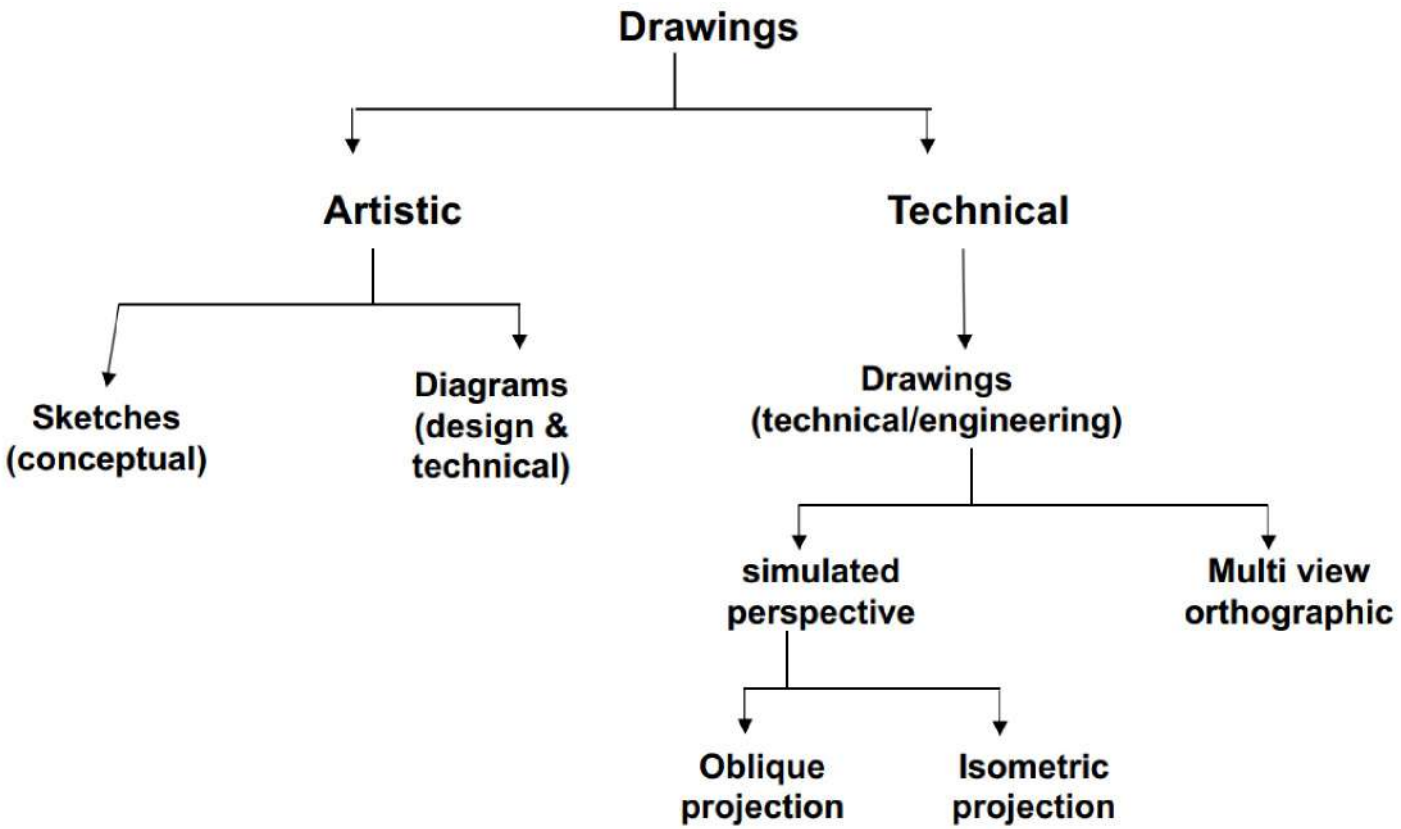
Engineering Drawing Principles L-1

Types of Drawings

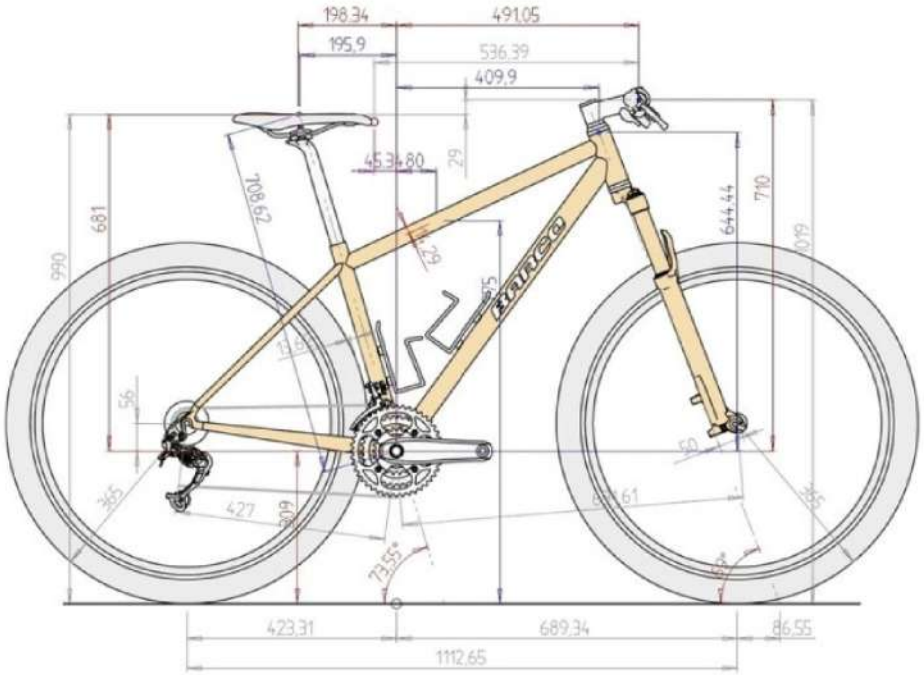


WHAT IS ENGINEERING GRAPHICS ?

Engineering Graphics is the language of Engineers. Like any other language, one should be able to READ|WRITE|SPEAK. The knowledge of Engineering Graphics is useful to both scientist as well as Engineers.

- An Engineering Drawing is a technical drawing which clearly defines and communicates design other interested parties.

- Other parties may have an interest in design collaboration, procurement/purchasing, costing, manufacturing, quality control, marketing.



ROLE OF ENGINEERING GRAPHICS

- Visualization
- Communication
- Documentation

- Mechanical: Design of machine elements, CNC machine tools, Robotics.
