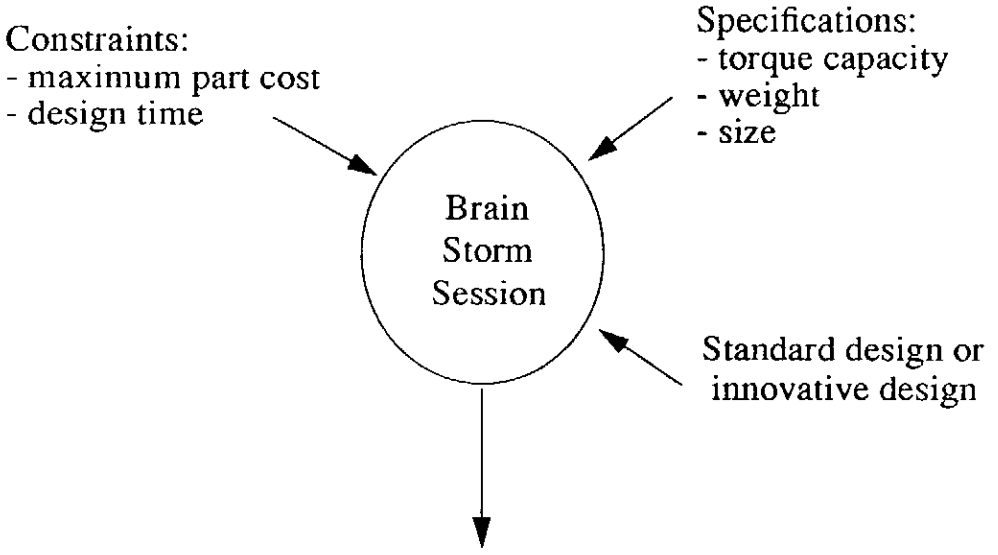
Introduction:

Why is Engineering Drawing important?

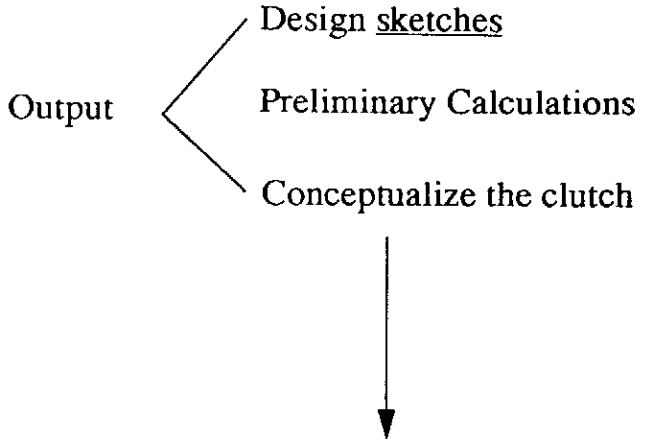
1. To convey information such as in a design
2. To solve problems graphically such as spatial relationships between two objects.

The Design & Manufacturing process:

Example: Design of a Clutch



Phase 1



Phase 2

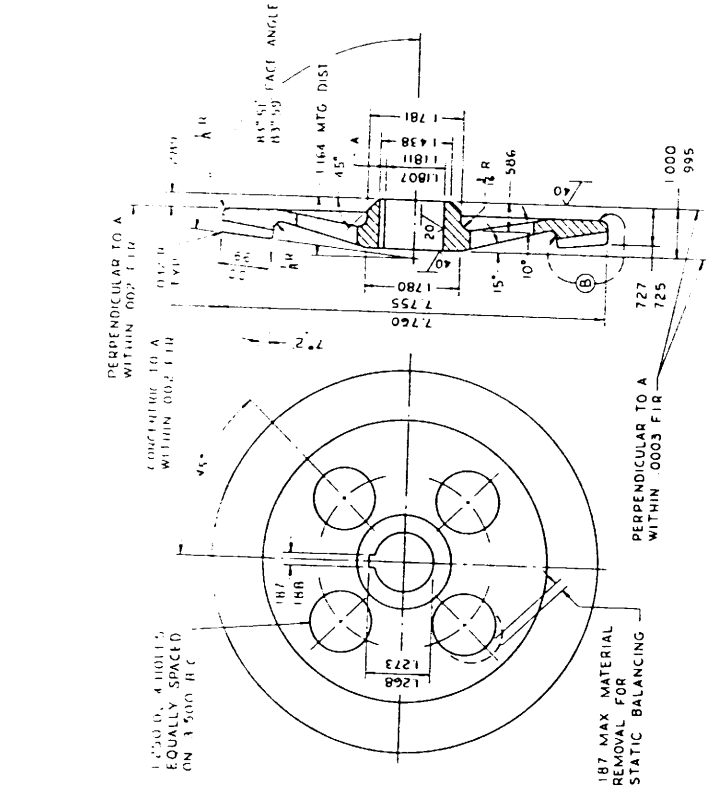
- stress analysis on parts and whole assembly
- select off the shelf parts from catalogs - "spec. out"
- design custom parts which must be manufactured

