



### Exercise brief :

Starts with exercising and loosening oneself, these set of exercises will help understand the concept of muscle memory. Of how one needs a coordination in between the mind and the hand, to be able to showcase what one is thinking.

**01.** Stand up and start with a fresh sheet of newsprint paper, pick up a 6B/8B pencil, and scribble. Keep scribbling, in circular motion (clockwise & anti-clockwise), make rivers, mountains, all scribbles.

(Multiple Sheets)

**02.** Stick the newsprint on your tables, and start making straight lines (horizontal). The lines should be equidistant. Try and make them as straight as you can, execute it with absolute control.

(Multiple Sheets)

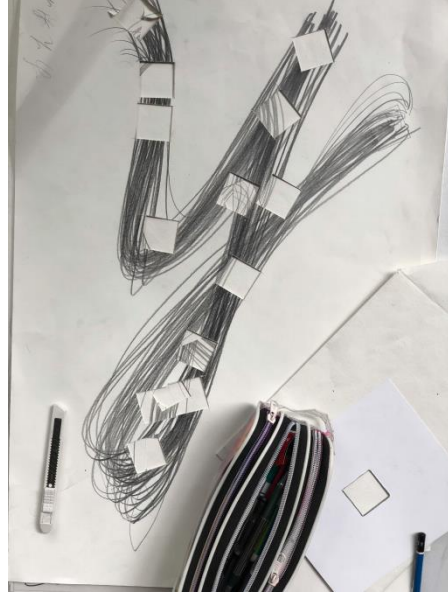
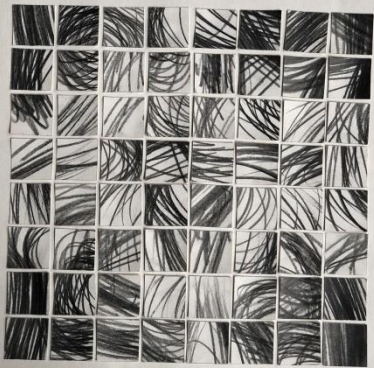
**03.** Stick the newsprint on your tables, and start making straight lines (vertical). The lines should be equidistant. Try and make them as straight as you can, execute it with absolute control. (Multiple Sheets)

### REPEAT 01

**04.** Scribble your initial/s. as big as you can, use the entire paper. Use charcoal pencil / stick if you feel like. Make sure the pencil is soft tipped. (Multiple Sheets)

**05.** Observe the the lifters, the downers and the end strokes. Cut out small square of 3cm X 3cm from these letter scribbles, and compose them in an a larger square (approx 30cm X 30cm) within a composition of your liking.

**PIN-UP SHEETS AT EVERY STAGE**



### Exercise brief :

Elements of Design & Principles of Design through dot, line, shape, form, texture and colour Format : 10cm x 10 cm boxes in an A3 sheet

**01.** Cut strips of 5mm from a 75gsm black paper. Start sticking the strips in the 10cm X 10 cm boxes. Each box should be different from the other. Remember & apply from our discussions on Principle of Design (contrast, harmony, balance etc.) (Multiple Sheets)

**02.** Use a broom stick end and cut a fine section through it to get a circle. Use waterproof ink and make impressions of this dot to make a composition through your 10cm X 10cm boxes. Principle of design never leave us. (Multiple Sheets)

**03.** Let's start using shapes. Base line is 5cm (d) for a circle. 5cm baseline for square and triangle (equilateral). Start composing them. They cannot touch each other. 10 cm X 10cm boxes.