- Automotive: Kinematics, Hydraulics, Steering.
- Electrical: Circuit layout, Panel design, control system.
- Electronics: Schematic diagrams of PCs, ICs,etc.
- Civil: Mapping, contour plotting, building drawing, structural design.
- Architectural: Town planning, interior decorations, multistoried complex.
- Aerospace: Design of space craft, flight simulator, lofting
- Communication: Communication network, satellite transmitting pictures, T.V, telecasting

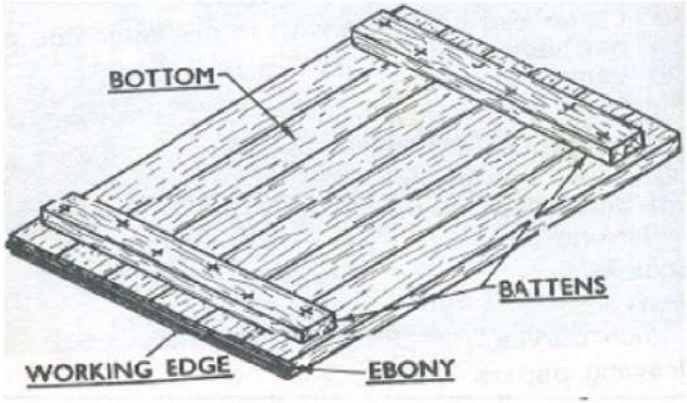
Why with AutoCAD?

- Current industrial practice (traditional drafting is obsolete).
- Helps students to explore other solid modelling softwares in their own disciplines
- Helps Mechanical students to generate 2-D Machine drawings as well as 3-Dmodels using Pro-Engineers.

