21MES102L
Engineering Graphics and Design
School of Mechanical Engineering

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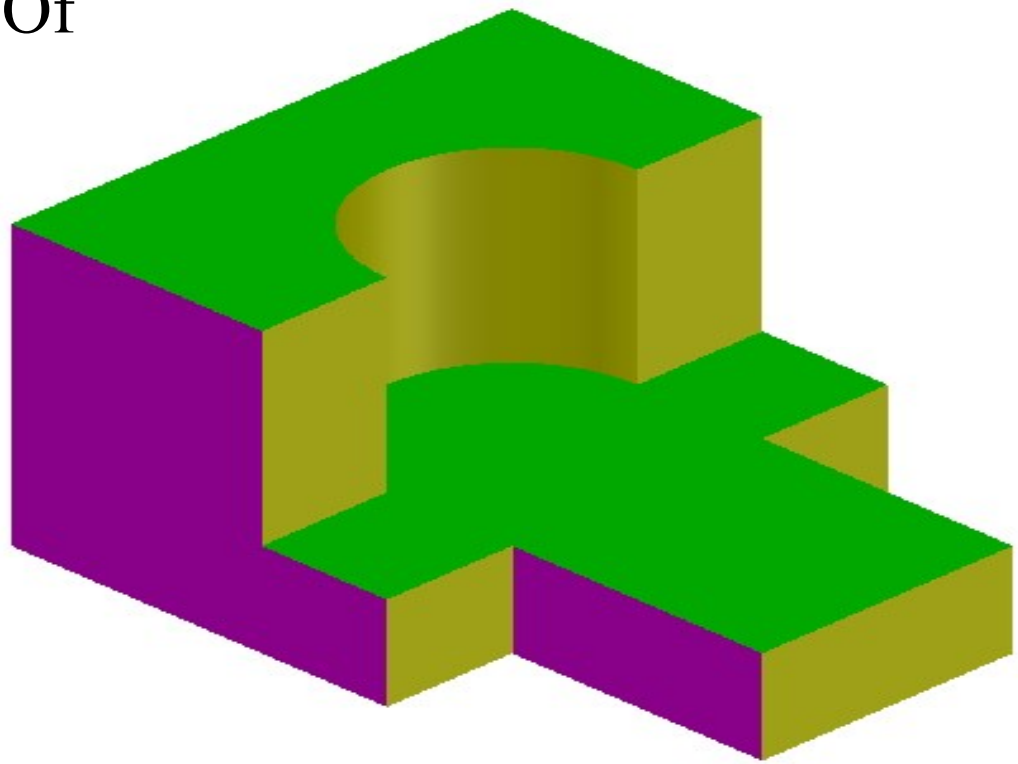
Engineering Graphics and Design

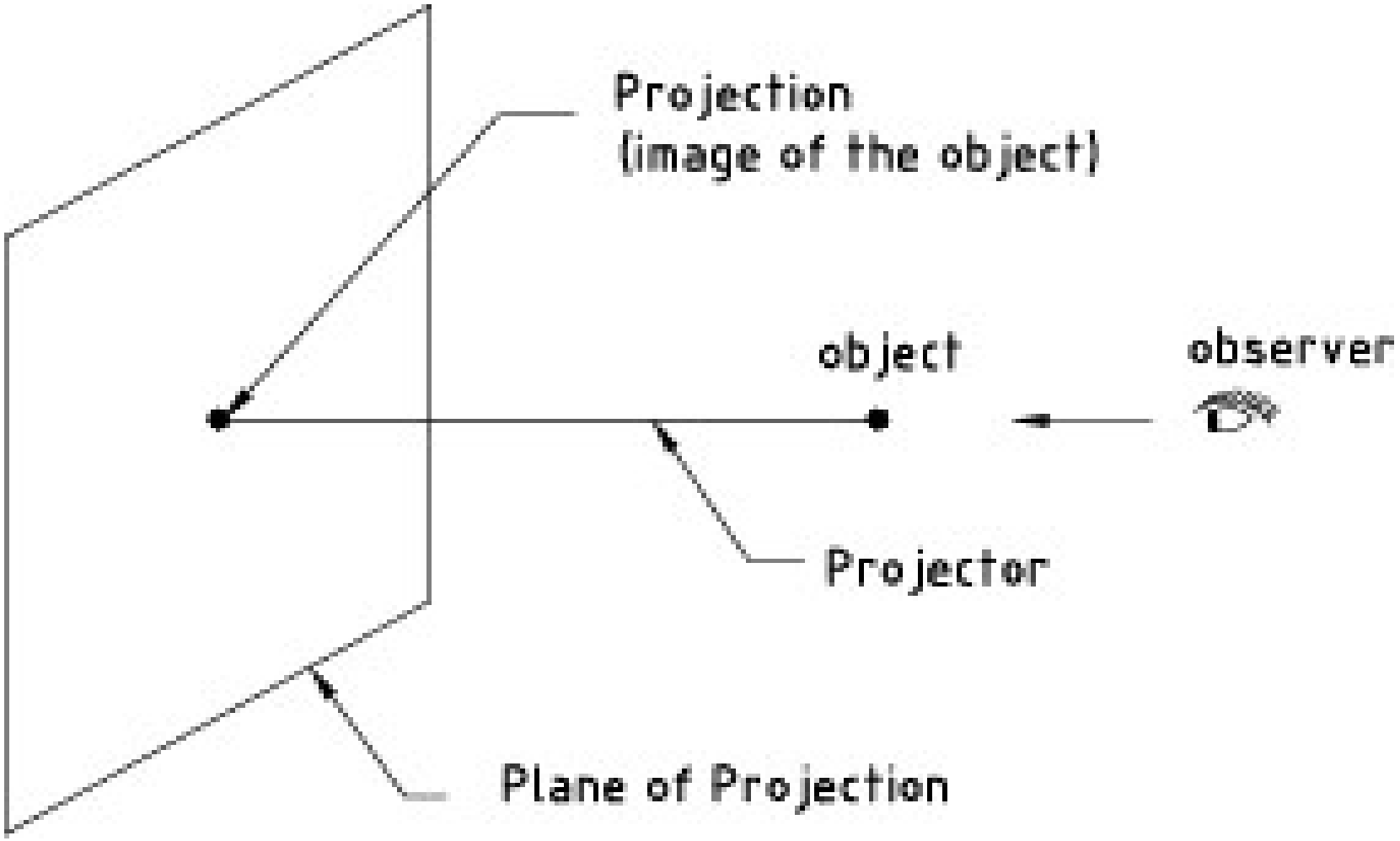
E5 Orthographic Projection Of Models



Topics Covered

- Principles of Projection
- Conventions Followed in Orthographic Projection
- Orthographic Projection of Simple Models

Principles of Projection



Principles of Projection

Projection: Projection of the image of an object to the Plane of Projection is known as Projection.

Plane of Projection: The Plane on which the Projection of object is obtained is called Plane of Projection.

Projector: The straight line from the object to the Plane of Projection is called Projector.

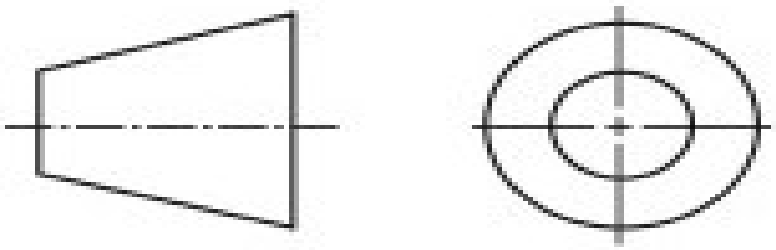
Orthographic Projection

- Projecting the image of an object by drawing projectors from the corners Parallel to each other & Perpendicular to the Plane of Projection is called as **Orthographic Projection.**
- The **Orthographic View** of the object is completed by joining the intersection points of the Projectors on the Plane of Projection

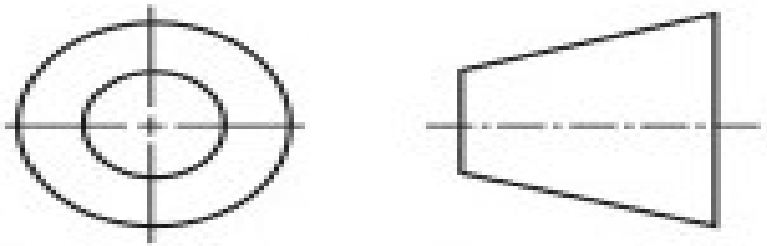
Conventions to be Followed in Orthographic Projection

