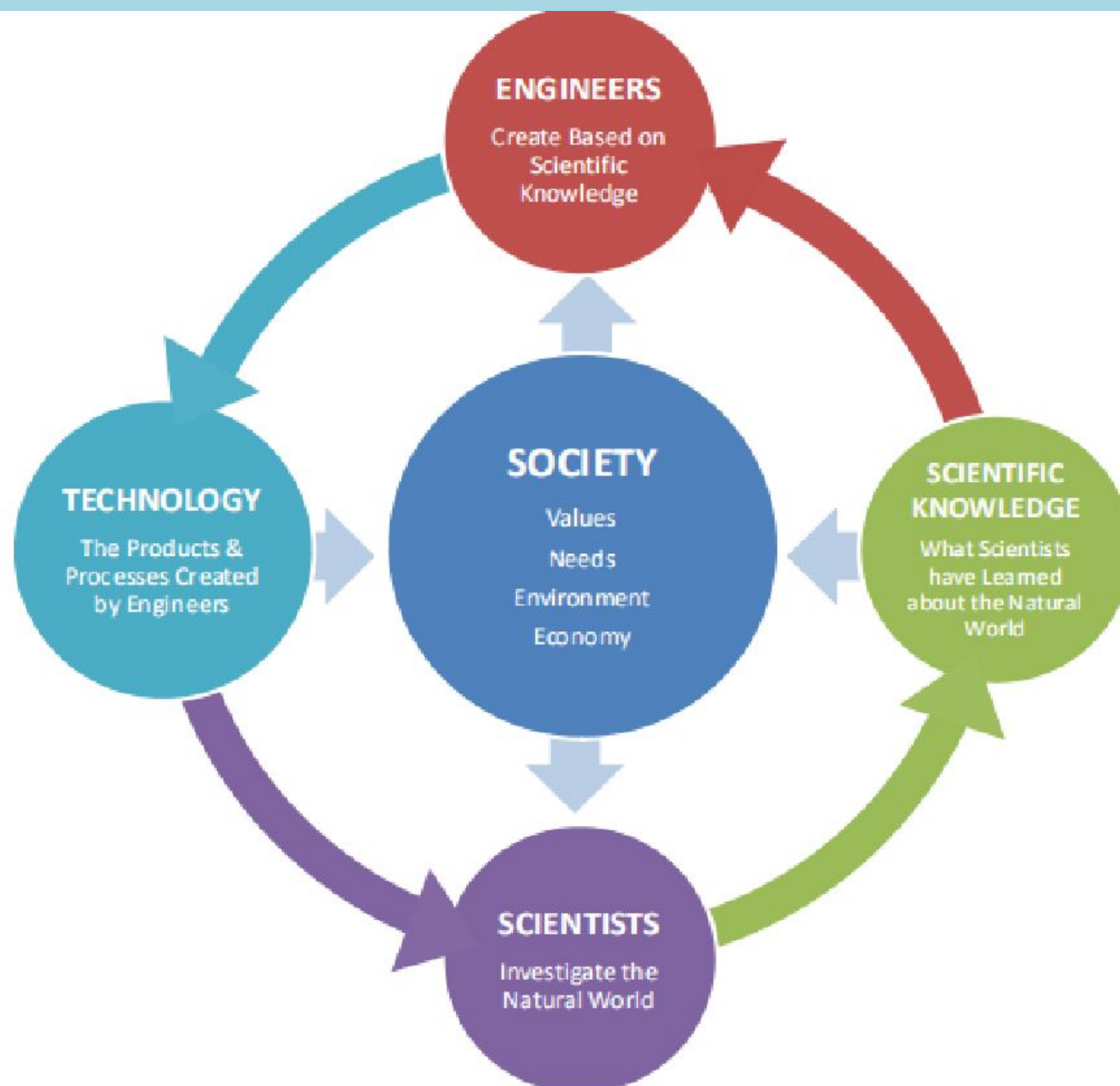




# ENGINEERING GRAPHICS

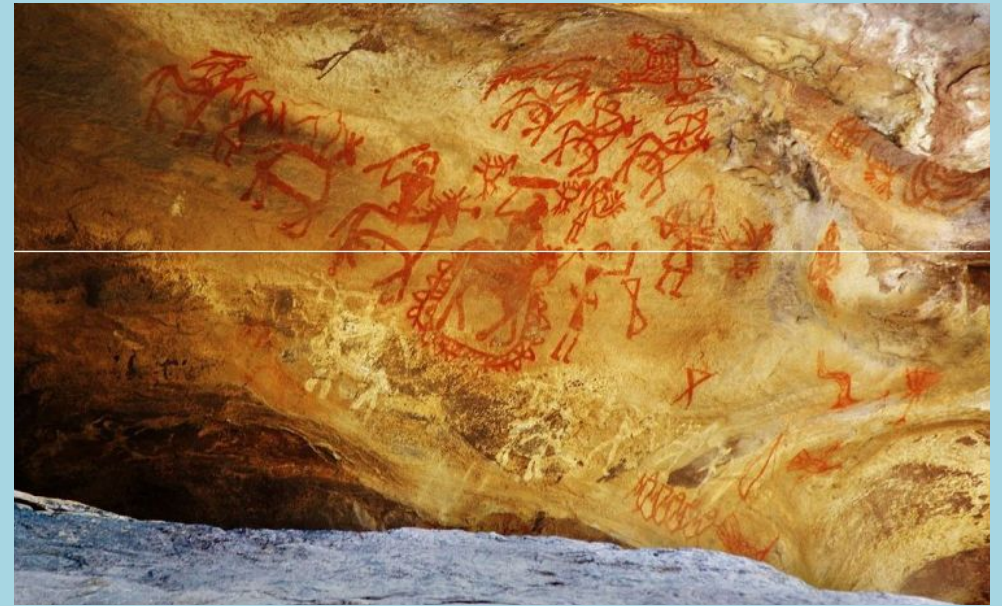
**FACULTY NAME : ASST PROF .IPSITA  
MOHANTY  
