

Planning :-

It is the process of thinking about & organizing the activities required to achieve a desired goal.

Factor to be Consider :-

- a) Local planning policy.
- b) Building by byelaws.
- c) Building regulation.
- d) Design & access statement.
- e) Locally available resources.
- f) Material required for construction.
- g) Geographical Location of Site.
- h) Climate condition.
- i) Owner budget & requirement.

General Principle of Planning :-

1) Orientation :- The building should be planned according to wind direction, sunlight, and climate.

- a) Aspect :- Rooms should face the right direction for sunlight & ventilation.
(e.g.; living room toward east.)
- b) Prospect :- The building should provide a pleasant external view & appearance.

2) Circulation :- Circulation deals with the movement of people inside and around the building. passage, corridors & staircases should be comfortable movement.

- a) vertical :- (stairs, lift)

- b) Horizontal :- (Same floor)

3) Grouping :- Grouping refers to the arrangement of room according to their function.

(For e.g., the kitchen should be near the dining room, & Bedroom should be close to bathrooms ... etc.)

4) Roominess :- The building appears spacious and comfortable without wasting space. It can be achieved by proper arrangement of rooms.

5) Economics :- The plan should be use material efficiently & well - budget required.

6) Elegance :- The plan should be use attractive & well - proportioned.

7) furniture requirements :-

Room should be planned & sized to fit necessary furniture comfortably & allowed easy movement.

8) flexibility :- Plans should be adaptable to changing condition.

9) Privacy :- Private areas (like : Bedroom, toilets) should be separated from public areas.

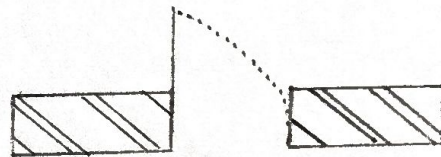
Size of Rooms for Residential Building :-

S.NO.	Name of Room	LIG	MIG	HIG	Minimum aspect
1.	Drawing room	3.5 x 3.0	4.2 x 4.0 to 4.5 x 4.0	5.0 x 4.2 to 7.2 x 5.5	16 m ²
2.	Dining room	3.0 x 2.8	3.5 x 3.1 to 7.0 x 3.1 (Drawing cum dining)	4.0 x 3.5 to 5.0 x 4.0	7.5 m ²
3.	Bed room	3.5 x 3.0	4.6 x 3.6	4.8 x 4.2	12 m ²
4.	Store room	2.25 x 2.2	3.0 x 2.8	3.0 x 3.0	3 m ³
5.	Kitchen	2.5 x 2.2	2.0 x 2.5	3.5 x 3	8 m ²
6.	Bath and W.C	2.1 x 1.5	3.0 x 1.6	3.5 x 2.5	5.5 m ²
7.	Bath (separate)	1.1 x 1.0	1.8 x 1.2	2.5 x 2.0	4 m ²

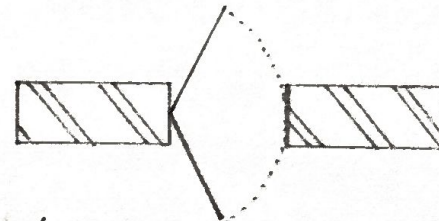
Symbols in Civil Engineering Drawing :-

1) Symbols for doors :-

a) Single leaf door :-

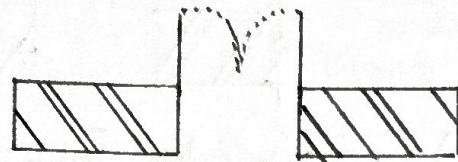


(Single leaf single swing)

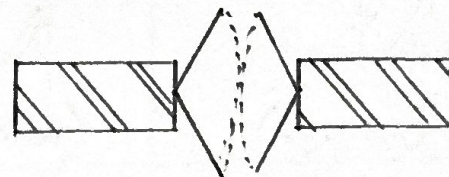


(Single leaf double swing)

b) Double leaf door :-



(Double leaf single swing)

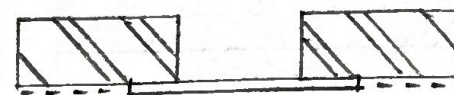


(Double leaf double swing)

c) Sliding door :-



(one way sliding door)



(Two way sliding door)

d) Revolving door :-



(Revolving door)

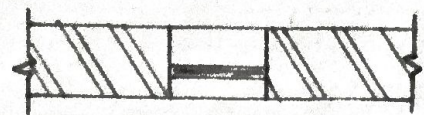
e) Door opening :-



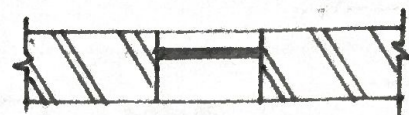
(Door opening)



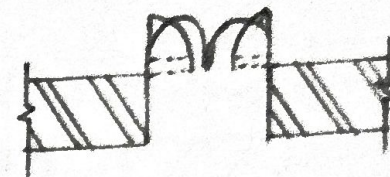
2) Symbols for windows :-



(window frame Outside)



(window frame Inside)



(window folding double leaf)

3) Symbols for cupboard and almirah :-

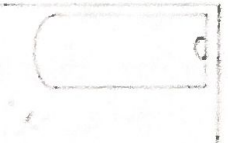
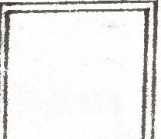
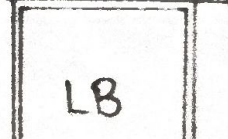
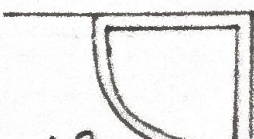


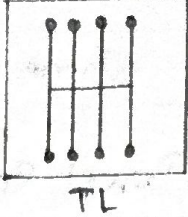
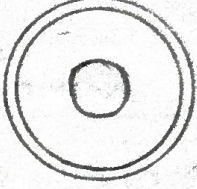
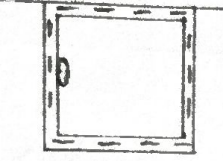
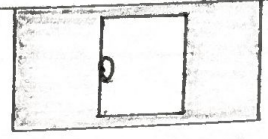
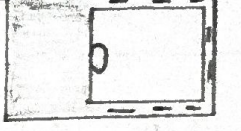
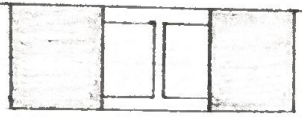
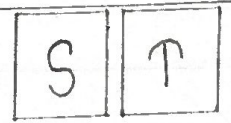
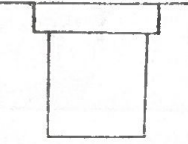
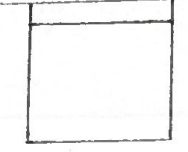
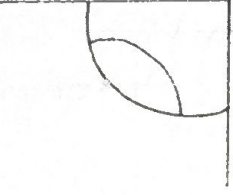
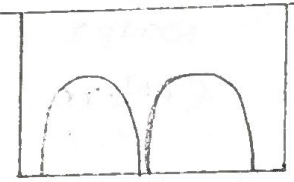
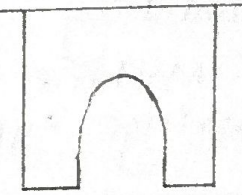
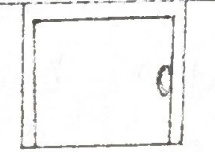
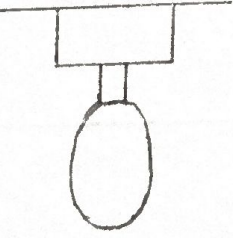
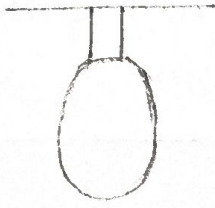
(Cup board)



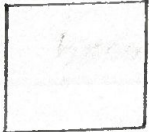
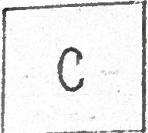
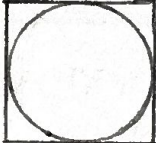
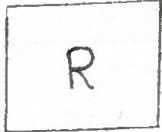
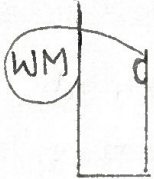
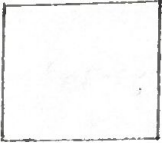
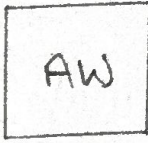
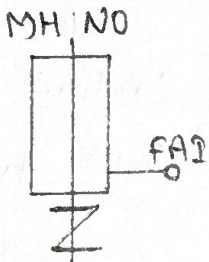
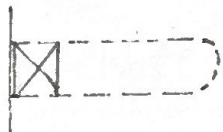
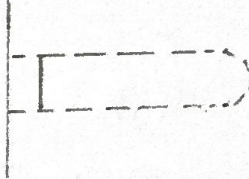
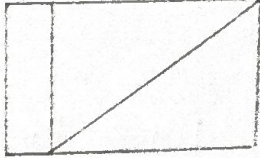
(Almirah)

4) Symbols for Sanitary installations :-

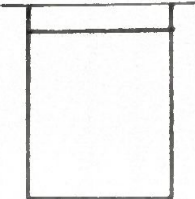
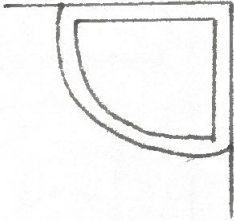
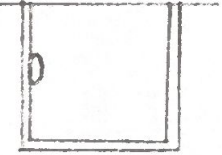
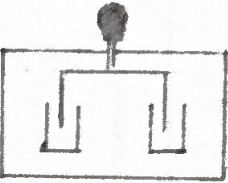
Name	Symbol	Name	Symbol	Name	Symbol
Rectangular bath		Roll Rim bath		foot bath	
Shower stall		Shower Head		Bidet	
Pedestal Lavatory Basin		Wall Lavatory Basin		Corner Lavatory Basin	

Name	Symbol	Name	Symbol	Name	Symbol
Through Lavatory wall type		Through Lavatory island type		Circular washing fountain	
Plan Kitchen Sink		Kitchen Sink with double drainage board		Kitchen Sink with single drainage board	
Double Sink unit		Sink and tub seat		Combination Sink	
WC low down		WC		Urinal wall hung	
Urinal corner hug		Urinal stall		Urinal floor	
Slab Urinal		Pedestal Urinal		Indian type WC	
Low tank WC		WC no tank flush type		Pedestal Drinking fountain	

5) Symbols for fittings:-

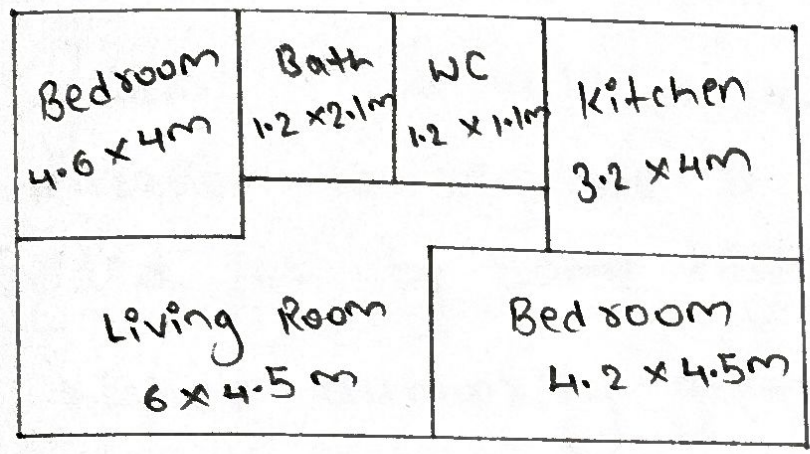
Name	Symbol	Name	Symbol	Name	Symbol
Manhole or Inspection chamber	 MH or I/C	Towel Rail		Gully	 G
Stair	 UP	Grease Trap	 GT	Cooker	 C
Rain water Outlet	 RWO	Refrigerator	 R	Rodding Eye	 RE
Washing Machine wringe type		Cold water Cistern	 CWC	Washing Machine Automatic	 AW
Intercepting Trap and fresh inlet	 MH NO FAI	Build in iron board		Surfacing iron board	
Vent inlet		Vent outlet		BED	

Symbol -

Name	Symbol	Name	Symbol	Name	Symbol
Concrete work		Exhaust fan		Double leaf double swing	
Wood work		Water closet		Wood across grain	
Light Bracket		Stair		Brick	
Two-Way Switch		Powel Rail		Corner wash basin	
Buzzer		kitchen Sink		Main Switch Power	

Question :-

Q1)