**04.** On the smooth side of the A3, start making straight lines (horizontal). The lines should be equidistant. Try and make them as straight as you can, execute it with absolute control. (3 Sheets)

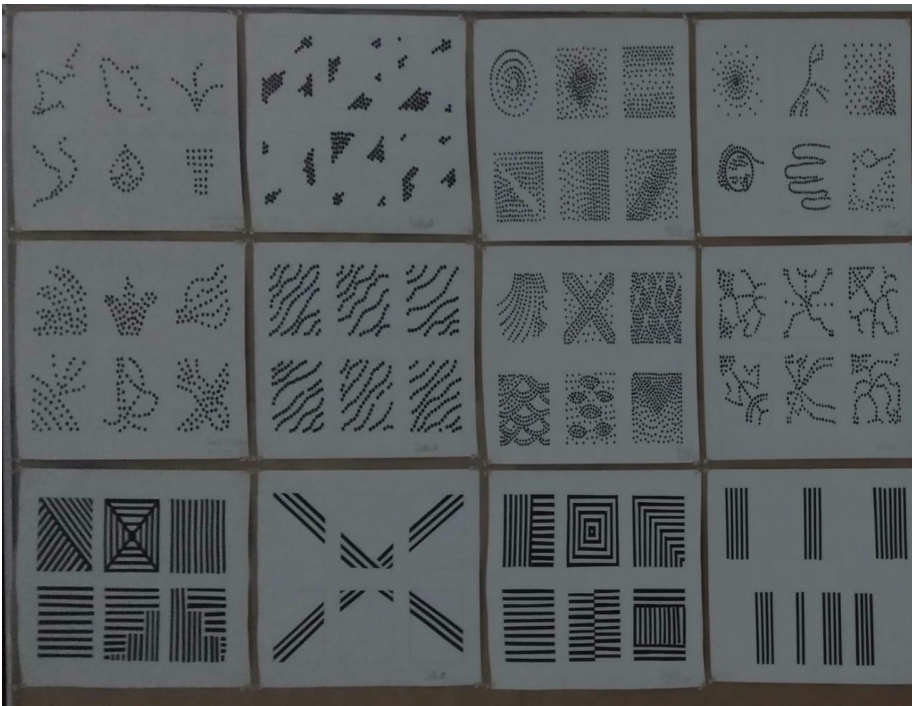
**05.** On the smooth side of the A3, start making straight lines (vertical). The lines should be equidistant. Try and make them as straight as you can, execute it with absolute control. (3 Sheets)

**06.** Let's start using shapes. Base line is 5cm (d) for a circle. 5cm baseline for square and triangle (equilateral). Start composing them.

**07.** Let's start using shapes. Base line is 5cm (d) for a circle. 5cm baseline for square and triangle (equilateral). Start composing them. They start interacting with each other. Use poster colours to neatly colour the shapes, the overlaps formed due to the interaction in between your shapes should be the appropriate mix of the parent shape. 10 cm X 10cm boxes.

**08.** Introduce Tessellation's & MC Escher. Use your shapes and any other element / principle you please and make a 30 cm X 30 cm composition in black & white.

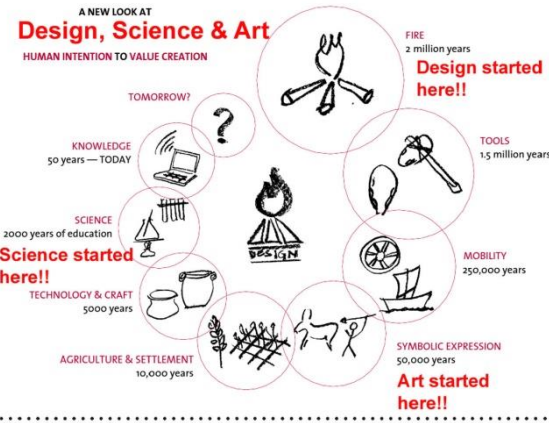
**PIN-UP SHEETS AT EVERY STAGE**





# WHY DESIGN ?

# WHAT IS DESIGN ?



WHAT ARE PRINCIPLES OF DESIGN

**PATTERN**

**UNITY**

**CONTRAST**

**VARIETY**

**EMPHASIS**

**BALANCE**

**SCALE**

**HARMONY**

**RHYTHM**

WHAT ARE ELEMENTS OF DESIGN

**DOT / POINT**

**LINE**

**SHAPE**

**DIRECTION**

**SIZE**

**TEXTURE**

**COLOUR**

**VALUE**

# Architectural Graphic Techniques (AGT)

## ENGINEERING DRAWING

[PLANE AND SOLID GEOMETRY]

