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BUILDING PLANNING AND DRAWING

1. According to IS:1444 - 1989 the standard size of drawing boards are :

Designation	Size
B_0	1000x1500
B_1	700x1000
B_2	500x700
B_3	350x500

2. Border lines : All the 4 sides 25 mm

3. Sheet sizes : Drawing sheets recommended by the Bureau of Indian standards are given below as per SP:46 - 1988 IS:10711 - 1983

Sheet designation	Trimmed size (mm)	Untrimmed size (mm)
A_0	841x1189	880x1230
A_1	594x841	625x880
A_2	420x594	450x625
A_3	297x420	330x450
A_4	210x297	240x330
A_5	147x210	165x240

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4. Title block : BIS recommended size is 185mm x 65mm (or) 150mm x 100mm
(i) Name of the student
(ii) USN
(iii) Semester and section
(iv) Title of drawing
(v) Scale
(vi) Units
(vii) Drawing sheet number
(viii) Date of drawing
(ix) Date of submission

5. Scales and scale drawing : SP46 (1988)

(i) Reducing scales :	1:2	1:5	1:10
	1:20	1:50	1:100
	1:200	1:500	1:1000
	1:2000	1:5000	1:10000
(ii) Enlarging scales :	50:1	20:1	
	5:1	2:1	
(iii) Full size scale :			1:1

6. Pencils : Initial work, construction lines, outlines, dotted lines, section plane line, dimension line, arrow heads are done with 2H pencils.
Centre line, section lines, final finishing done with 3H pencil

7. Types of lines : SP46-1988, IS:10714-1983
(for technical drawings)

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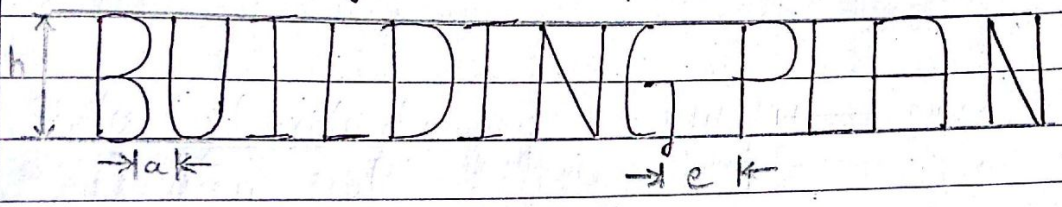
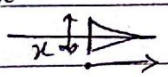
8. Lettering : IS:9609-1990, IS:909-1983
The main titles are generally written in 6mm to 8mm size, sub titles in 3mm to 6mm size while notes dimension figure etc in 3mm to 5mm size. The drawing number in the title block is written in numerals of 10mm to 12mm size.

Lettering height : (h)	5	7
Spacing between characters (a)	1	1.4
Minimum spacing b/w words (e)	3	4.2



Arrow head :



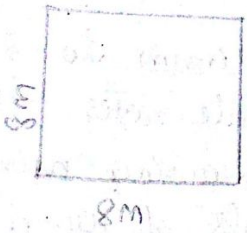
9. Placing of dimensions : Always towards right hand side

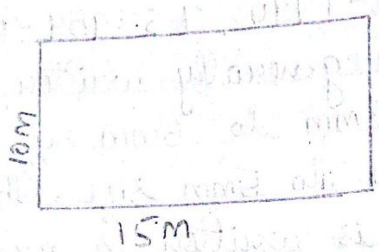
10. Scale : Conversion
If the scale is 1:100, and the actual dimension is 3m.
Then

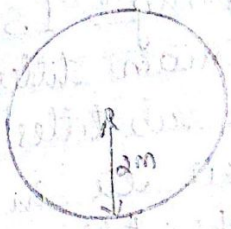
Drawing sheet		Actual dimension
1	:	100
?		3m
$\frac{3 \times 1}{100}$	=	0.03m
	or	3cm
	or	30mm