DRAWING INSTRUMENTS

- Drawing Board
- Mini – Drafter
- Instrument Box
  - ✓ Compass
  - ✓ bow compass
  - ✓ Spring bow compass
  - ✓ Divider
  - ✓ Bow divider
  - ✓ Bow pen
  - ✓ Inking pen
- Set-squares
- Protractor
- Set of Scales
- French curves
- Drawing sheets
- Paper fasteners
- Drawing Pencils – H, 2H, HB
- Sand Paper
- Eraser (Rubber)
- Drafting brush
- Cello tape

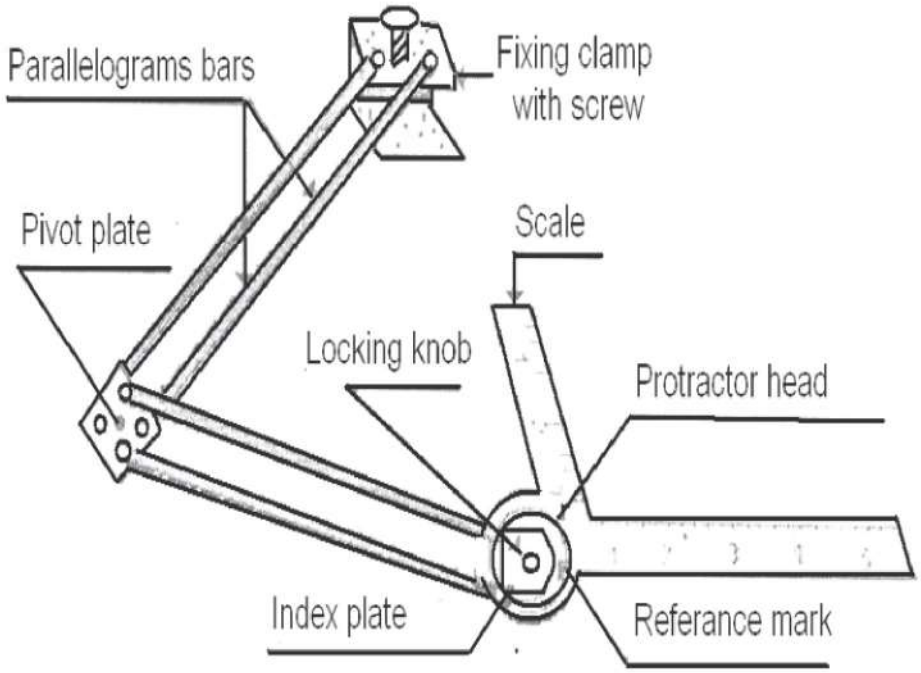
DRAWING INSTRUMENTS



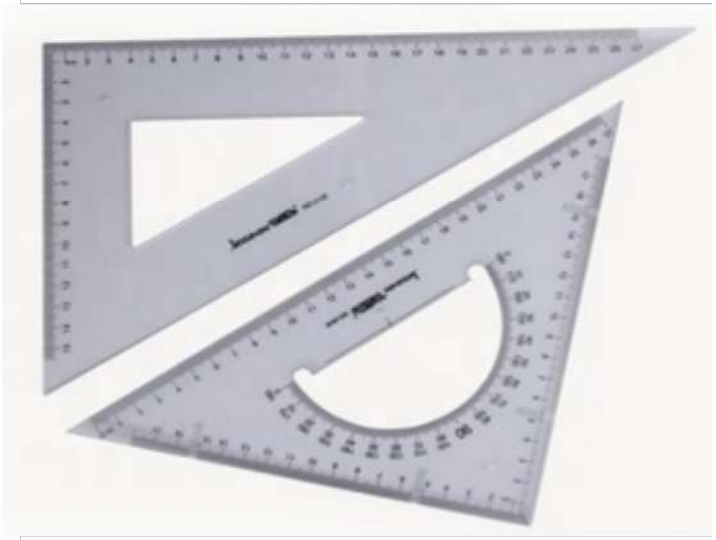
- To make lines on a drawing paper smooth and straight, a polished drawing board is one of the top most requirements

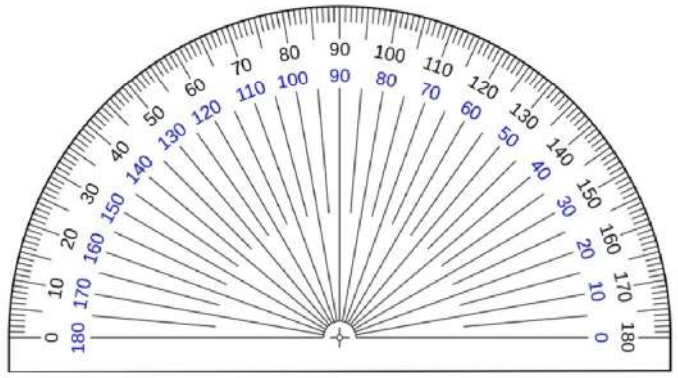
S. No.	Designation	Size (mm)
1	B0	1000 X 1500
2	B1	700 X 1000
3	B2	500 X 700
4	B3	350 X 500