TEACHING ASISSTANT:**



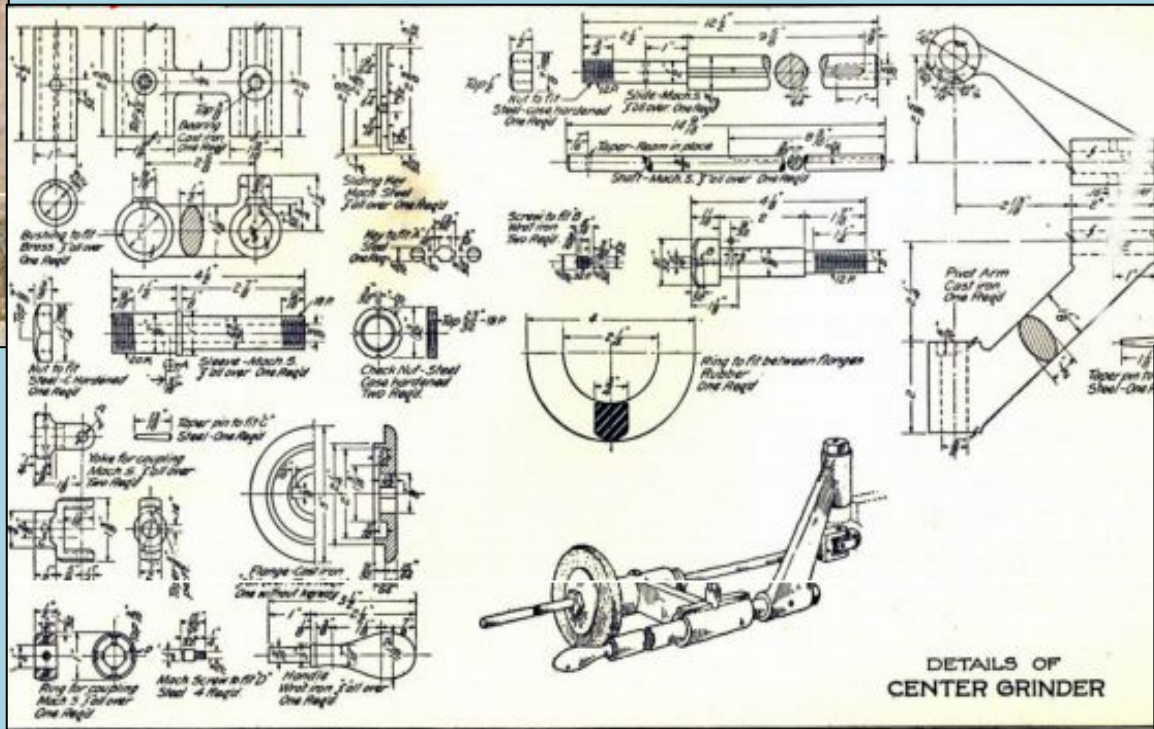
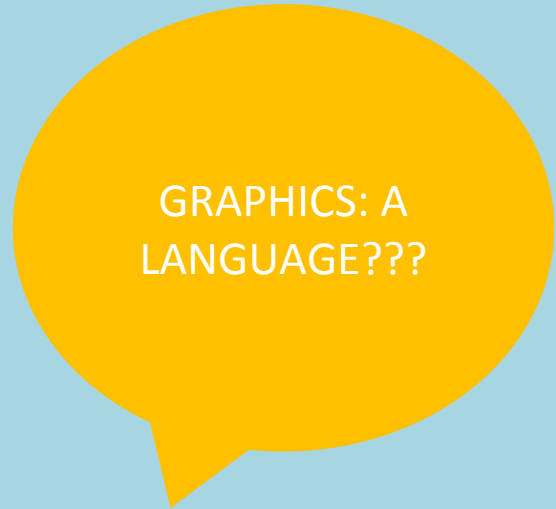
THE WORD *GRAPHICS* ORIGINATED FROM THE GREEK WORD *GRAPHIKOS* MEANING :