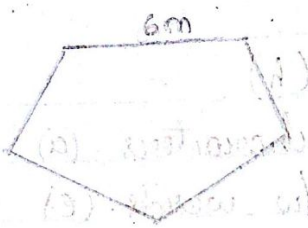
Scale	RF
Full size	1:1
50cm = 1m	1:2
40cm = 1m	1:2:5
20cm = 1m	1:5
10cm = 1m	1:10
5cm = 1m	1:20
2cm = 1m	1:50

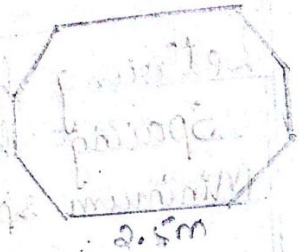
DSCE

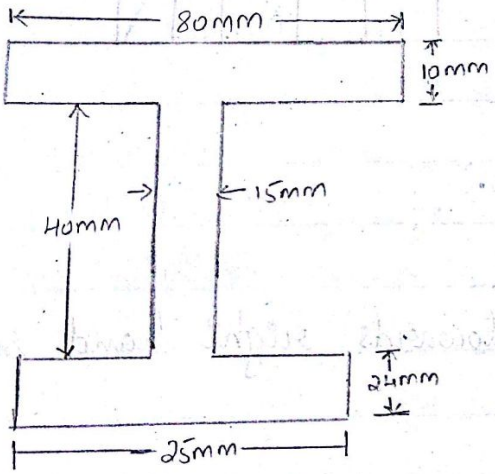


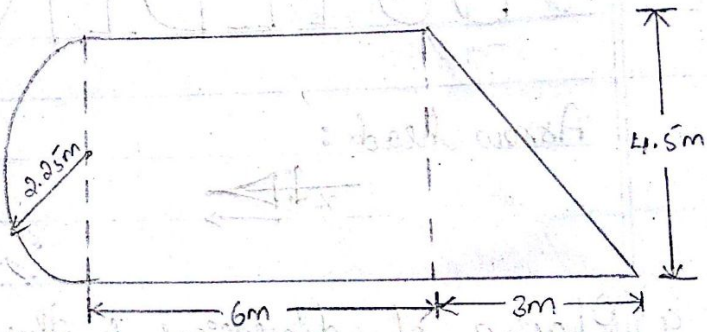


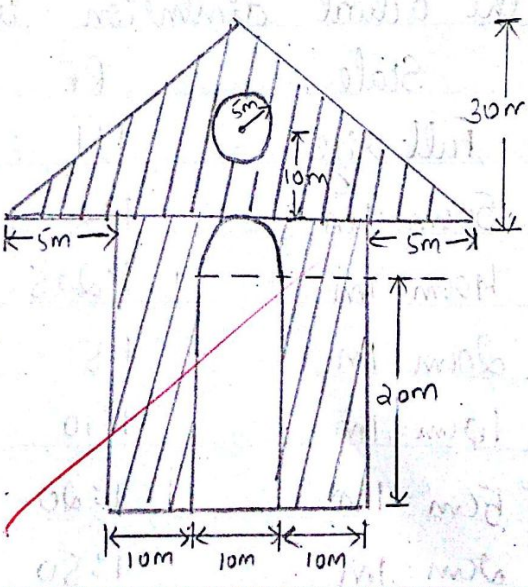


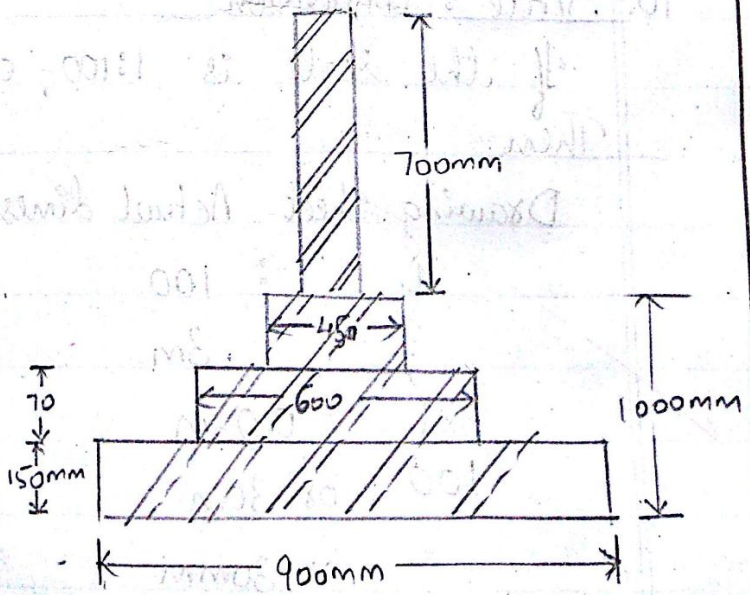












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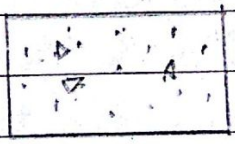
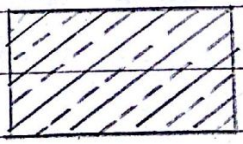
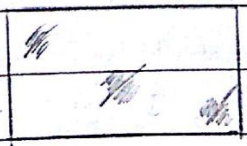
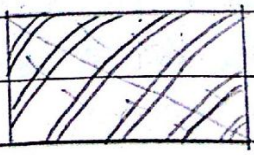
Types of lines :

	Description	Application
1.	Continuous thick	Visible outlines
2.	Continuous thin	Imaginary lines Dimension lines Projection lines Hatching
3.	Continous thin with Zig Zag	Long breadth line
4.	Dashed thin	Hidden outlines
5.	Chain thin	Centre line, lines of symmetry

Material	Symbol
Brick	
Concrete	
Natural stones	
Glass	
Wood	

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BASIC CONCEPTS OF THE BUILDING ELEMENTS

Building drawing includes the drawing of all the buiding elements like foundations, doors, windows, staircase, arches, floors etc. The complete structure of a building can be into two basic components

(i) Foundation or substructure

(ii) Superstructure.

The foundation is the structure below the ground surface and superstructure is that above the ground surface.

Foundation or substructure:

Foundation is the portion of building which goes below the ground level. It transmits the load coming from the superstructure on to the subsoil below it. The soil which is located immediately below the base concrete of the founda-tion is called subsoil and foundation soil. Foundation may consist of concrete, stone & brick footings above base concrete