MINI – DRAFTER



INSTRUMENT BOX, SET-SQUARES, and PROTRACTOR





LETTERING

COMMON MISTAKES IN LETTERING

Lettering style not uniform	
Lettering height not uniform	
Lettering inclination not uniform	
Lettering thickness not uniform	
Lettering space not uniform	

LETTERING

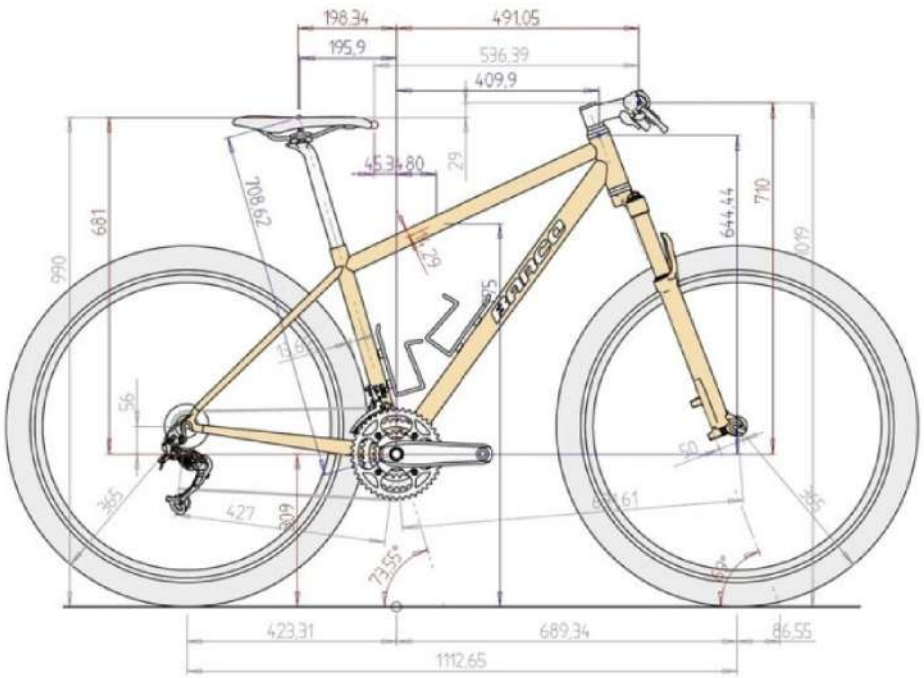
Writing text on a drawing (e.g. titles, dimensions, scales) using letters which can be alphabets, numerals, symbols or punctuation marks to convey detailed information.

Features of Lettering

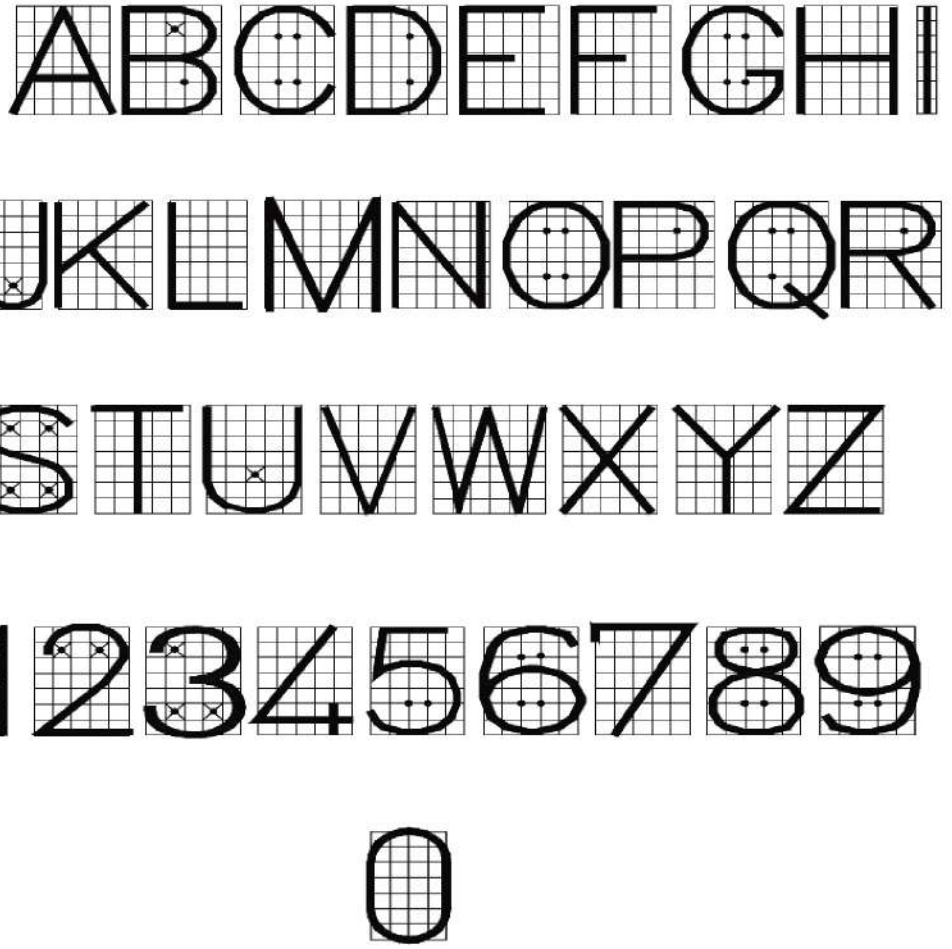
1. Legibility, uniformity, ease, rapidity of execution and reproducibility
2. No ornamental or artistic and cursive style of letter
3. Letters should be distinguishable from each other in order to avoid any confusion even in case of slight mutilations.

