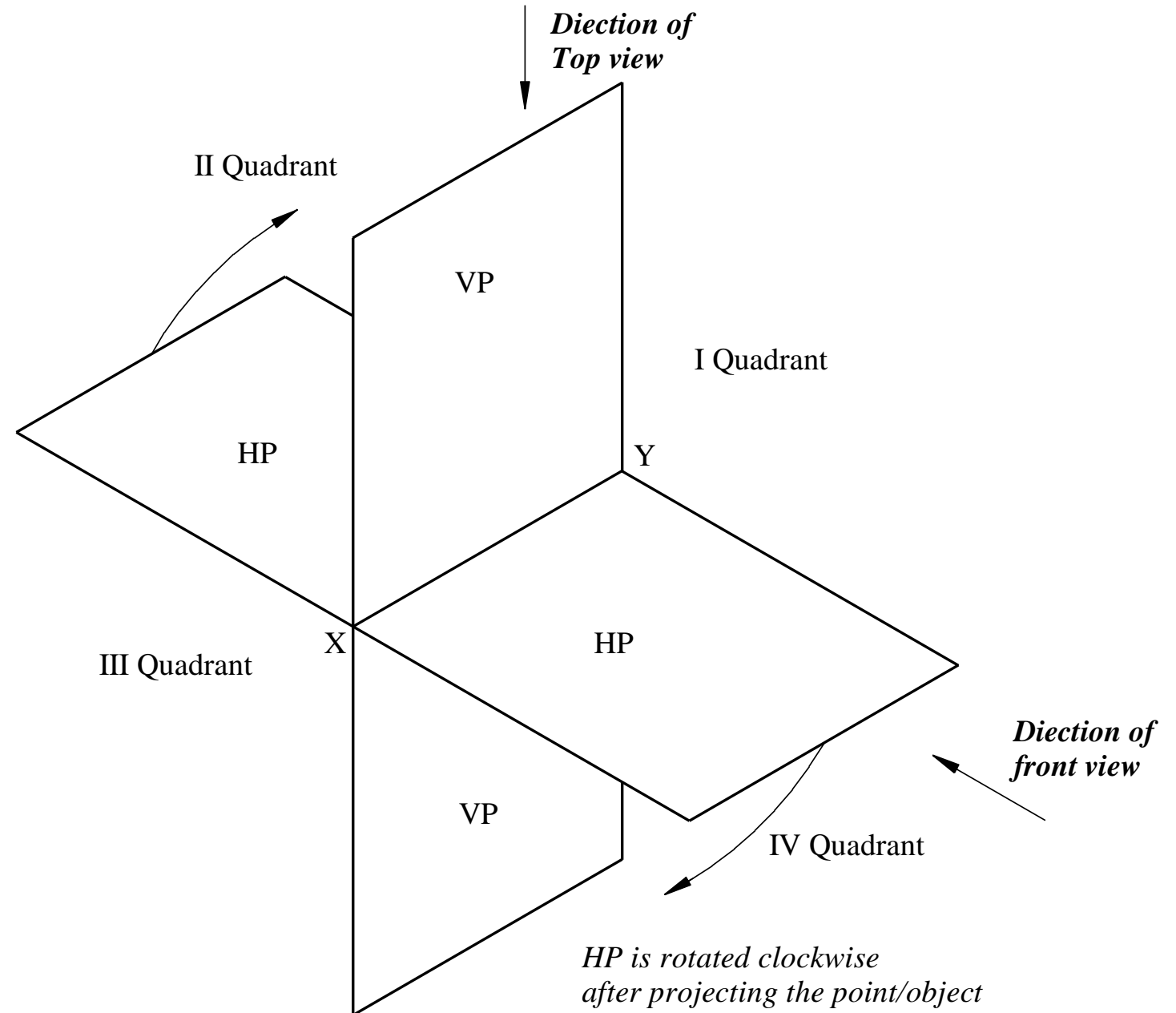
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## Projection of Points in 4 quadrants

- A point in I quadrant will be above HP & in front of VP and in front of LPP/RPP.
- A point in II Quadrant will be above HP and behind VP.
- A point in III quadrant will be below HP, behind VP and behind LPP/RPP.
- A point in the IV quadrant will be below HP, in front of VP.
- In I quadrant, **(First angle Projection)** as object comes first and then the plane, right side view will be on LPP & vice versa.
- In III quadrant, **(Third angle Projection)** plane comes first and then object, hence right side view will be on RPP & left side view on LPP.