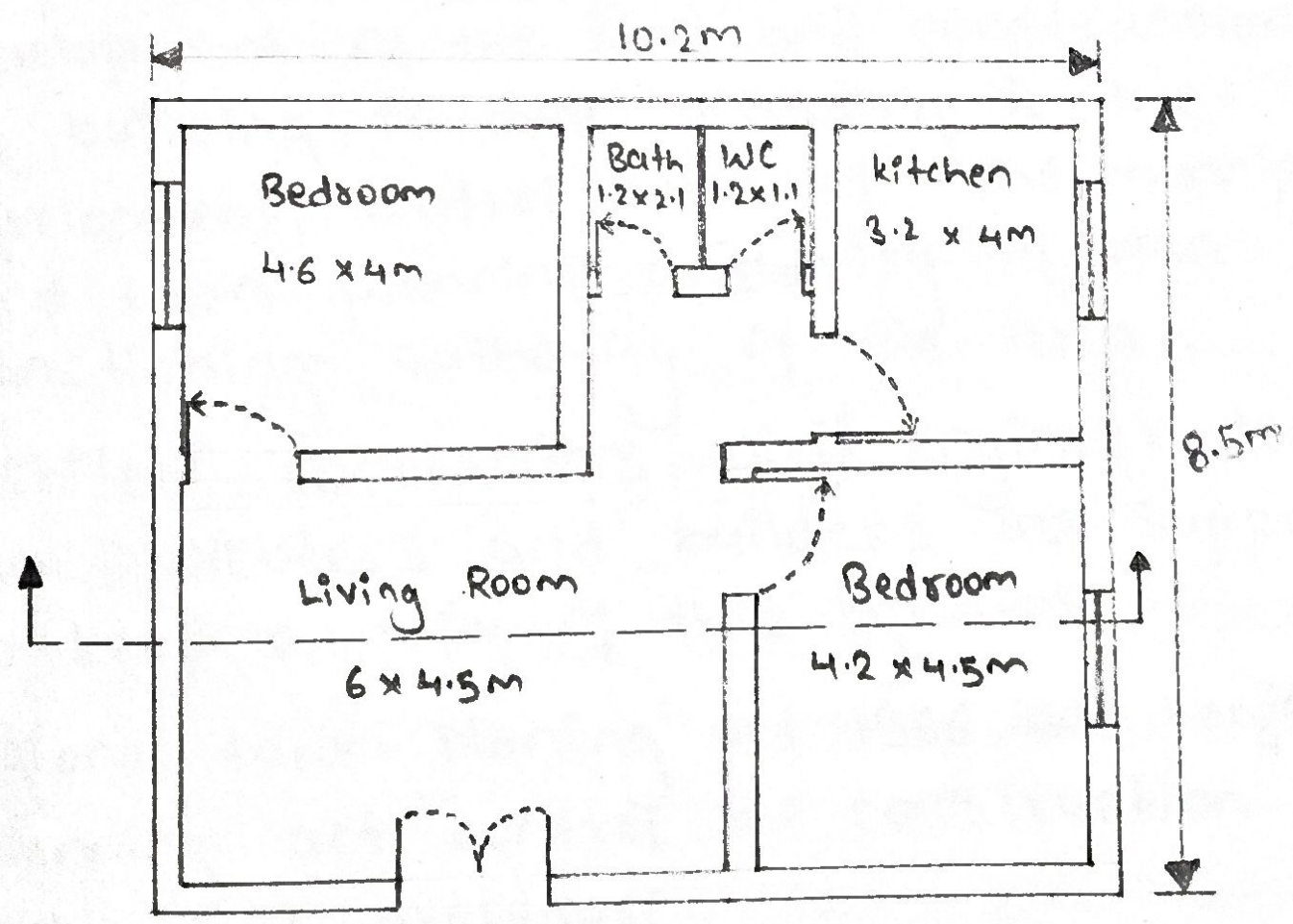
Q2)

Adapt Scale 1:100

1m : 100cm

$$\frac{1}{100} \times 100 = 1\text{cm}$$

1m : 1cm



Q.27

Kitchen 3.4 x 2.7	Dinning cum Living 1.7 x 4.9 m	
Drawing Room 3.4 x 4.6	Master Bedroom 2.9 x 4.9 m	Changing Room 1.8 x 2
Verandah 3.4 x 2.5 m	Wc Bath 1.8 x 2.9	

Q.27

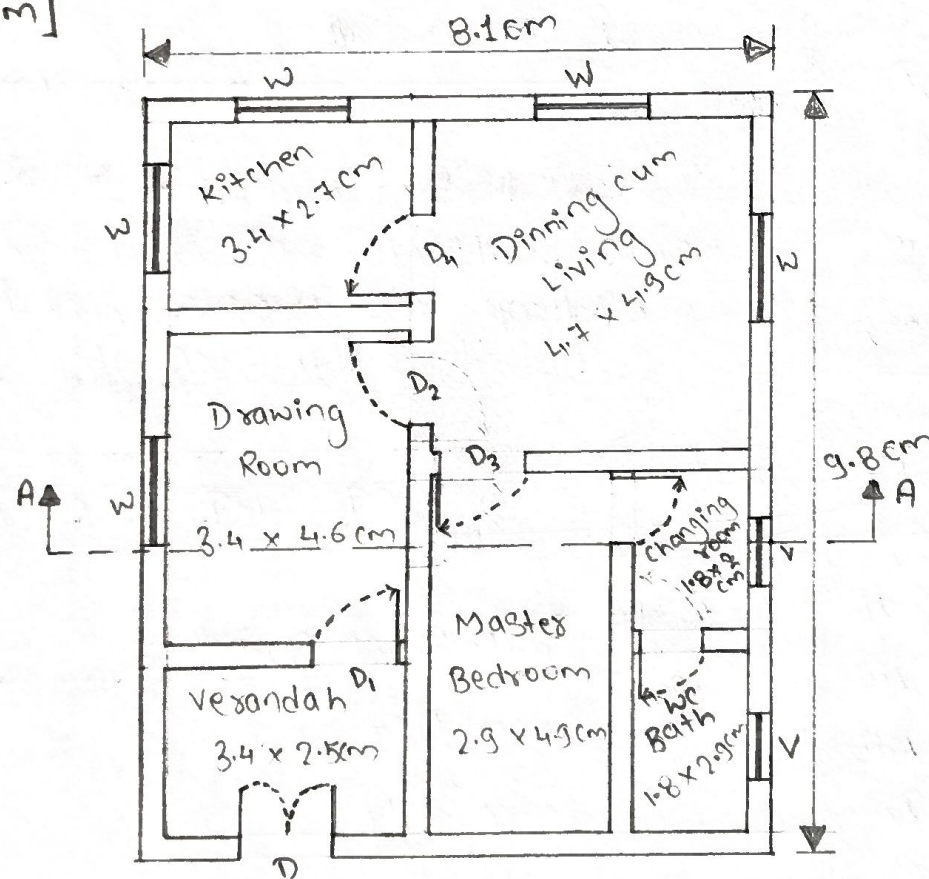
Adapt scale 1:100

1m : 100cm

$\frac{1}{100} \times 100 = 1\text{cm}$

[1m : 1cm]

Particular	Actual Dimen.	Drawing Dimen.
1) Door	1.2 x 2.1 m	1.2 x 2.1 cm
2) Window	1.5 x 1.5 m	1.5 x 1.5 cm
3) Wall thickness	300 mm	0.3 cm
4) WC Bathwindow	0.9 x 0.5 m	0.9 x 0.5 cm



Q. Explain in Brief Building Byelaws?

Ans

- a) A Byelaws is a rule or law established by an organization to regulate it self as allow or provided for by some higher authority.
- b) The higher authority generally a legislature or some other government body established the degree of control that the byelaws may exercise.
- c) Munciple byelaws are public regulatory law which apply in the certtain area.
- d) Development of the land and construction of building is done according to the development control rules of the municipality and town planning authority. of plan sanctioning authority of the area.
- e) Architect, contractors, civil engineer draft-man promoters and builders are supposed to keep a copy of this byelaws.
- f) Regional town planing act 1966 and town planning act control the construction & development procedure.
- g) for some area the industrial development authority and revenue department act as Plan Sectioning authority.

→ These regulation give detailed requirement for the following:-

- 1) Layout plan, size of plot, width of road and open space.
- 2) Building line
- 3) Buildup area & floor area ratio.
- 4) Marginal distance around building for open space.
- 5) Height of the building
- 6) Maximum no. of storey/se.
- 7) Maximum no. of tenement.
- 8) Plith height.
- 9) Room area. (minimum room dimension.)
- 10) Ventilation.
- 11) Stairs case & lift.
- 12) water supply & sanitary arrangement.
- 13) Balconies, chajjas, other over hanging & poches
- 14) Basement.
- 15) Group housing Scheme.
- 16) Co-operative housing Scheme.
- 17) Industrial or Public building.
- 18) Shop
- 19) parking space & garages.
- 20) Compound wall.

→ The building byelaws may be summarized as -

1) Building line :- It means the permissible line to which the plinth of building is allowed to extend.

• This line is also called front building line or set back line.

Type of Road	Building Line
1) National or State highway.	30 m
2) Measure district road	15m
3) other district road.	9m
4) Village road	9m

2) Build-up area :- This is actual ground area covered by the building above plinth level. Area like garden, pool, boundary wall gate are not included.

$$\text{BUA} = \text{Plot area} - \text{open space}$$

Area	BUA Limitation
1) Less than 200 sq.m.	60% of plot area.
2) 200m ² - 500 m ² .	50% of plot area.
3) 500m ² - 1000m ²	40% of plot area.
4) more than 1000m ²	33.3% of plot area

3) Plinth area :- This is build-up cover area measured at the floor level of the basement or any story.

*The following shall be included in the plinth area:-

a) Area of the wall at the floor level excluding plinth of set.

b) Porch or other cantilever projection provided.

*Following are not included in plinth area:-

a) Unenclosed balcony, unless they form a story at the terrace level, tower dom projecting above the terrace level.

4) Floor area :- This is the useable covered area of the building at any floor level.

• To get the floor area the area of wall shall be deducted from the plinth area. to arrived at the floor area.

5) Carpet area :- This is the floor area of the use able room at any floor level.

• The carpet area of the floor shall be the floor area excluding following portion.

i) Corridor & passage.

ii) Verandah

iii) Garage

iv) Stairs case & lift.

6) Floor area ratio :-

a) In town planning scheme one of the important factors to be control is the density of Population.

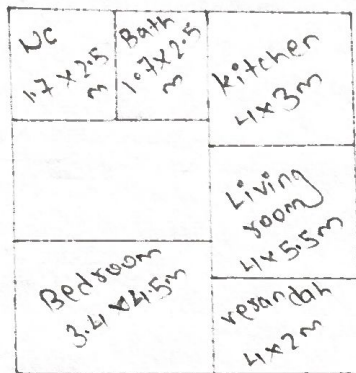
b) It is measure of the intensity of land use it is expressed as no. of person living on a unit of land

c) Floor area is the new concept of regulate Population density and to control over crowding the dwelling unit. It limit the total floor area of a building in relation to the plot area.

E.g. Floor area ratio is 1.6 means that the total area of the floor is building cannot be greater than 1.6 times the area of the plot.

$$FAR = \frac{\text{Total covered area of all floors}}{\text{Plot area}} \times 100$$

Q.3)



Q.4)

Adapt Scale 1:50

1m : 100cm

$$\frac{1}{50} \times 100 = 2 \text{ cm}$$

1m : 2cm

Pasticular	Actual dimension
1) Door	1.2 x 2.1 m
2) window	1.5 x 1.5 m
3) wall thickn- -ess	300 mm
4) WC bath window	0.9 x 0.5 m

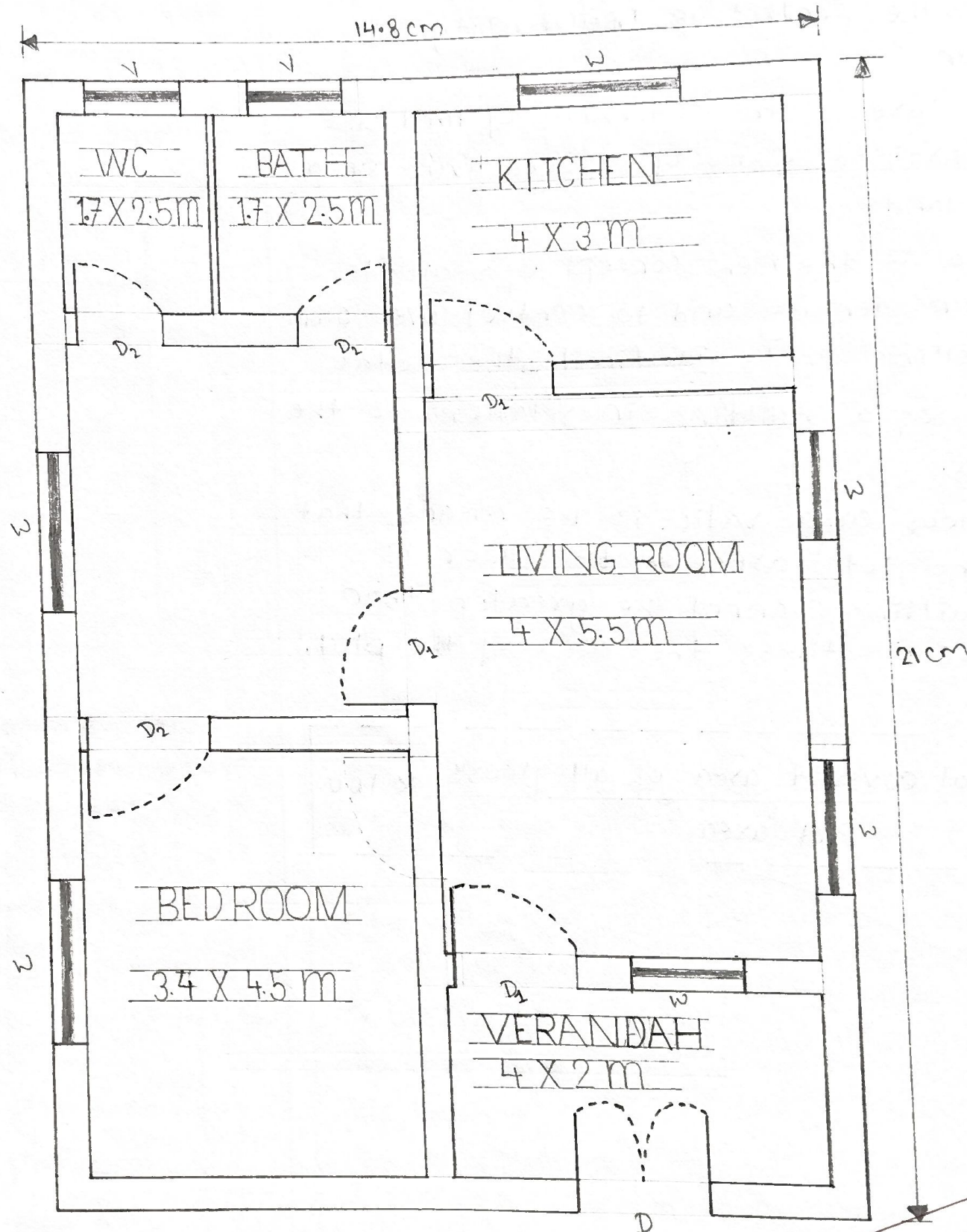
Drawing dimension

1) 2.4 x 4.2 cm

2) 3 x 3 cm

3) 0.6 cm

4) 1.8 x 1 cm



Q.4)

Q.4)

Q.4)

Kitchen 3.7 x 5.4 m	Bedroom 5.6 x 4 m
Drawing room 3.7 x 4.1 m	Toilet 4 x 2 m
Verandah 3.7 x 2.5 m	Bedroom 5.6 x 4 m

Q.1)