[IN FIRST-ANGLE PROJECTION METHOD]



by  
**N. D. BHATT**

Formerly, Lecturer in Machine Drawing  
Birla Vishvakarma Mahavidyalaya  
(Engineering College)  
Vallabh Vidyanagar, Anand

Revised and enlarged by

**V. M. PANCHAL**

M.E. (Machine Tool Engg.),  
L.M.I.S.T.E., F.I.E (India)  
Formerly, Professor in Mech. Engg.  
Faculty of Technology and Engineering  
M. S. University of Baroda, VADODARA

**PRAMOD R. INGLE**

B.E. (Mech. Engg.), L.M.I.S.T.E.  
Lecturer in Mech. Engg.  
B and B Institute of Technology  
Vallabh Vidyanagar  
ANAND

[FIFTIETH REVISED AND ENLARGED EDITION: 2011]



**Charotar PUBLISHING HOUSE PVT. LTD.**  
Publishers of Engineering Text-Books

Opposite Amul Dairy, Old Civil Court Road  
ANAND 388 001 Gujarat, India

40 Engineering Drawing

[Ch. 3

Therefore, H or HB grade of pencil is recommended for this purpose. The spacing between two letters should not necessarily be equal. The letters should be so spaced that they do not appear too close together or too much apart.

Judging by the eye, the back ground areas between the letters should be kept approximately equal. The distance between the words must be uniform and at least equal to the height of the letters. Refer to fig. 3-8.

Lettering should be so done as can be read from the front with the main title horizontal, i.e. when the drawing is viewed from the bottom edge.

All sub-titles should be placed below but not too close to the respective views. Lettering, except the dimension figures, should be underlined to make them more prominent.

(2) **Gothic letters:** Stems of single-stroke letters, if given more thickness, form what are known as *gothic* letters. These are mostly used for main titles of ink-drawings. The outlines of the letters are first drawn with the aid of instruments and then filled-in with ink.

The thickness of the stem may vary from  $\frac{1}{5}$  to  $\frac{1}{10}$  of the height of the letters.

Fig. 3-9 shows the alphabet and figures in gothic with thickness equal to  $\frac{1}{7}$  of the height.

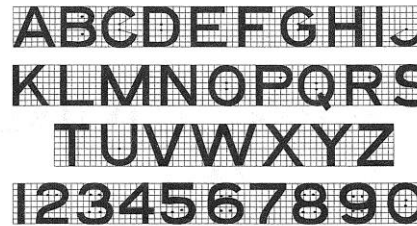


FIG. 3-9

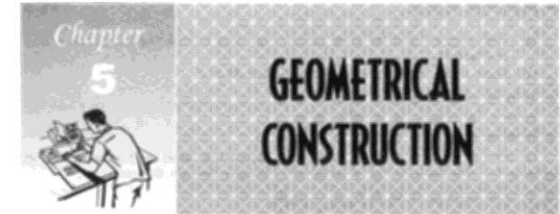
### 3-3. DIMENSIONING

Every drawing, whether a scale drawing or a freehand drawing, besides showing the true shape of an object, must supply its exact length, breadth, height, sizes and positions of holes, grooves etc. and such other details relating to the manufacture of that object.

Providing this information on a drawing is called dimensioning. Lines, figures, numerals, symbols, notes etc. are used for this purpose.

**Types of dimensions** (fig. 3-10): Two types of dimensions needed on a drawing are:

- size or functional dimensions and
- location or datum dimensions (shown by letters F and L respectively).