Output
- detailed drawings of parts done to standard perhaps on CAD
- assembly drawing showing inter-relation of all parts
- parts list

Phase 3

- manufacture parts in shop on mlc tools, molding, forming, etc.
- assemble and test the clutch

Does the clutch meet initial specs?
- If NO, go back to Phase 1



BEVEL GEAR DATA	
NUMBER OF TEETH	81
DIAMETRAL PITCH	10.4516
PITCH DIAMETER (THEOR)	7.750
PITCH ANGLE	82° 58'
ROOT ANGLE (BASIC)	80° 56'
PRESSURE ANGLE	20°
ADDENDUM (TIP OF	.042
WHOLE DEPTH (APPROX)	.181
CONE CENTER TO CROWN	.437
CONE DISTANCE	3.9044
BACKLASH WITH MATE	.010/.014
NO OF TEETH IN MATE	10
MATING GEAR PART NO	1620 D 10
DRIVING MEMBER	PINION

NOTES

(B) CARBURIZE AND HARDEN ENCLOSED ZONE TO ROCKWELL "C" 58 MIN - FINISHED CASE DEPTH .020 - .025 DP - CORE AND UNCARBURIZED AREAS TO BE ROCKWELL "C" 27 MIN

FINISH UNLESS NOTED TO 100√ ALL OVER

GEAR AND PINION TO BE MATCHED AND LAPPED AS A SET - ETCH GEAR WITH SET NO, MOUNTING DIST, AND BACKLASH

MAGNETIC INSPECT PER MIL-I-6868

STATICALLY BALANCE TO WITHIN 0.06 INCH-OUNCES

PITCH DIAMETER OF GEAR CONCENTRIC TO A WITHIN .002 FIR

Figure 13
Sample of uppercase lettering.

Orthographic Projections

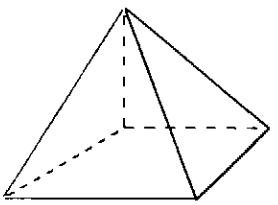
This lecture:

- orthographic views
- the projection box
- multiview projections

Orthographic views

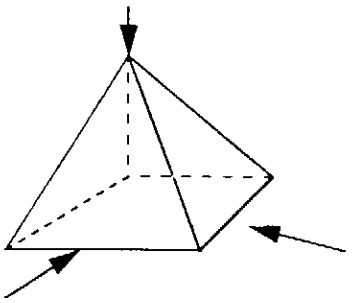
An orthographic view shows the individual faces of an object to define the exact shape.