Adapt. Scale 1:50

1m : 100cm

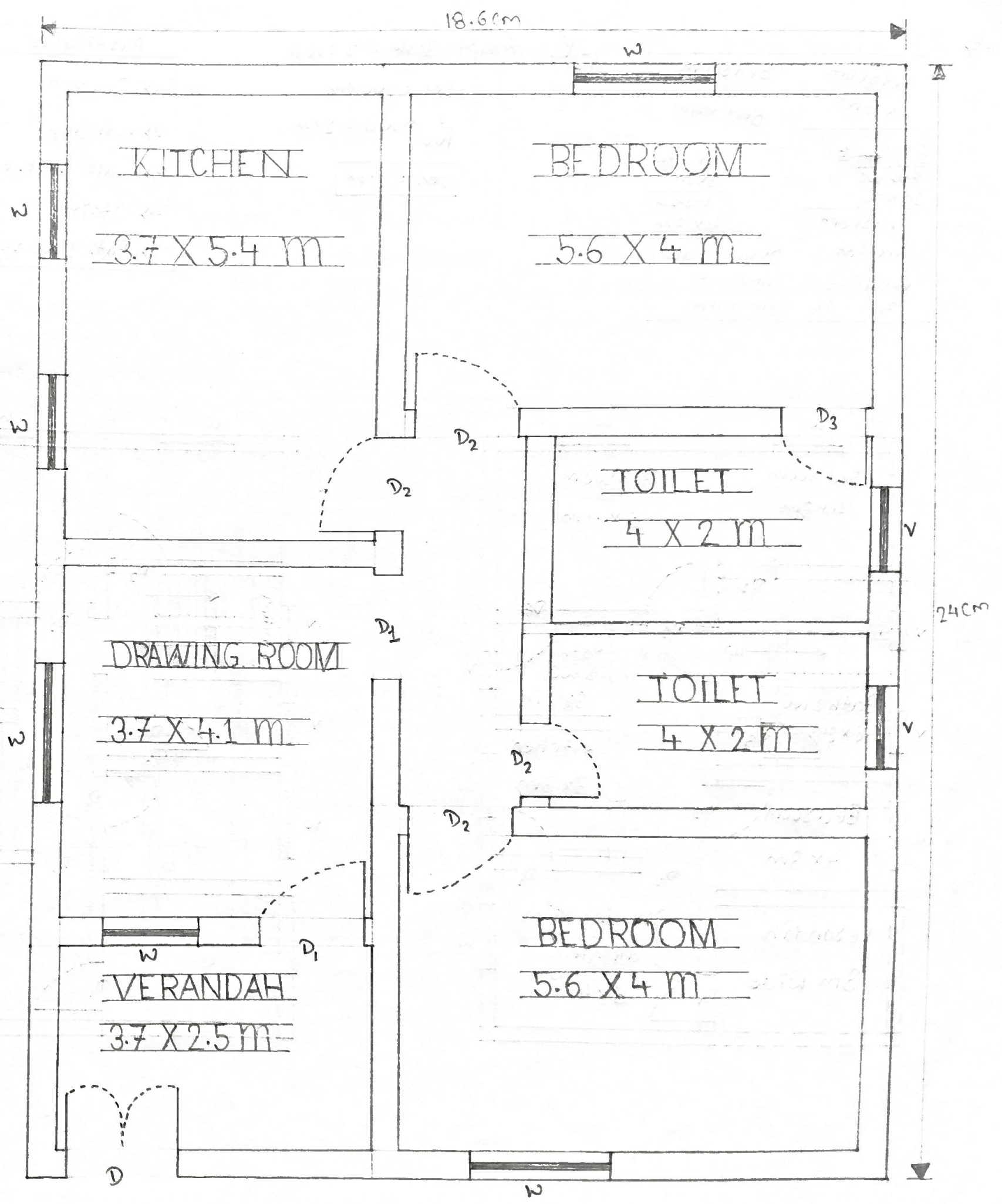
$\frac{1}{50} \times 100 = 2\text{cm}$

1m = 2cm

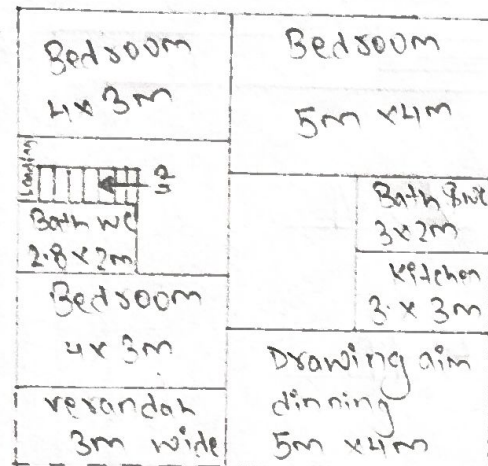
Particulars	Actual dimension.
1) Door	1.2 x 2.1m
2) window	1.5 x 1.5m
3) Toilet ventilat-ion.	0.9 x 0.5m
4) wall thickness	300mm
5) Toilet Door	

Drawing Dimension.

- 1) 2.4 x 4.2 cm
- 2) 3 x 3 cm
- 3) 1.8 x 1 cm
- 4) 0.6 cm



Q.5)



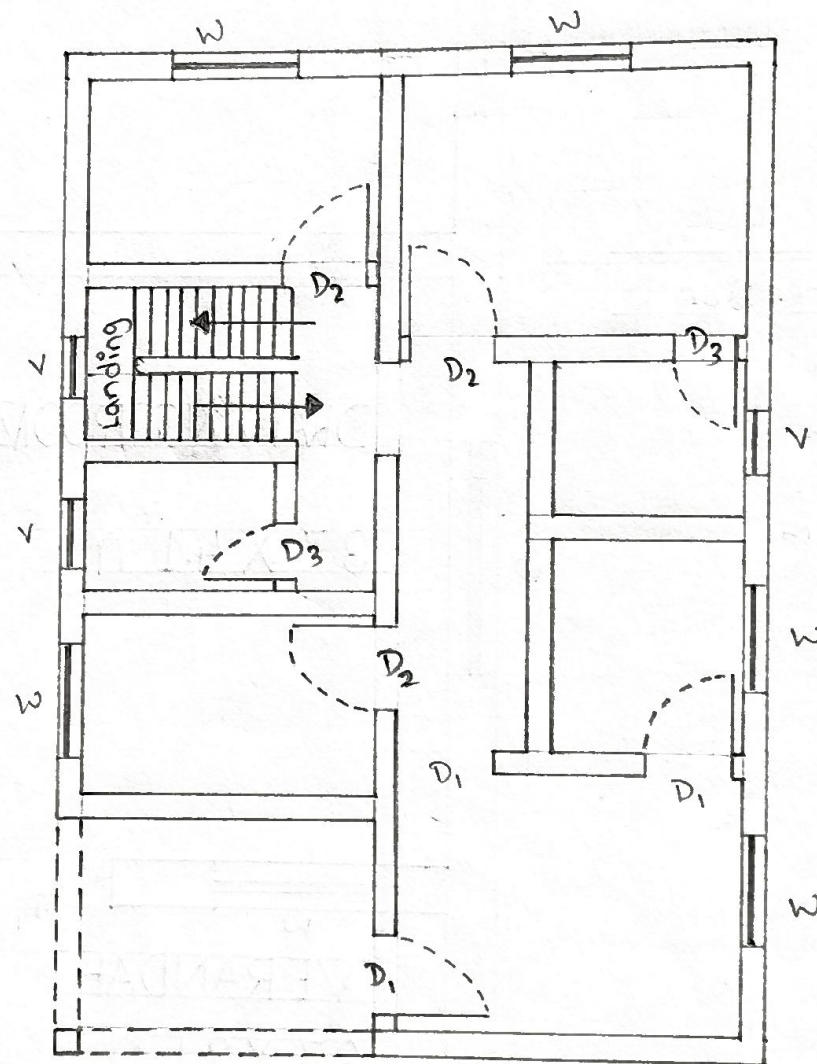
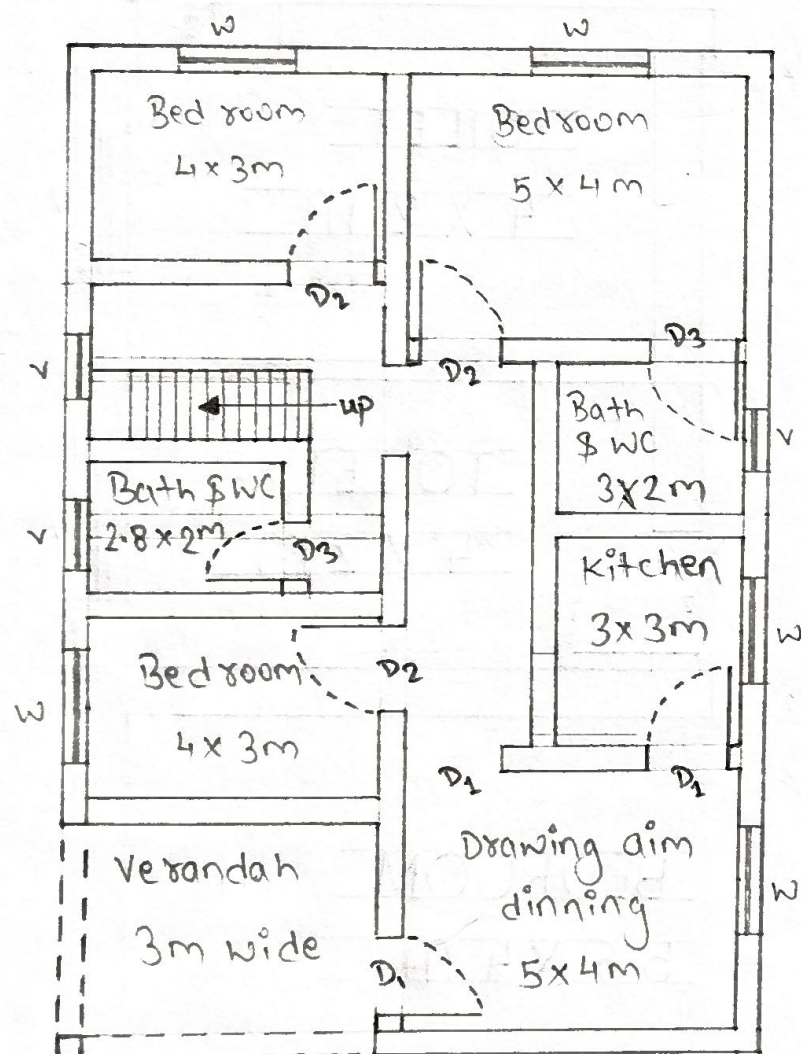
Adapt Scale: 1:100

1m : 100 cm

$\frac{1}{100} \times 100 = 1\text{cm}$

1m = 1cm

Particular	Actual dimension	Drawing Dimen.
1) Door	1.2 x 2.1 m	1.2 x 2.1 cm
2) Window	1.5 x 1.5 m	1.5 x 1.5 cm
3) wall thickness	300 mm	0.3 cm
4) Stair	0.9 m	0.9 cm
5) Bath & WC ventilation	0.9 x 0.5 m	0.9 x 0.5 cm



Q.6

Stair Hall 5 x 2.1 m		Rear Verandah 5.5 m wide	Bath & WC 4.0 x 2 m
Bath 2.5 x 1.9 m	Dress 2.5 x 1.9 m		Bed room 4 x 4.5 m
Bed room 5 x 5 m		Drawing & Dinning 5 x 6.5 m	Washing area 2.5 x 1.5
Verandah			Kitchen 4 x 4 m