### 5-0. INTRODUCTION

In this chapter, we shall deal with problems on geometrical construction which are mostly based on plane geometry and which are very essential in the preparation of engineering drawings. They are described as under:

- |   |   |
|---|---|
| (1) Bisecting a line                      | (11) To construct squares                                   |
| (2) To draw perpendiculars                | (12) To construct regular polygons                          |
| (3) To draw parallel lines                | (13) Special methods of drawing regular polygons            |
| (4) To divide a line                      | (14) Regular polygons inscribed in circles                  |
| (5) To divide a circle                    | (15) To draw regular figures using T-square and set-squares |
| (6) To bisect an angle                    | (16) To draw tangents                                       |
| (7) To trisect an angle                   | (17) Lengths of arcs  |
| (8) To find the centre of an arc          | (18) Circles and lines in contact                           |
| (9) To construct an ogee or reverse curve | (19) Inscribed circles.                                     |
| (10) To construct equilateral triangles   |   |

### 5-1. BISECTING A LINE

**Problem 5-1.** To bisect a given straight line (fig. 5-1).

- Let  $AB$  be the given line. With centre  $A$  and radius greater than half  $AB$ , draw arcs on both sides of  $AB$ .

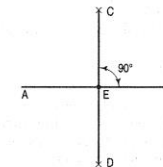


FIG. 5-1

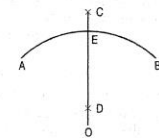


FIG. 5-2

## Exercise 01:

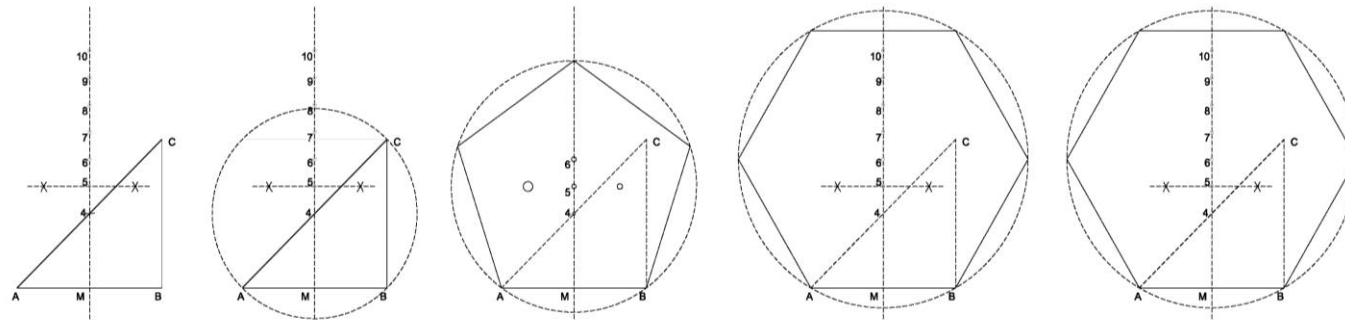
Introduction to architectural drafting

Drafting lines at 5mm distance – Vertical, Horizontal, Diagonal

Drafting squares

## Exercise 02:

Drafting polygons



- Part of the Skill module -01 is to introduce and improve the skill of architectural drafting for the first year students.

The exercise starts with setting up the drafting table, learn to tie the parallel bars and familiarize students to drafting tools.

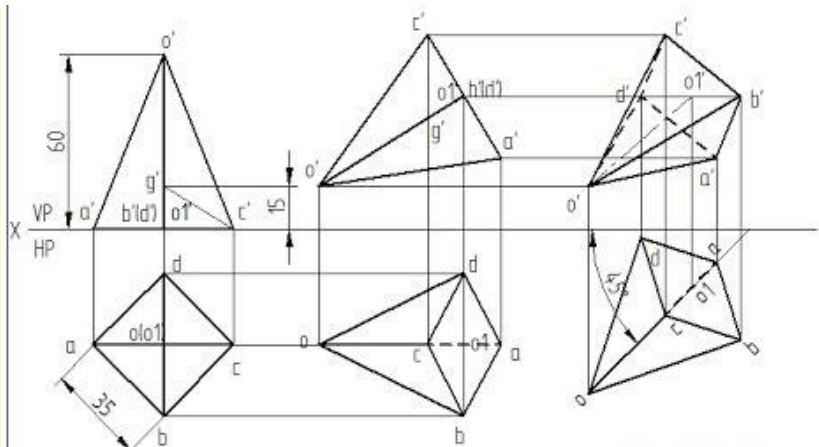
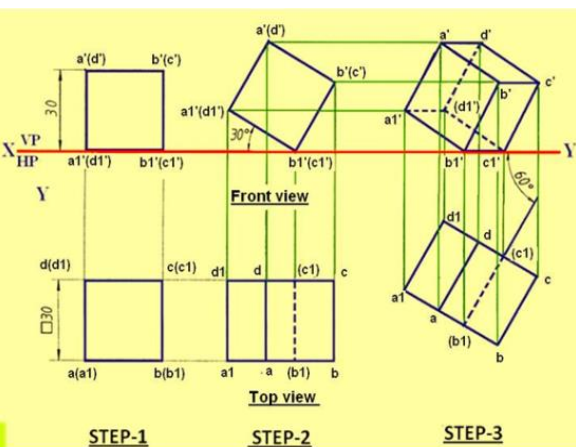
The students learn to draft basic geometry with maximum precision in 2 Dimensions and 3D.