“THE ART OR SCIENCE OF DRAWING A REPRESENTATION OF AN OBJECT ON A TWO-DIMENSIONAL SURFACE ACCORDING TO MATHEMATICAL RULES OF PROJECTION “

IMAGE : 40,000 YEAR OLD CAVE DRAWINGS







## ABOUT ENGINEERING DRAWING

Engineering drawing is a two dimensional representation of three dimensional objects. In general, it provides necessary information about the shape, size, surface quality, material, manufacturing process, etc., of the object. It is the graphic language from which a trained person can visualize objects.

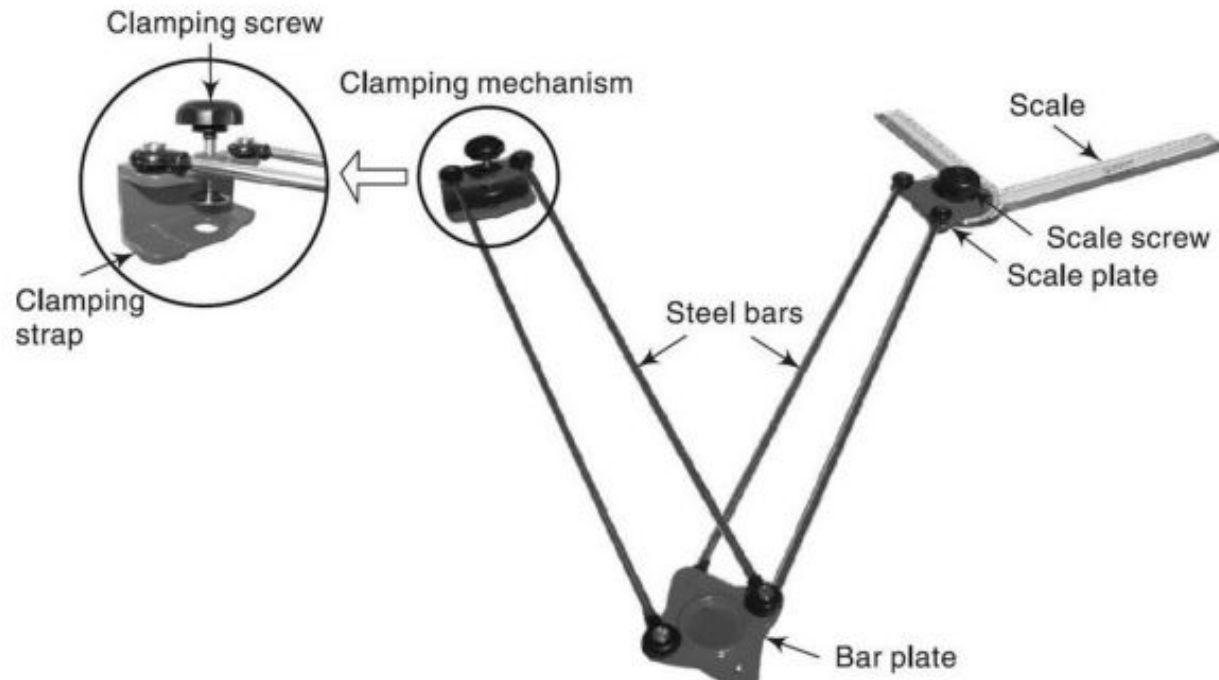
Engineering drawings are prepared on standard size drawing sheets. The correct shape & size of the object can be visualised from the understanding of not only its views but also from the various types of lines used, dimensions, scale etc.