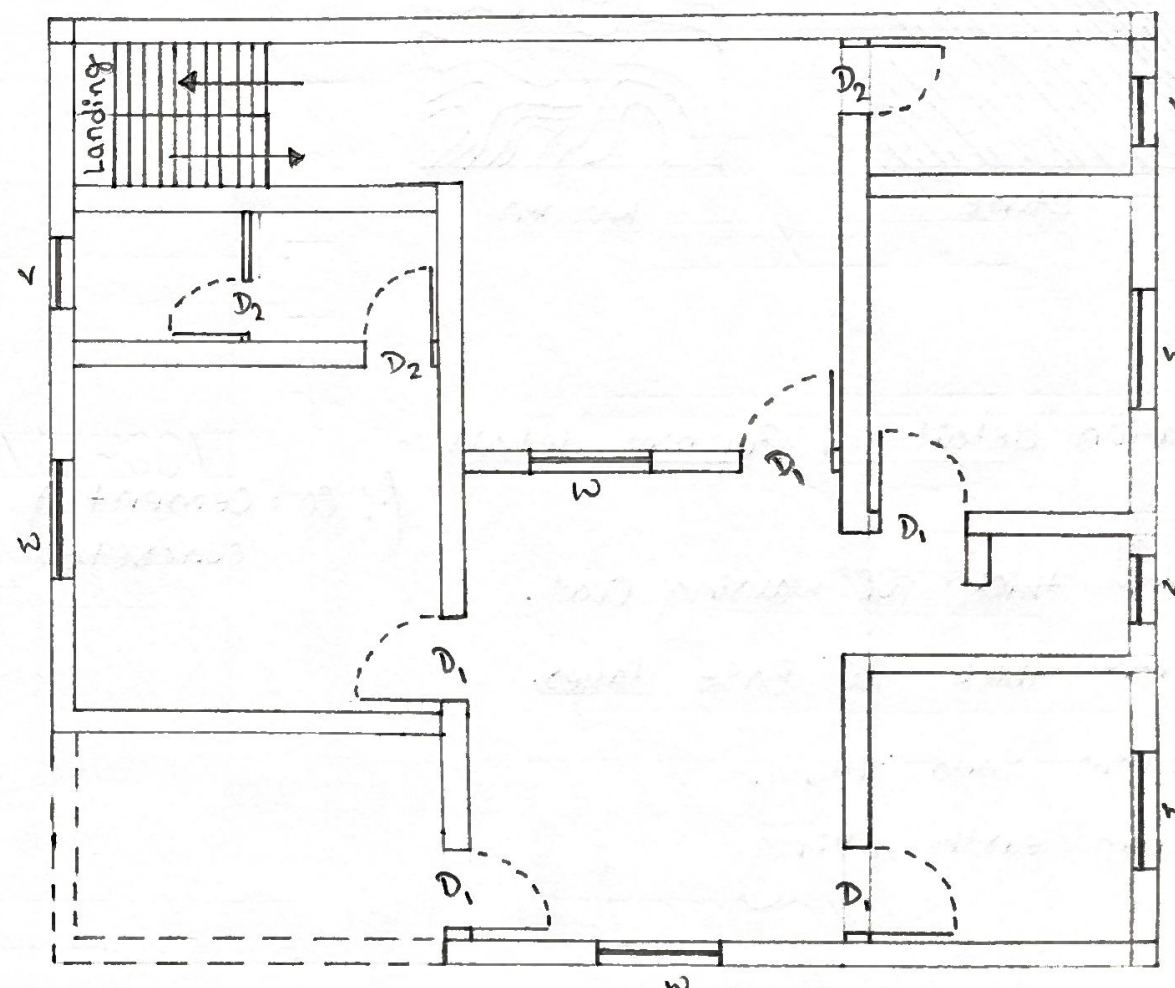
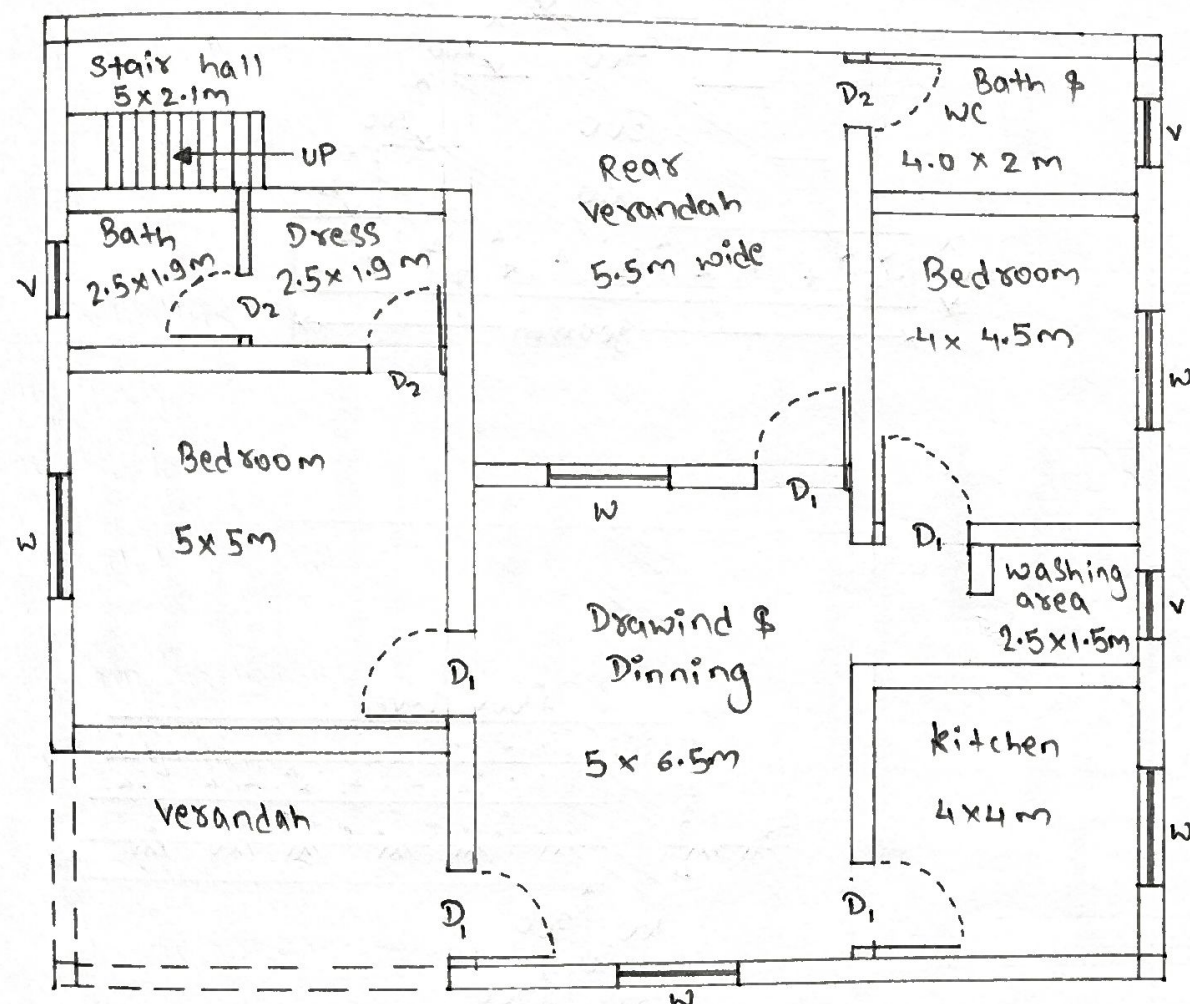
Q.6.1. Adapt scale : 1 : 100

1 m : 100 cm

 $\frac{1}{100} \times 100 = 1 \text{ cm}$

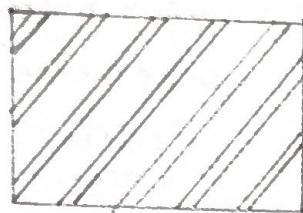
1 m : 1 cm

Particular	Actual Dimension	Rear Dimension
1) Door (D_1)	1.2 x 2.1 m	1.2 x 2.1 cm
2) D_2	0.9 x 2 m	0.9 x 2 cm
3) window (w)	1.5 x 1.5 m	1.5 x 1.5 cm
4) ventilation (v)	0.9 x 0.5 m	0.9 x 0.5 cm
5) wall thickness	300 mm	0.3 cm
6) Stair	0.9 m	0.9 cm

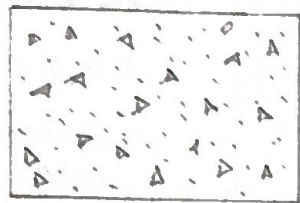


Section and Elevation :-

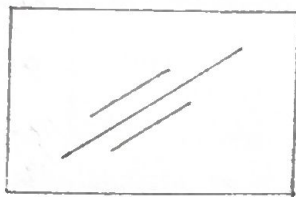
→ Symbols :-



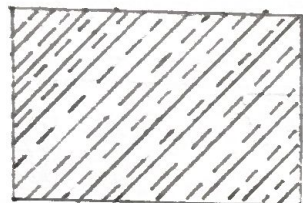
Brick



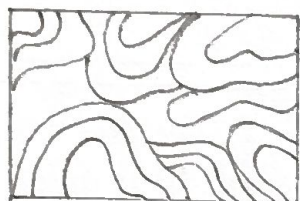
Concrete



Glass



Stone

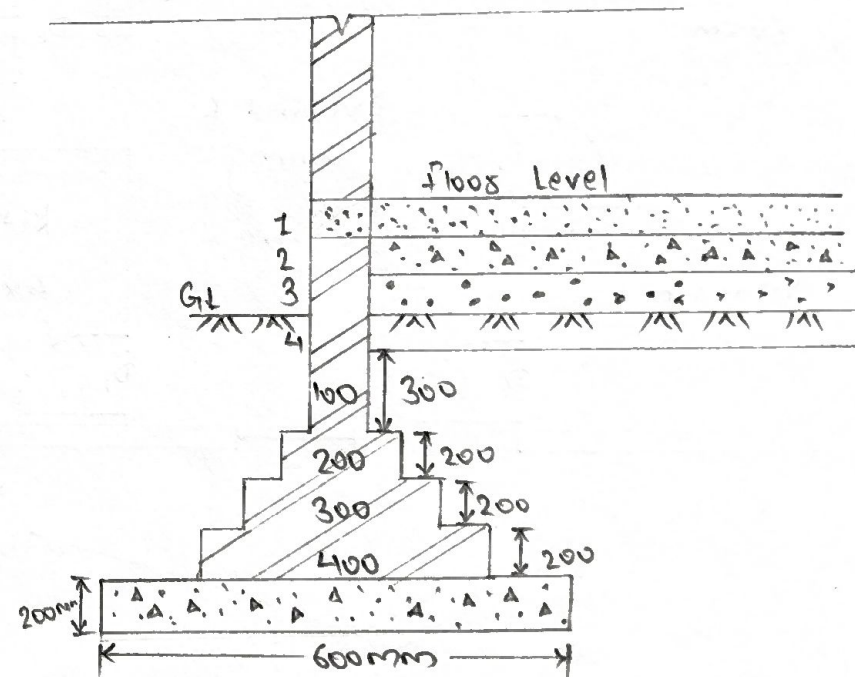
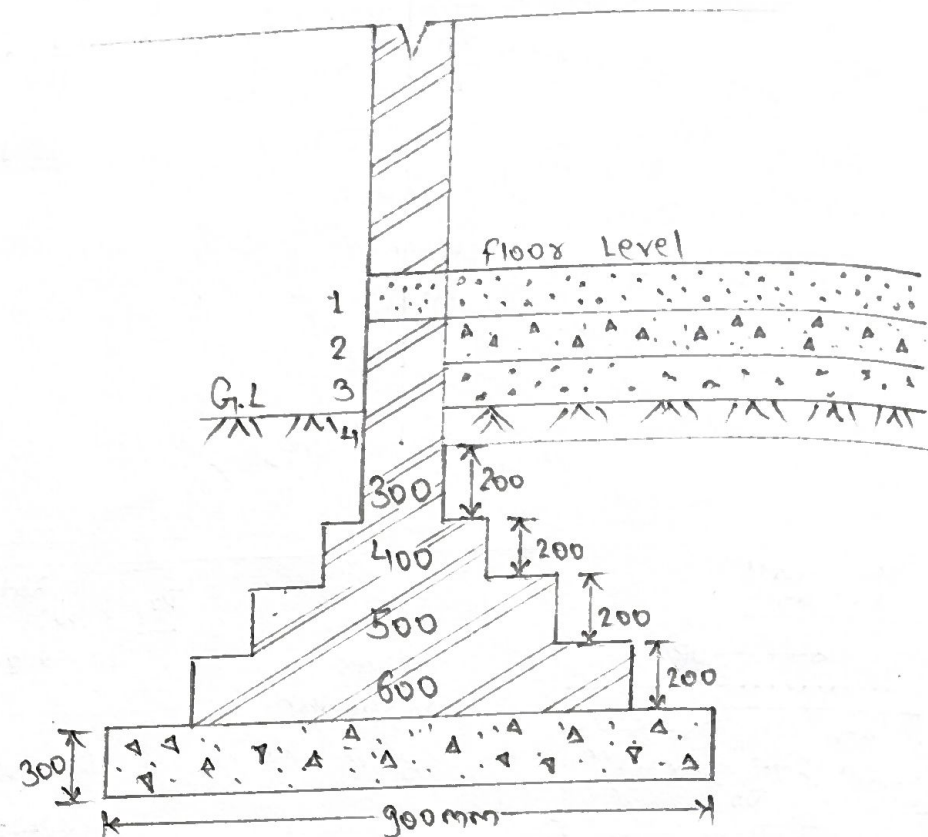


Wooden

→ Foundation detail for 300 mm detail :-

- 1) 50 mm thick CC wearing coat.
- 2) 50 mm thick CC Base layer.
- 3) 100 mm Sand filling.
- 4) 100 mm earth filling.

(∴ CC = cement concrete)