This is the first introduction to making Plans, sections and elevations in architectural drawings.

## Exercise 03:

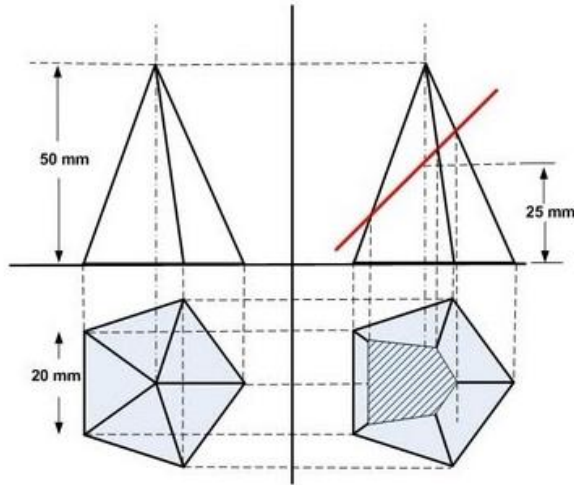
Projections of shapes and solid – Cube, Cuboid, Cone, Prism, Pyramid,

Tilting shapes @30 Degree



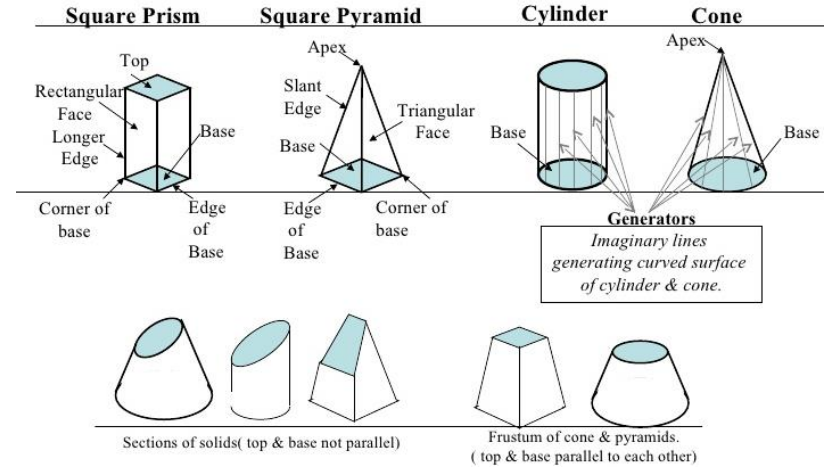
# Architectural Graphic Techniques (AGT)