- Visualize the **Visible Edges** from the Given 3D Model & Start with **Front View**
- Invisible Edges should be shown with **Hidden** Lines
- Represent the **Axis** for the Circular components
- Mark the Dimensions without **intersecting** the Projection Lines
- Show the Possible Dimensions in Respective Views
- Same Dimensions should not be Repeated in other views.
- Avoid Dimensioning **inside** the Projected Views

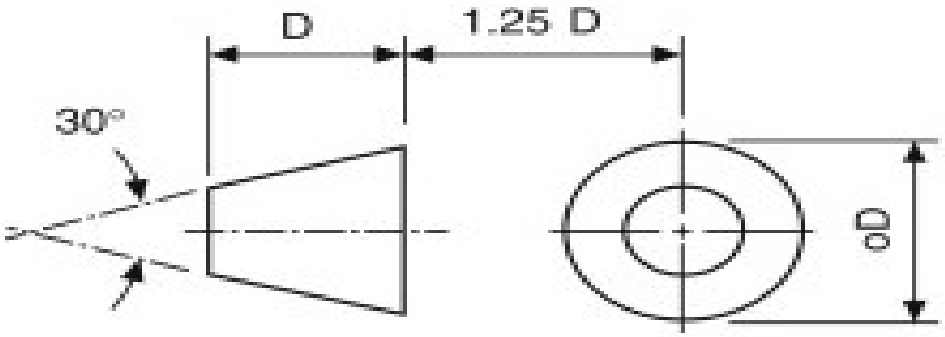
Projection Symbol



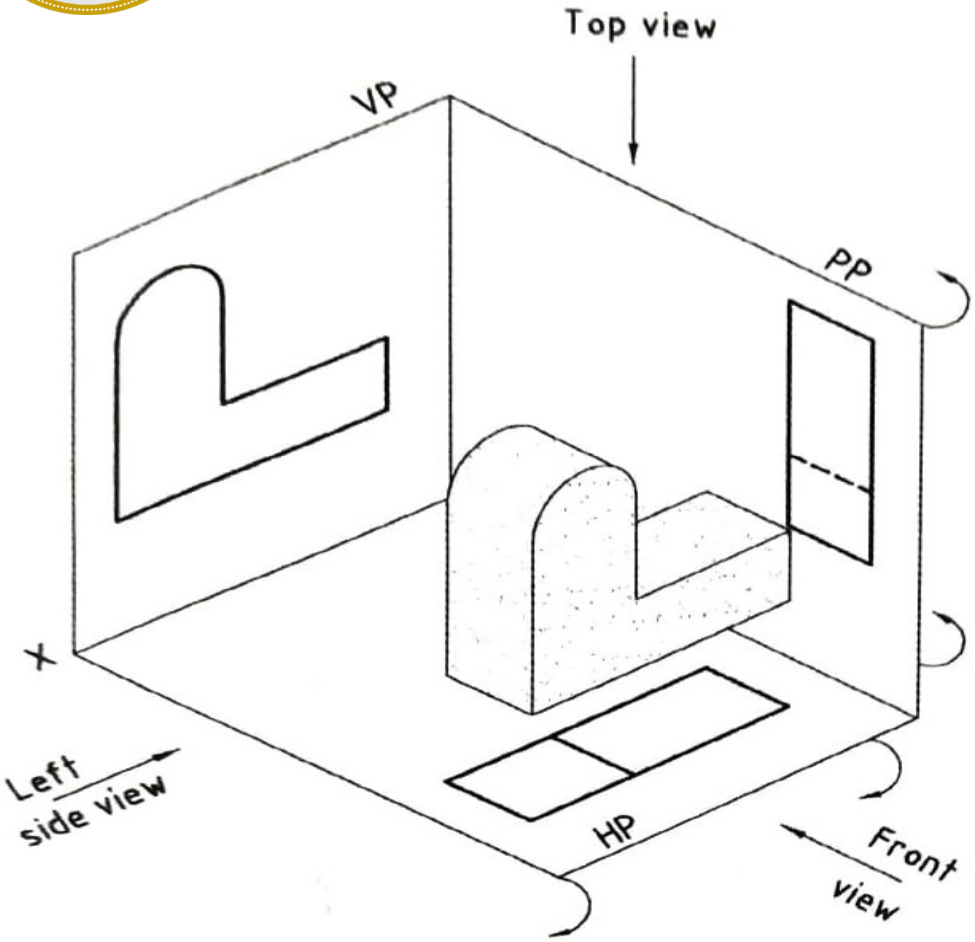
First angle projection symbol

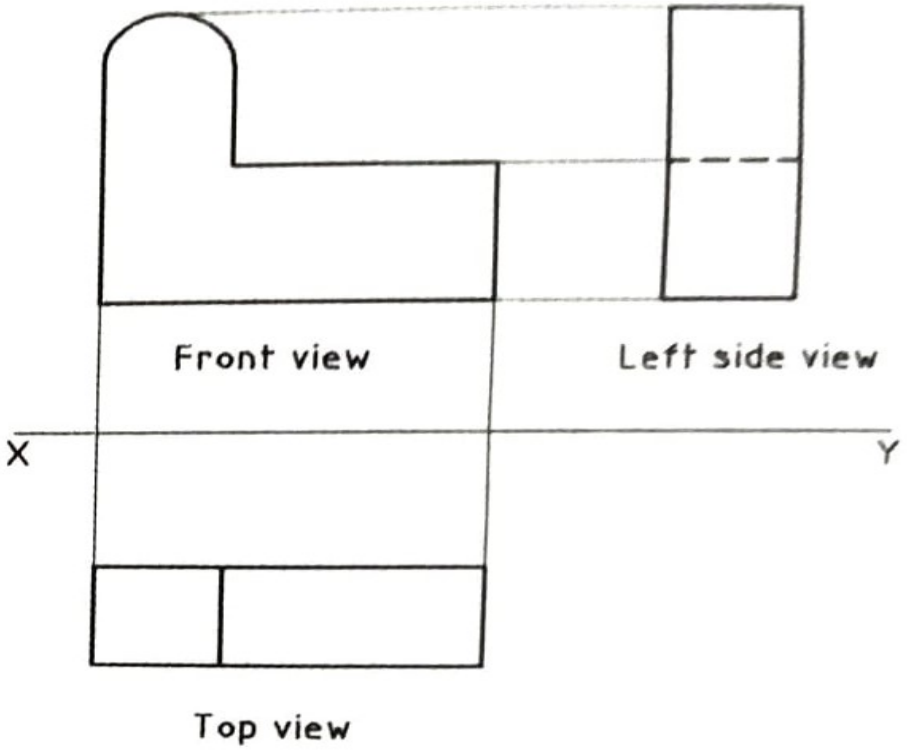


Third angle projection symbol



First Angle Projection

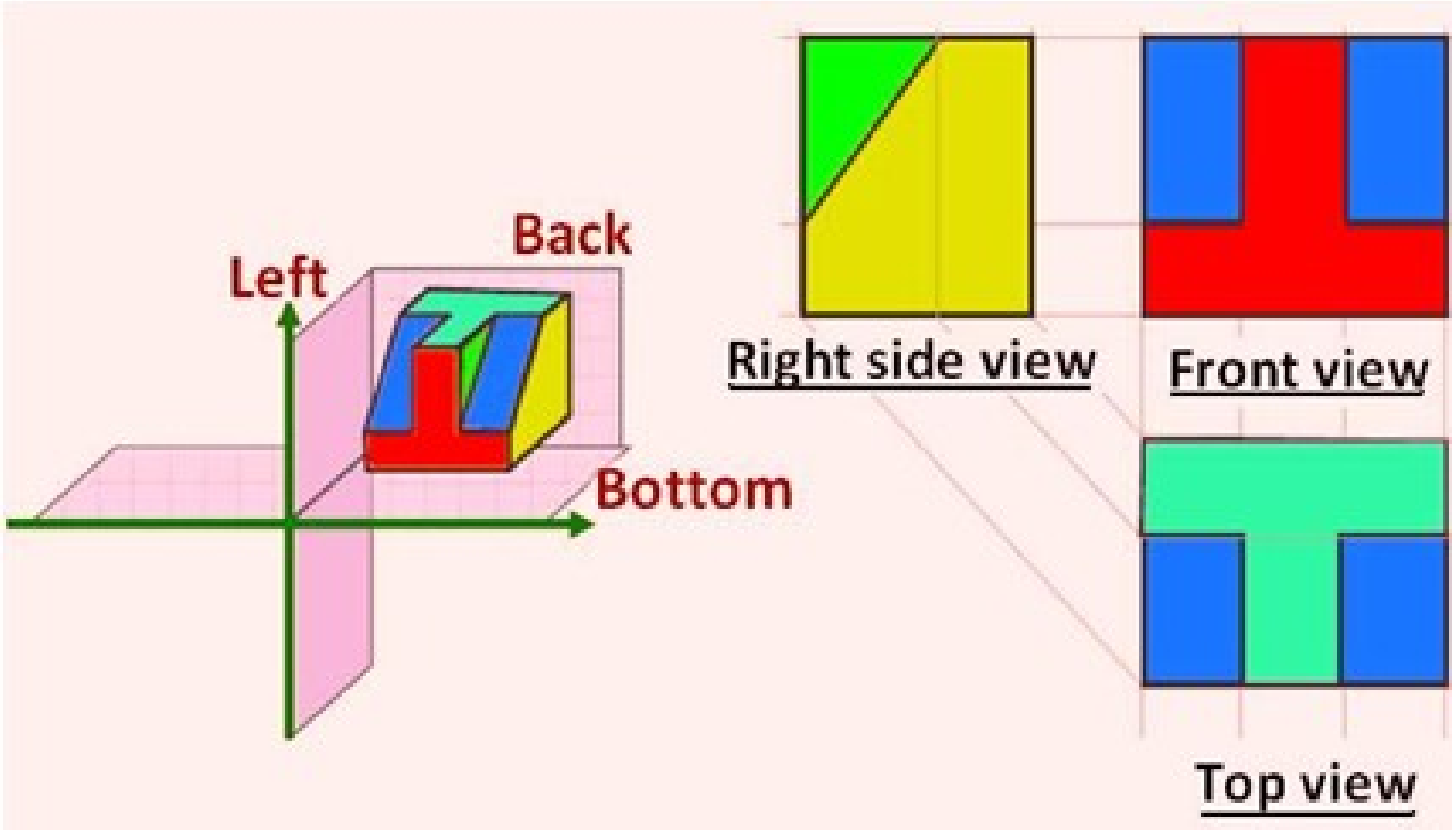




First Angle Projection