For uniformity, the drawings must be drawn as per certain standard practice. This subject deals with the drawing practices as recommended by Bureau of Indian Standards (BIS) SP: 46:2003, A government body that controls standards

# DRAWING ACCESSORIES

- Drawing Board
- Drawing Sheet
- T-square / Mini-drafter (Roll and Draw)
- Set Squares
- Large Compass & Divider
- Protractor (pro-circle)
- Mechanical Pencil
- Eraser

## MINI DRAFTER



## DRAWING BOARD WITH A FIXED DRAFTER



## DRAWING SHEET

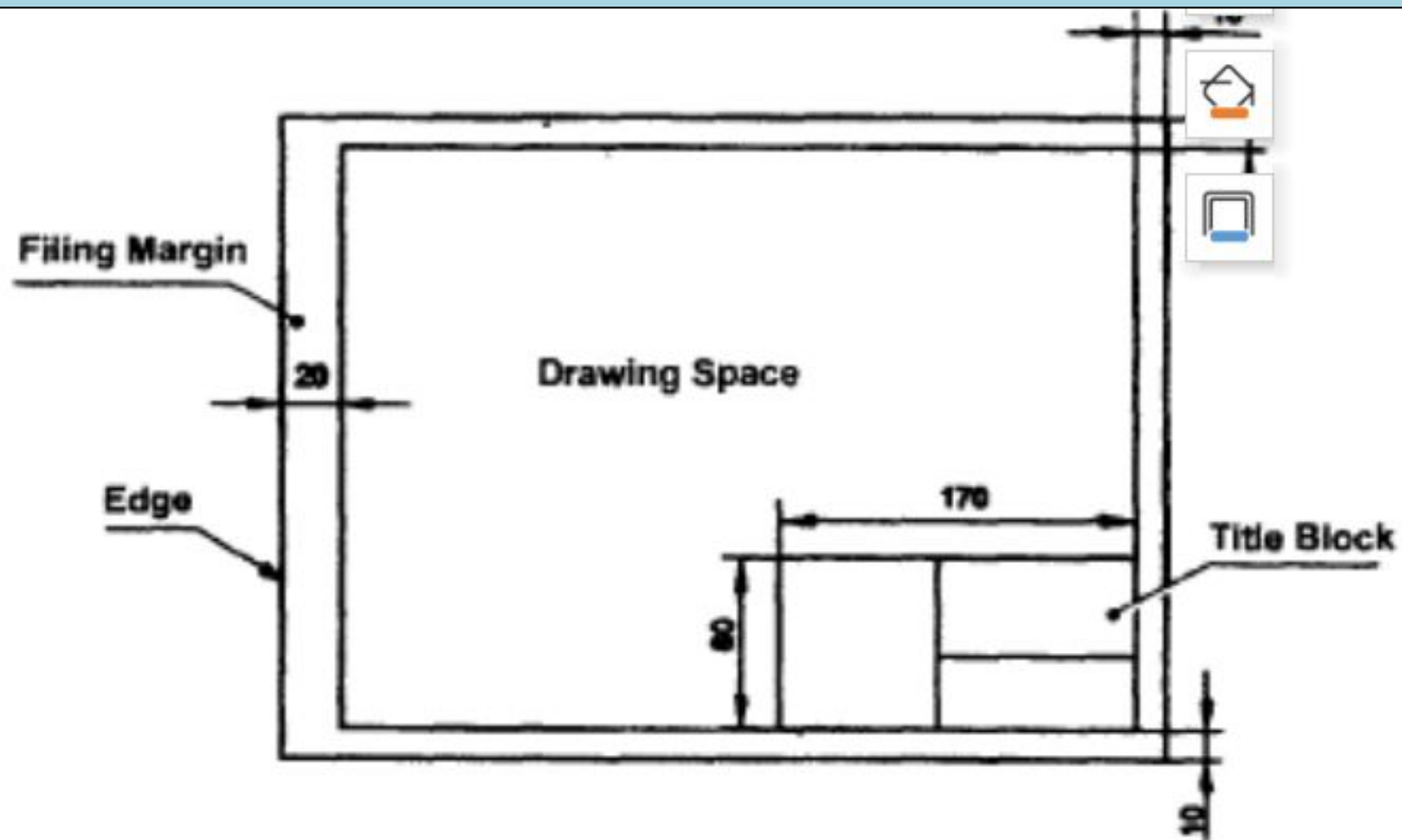
The standard sheet size of A0 is 841 mm X 1189 mm. The successive sizes are obtained by either halving along the length or doubling the width, the area being in the ratio 1 : 2.