## Exercise 04: Projection of cut solids

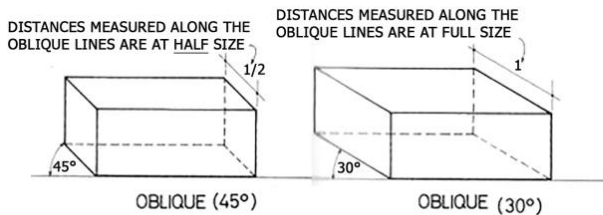
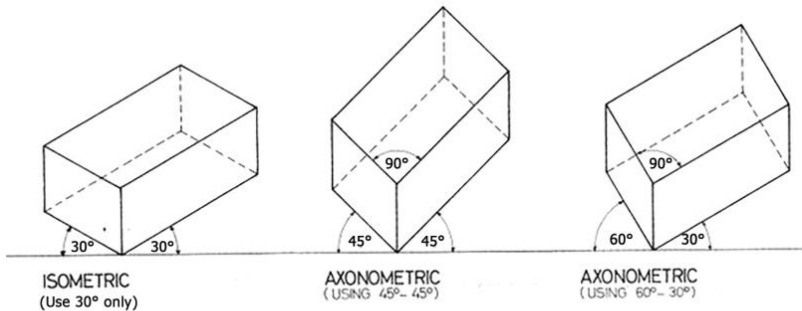


## SOLIDS

Dimensional parameters of different solids.