Standard followed

IS 9609 (Part 0): 2001 & SP46: 2003 (lettering for technical drawings). This BIS standard is based on ISO 3098-0: 1997



Types of Lettering



Single stroke

- Thickness of the line of the letter should be such as is obtained in one stroke of the pencil.
- Does not mean that the letter should be made in one stroke without lifting the pencil.

Double stroke

When more thickness is given to single stroke letters, it is known as double stroke or gothic letters.

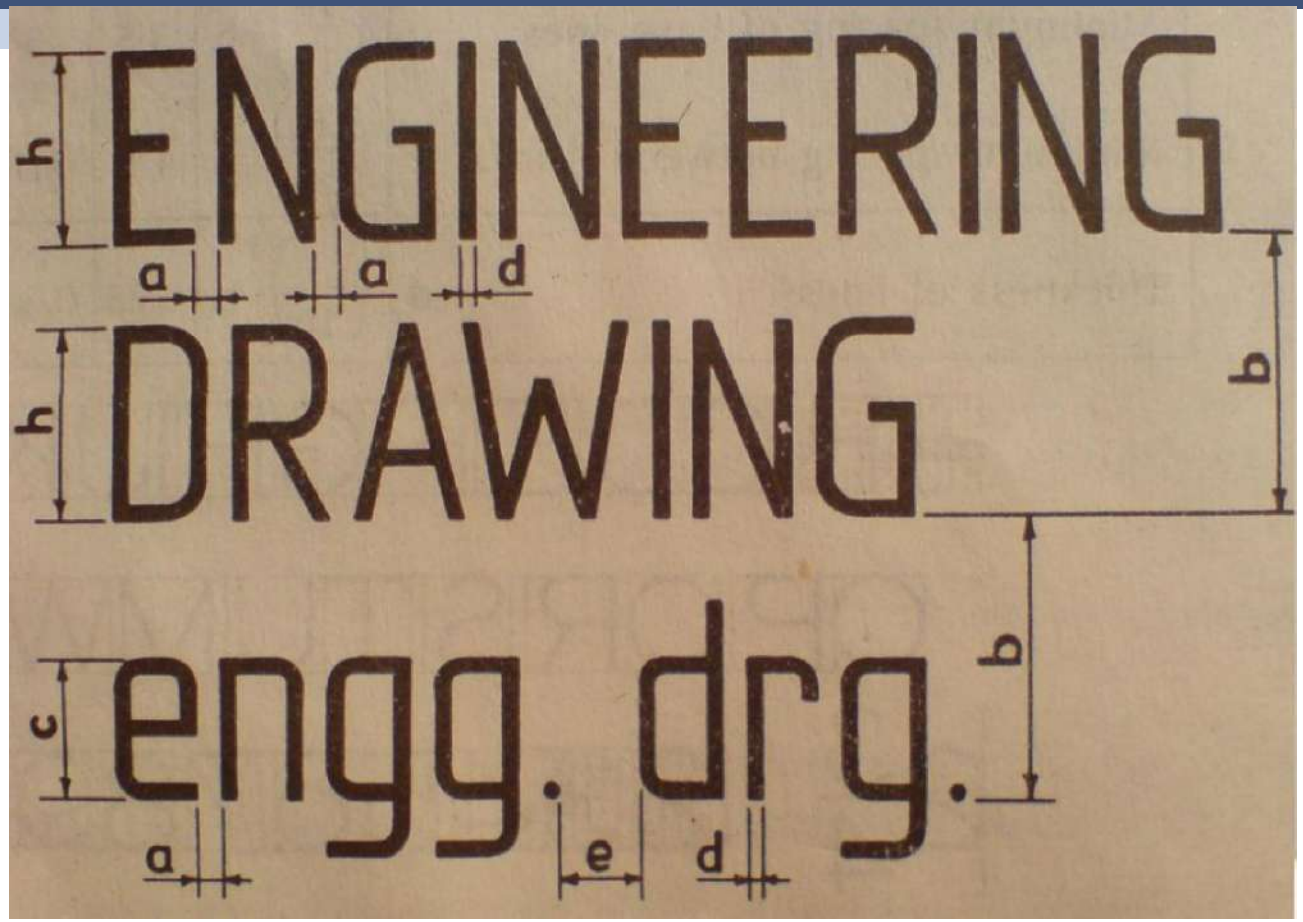
BIS (SP46:2003) - Gives dimensions for lettering & types