Question:-

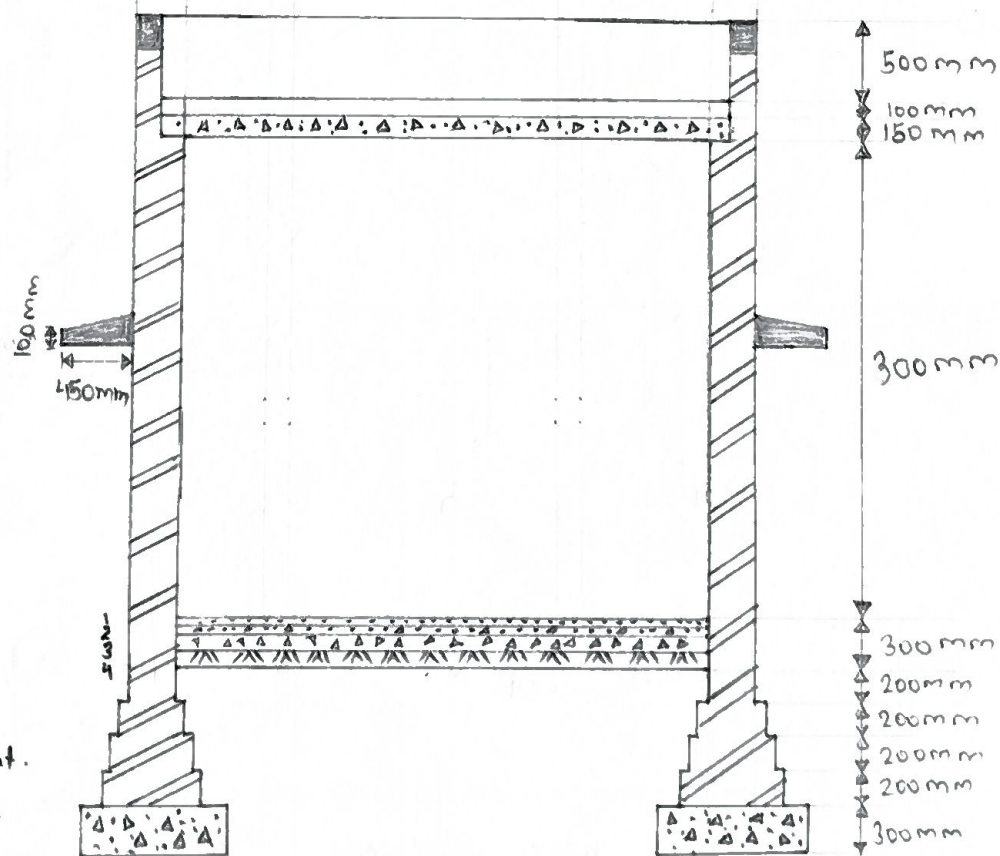
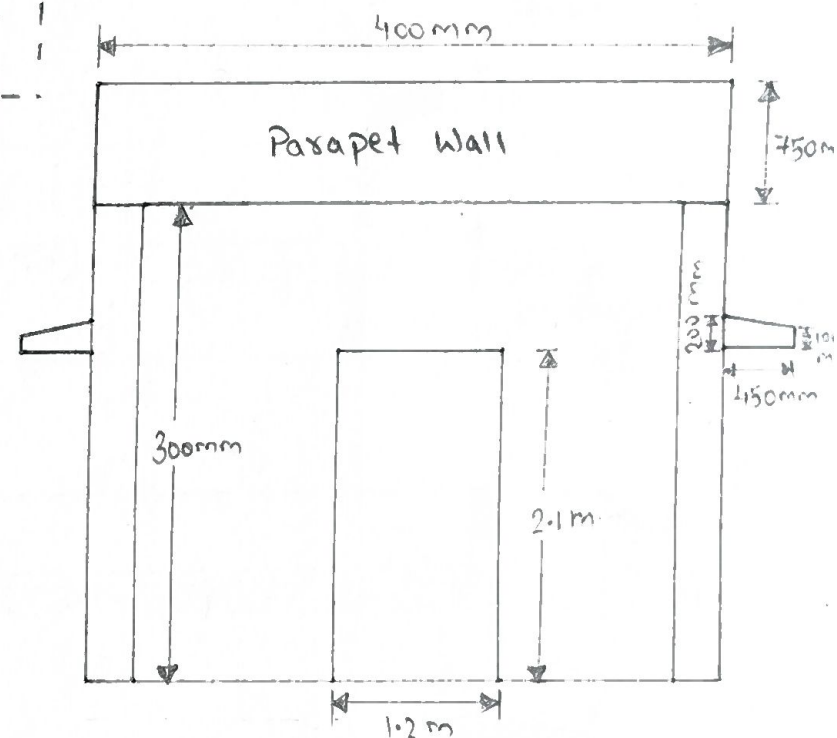
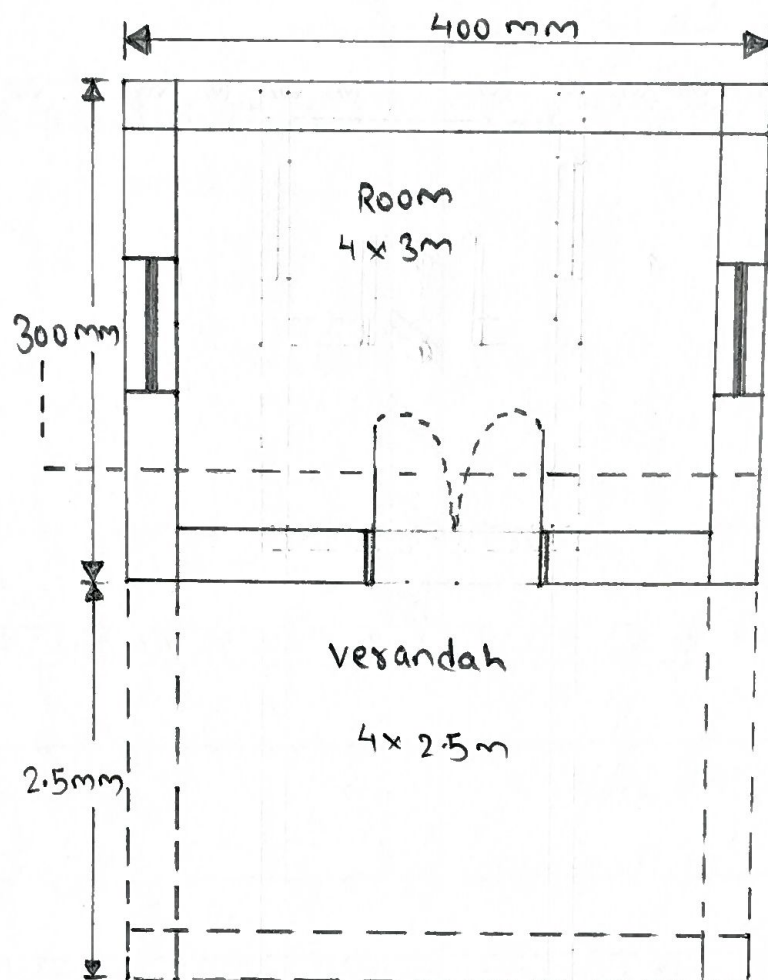
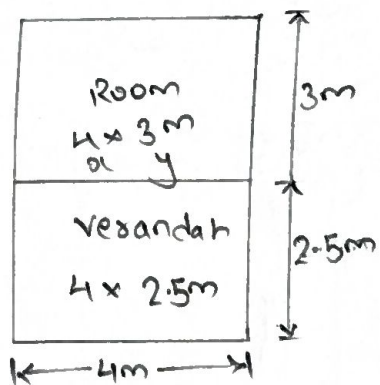
1)

qst. Adapt Scale 1:50

1m : 100cm

$\frac{1}{50} \times 100 = 2\text{cm}$

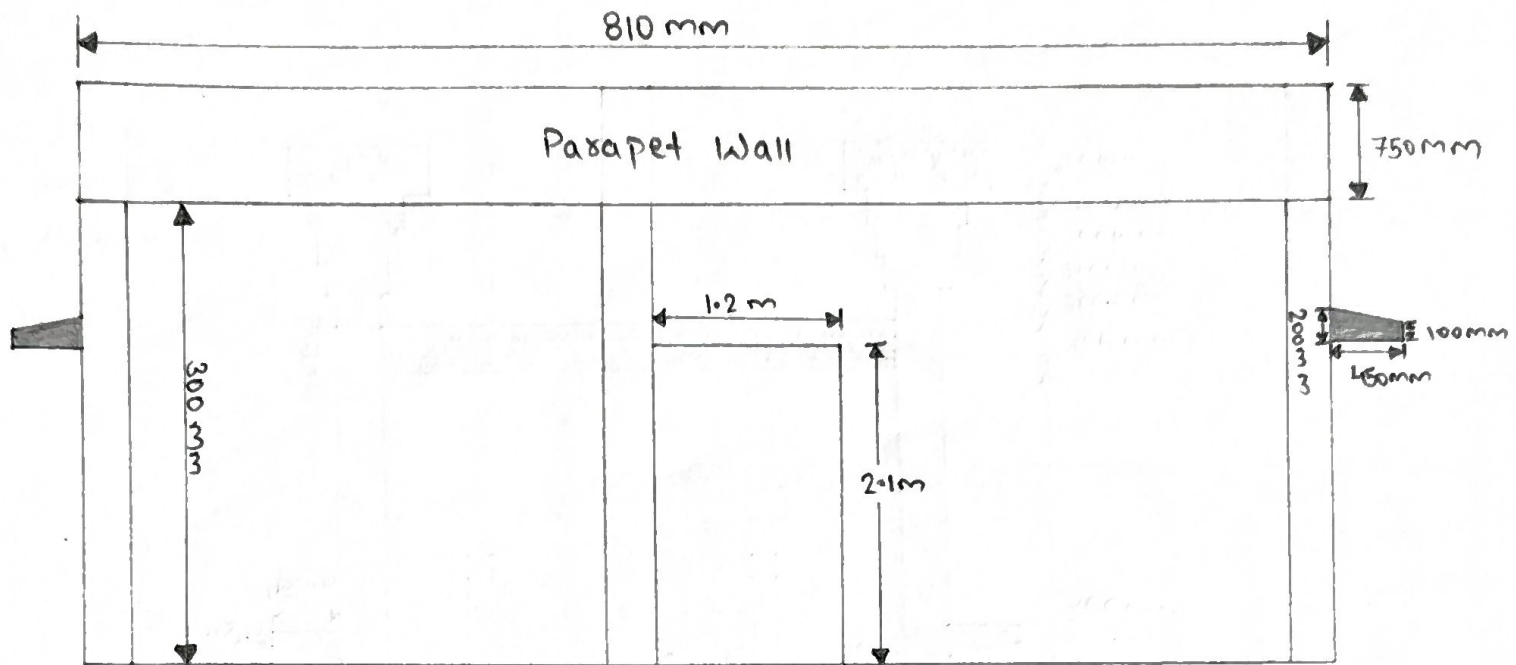
1m = 2cm



Foundation Detail:-

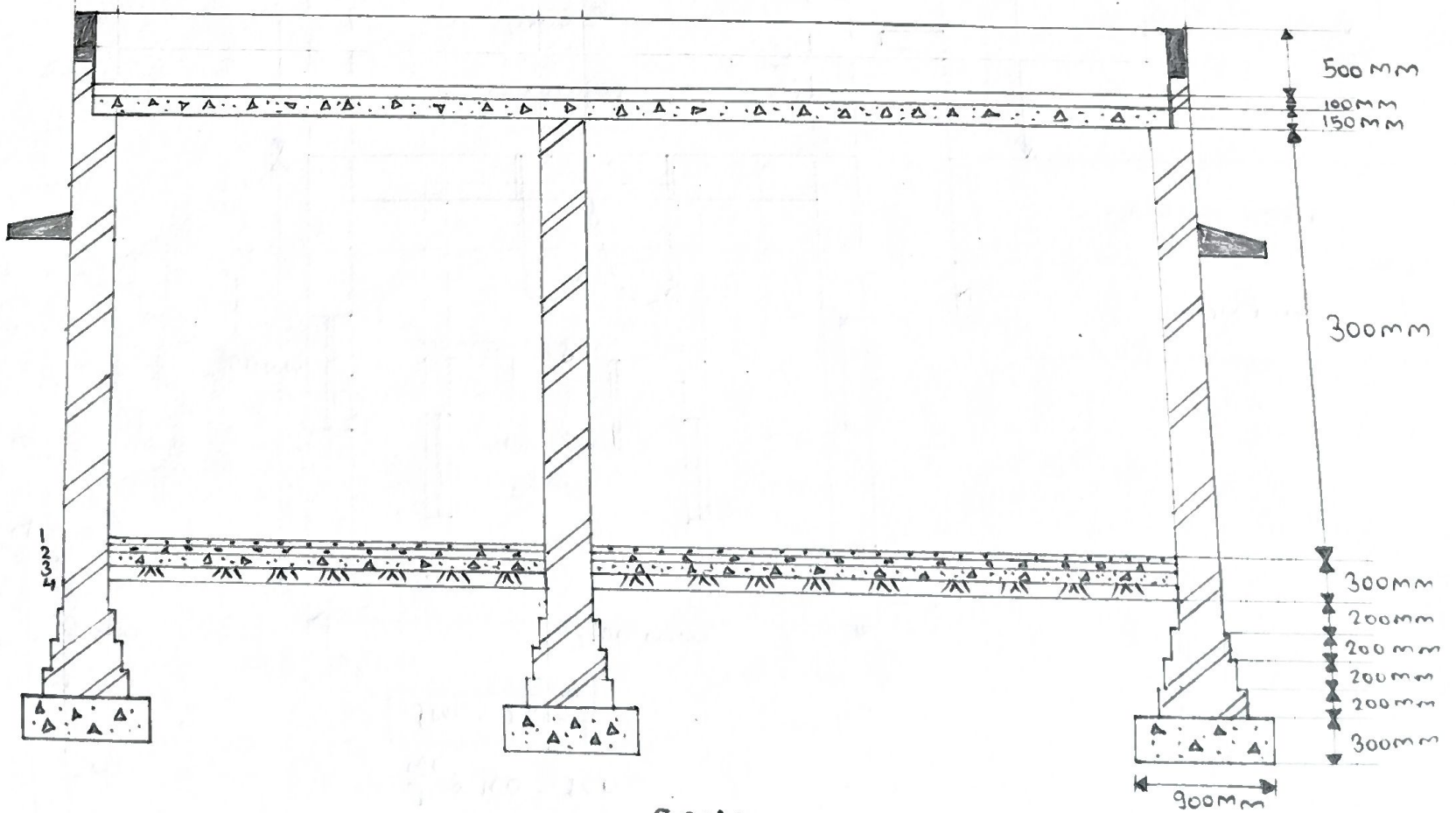
- 1) 50 mm thick CC wearing coat.
- 2) 50 mm thick CC Base coat.
- 3) 100mm sand filling.
- 4) 100mm earth filling.

Q.2) (Section) (Elevation)