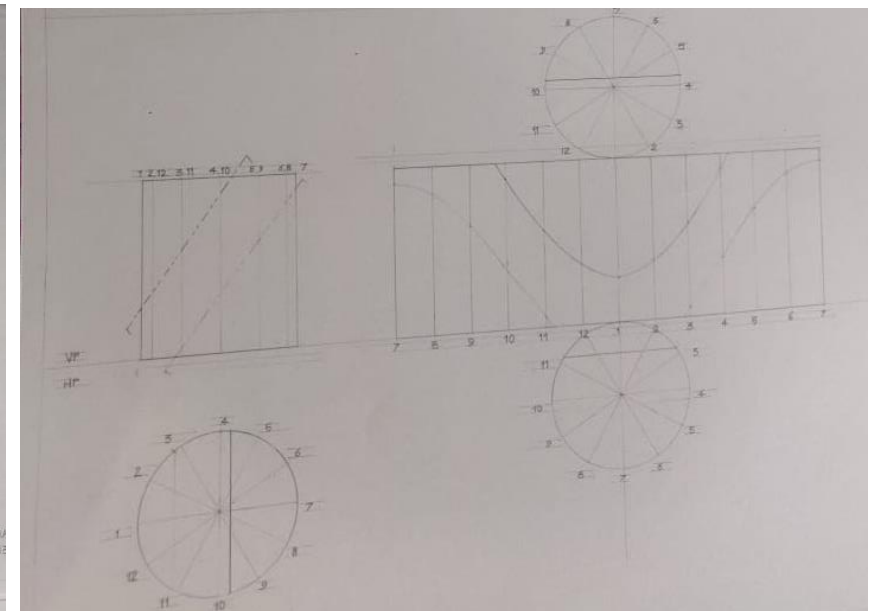
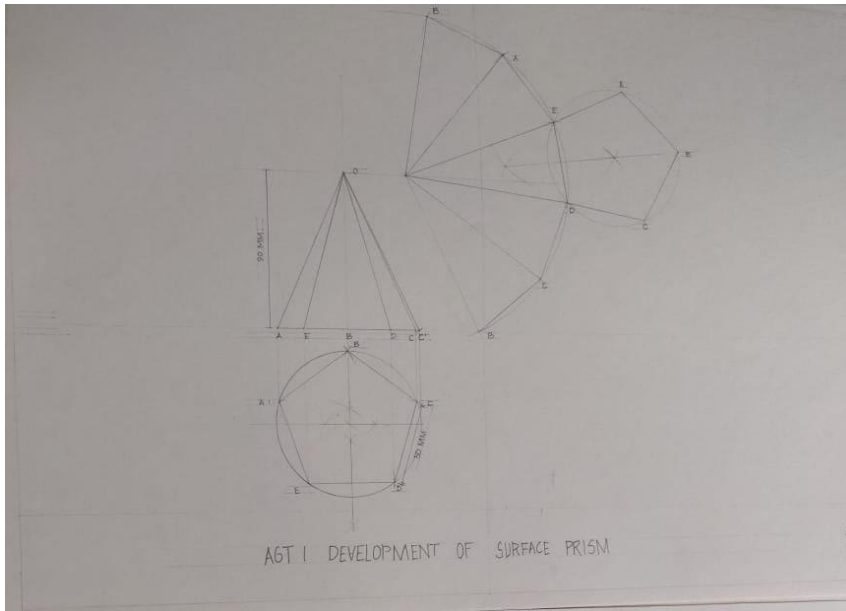
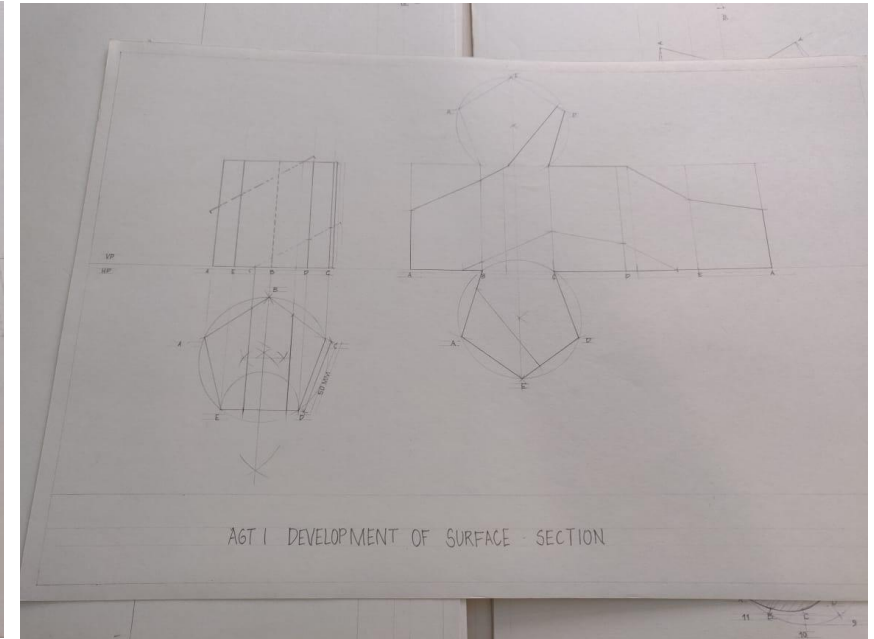
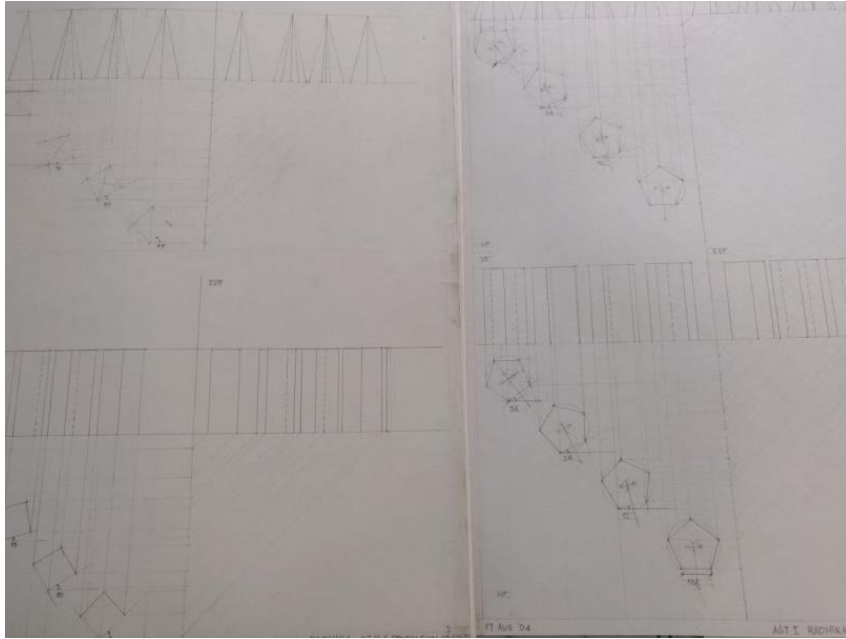
## Exercise 05: Axonometric & Isometric Projections