- In First Angle Projection the object is assumed to be placed in First Quadrant i.e Above **Horizontal Plane (HP)** & in Front of **Vertical Plane (VP)**
- The Object is lying between **Observer & Plane of Projection**.
- The **Top View** of the object is projected on to the **HP.**
- The **Front View** of the object is projected on to the **VP.**
- The **Top View** appears **below** the **Front View**.
- The **Left side View** appears on **Right** side of the **Front View**.

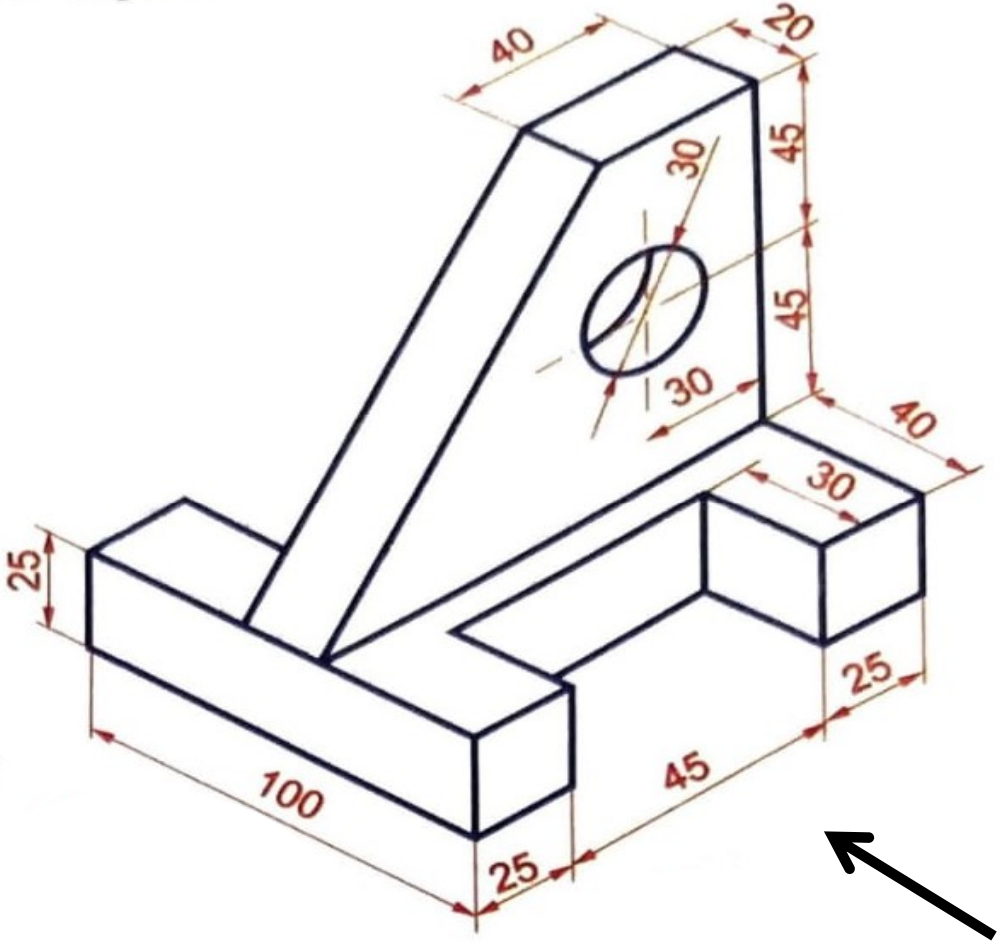
Orthographic Projection of Models



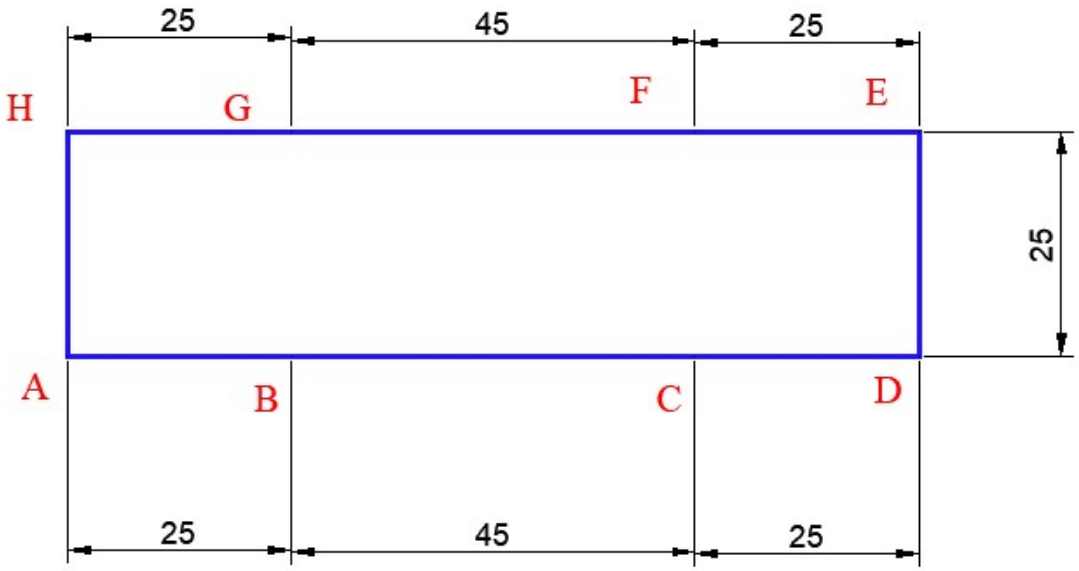
Orthographic Projection Of Models

- Observer should Stand Orthogonally in Arrow Direction
- Identify the Visible Edges
- Start with Front view