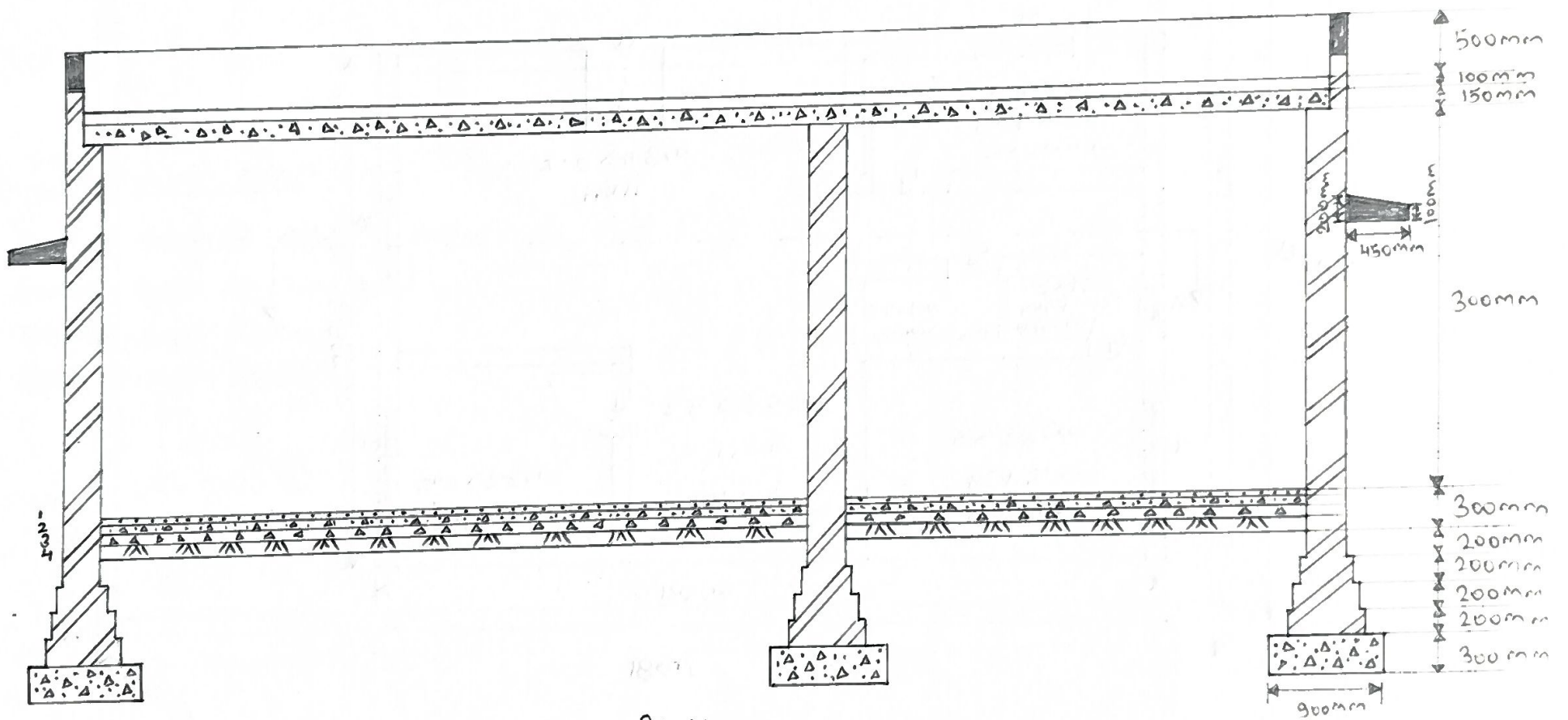
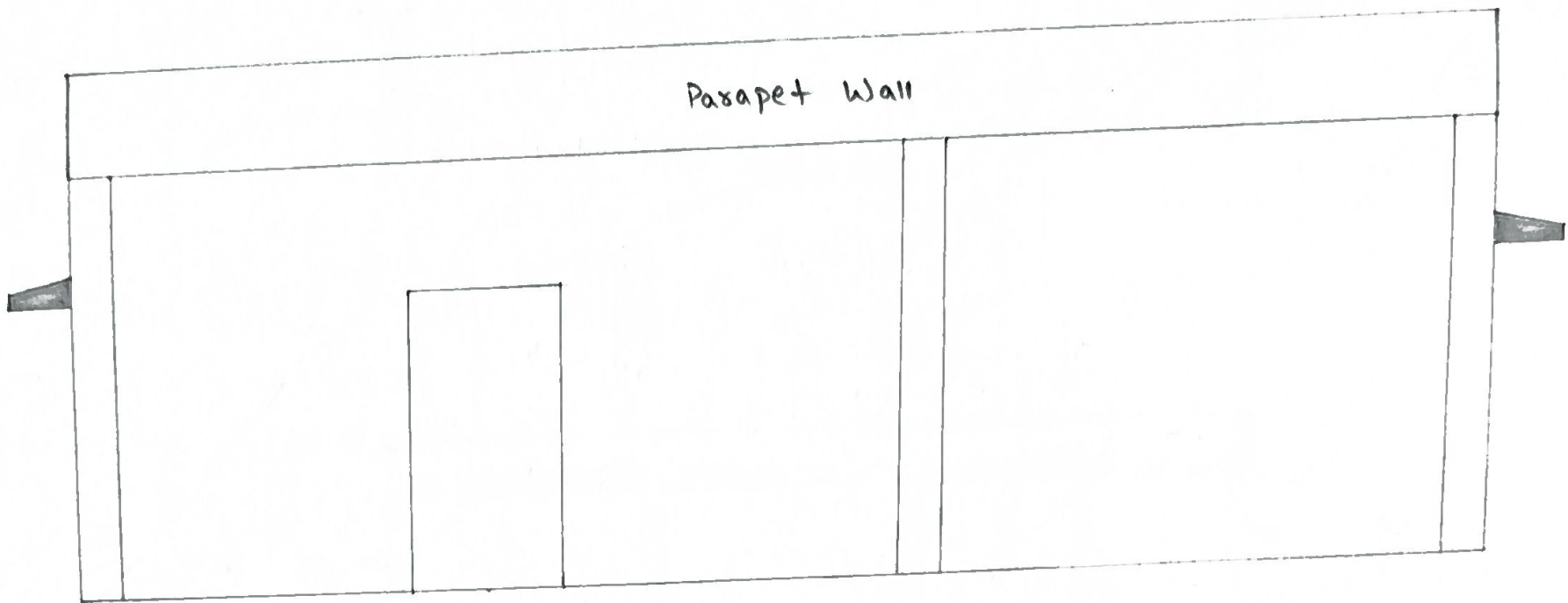
Foundation details:-

- 1) 50mm thick cc wearing coat
- 2) 50mm thick cc Base coat.
- 3) 100mm Sand filling.
- 4) 100mm earth filling.



Section

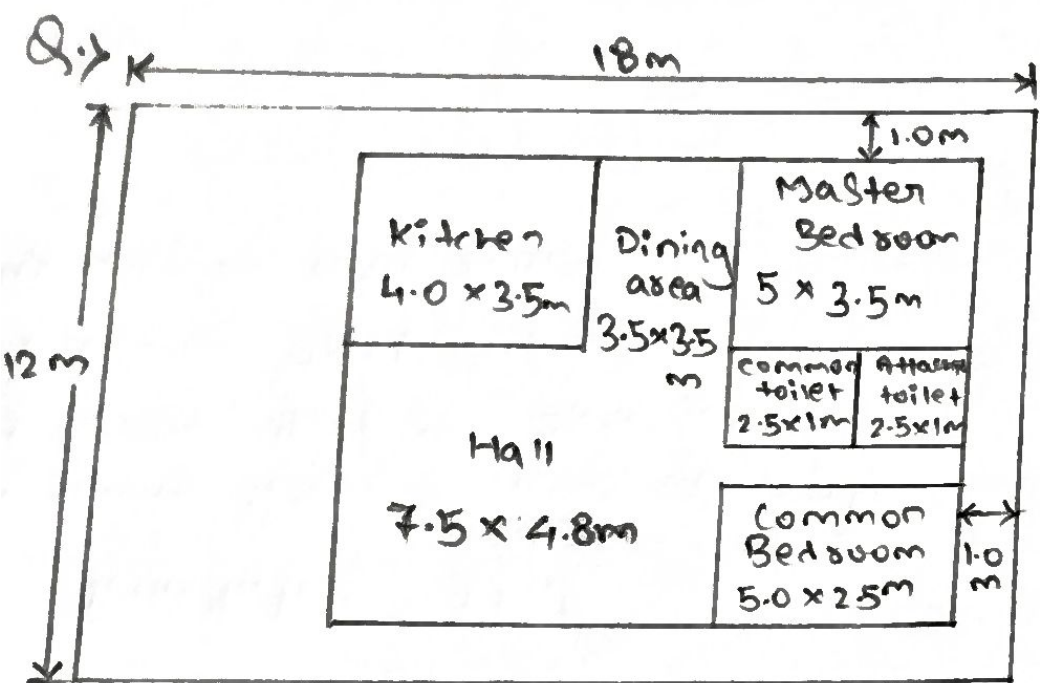
Q. 1) (Section & Elevation)



Section

Foundation detail

- 1) 50mm thick cc wearing coat
- 2) 50mm thick cc Base coat.
- 3) 100mm Sand filling
- 4) 100mm earth filling

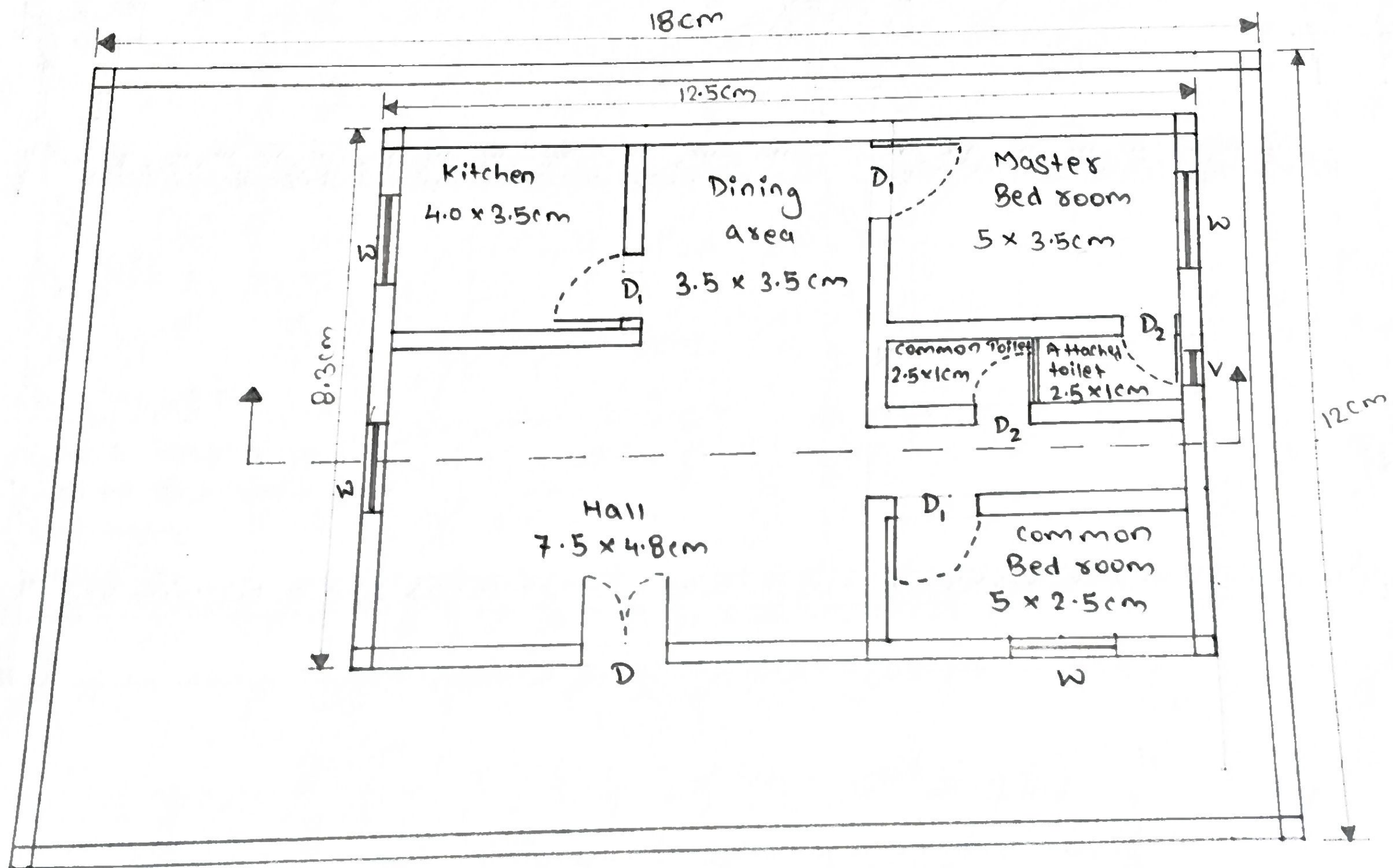


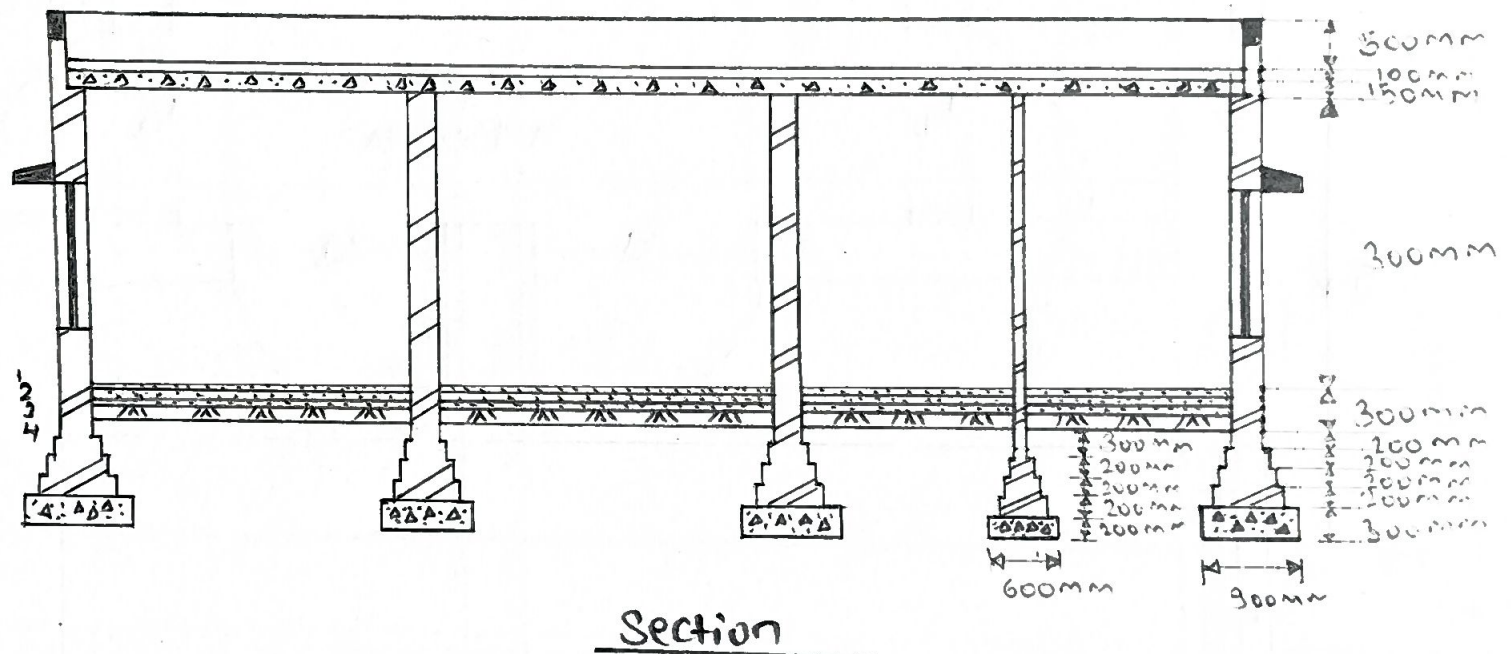
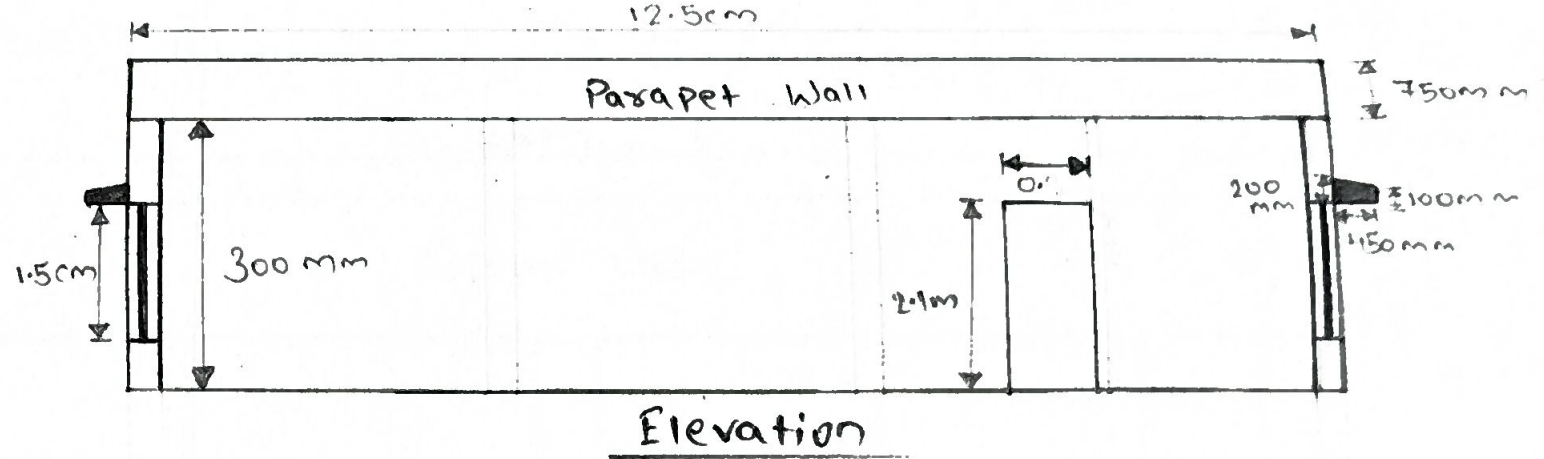
Q.2. Adapt Scale 1:100

1m : 100cm

$$\frac{1}{100} \times 100 = 1\text{cm}$$

1m : 1cm





foundation detail

- 1) 50 mm thick CC wearing coat.
- 2) 50mm thick CC Base coat.
- 3) 100mm sand filling.
- 4) 100mm earth filling.