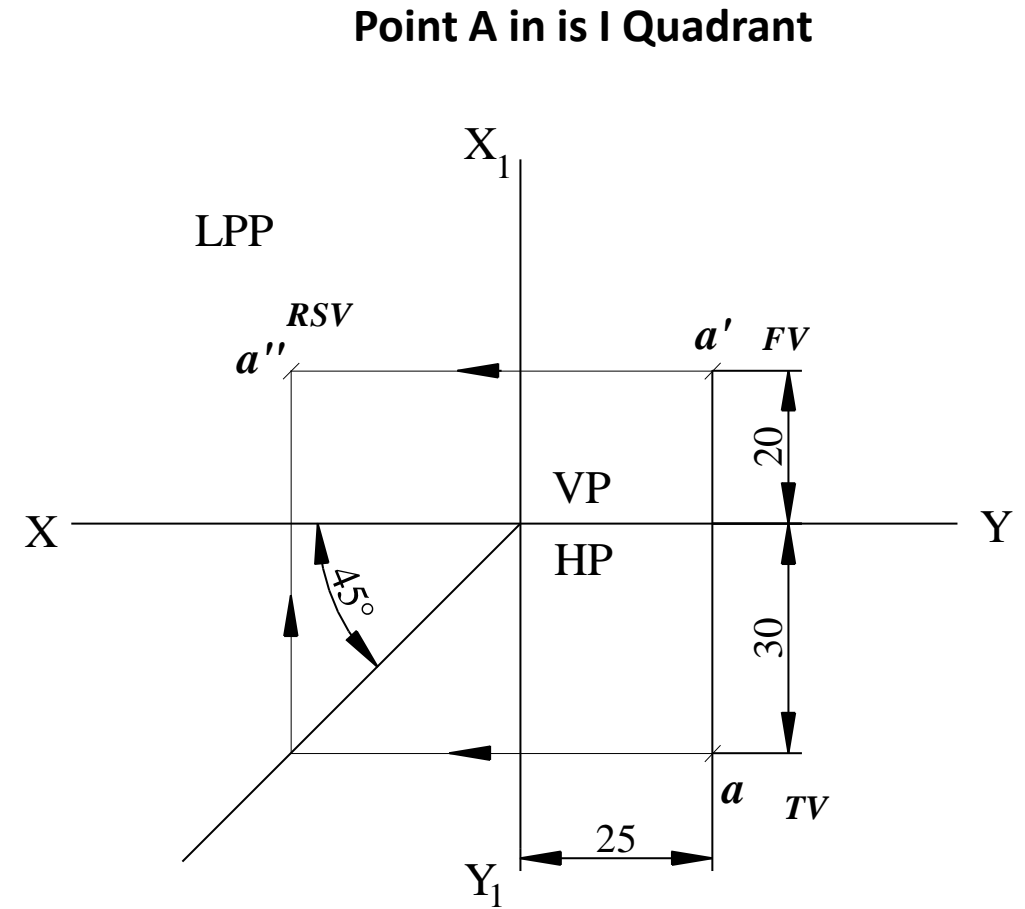


**2.1 Point A is 30mm in front of VP, 20mm above HP and 25mm in front of LPP. Draw the projections.**

**Solution:** The point A is in I quadrant. Hence, VP will be above XY line & HP will be below XY line.

- Draw front view  $a'$  20 mm above XY line and top view  $a$  30 mm below XY line (along the same projector)
- To obtain the side view, draw  $X_1Y_1$  line 25 mm towards **left** (As LPP is given) of projector  $aa'$ . From the intersection of XY and  $X_1Y_1$  line, draw a  $45^\circ$  line wherever the top view is (*In this case, **below** XY line*)
- Draw a horizontal projector from top view to intercept the  $45^\circ$  line and then draw a vertical projector to meet the horizontal drawn from the front view.
- The intersection of the two lines gives side view  $a''$  (***Right side view projected on LPP***)