# DRAWING SHEET SIZE AND LAYOUT OF SHEET

Designation	Dimension, mm Trimmed size
A0	841 × 1189
A1	594 × 841
A2	420 × 594
A3	297 × 420
A4	210 × 297



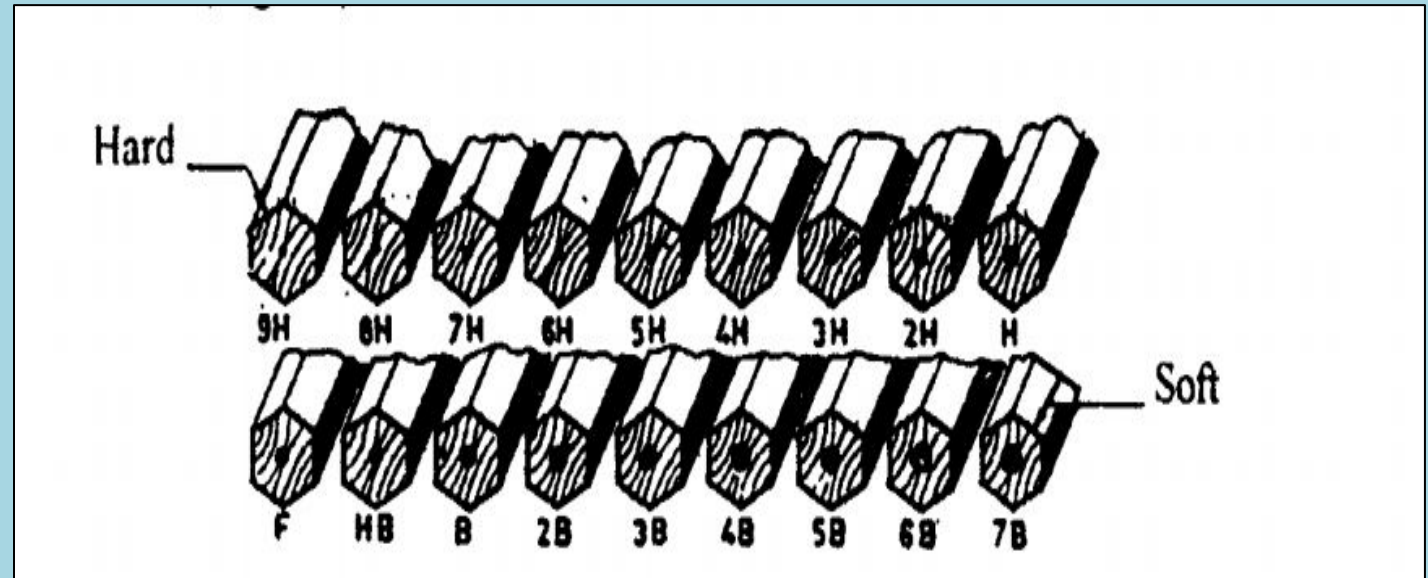
## CONTENTS OF TITLE BLOCK

The title block to be utilised for classwork and training should lie within the drawing space at the bottom right hand corner of the sheet. The title block can have a maximum length of 180 mm and width of 65 mm providing the following information.