Example

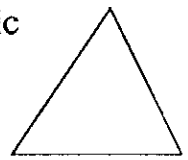


Pyramid shape

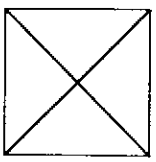
Pictorial diagram showing 3D form



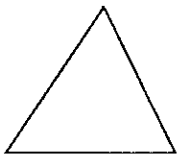
Orthographic View



Front



Top

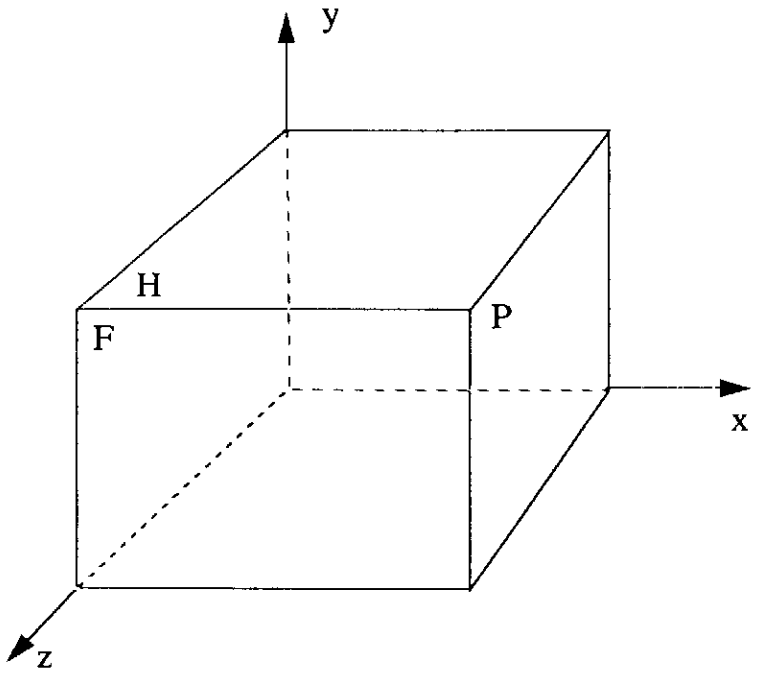


r.h. profile (redundant)

- Othographic views preserve the size of features

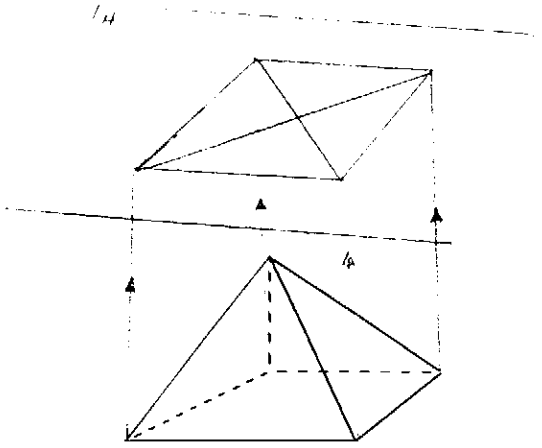
Projection Box

- standard representation for orthographic views

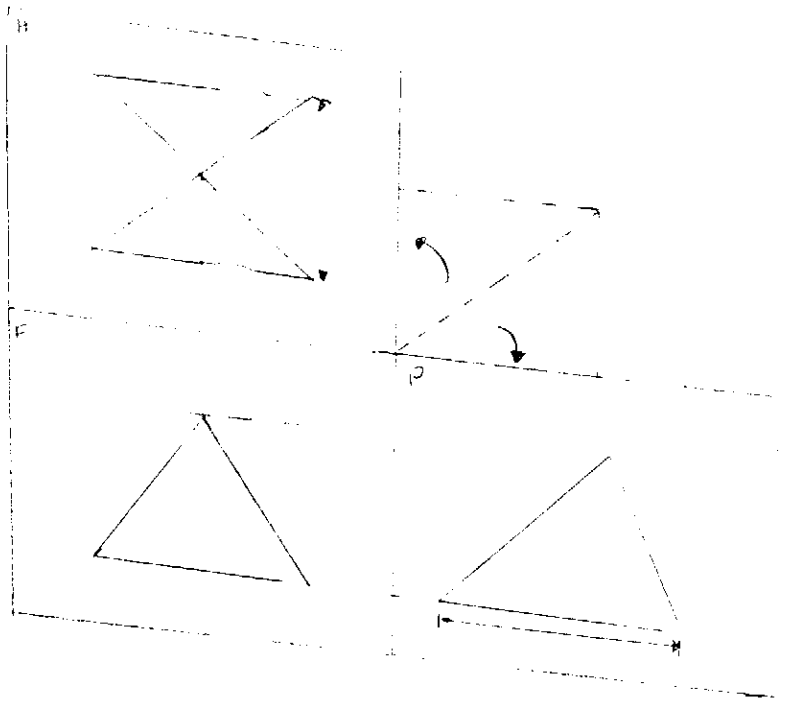


- North American - third quadrant projection box
- The box envelopes the object with the principle object face parallel to a projection plane.

Example:

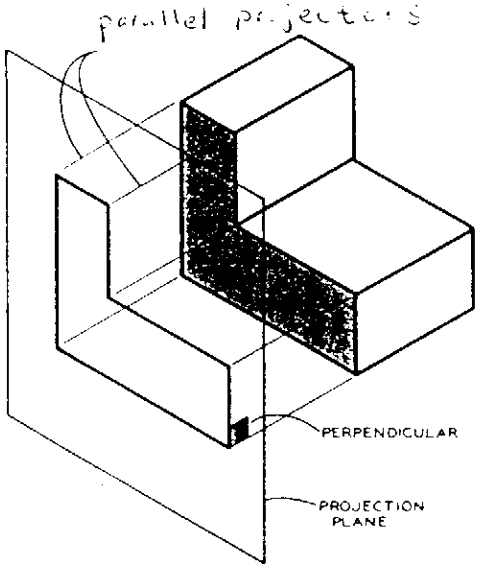


- To create a standard orthographic drawing we open the box to get the H, F and P view.