- Type A - Height of capital letter is divided into 14 parts
- Type B – Height of capital letter is divided into 10 parts

Both types can be Vertical or Inclined at 75˚ to the horizontal

Line Width of Type A < Type B

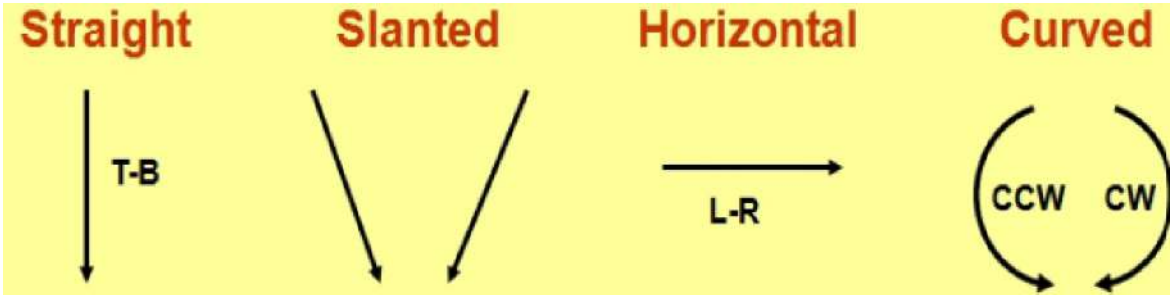
Types of Lettering



Types of Lettering

CHARACTEERISTIC		RATIO	DIMENSIONS (mm)						
Lettering Height 'A' (d = h/14)									
Height of Capital Letters	h	(14/14) h	2.5	3.5	5	7	10	14	20
Height of Lower Case Letters	c	(10/14) h	-	2.5	3.5	5	7	10	14
Spacing between Characters	a	(02/14) h	0.35	0.5	0.7	1	1.4	2	2.8
Minimum Spacing of Base Line	b	(20/14) h	3.5	5	7	10	14	20	28
Minimum Spacing between Words	e	(06/14) h	1.05	1.5	2.1	3	4.2	6	8.4
Thickness of Lines	d	(01/14) h	0.18	0.25	0.35	0.5	0.7	1	1.4