Q.1 Line diagram of a building showed a head. Other detail are-

width of foundation - 0.9m

Depth of foundation - 1m

Wall thickness - 300mm

Door - $D_o = 1.2 \times 2.1m$

$D_i = 1 \times 2m$

window - $w = 1.2 \times 1.2m$

ventilation - $0.60m \times 0.30m$

Height of room - 3.5m

Assumed any other data is required
draw double line plan, Elevation

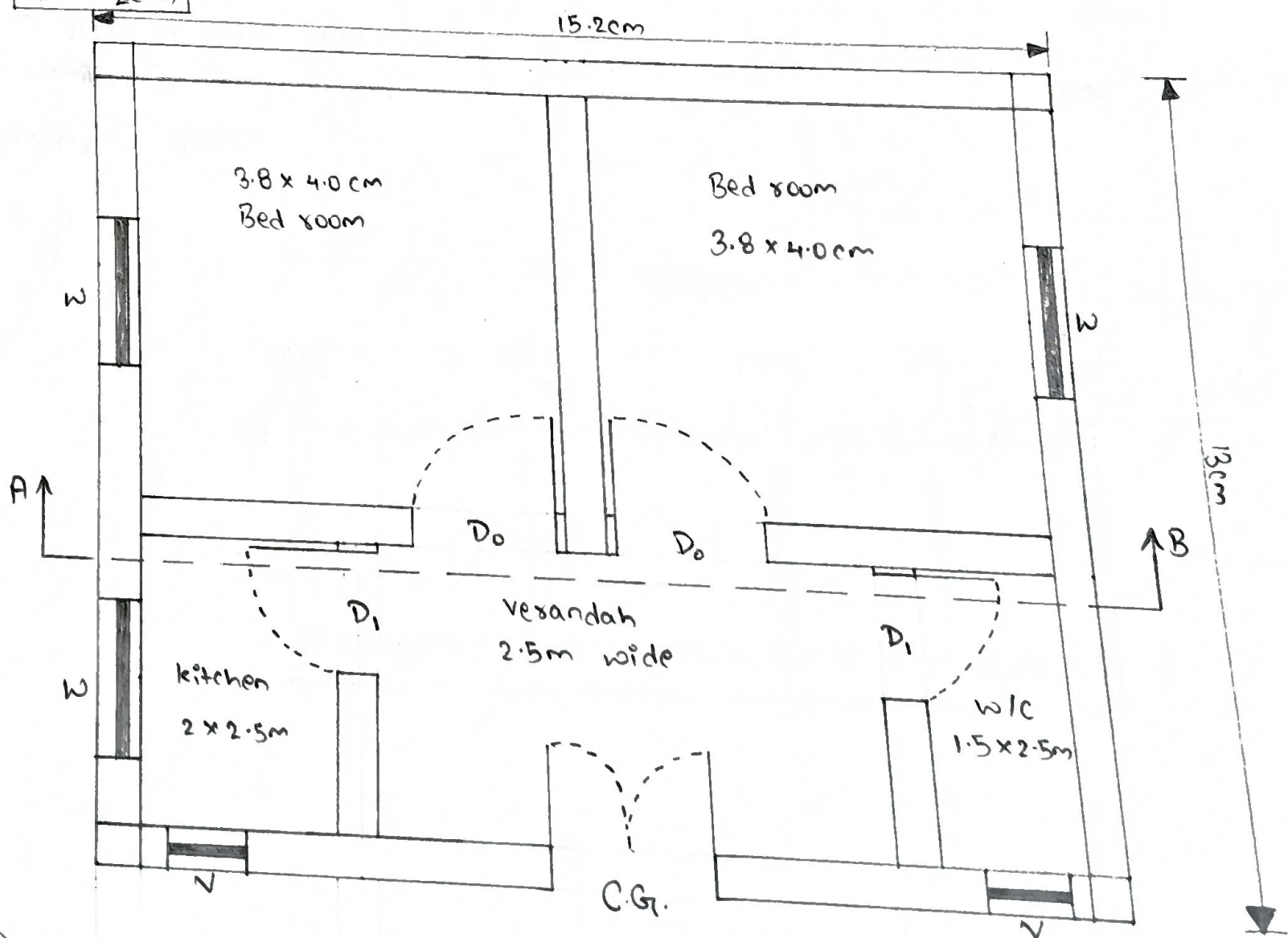
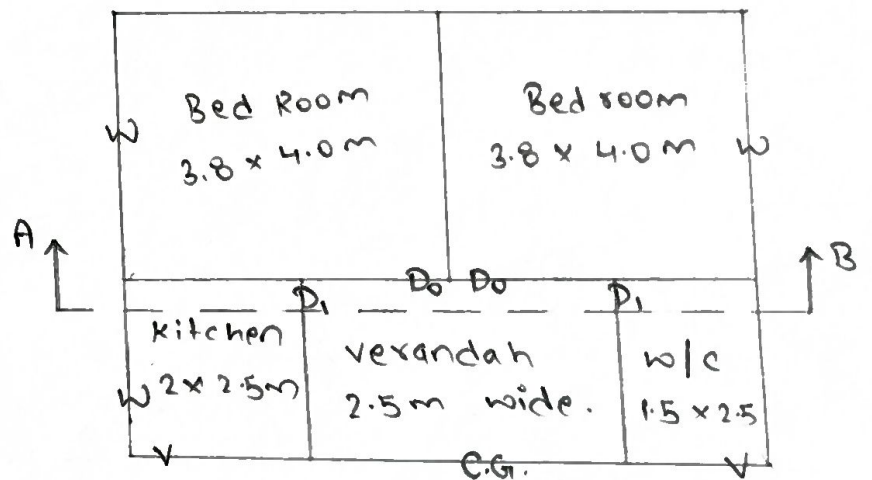
Section view AB.

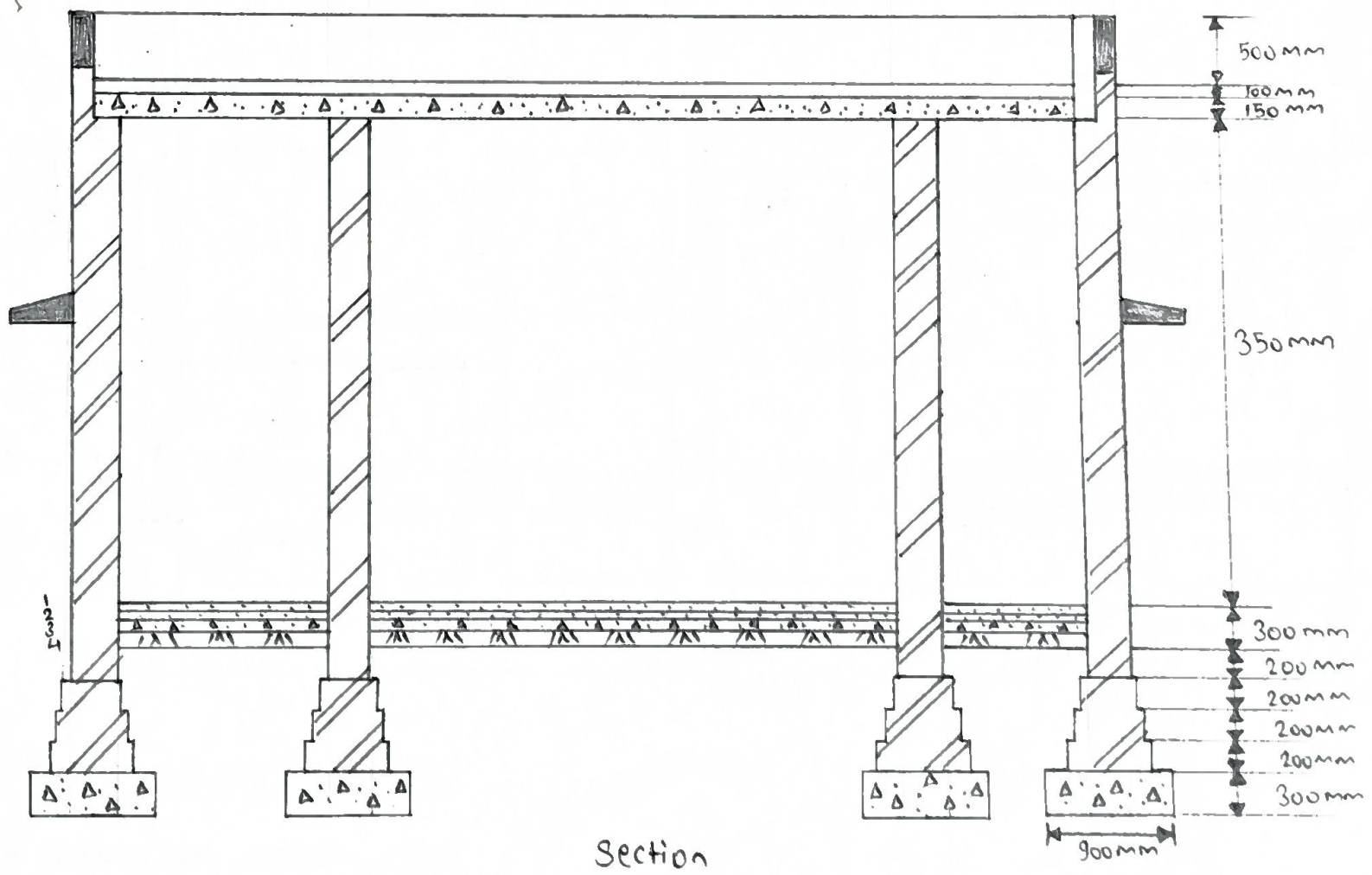
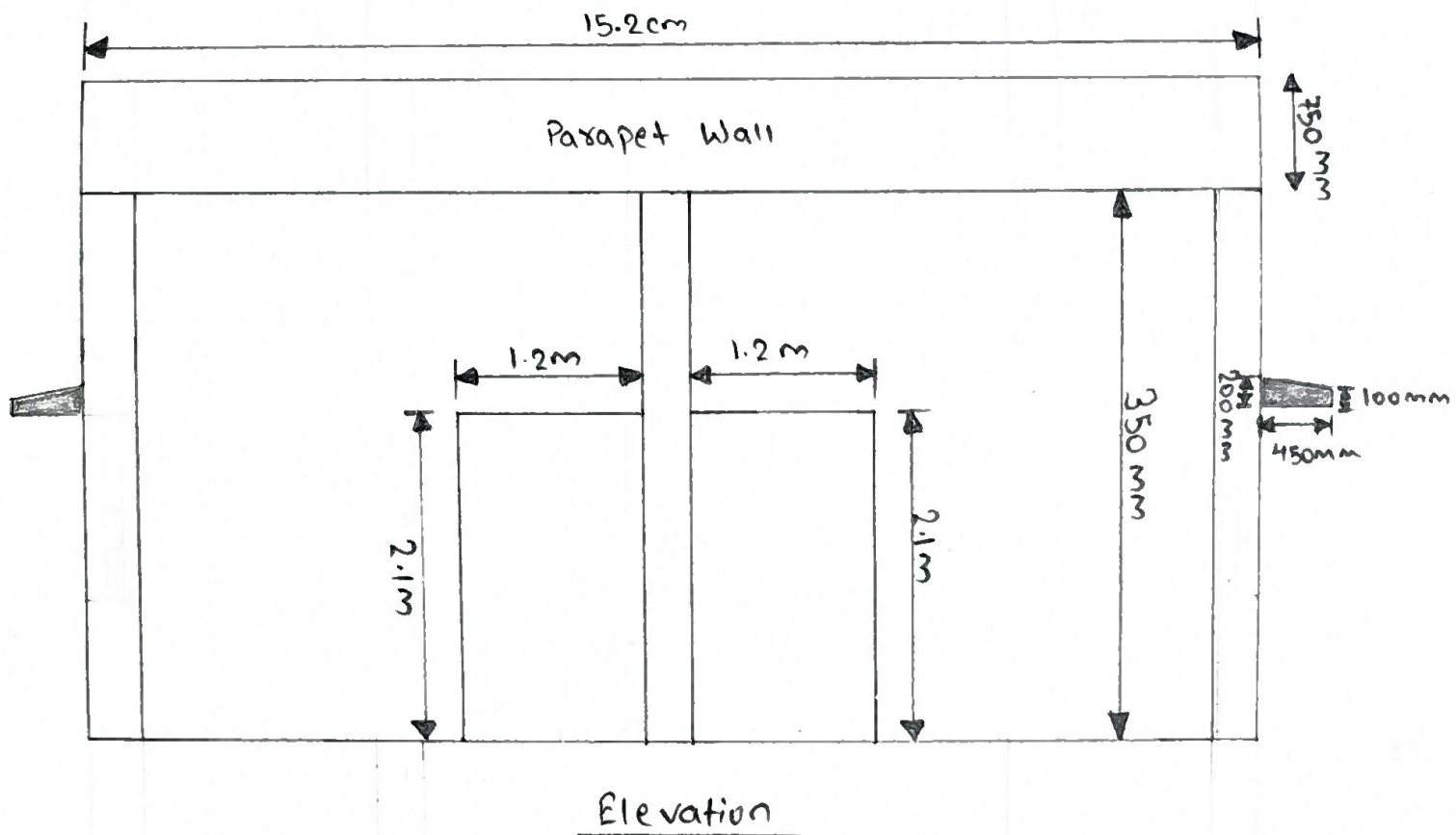
Q.2: Adapt Scale 1:50

1m = 100cm

$\frac{1}{50} \times 100 = 2cm$

1m : 2cm

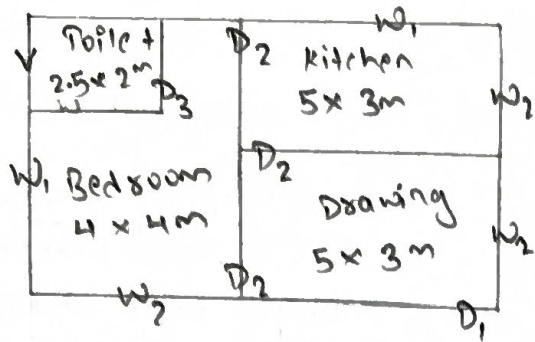




foundation detail -

- 1) 50mm thick cc wearing coat.
- 2) 50mm thick cc Base coat.
- 3) 100mm thick Sand filling.
- 4) 100mm earth filling.