(i) Footings: Footings are stepped courses in foundation. These are constructed in brick masonry as stone masonry as concrete masonry under the wall or columns for distributing the load of the superstructure on to a larger area of subsoil.

(ii) Base concrete: Base concrete or bed concrete is the very first course of the foundation above the levelling course, i.e, it is the bottom most structural bed, transferring the load of the structure on to a wider base below it. It provides stability & strength to foundation.

D D M M Y Y Y Y

(iii) Plinth: It is the portion of the structure above the ground upto the floor level. The level of the floor is usually known as the plinth level. Plinth level is raised above the natural ground level so that the floor level of the building is fairly above the adjacent road level which is likely to be raised year after year. While the natural ground is uneven, plinth level is fairly uniform. Higher plinth protects the building from rain water, frost and traffic dangers. Plinth height may be 300mm to 600mm, but 450mm is more common.

(iv) Flooring: The purpose of a floor is to provide a level surface for the occupants of a building. The flooring will be generally of plain cement concrete (PCC) 1:4:8 of above 150mm finished with cement mortar 1:3 of above 20mm thick or of mosaic tiles or marble or polished granite etc.

(v) Damp-proof course (DPC): Dampness is the presence of gravitational or hydroscopic moisture (absorbing moisture from air). Dampness gives rise to unhygienic conditions, apart from reduction in strength of structural components of the building. Damp proof course of 20mm to 25mm thick is a continuous layer of rich concrete provided at the plinth level beneth the walls to prevent the entire moisture into the building.