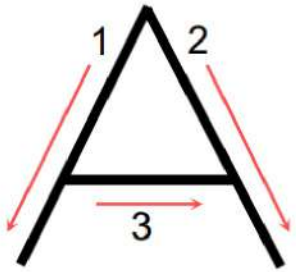
Types of Lettering



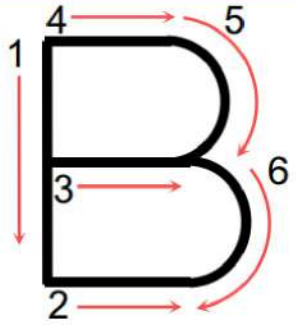
Examples

"**I**" letter

"**A**" letter



"**B**" letter

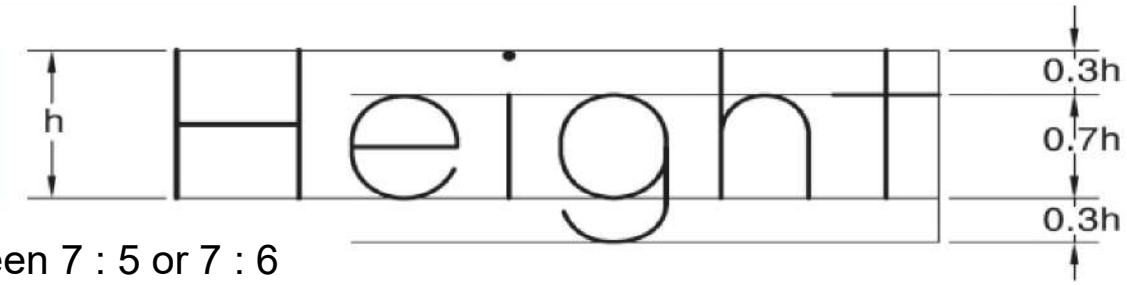


Height and width of letters

BIS (SP 46: 2003) has recommended the heights of letters as: 1.8, 2.5, 3.5, 5, 7, 10, 14 & 20 mm

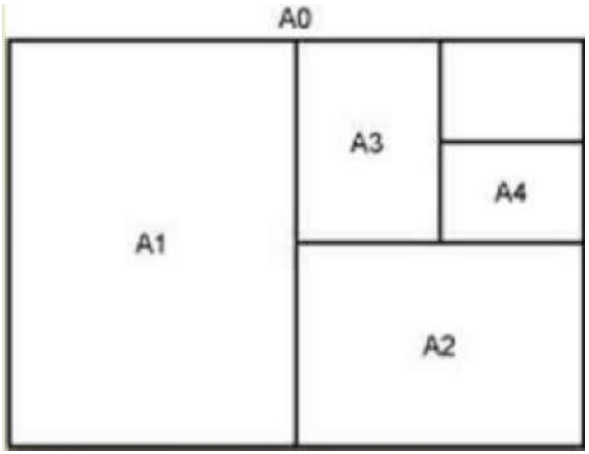
Sl. no	Items on a drawing	Size (mm)
1	Name of the company	10, 14, 20
2	Drawing numbers, letters denoting section planes	10,14
3	Title of the drawing	7, 10
4	Sub- titles & Headings	5, 7
5	Dimensioning, notes, schedules & material lists	3.5, 7
6	Alteration entries and tolerances	3.5

Total height of lowercase letters equals that of capital letters.