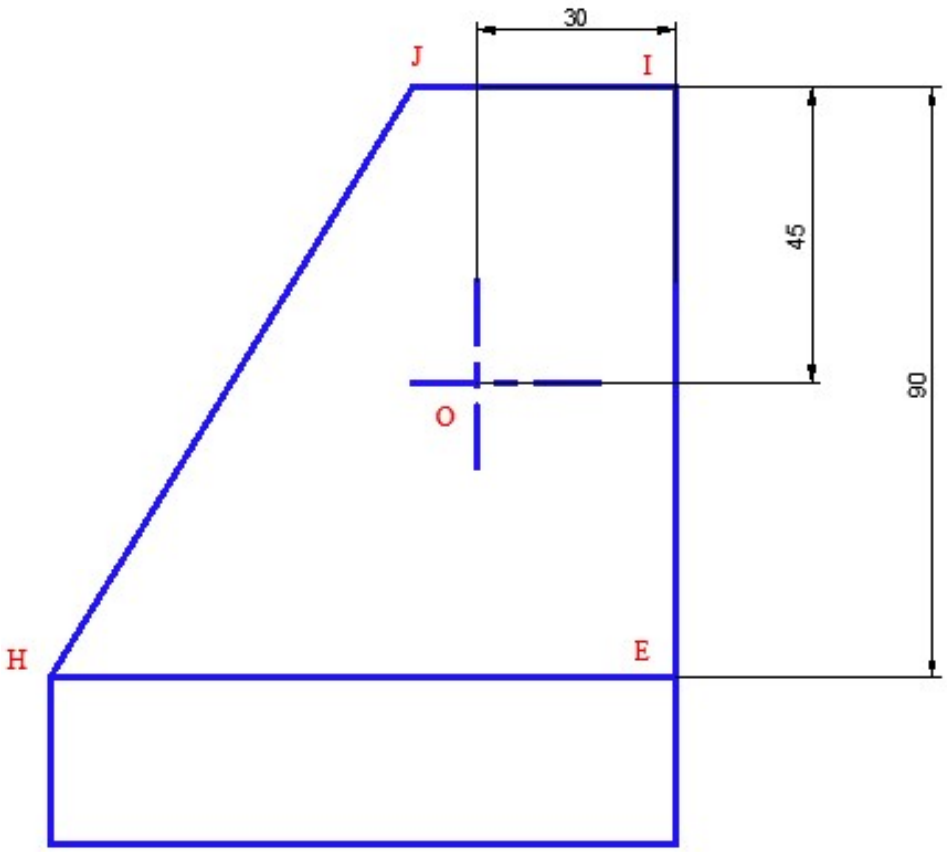
- Project Lines From Front View to Draw Top View
- Project Lines From Front View & Top View to Draw Side View



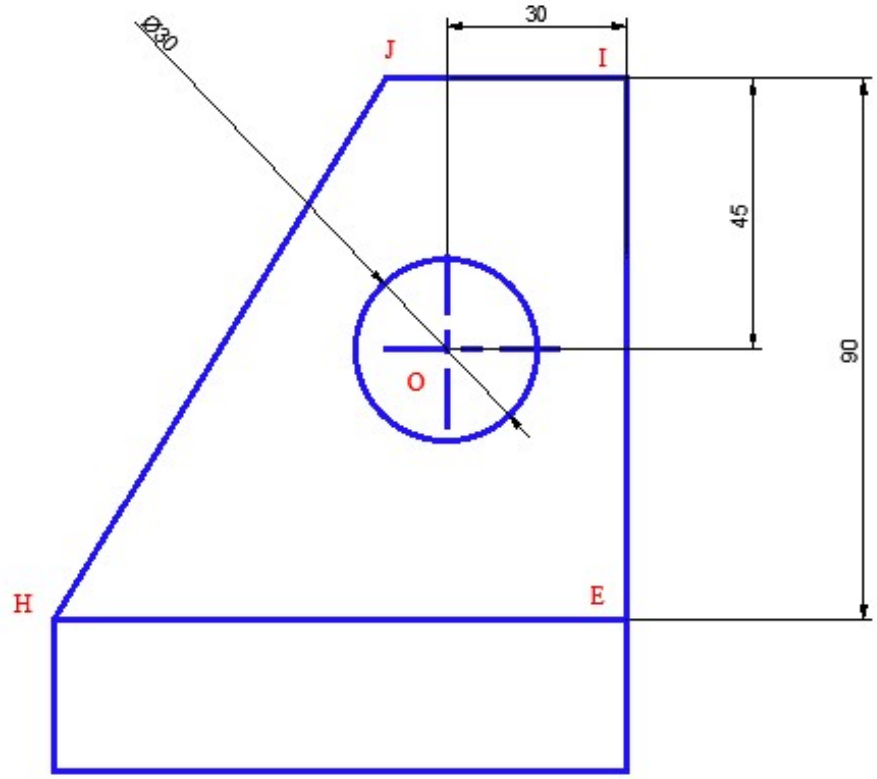
- Initial setup of workspace **Drafting & Annotation** Mode
  - Type UN or **UNITS**
  - Set the Precision for **0**
  - Set the Units in Millimeters
- Type **LIMITS** Press Enter
  - Specify the Lower Left Corner as **0,0** Press Enter
  - Specify the Upper Right Corner as **210,297** Press Enter
- Type **ZOOM** Press Enter
- Type **ALL** Press Enter



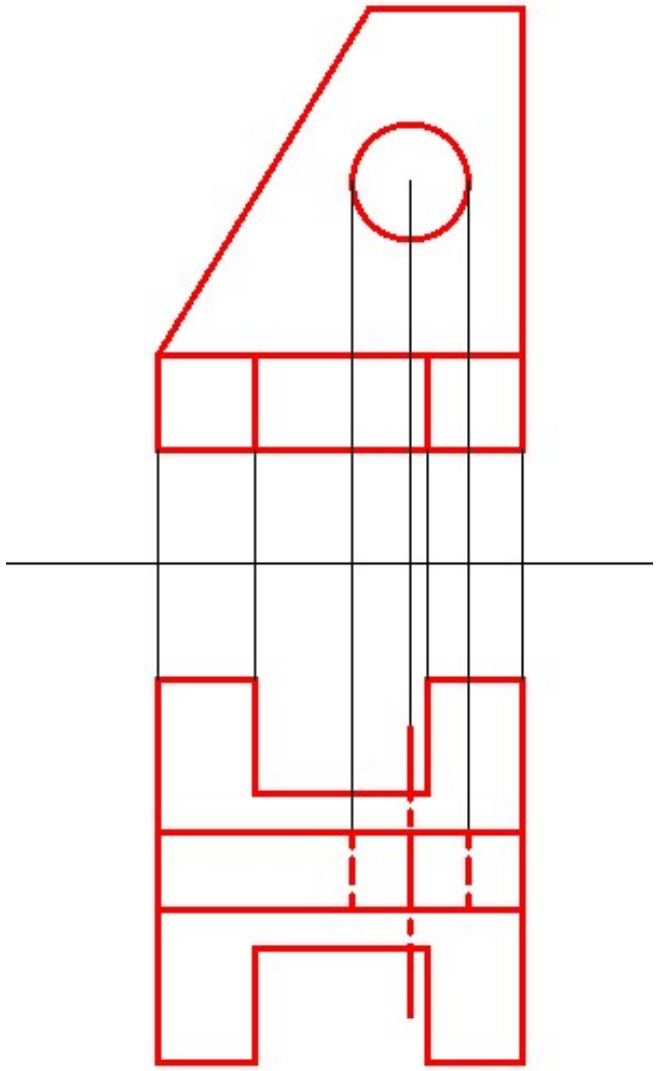
➢Use **LINE** command (**ORTHO ON**) Specify the Start Point & complete the Above Sketch as per **Alphabet order** with Dimensions.



➢Use **LINE** command (**ORTHO ON**) Specify the Start Point as **E** & complete the Above Sketch as per Dimensions.