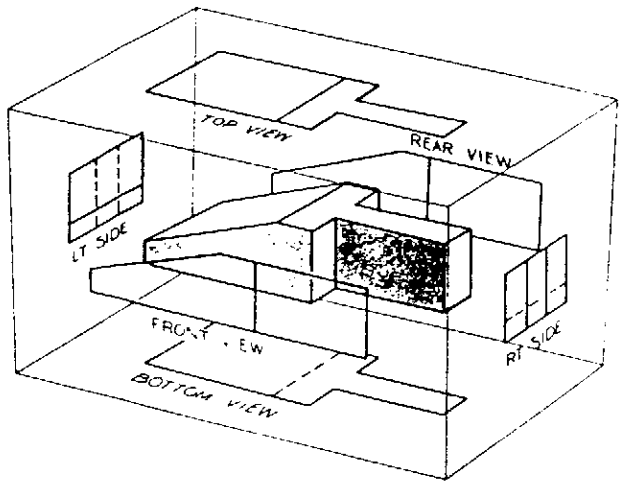


Note: sometimes more views are needed. (e.g. bottom, rear, left profile or auxiliary)

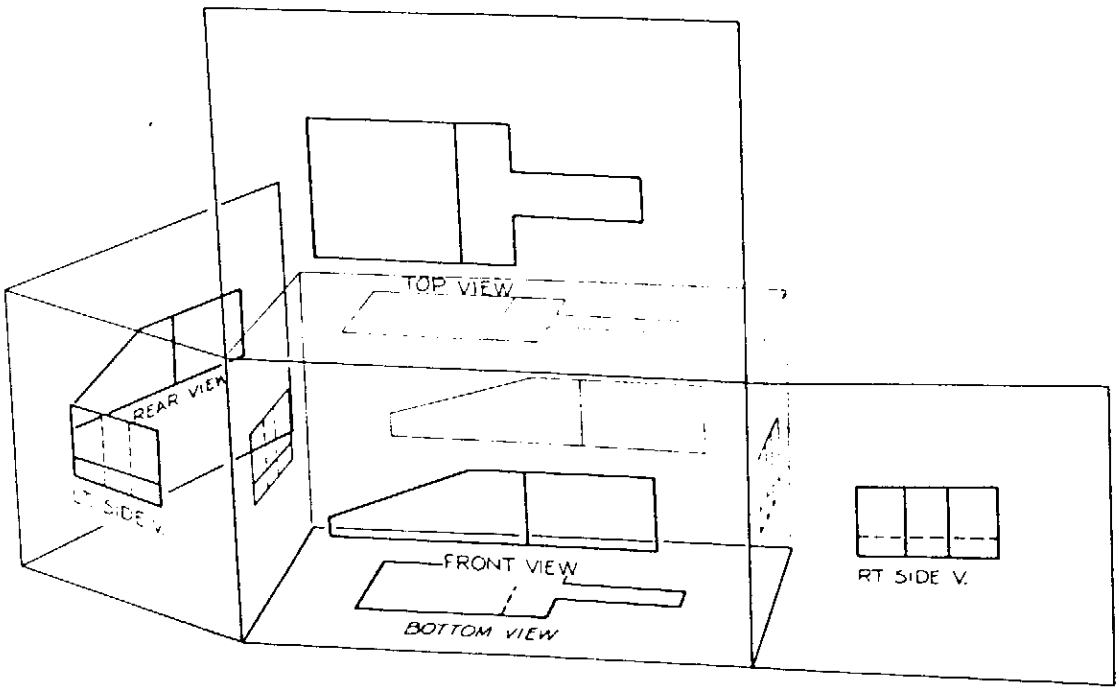
Exercises: 17,18



Orthographic projection is defined as the projection of a view onto a projection plane with parallel projectors. The projectors are perpendicular to the projection plane.



Six principal views of an object can be drawn in orthographic projection. You can assume that the object is in a glass box with the views projected onto the six planes of projection.



The glass box can be opened into a common plane, the plane of the drawing paper.

CONVENTIONAL LINES USED IN SKETCHING