**Note:** 1. Above HP implies front view is above XY line, In front of VP implies top view is below XY line.  
2. In First angle projection, Left side view is projected on RPP & Right side view is projected on LPP.  
3. The front view & side view of a point will be along the same horizontal line



**Solution to Q 2.1**

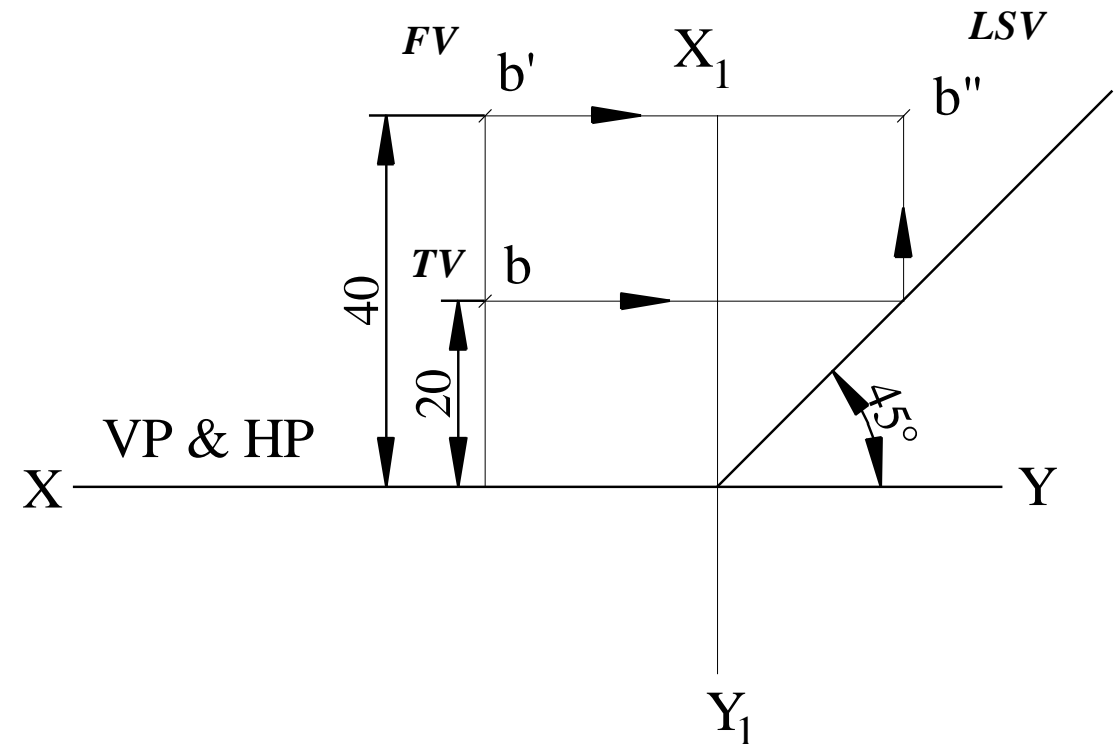
**2.2 Point B is 20mm behind VP, 40mm above HP and 25mm in front of RPP. Draw its projections.**

**Solution:** The point B is in II quadrant. Hence, both HP & VP will be above XY line (after rotating HP in cw direction)

- Draw front view  $b'$  40 mm above XY line and top view  $b$  20 mm above XY line (along the same projector)
- To obtain the side view, draw  $X_1Y_1$  line 25 mm towards **right** (As RPP is given) of projector  $bb'$ . From the intersection of XY and  $X_1Y_1$  line, draw a  $45^\circ$  line wherever the top view is (*In this case, **above** XY line*)
- Draw a horizontal projector from top view to intercept the  $45^\circ$  line and then draw a vertical projector to meet the horizontal drawn from the front view.
- The intersection of the two lines gives side view  $b''$  (*left view as it is mentioned in front of RPP implies observer is looking from left side*)

**Note:** 1. Above HP implies front view is above XY line, Behind VP implies top view is above XY line.  
2. The front view & side view of a point will be along the same horizontal line.