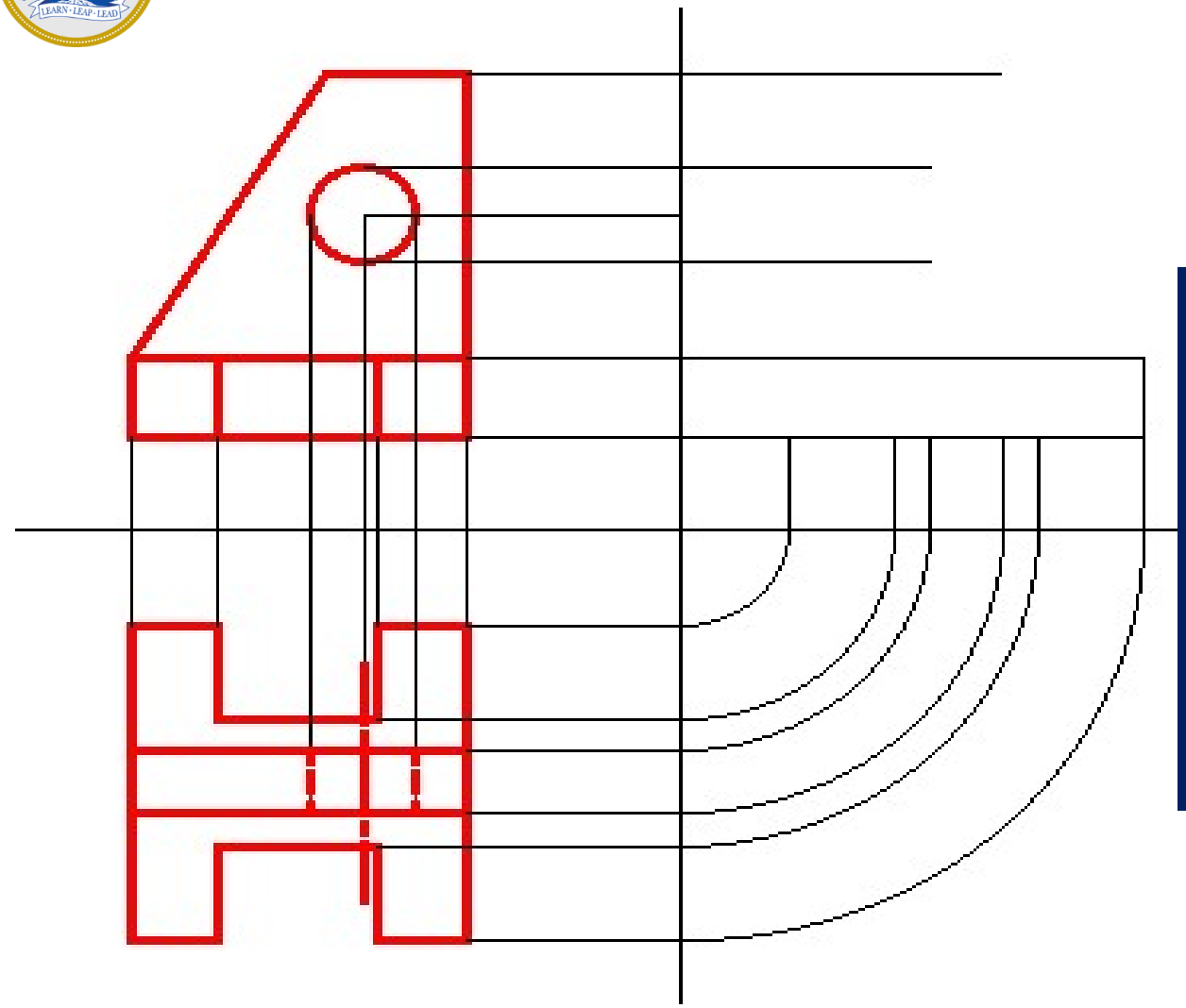
➢Use **Circle** command & Draw the Circle at Specified Center **O**



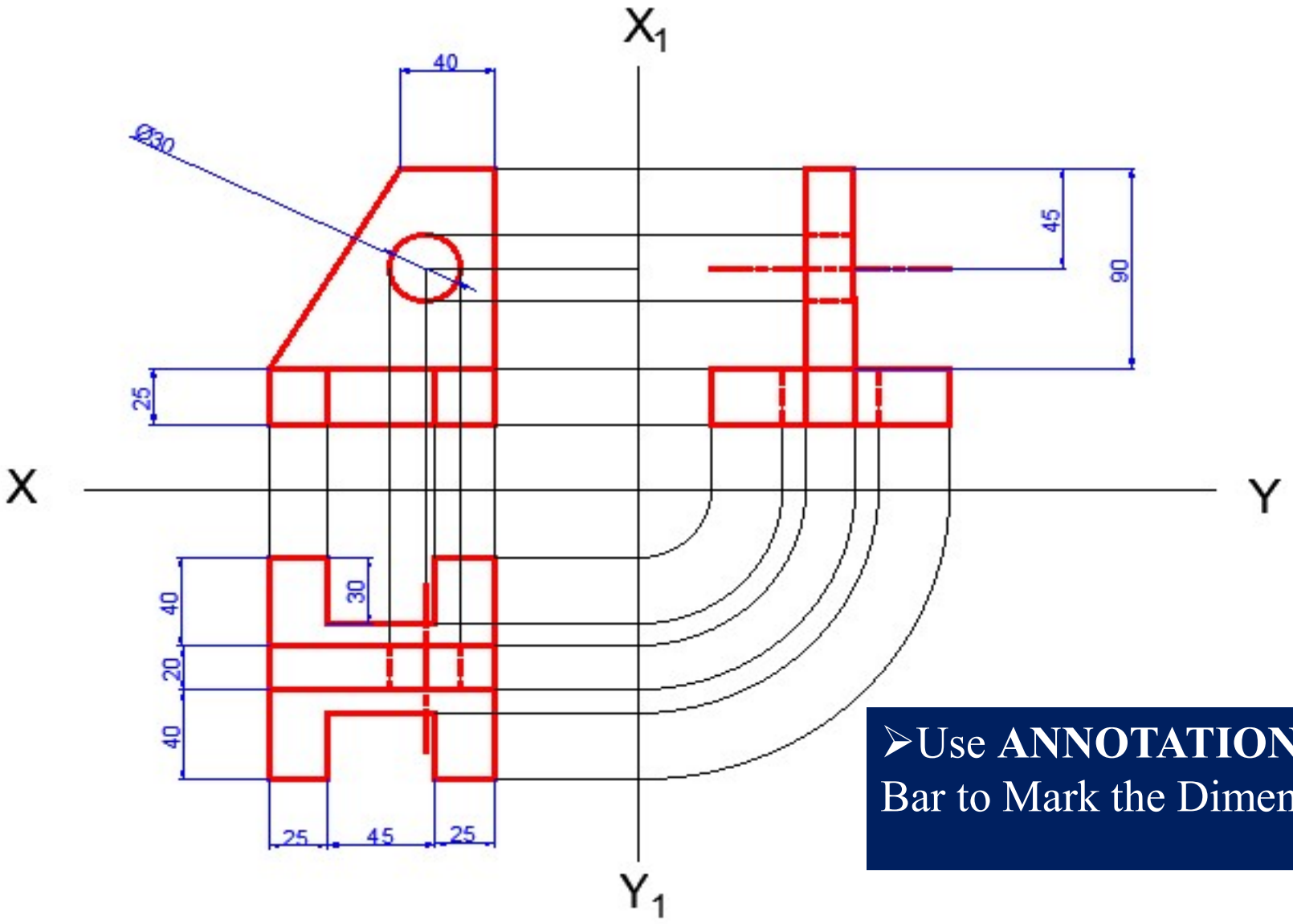
- Use **LINE** command (**ORTHO ON**)