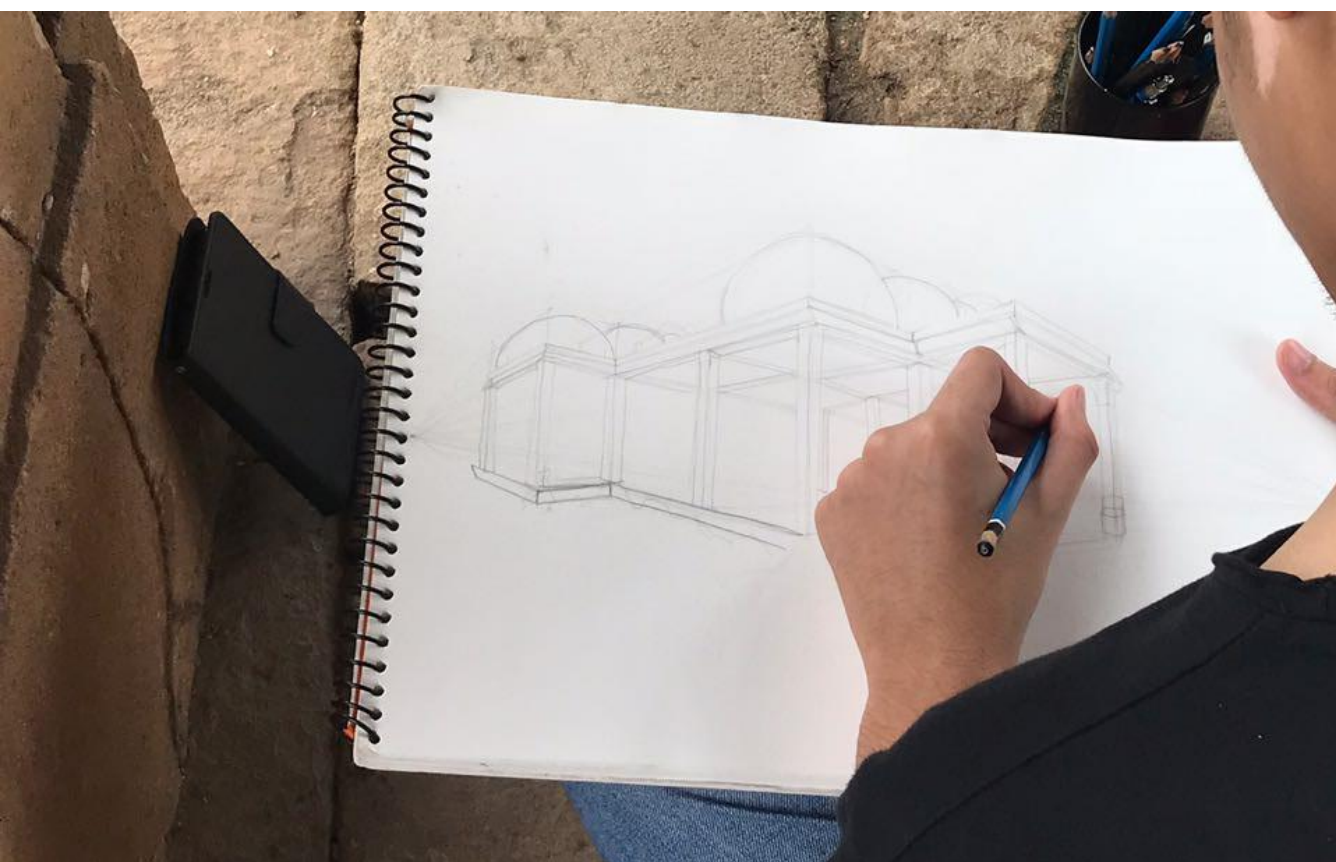


- The complexity of the drafting increases with basic shapes, shape cuts, and shape tilt.
- This exercise improves the visualization skills for students. It further helps them to make complex multiple objects & shapes together.



# Architectural Graphic Techniques (AGT)





## Sketching trips

- Students shall visit various areas of the city and campus – Old monuments, markets, important buildings, public spaces etc.
- Student shall make at least three sketches on the site on selected medium