Point B in is II Quadrant



**Solution to Q 2.2**

**2.3 Point C is 25mm behind VP, 35mm below HP and 30mm behind RPP. Draw its projections.**

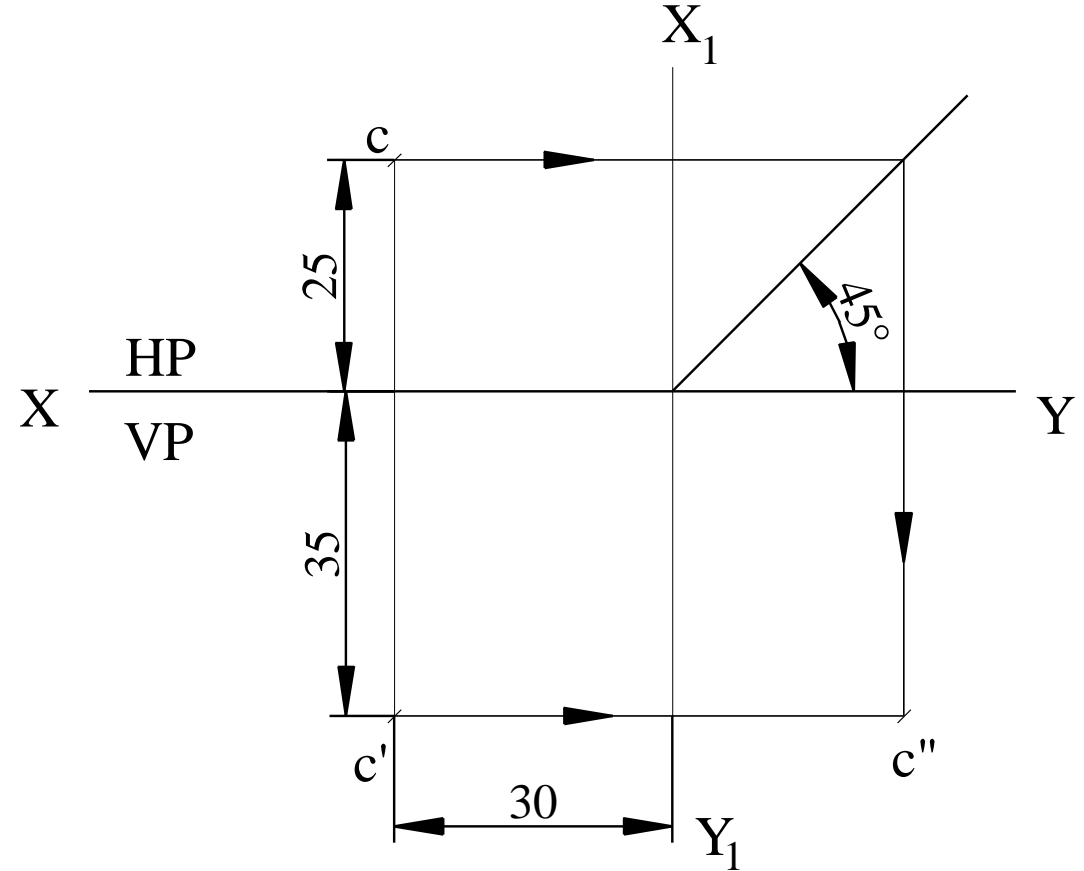
**Solution:** The point C is in III quadrant. Hence, HP will be above XY line & VP will be below XY line (after rotating HP in cw direction)

- Draw front view  $c'$  35 mm below XY line and top view  $c$  25 mm above XY line (along the same projector)
- To obtain the side view, draw  $X_1Y_1$  line 30 mm towards **right** (As RPP is given) of projector  $cc'$ . From the intersection of XY and  $X_1Y_1$  line, draw a  $45^\circ$  line wherever the top view is (*In this case, **above** XY line*)
- Draw a horizontal projector from top view to intercept the  $45^\circ$  line and then draw a vertical projector to meet the horizontal drawn from the front view.
- The intersection of the two lines gives side view  $c''$  (*Right view as in III angle, the LSV will be on LPP & RSV on RPP*)

**Note:** 1. Below HP implies front view is below XY line, Behind VP implies top view is above XY line.  
2. The front view & side view of a point will be along the same horizontal line.