Masonry:

The term masonry is used to indicate the art of building the structures in stones or bricks.

Brick masonry: Constructions carried out using bricks & mortar is termed as brick masonry standard size of brick is 19cm x 9cm x 9cm

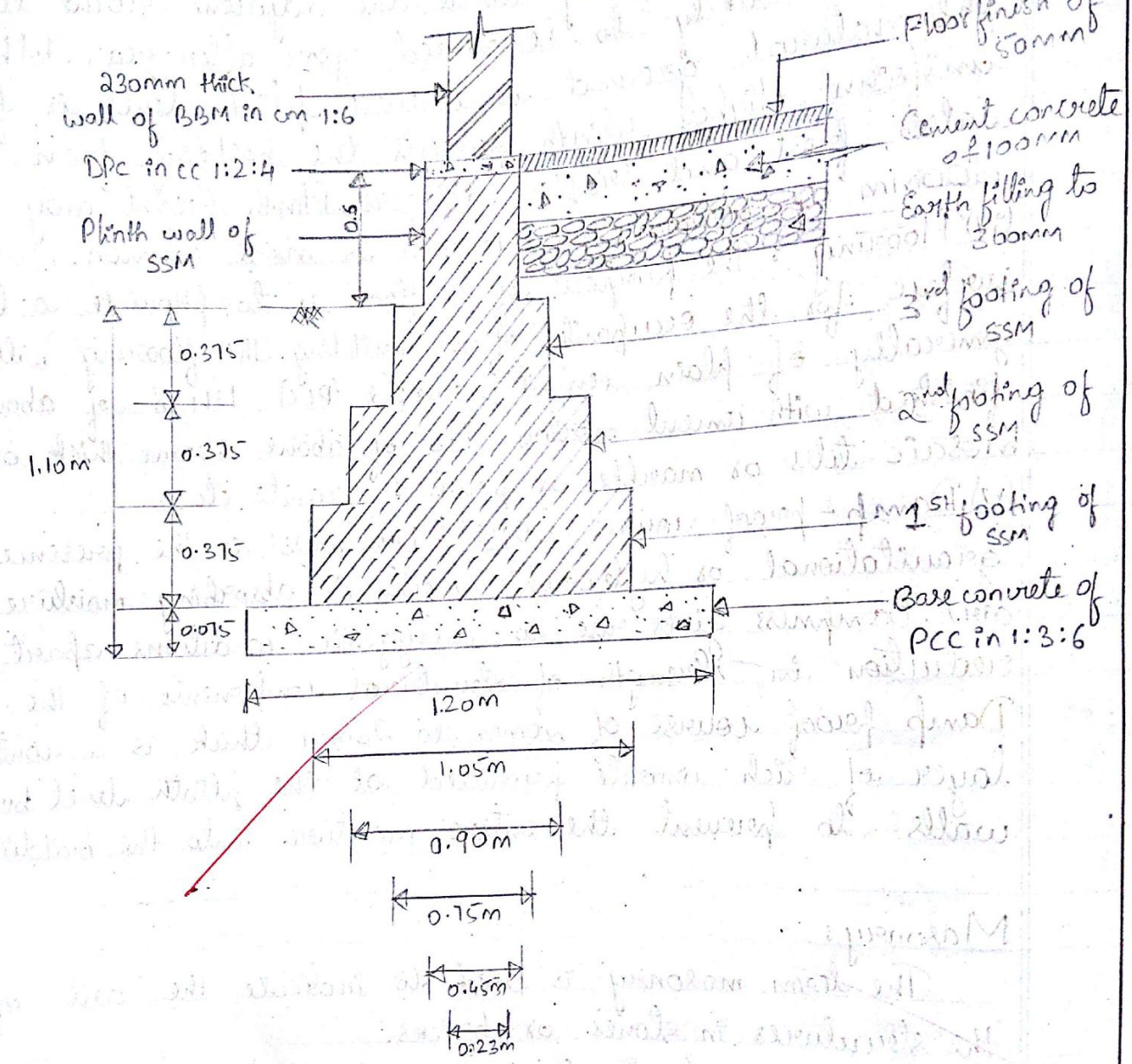
D D M M Y Y Y Y

Stone masonry: The construction of walls, pillars etc are carried out using stone blocks and mortar is known as stone masonry. Stone masonry