Project the Lines from the **FRONT** View

& Complete the **TOP** View

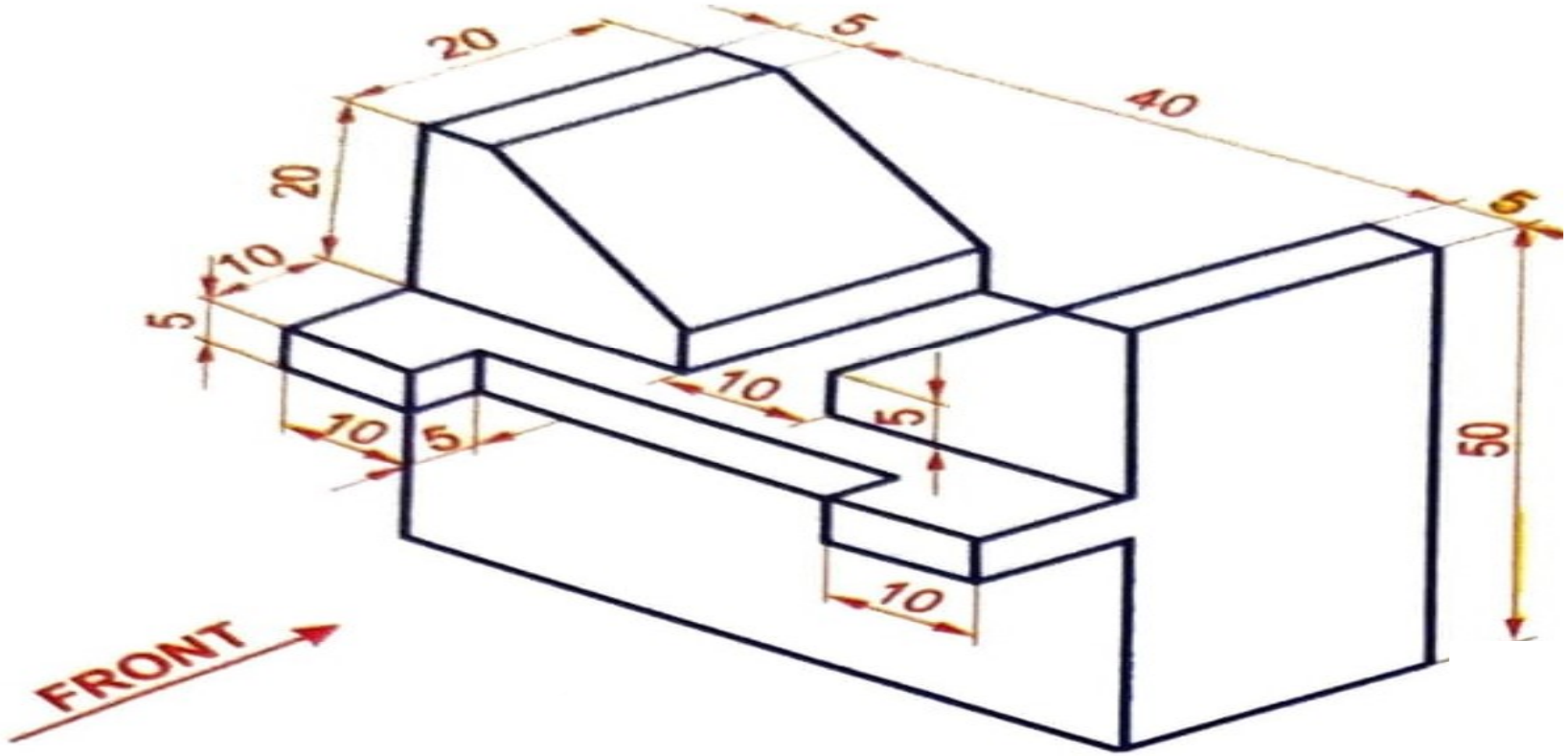


- Use **LINE** command (**ORTHO ON**) Project the Lines from the **FRONT** View & **TOP** View to Complete the **SIDE** View

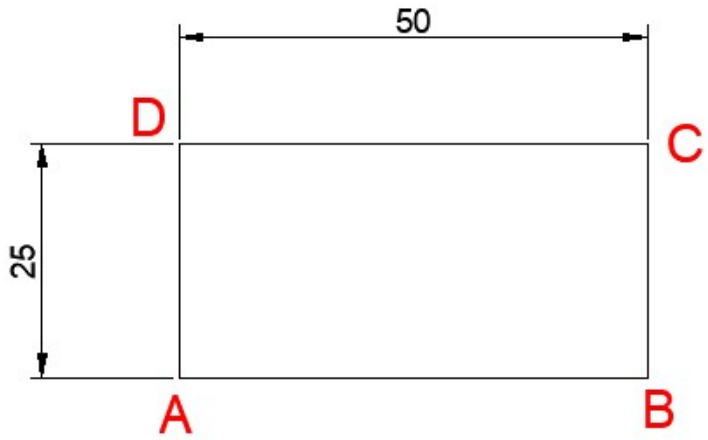


➢Use **ANNOTATION** Tool Bar to Mark the Dimensions.

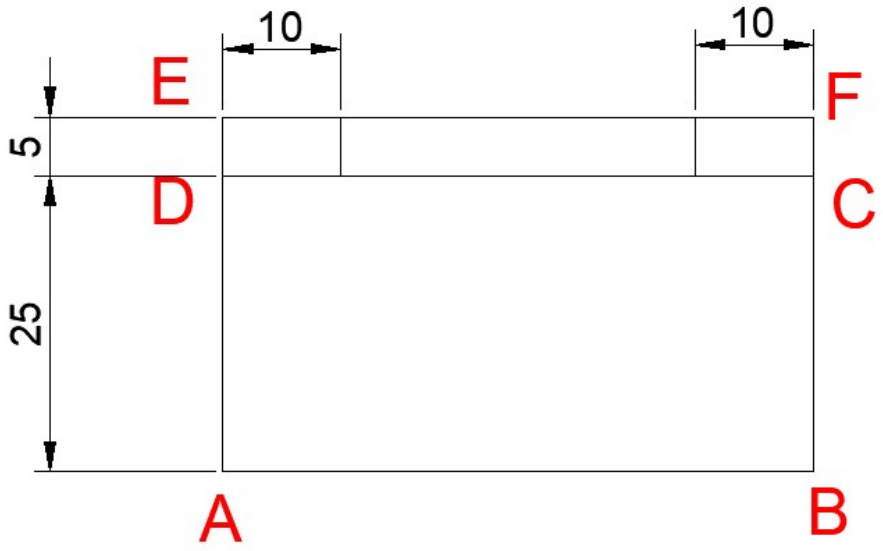
Orthographic Projection of Model



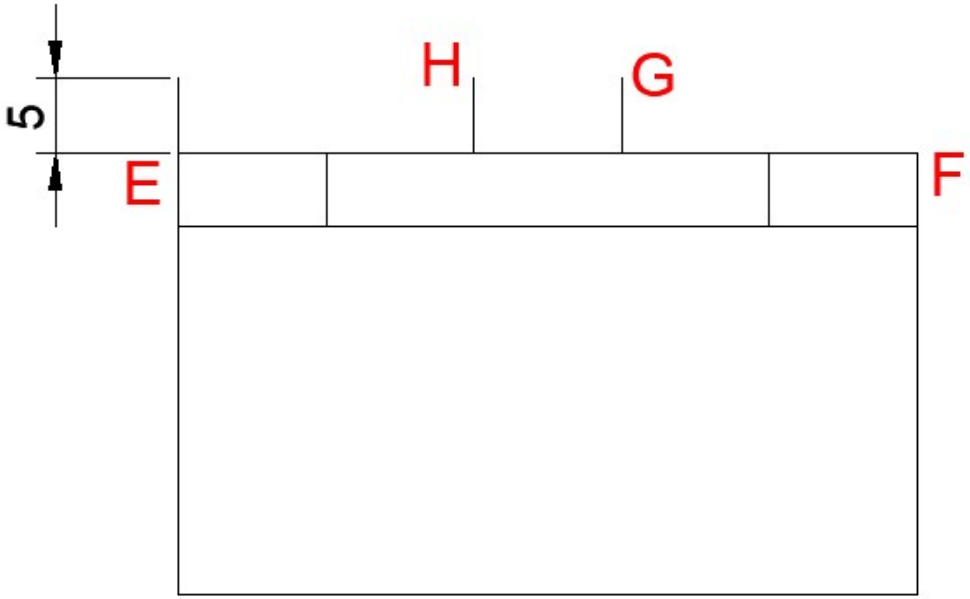
- Initial setup of workspace **Drafting & Annotation** Mode
  - Type UN or **UNITS**
  - Set the Precision for **0**
  - Set the Units in Millimeters
- Type **LIMITS** Press Enter
  - Specify the Lower Left Corner as **0,0** Press Enter
  - Specify the Upper Right Corner as **210,297** Press Enter
- Type **ZOOM** Press Enter
- Type **ALL** Press Enter