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Point C in is III Quadrant



**Solution to Q 2.3**

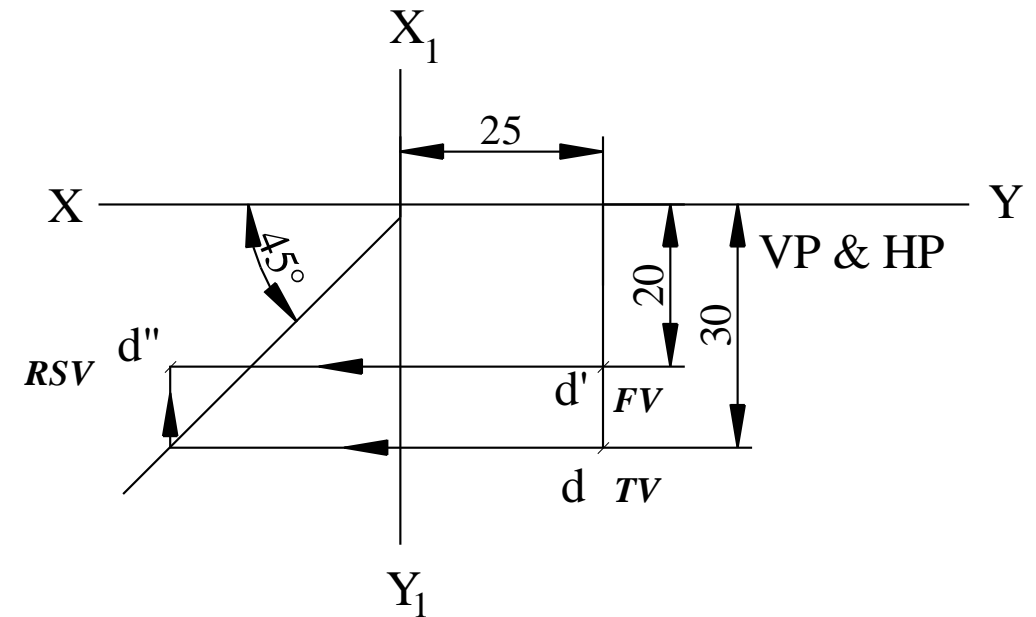
**2.4 Point D is 30mm in front of VP, 20mm below HP and 25mm in front of LPP. Draw the projections.**

**Solution:** The point D is in IV quadrant. Hence, both HP & VP will be below XY line. (after rotating HP in cw direction)

- Draw front view  $d'$  20 mm below XY line and top view  $d$  30 mm above XY line (along the same projector)
- To obtain the side view, draw  $X_1Y_1$  line 25 mm towards **left** (as LPP is given) of projector  $dd'$ . From the intersection of XY and  $X_1Y_1$  line, draw a  $45^\circ$  line wherever the top view is (*In this case, **below** XY line*)
- Draw a horizontal projector from top view to intercept the  $45^\circ$  line and then draw a vertical projector to meet the horizontal drawn from the front view.
- The intersection of the two lines gives side view  $d''$  (***Right view as it is stated that point is in front of LPP***)

**Note:** 1. Below HP implies front view is below XY line, In front of VP implies top view is below XY line.  
2. The front view & side view of a point will be along the same horizontal line.