when constructed in squared well shaped blocks is termed as ashlar masonry and when the unsquared irregular shaped stone blocks it is known as rubble masonry.

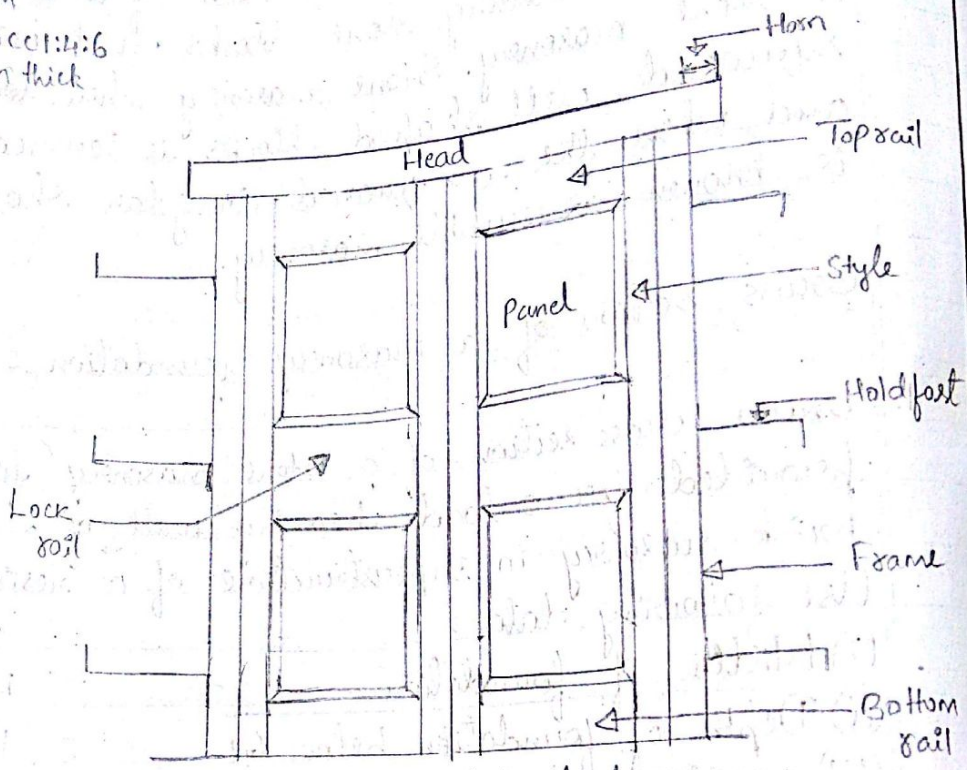
Cross section of a masonry foundation:

1. Draw cross section of a stone masonry foundation to be provided for a load bearing wall of 230mm thick in burnt brick masonry in superstructure of a residential building. Use following data:

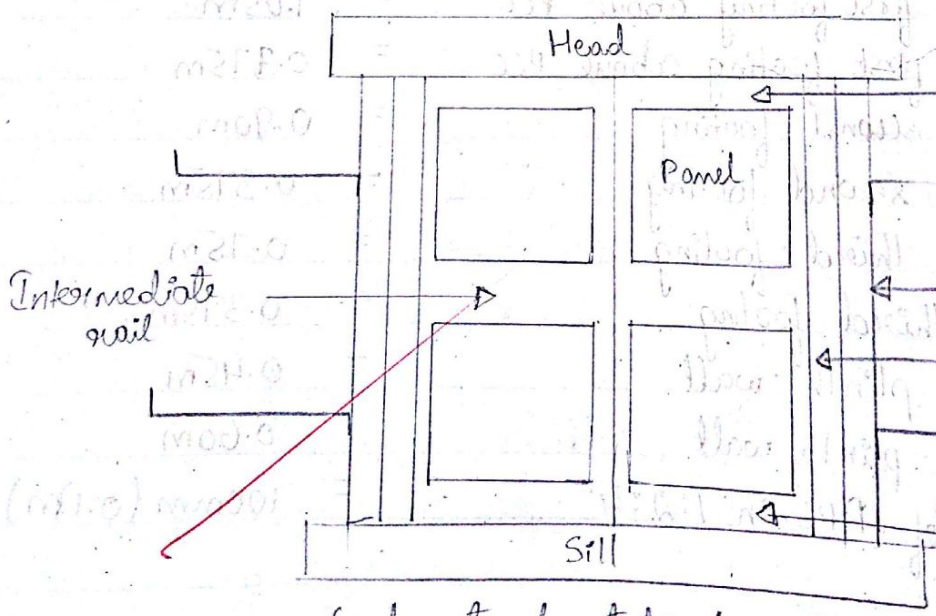
(i) Width of foundation	=	1.20m
(ii) Depth of foundation below GL	=	1.20m
(iii) Width of PCC	=	1.20m
(iv) Thickness of PCC in 1:3:6	=	75mm (0.075m)
(v) Width of first footing above PCC	=	1.05m
(vi) Depth of first footing above PCC	=	0.375m
(vii) Width of second footing	=	0.90m
(viii) Depth of second footing	=	0.375m
(ix) Width of third footing	=	0.75m
(x) Depth of third footing	=	0.375m
(xi) Width of plinth wall	=	0.45m
(xii) Depth of plinth wall	=	0.60m
(xiii) Thickness of DPC in 1:2:4	=	100mm (0.1m)



Section



Components of a typical door



Components of a typical window (front elevation)

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Doors and windows:

A door may be defined as an openable barrice secured in a wall opening. A door consists of two parts

(i) door frames

(ii) door shutters

The door shutter is held in portion by the door frame.

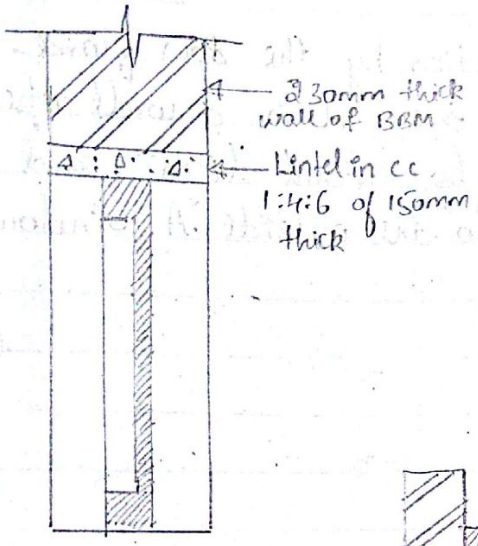
A window is also a barrier secured in a wall opening The function of the window is to admit light and air to the building & to give a view to the outside. A window also consists of two parts

(i) Window frame

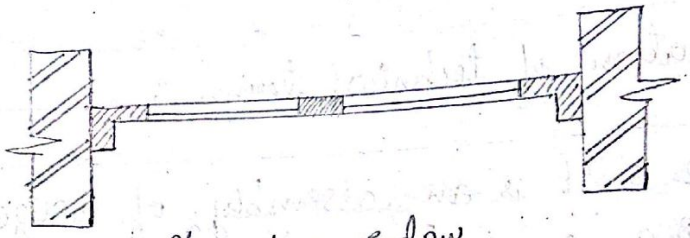
(ii) window shutter

Defination of technical terms:

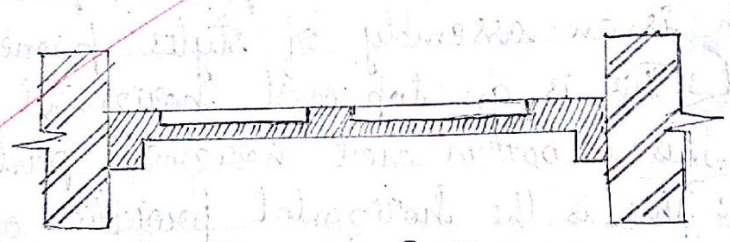
1. Frame: It is an assembly of horizontal and vertical members forming an enclosure towards to which shutters are fixed.
2. Shutters: These are the openable parts of a door or window which is an assembly of styles, pannels & rails.
3. Head: This is an top most horizontal part of a frame.
4. Sill: This is bottom most horizontal part of the window frame.
5. Horn: This is the horizontal projection of the head & sill of a frame facilitate the fixing of the frame on the wall opening. The length of the horn is kept about 10 to 15 cm.
6. Style: It is verticle outside member of the shutter of door or window.
7. Top rail: This is the top most horizontal member of shutter
8. Lock rail: This is the middle horizontal member of a door



Section



Plan of a window



Plan of a Door

D D M M Y Y Y Y

shutter, to which locking arrangement is fixed.

9. Bottom rish : This is the bottom most horizontal members of a shutter.

10. Intermediate or iron rail : An additional rail fixed between the top rail and bottom rail is called iron and or rail fixed between the top soil & lock soil is called frieze rail

11. Pannel : This is the horizontal area of shutter enclosed b/w the adjacent rails

12. Transom : This is a horizontal member of a frame which is employed to sub divide a window opening horizontally

13. Hold fasts : These are mild steel flats generally bent into T shape to fix or hold the frame to the opening. The horizontal length of hold fast is kept about 20cm & is embedded in the masonry

14. Rebate : It is the depression made inside the doors frame to recieve the door shutter.

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D D M M Y Y Y Y

WALL FOOTING

The footing transmits the load into the soil. The lower the bearing capacity of soil, the wider the footing needs to be, if the soil is very strong, the footing isn't even strictly necessary just the soil under the wall would be enough to hold the building up.

Wall footing is a continuous strip of concrete that rescues to spread the weight of a load-bearing wall across an area of soil. It is the component of a shallow foundation.

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ISOLATED FOOTING

Isolated footing is one of the shallow foundation. It is circular, square or rectangular of uniform thickness. Sometimes it is stepped/sloped to spread the load over a larger area. When footing is provided to support an individual column it is called as isolated footing

It is not necessary to have isolated footings at all times and in all soil condition.

Footings is designed to sustain the applied loads. Moments and forces and the induced reactions to ensure that any settlement which may occur is as nearly uniform as possible and safe bearing capacity of the soil is not exceeded.

It is one of the shallow foundation.

DOGLEGGED - STAIRCASE

A Dog legged is a configuration of stairs b/w 2 floors of a building, often a domestic building in which a flight of stairs ascends to a half-landing before turning at a right and and continuing upwards. The flights do not have to be equal and frequently are not.