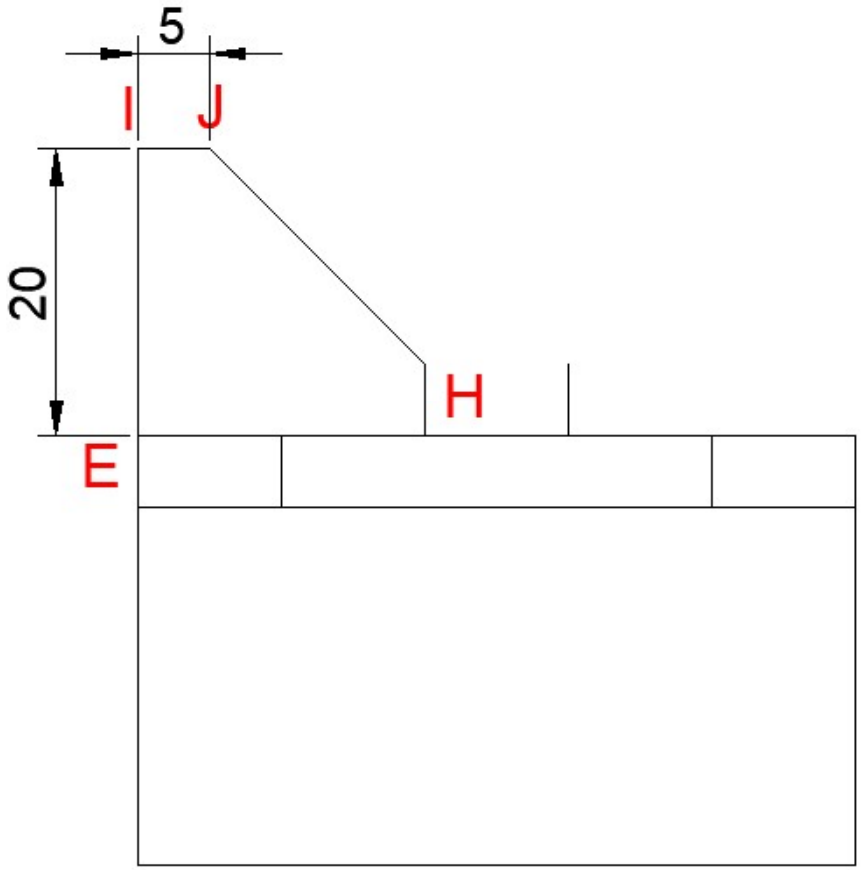
- Use **LINE** command **ORTHO ON** & draw the reference line **XY**
- Use **LINE** command **ORTHO ON** & Start with **FRONT** view,.
- Specify the **Start point** from (**A**) & drag for **50** mm length (**B**), then move the curser upwards for **25** mm (**C**) , then move left for **50** mm (**D**) then drag down for **25** mm (**A**) & press enter.



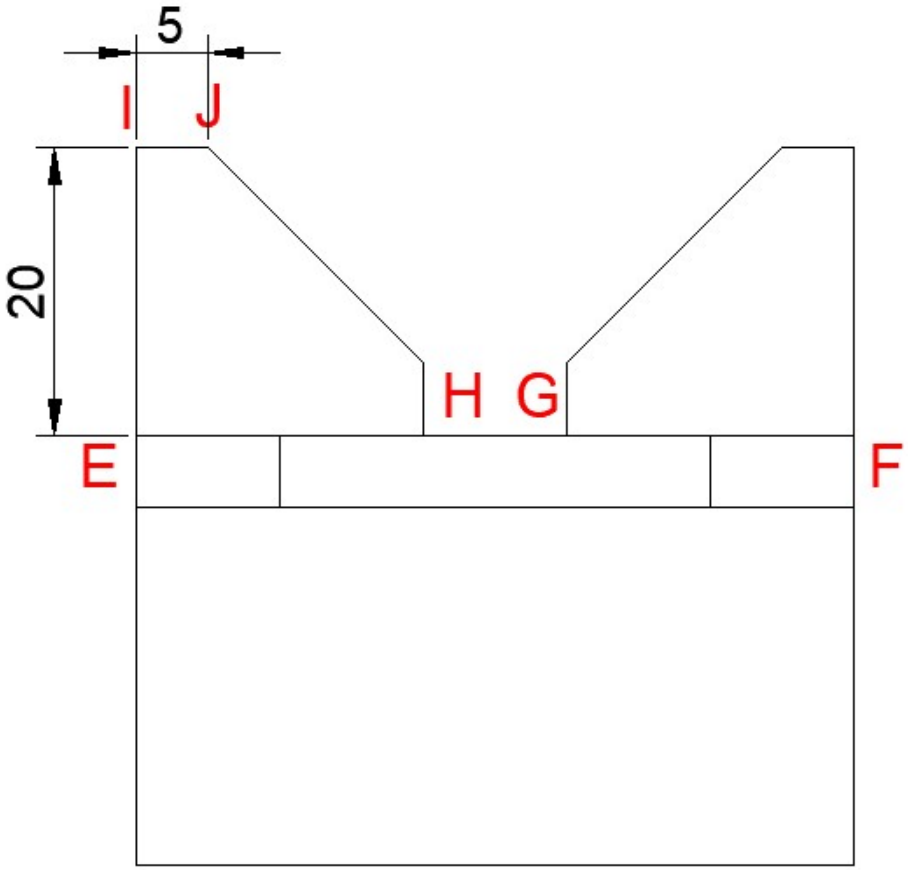
- Use **LINE** command **ORTHO ON** & specify the start point from (**D**) drag up for **5** mm (**E**) & drag right for **50** mm (**F**) & drag down for **5** mm.
- Use **OFFSET** command from **MODIFY** tool bar specify the offset distance **10** mm & select the **5** mm vertical line (**DE**) & move the right side & give a left click.
- Use **OFFSET** command from **MODIFY** tool bar specify the offset distance **40** mm & select the **5** mm vertical line (**DE**) & move the right side & give a left click.



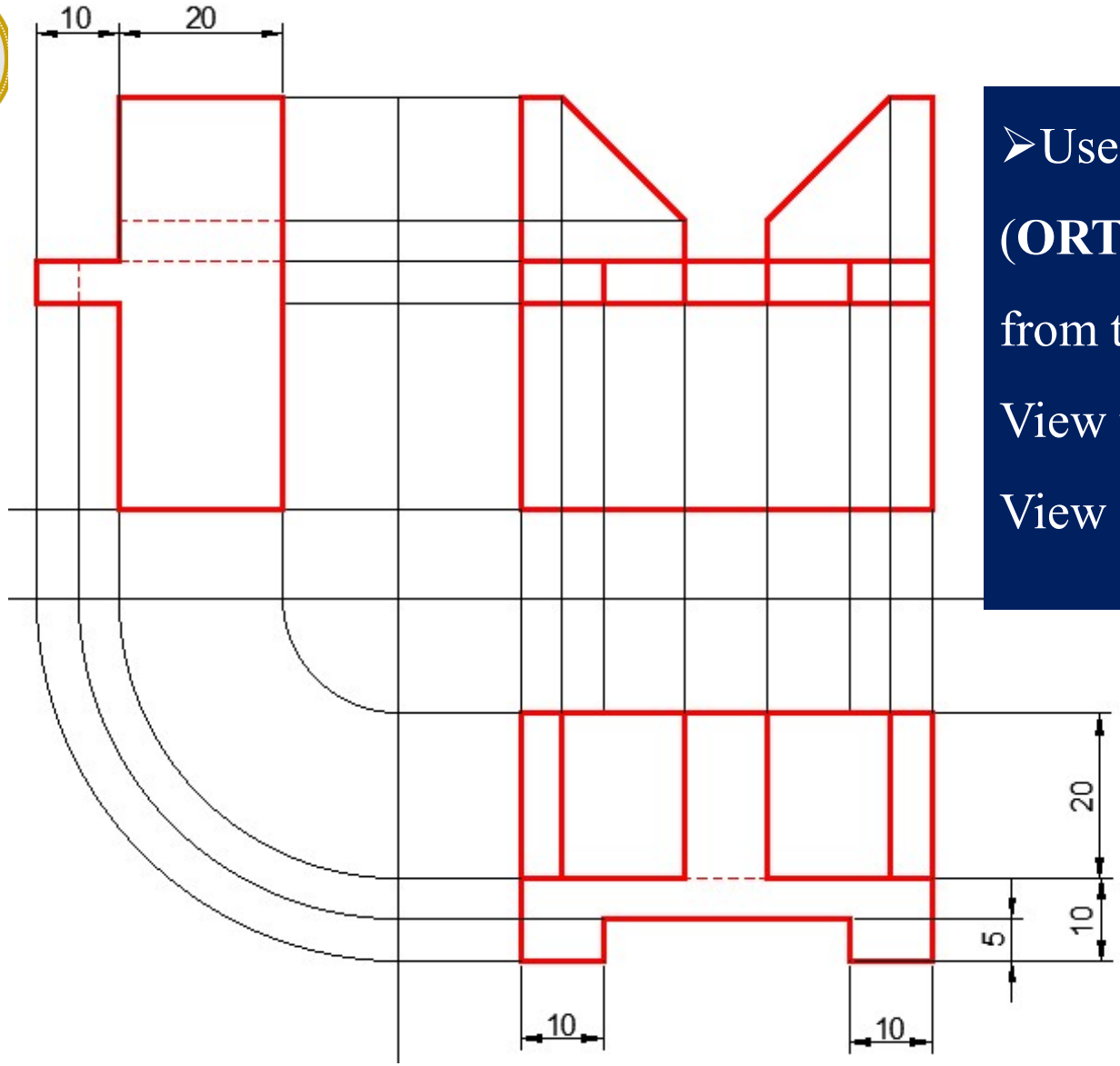
- Use **LINE** command **ORTHO ON** & specify the start point from (**E**) drag up for **5** mm.
- Use **OFFSET** command from **MODIFY** tool bar specify the offset distance **20** mm & select the **5** mm vertical line & move the right side & give a left click (**H**).
- Use **OFFSET** command from **MODIFY** tool bar specify the offset distance **30** mm & select the **5** mm vertical line & move the right side & give a left click (**G**) .