Point D in is IV Quadrant



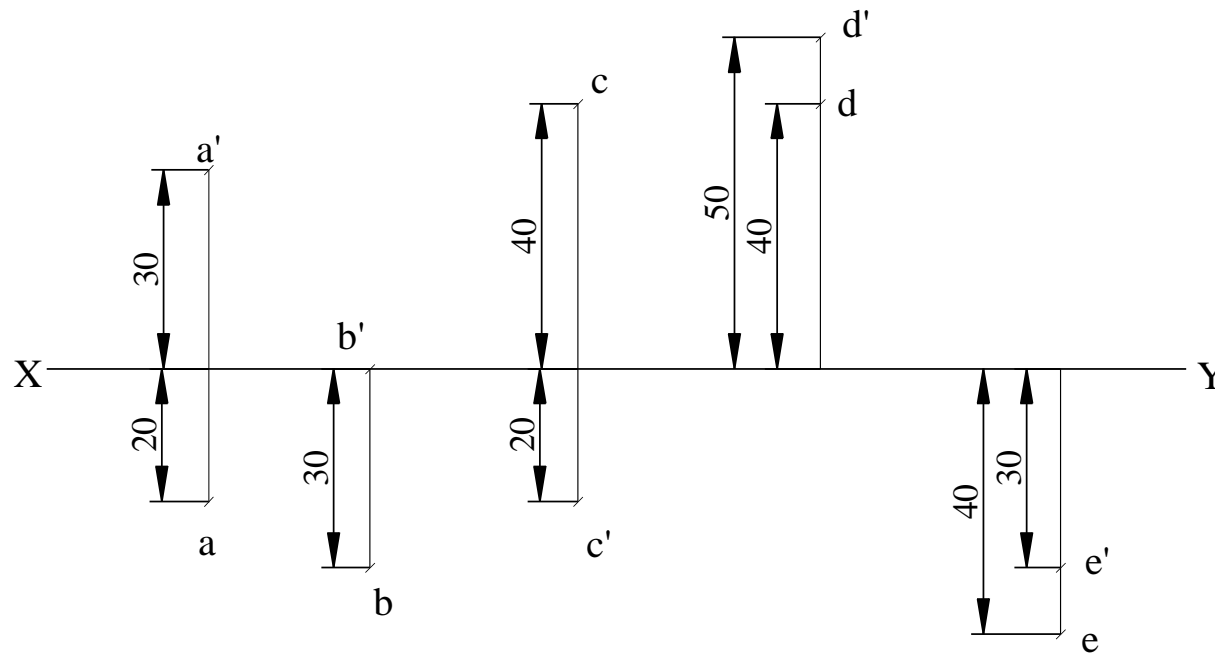
**Solution to Q 2.4**

## ***Important Points to be remembered***

1. When a Point is **on HP**, its front view is on XY line, & when a point is **in VP**, its top view will be on XY line.
2. When a point lies **on HP & in front of VP**, the point lies in either **I or IV** quadrant.
3. When a point lies **on HP and behind VP**, the point lies either **II or III** quadrant.
4. When a point lies **in VP and above HP**, the point is either in **I or II** quadrant.
5. When a point lies **in VP and below HP**, the point is either in **III or IV** quadrant
6. When point lies **in both HP & VP**, its front and top views coincide and will be on XY line.
7. When a point lies **in HP, VP & Profile plane**, all three views coincide & will be at intersection of XY &  $X_1Y_1$  line.

**2.5 Draw the projections of the following points on the same XY line.**

- a) A is 20mm in front of VP and 30 mm above HP.**
- b) B is 30mm in front of VP and in HP.**
- c) C is 40mm behind VP and 20mm below HP**
- d) D is 40mm behind VP and 50mm above HP**
- e) E is 40mm in front of VP and 30mm below HP.**