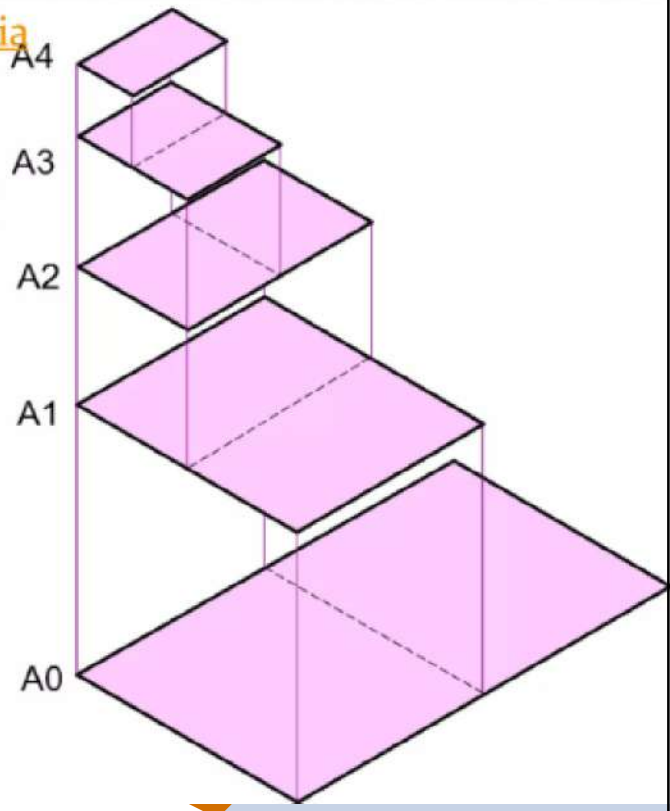


The height-to-width ratio for letters varies between 7 : 5 or 7 : 6

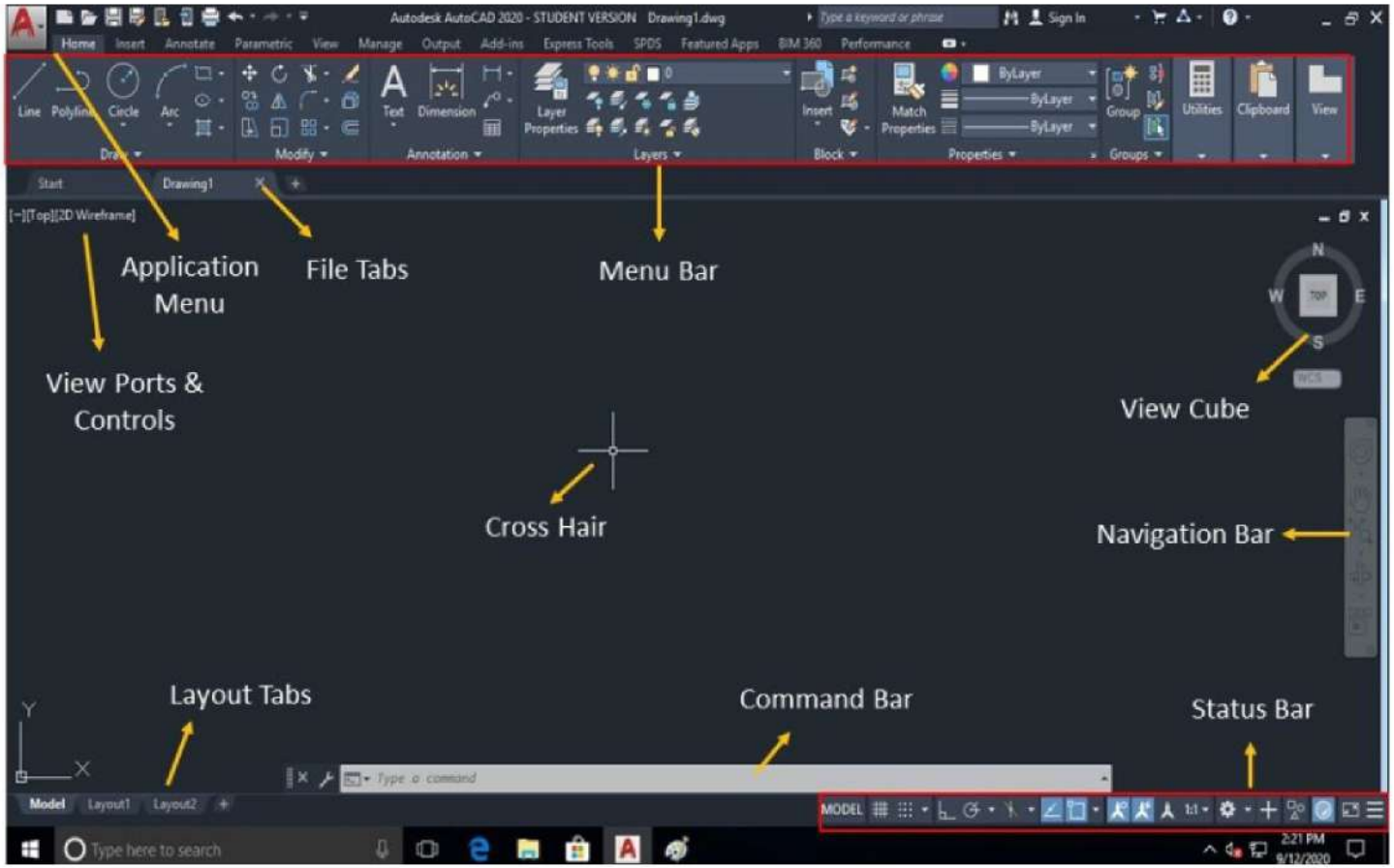
SHEETS



Designation	Dimension(mm)
A0	841 Xl 189
A1	594 X 841
A2	420 x 594
A3	297 X 420
A4	210 x 297



AutoCAD


Application Menu
File Tabs
Menu Bar
View Ports & Controls
View Cube
Cross Hair
Navigation Bar
Layout Tabs
Command Bar
Status Bar

3D Printing