- 1.Name of College/University
- 2.Name of Student
- 3.Roll Number
- 4.Branch
- 5.Section
- 6.Scale
- 8.Date
- 9.Signature
- 10.Worksheet Number

# PENCILS

Pencils with leads of different degrees of hardness or grades are available in the market. The hardness or softness of the lead is indicated by 3H, 2H, H, HB, B, 2B, 3B, etc. The grade HB denotes medium hardness of lead used for general purpose. The hardness increases as the value of the numeral before the letter H increases. The lead becomes softer, as the value of the numeral before B increases.

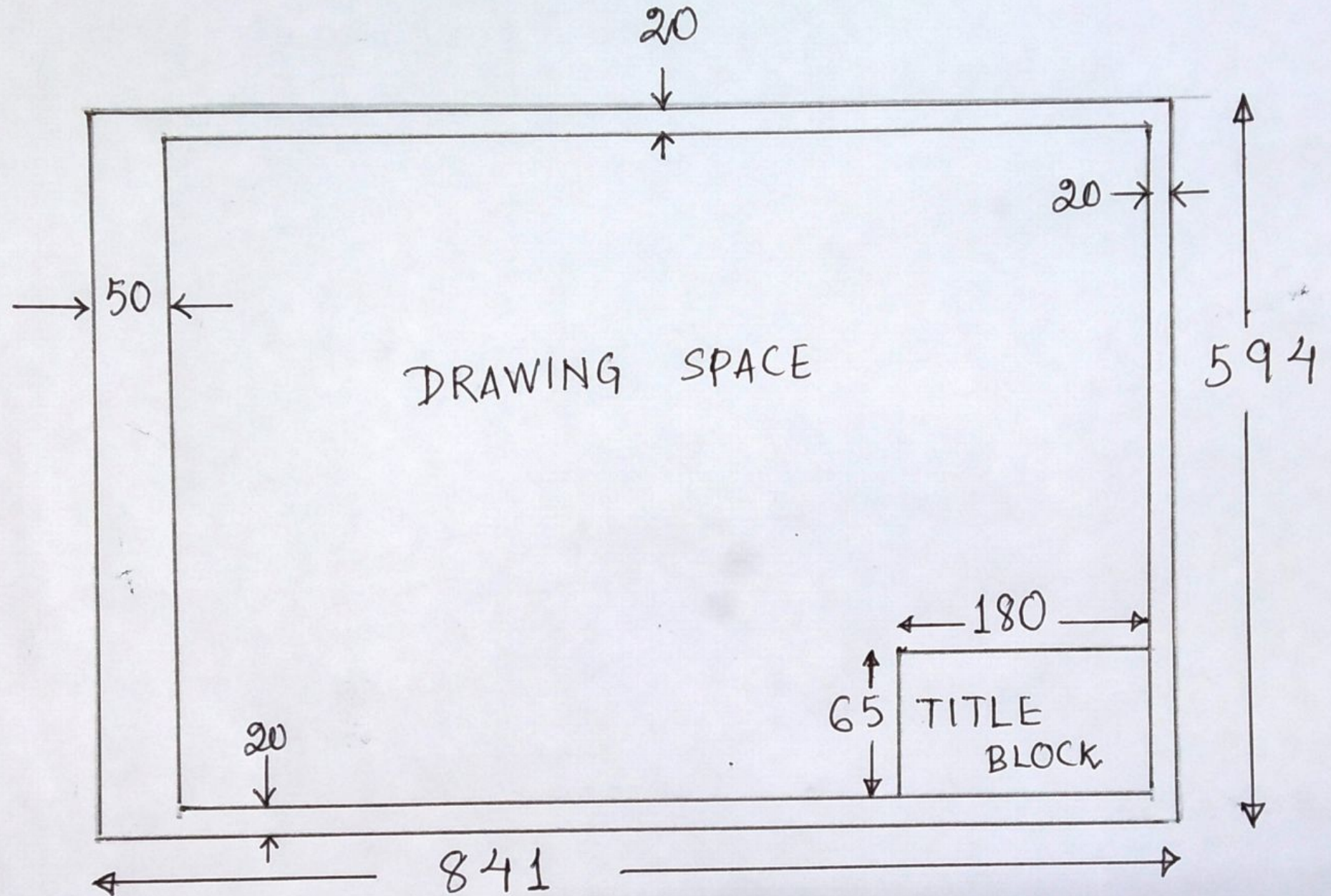


# LINE TYPE AND THEIR REPRESENTATION

01.1	Continuous narrow line  B 	Dimension lines, Extension lines
		Leader lines, Reference lines
		Short centre lines
		Projection lines
		Hatching
		Construction lines, Guide lines
		Outlines of revolved sections
		Imaginary lines of intersection
01.1	Continuous narrow freehand line C 	Preferably manually represented termination of partial or interrupted views, cuts and sections, if the limit is not a line of symmetry or a center line <sup>a</sup> .
01.1	Continuous narrow line with zigzags A 	Preferably mechanically represented termination of partial or interrupted views, cuts and sections, if the limit is not a line of symmetry or a center line <sup>a</sup> .
01.2	Continuous wide line 	Visible edges, visible outlines
		Main representations in diagrams, maps, flow charts
02.1	Dashed narrow line D 	Hidden edges
		Hidden outlines
04.1	Long-dashed dotted narrow line E 	Center lines / Axes, Lines of symmetry
		Cutting planes (Line 04.2 at ends and changes of direction)
04.2	Long-dashed dotted wide line F 	Cutting planes at the ends and changes of direction outlines of visible parts situated in front of cutting plane



# A1 LAYOUT



# TITLE BOX

A hand-drawn title box template on a light blue background. The box is rectangular and contains several fields for text entry. To the left of the box, vertical dimensions are marked with arrows and numbers: 15, 10, 10, 10, and 20. Below the box, horizontal dimensions are marked with arrows and numbers: 100 and 20. The fields are as follows:

- Top row: KJIT UNIVERSITY
- Second row: NAME:
- Third row: ROLL NO: BRANCH:-
- Fourth row: TITLE:
- Fifth row: SCALE: 1:1
- Sixth row: SHEET NO. 1
- Seventh row: DATE:

The drawing is done in black ink on a light blue background. The text is in a simple, hand-drawn font. The dimensions are indicated by green arrows and numbers.

KJIT UNIVERSITY	
NAME:	
ROLL NO:	BRANCH:-
TITLE:	
SCALE: 1:1	SHEET NO. 1
	DATE:

# SCALES

## *Reducing and Enlarging Scales*

Objects which are very big in size can not be represented in drawing to full size. In such cases the object is represented in reduced size by making use of reducing scales. Reducing scales are used to represent objects such as large machine parts, buildings, town plans etc. A reducing scale, say 1: 10 means that 10 units length on the object is represented by 1 unit length on the drawing.

## *Representative Fraction*

The ratio of the dimension of the object shown on the drawing to its actual size is called the Representative Fraction

(RF) = Drawing size of an object/Its actual size

For example, if an actual length of 3 metres of an object is represented by a line of 15mm length on the drawing

$$RF = 15 \text{ mm} / 3 \text{ m} = 15 / (3 \times 1000) = 1/200$$

## *Metric Measurements*

10 millimetres (mm) = 1 centimetre (cm)

10 centimetres (cm) = 1 decimetre (dm)

10 decimetre (dm) = 1 metre (m)

10 metres (m) = 1 decametre (dam)

10 decametre (dam) = 1 hectometre (hm)

10 hectometres (hm) = 1 kilometre (km)

1 hectare = 10,000 m<sup>2</sup>



Representative fraction is the \_\_\_\_\_

- a) ratio of the length in drawing to the actual length
- b) ratio of the actual length to the length in drawing
- c) reciprocal of actual length
- d) square of the length in drawing

The actual length is 1m. The length of the drawing is 5cm. Find the representative factor.

- a)  $1/5$
- b) 20
- c)  $1/20$
- d) 5

The length of the drawing is 20 cm, the scale is given as 2:1. Find the actual length.

- a) 50 cm
- b) 10 cm
- c) 25 cm
- d) 10 mm

The areas of the two subsequent sizes of drawing sheet are in the ratio \_\_\_\_\_

- a) 1:5
- b) 1:4
- c) 1:2
- d) 1:10

The increase in hardness is shown by the value of the figure put in front of the letter H, 2H, 3H, and 4H etc.

- a) True
- b) False

Which of the following grades of leads is the hardest?

- a) 6B
- b) 5H
- c) 4B
- d) 6H

Which of the following is not a valid representative factor?

- a) 1:2
- b) 1:3
- c) 2:5
- d) 0:4

***SOVLE.....***

# WORKSHEET 1 - LETTERING