- Use **LINE** command **ORTHO ON** & specify the start point from (**E**) drag up for **20** mm (**I**) & drag right side for **5** mm (**J**) .
- Use **LINE** command **ORTHO OFF** & specify the start point from (**J**) drag down to connect the **5** mm vertical line (**H**) .

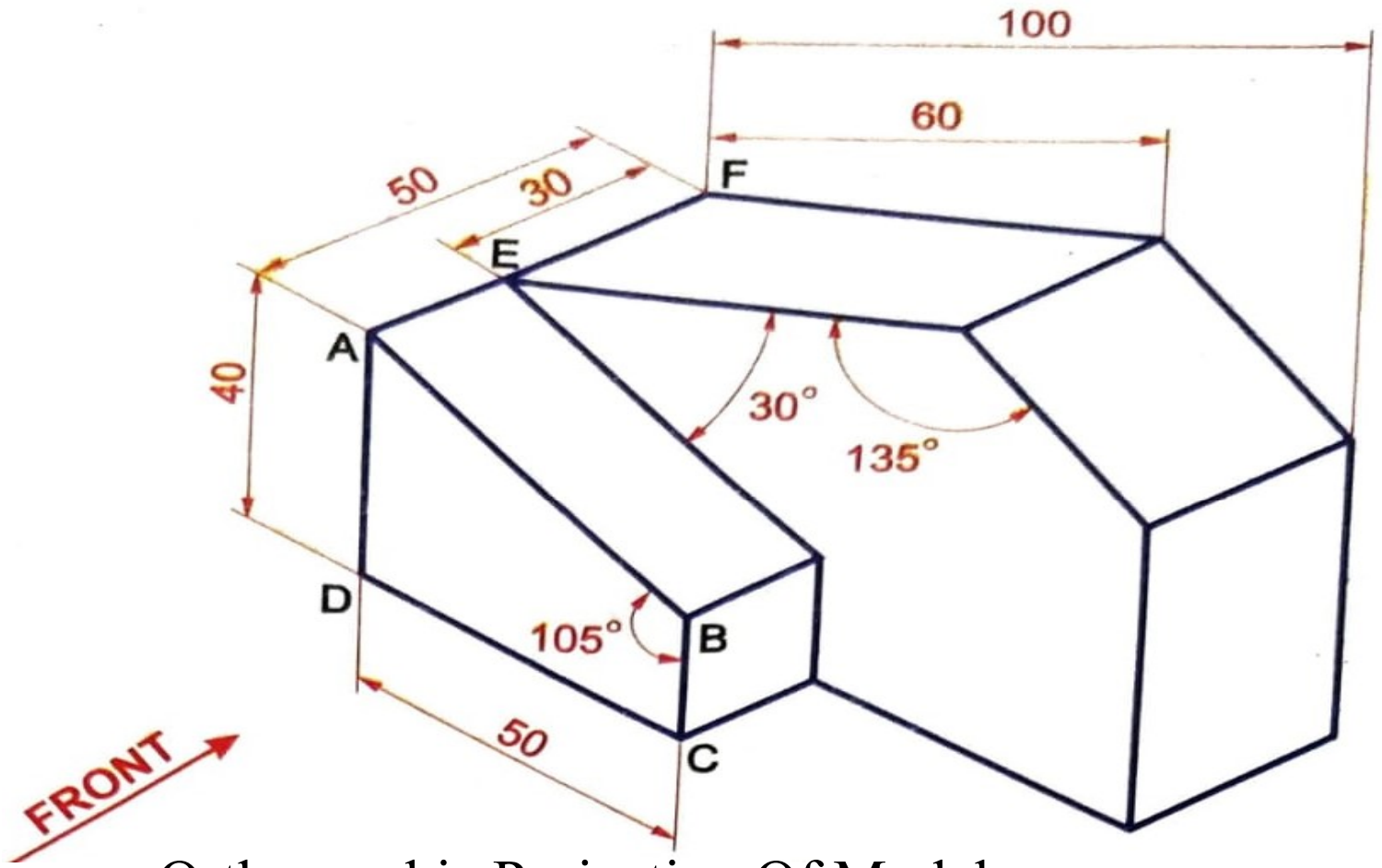


- Use **MIRROR** command Select the lines (**E I**), (**I J**) & (**J H**) & Locate the Midpoint of (**E F**) & drag up & Press Enter.



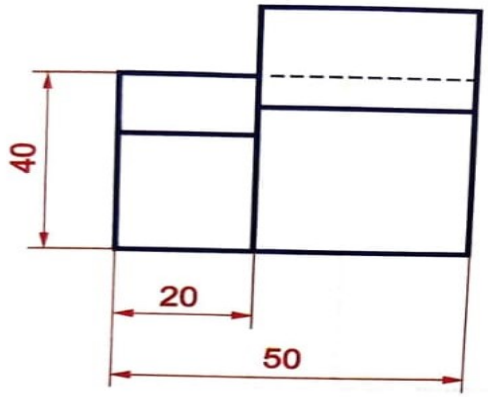
➢Use **LINE** command (**ORTHO ON**) Project the Lines from the **FRONT** View & **TOP** View to Complete the **SIDE** View

➢Use **ANNOTATION** Tool Bar to Mark the Dimensions.

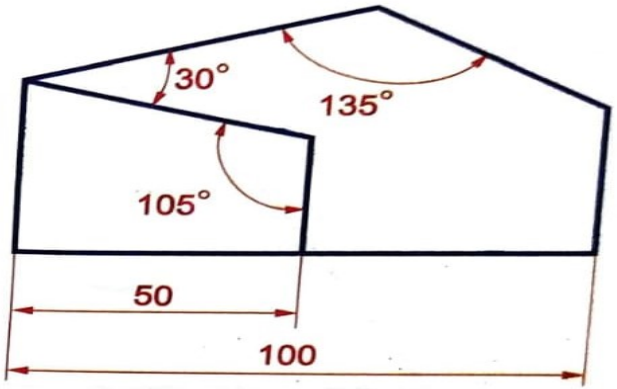


Orthographic Projection Of Models

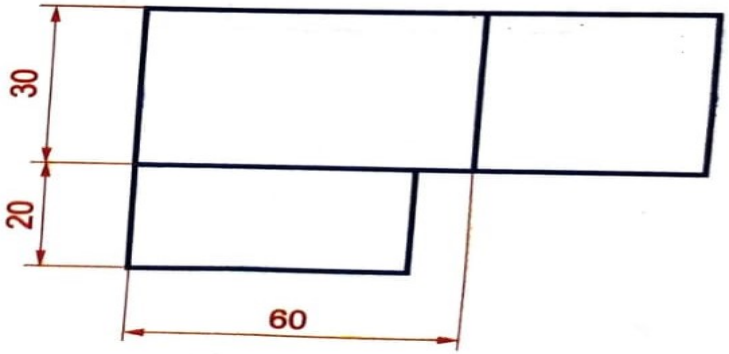
Orthographic Projection Of Models



R.S. VIEW



FRONT VIEW



TOP VIEW

REFERENCE BOOKS

- JEYAPOOVAN T, “ENGINEERING GRAPHICS AND DESIGN”, 2023, Vikas Publishing House Pvt Ltd,
- K.V.NATARAJAN, “Engineering Graphics”, 2015, Dhanalakshmi Publishers.