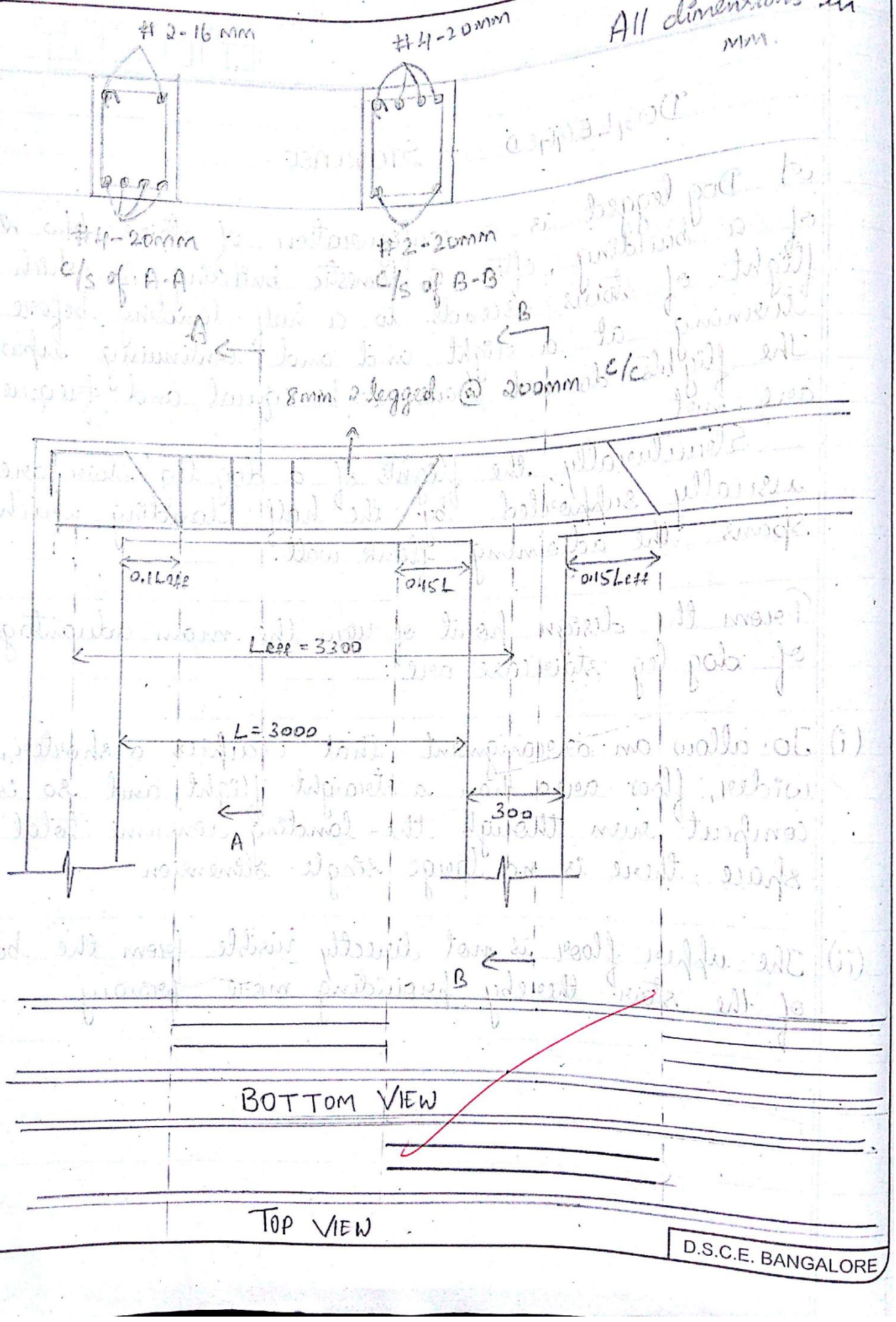
Structurally, the flights of a dog leg stair are usually supported by the half landing which spans the adjoining flank wall.

From the design point of view the main advantages of dog leg staircase are:

(i) To allow an arrangment that occupies a shorter, though wider, floor area than a straight flight and so is more compact even though the landing consume total floor space, there is no large single dimension

(ii) The upper floor is not directly visible from the bottom of the stair thereby providing more privacy.

All dimensions in mm.



D.S.C.E. BANGALORE

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CONTINUOUS BEAM:

A continuous beam is a statically indeterminate structure The advantages of a continuous beam as compared to a simply supported beam are as follows:

(i) For the same span and section, vertical loads capacity is made

A continuous beam is a statically indeterminate multi span beam on hinged support the end span may be cantilever, may be freely supported or support is fixed.

19/9/17