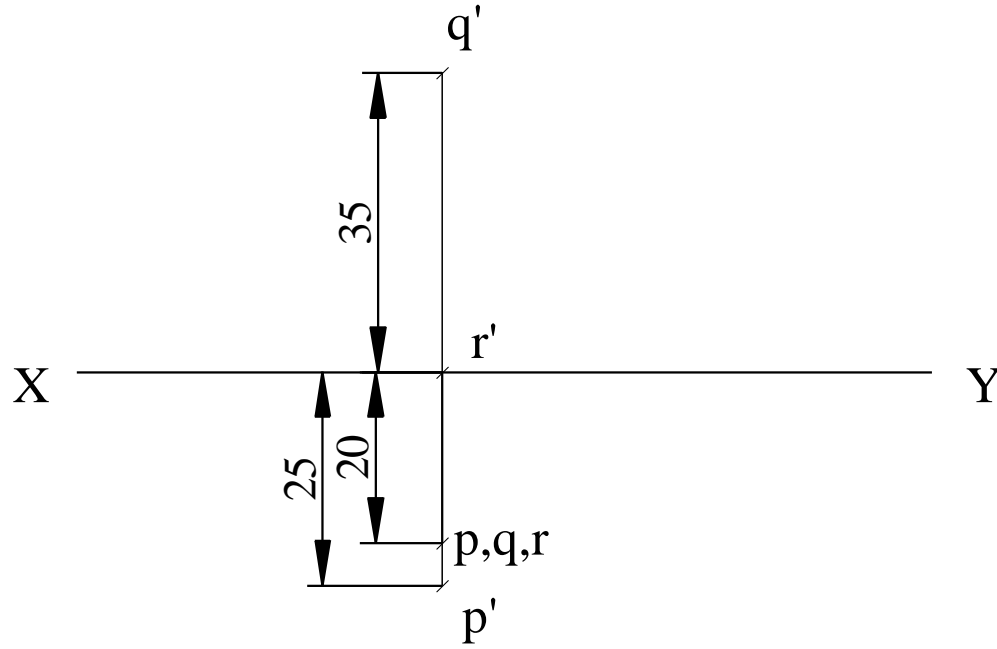
**Solution to Q 2.5**

**Solution:**

- (a) Point A is in I Quadrant:** Front view of A is 30 mm above XY line & its top view is 20 mm below XY line.
- (b) Point B is either in I or IV quadrant:** Front view of B is on XY & its top view is 30 mm below XY line.
- (c) Point C is in III Quadrant:** Front view of C is 20 mm above XY line & its top view is 40 mm above XY line.
- (d) Point D is in II Quadrant:** Front view of D is 50 mm above XY line & its top view is 40 mm above XY line.
- (e) Point E is in IV Quadrant:** Front view of E is 30 mm below XY line & its top view is 40 mm below XY line.



**2.6 A point 20mm below XY line is the top view of three points P, Q and R. P is 25mm below HP, Q is 35mm above HP and R on HP. Draw the projections of the three points and state their positions with reference planes and the quadrants in which they lie.**



**Solution to Q 2.6**

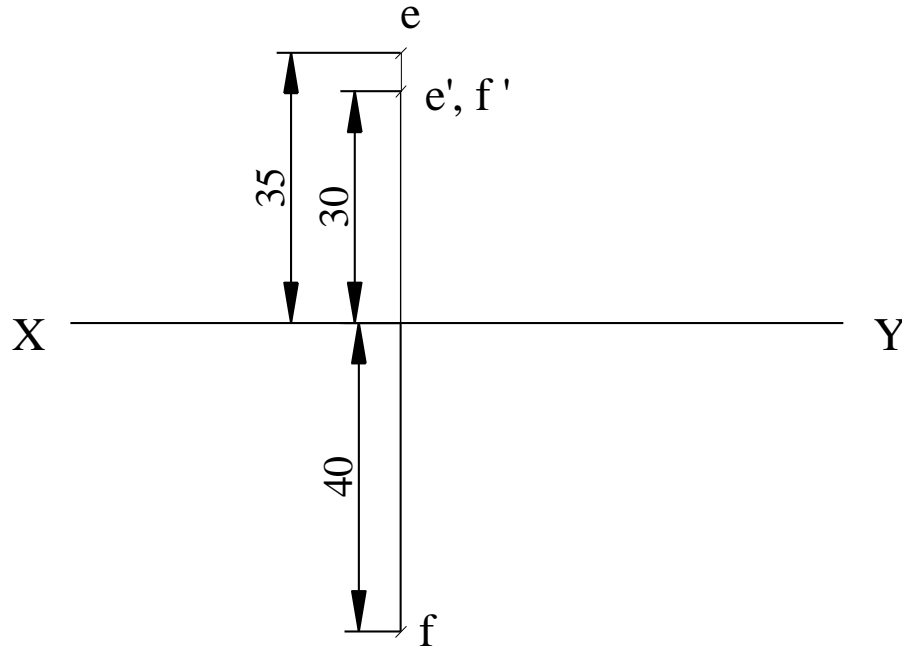
**Solution:**

***Point P is in IV Quadrant:*** P is 25 mm below HP & 20 mm in front of VP.

***Point Q is in I quadrant:*** Point Q is 35 mm above HP & 20 mm in front of VP.

***Point R is either in I or IV quadrant:*** Point R is on HP & 20 mm in front of VP.

**2.7 A point 30mm above XY line is the front view of two points E and F. E is 35mm behind VP and F is 40mm in front of VP. Draw the projections of the two points and state their positions with reference planes and the quadrants in which they lie.**



**Solution:**

***Point E is in II Quadrant:*** E is 30 mm above HP & 35 mm behind VP.

***Point F is in I quadrant:*** Point F is 30 mm above HP & 40 mm in front of VP.

**Solution to Q 2.7**