Q.3



$$D_1 : 1.2 \times 2.1 \text{ m} \quad W_1 : 1.5 \times 1.5 \text{ m}$$

$$D_2 : 1.0 \times 2.1 \text{ m} \quad W_2 : 1 \times 1.5 \text{ m}$$

$$D_3 : 0.75 \times 2.1 \text{ m} \quad W : D$$

$$V : 0.6 \times 0.6 \text{ m}$$

Wall thickness : 300mm
Height of building : 3.5m

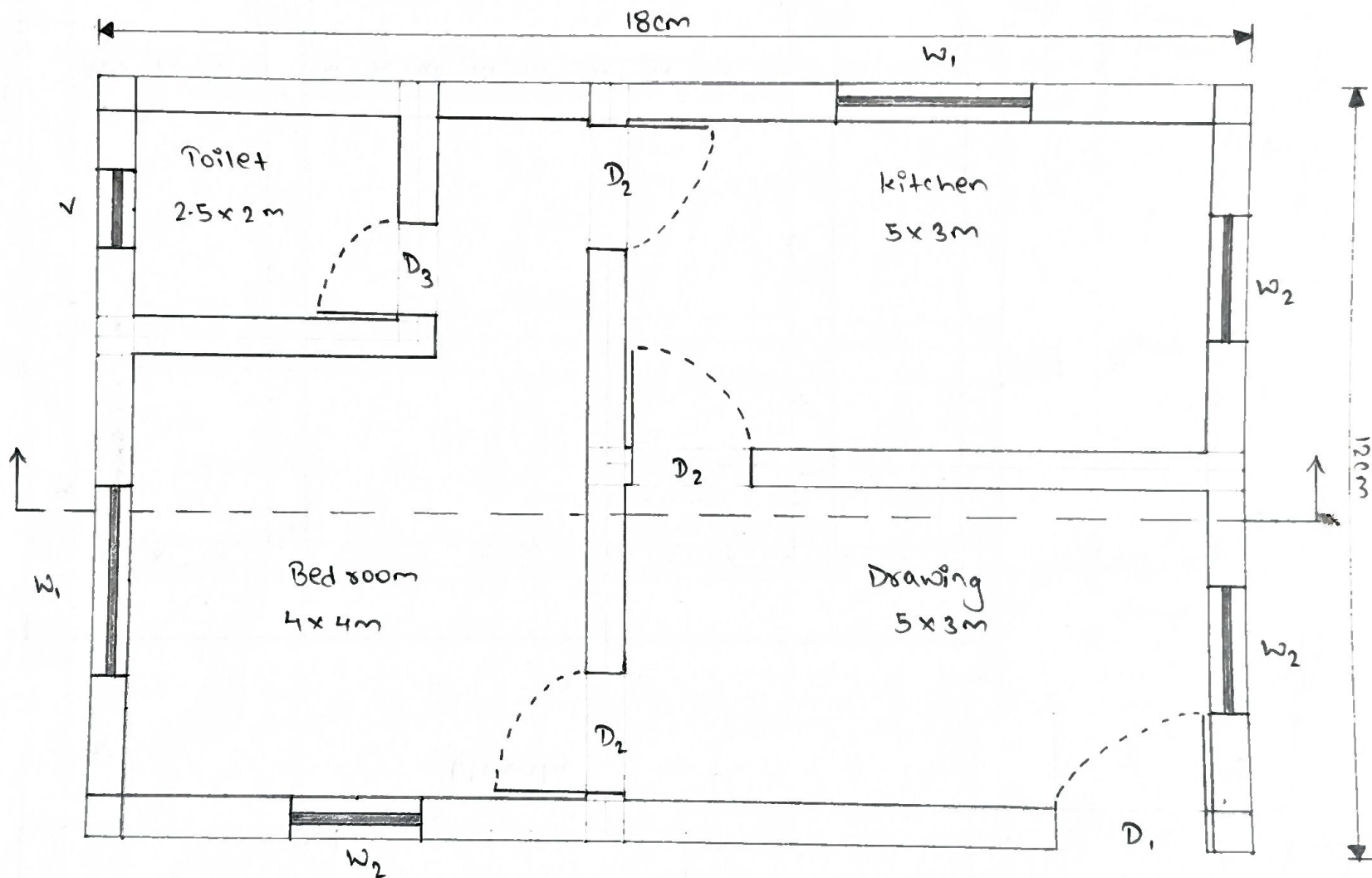
Ref.

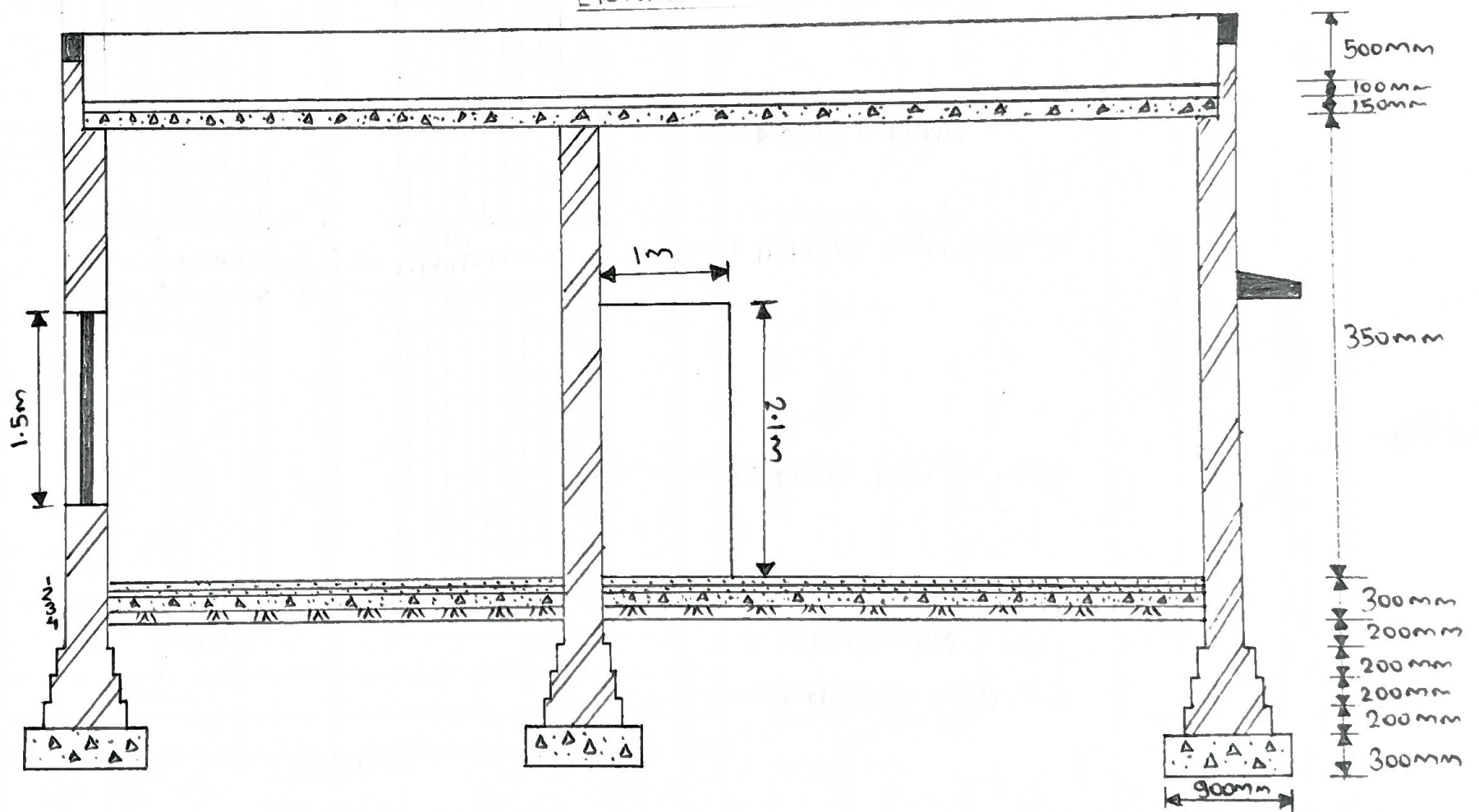
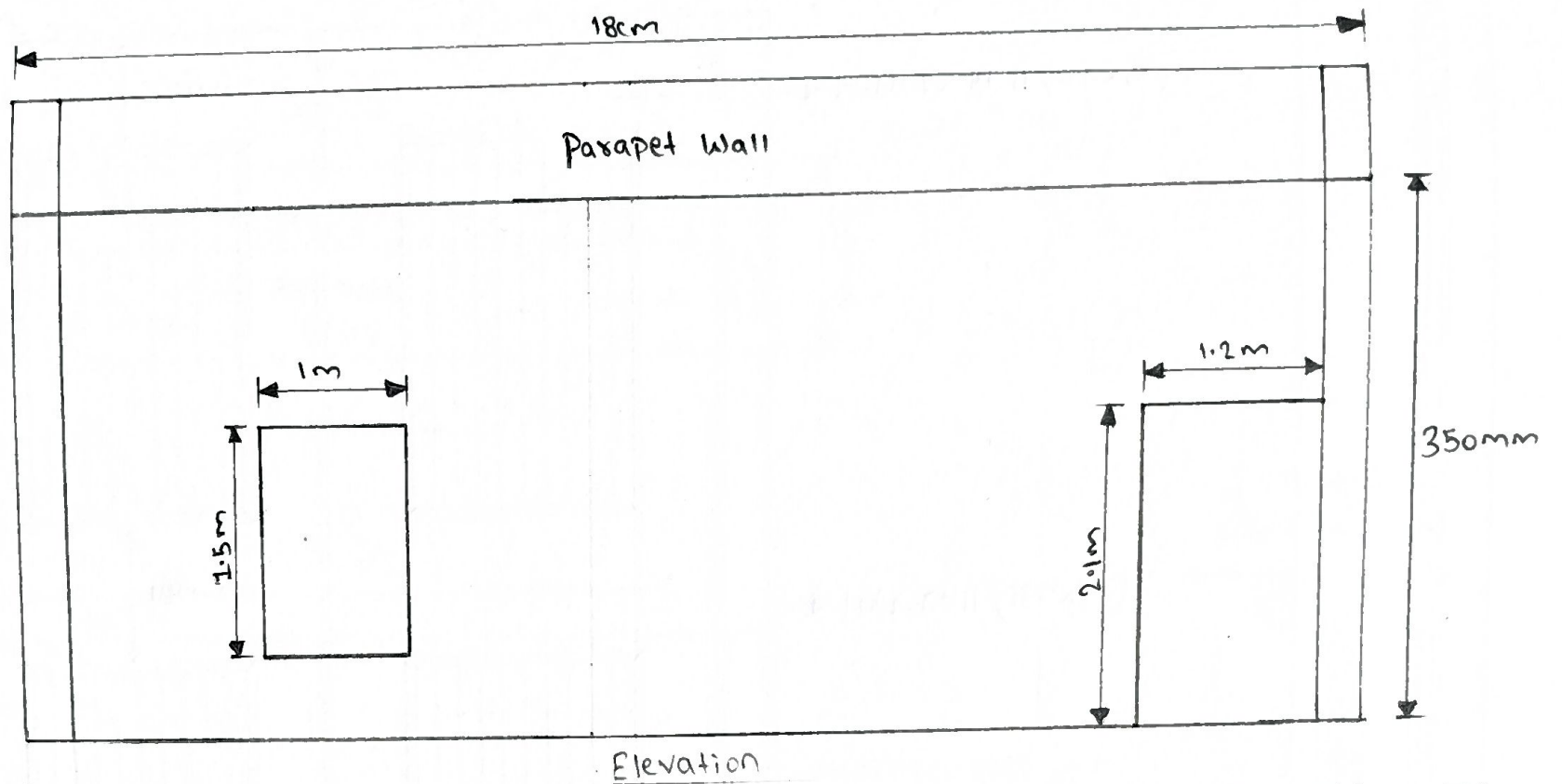
Adapt Scale 1:50

$$1 \text{ m} : 100 \text{ cm}$$

$$\frac{1}{50} \times 100 : 2 \text{ cm}$$

$$1 \text{ m} : 2 \text{ cm}$$



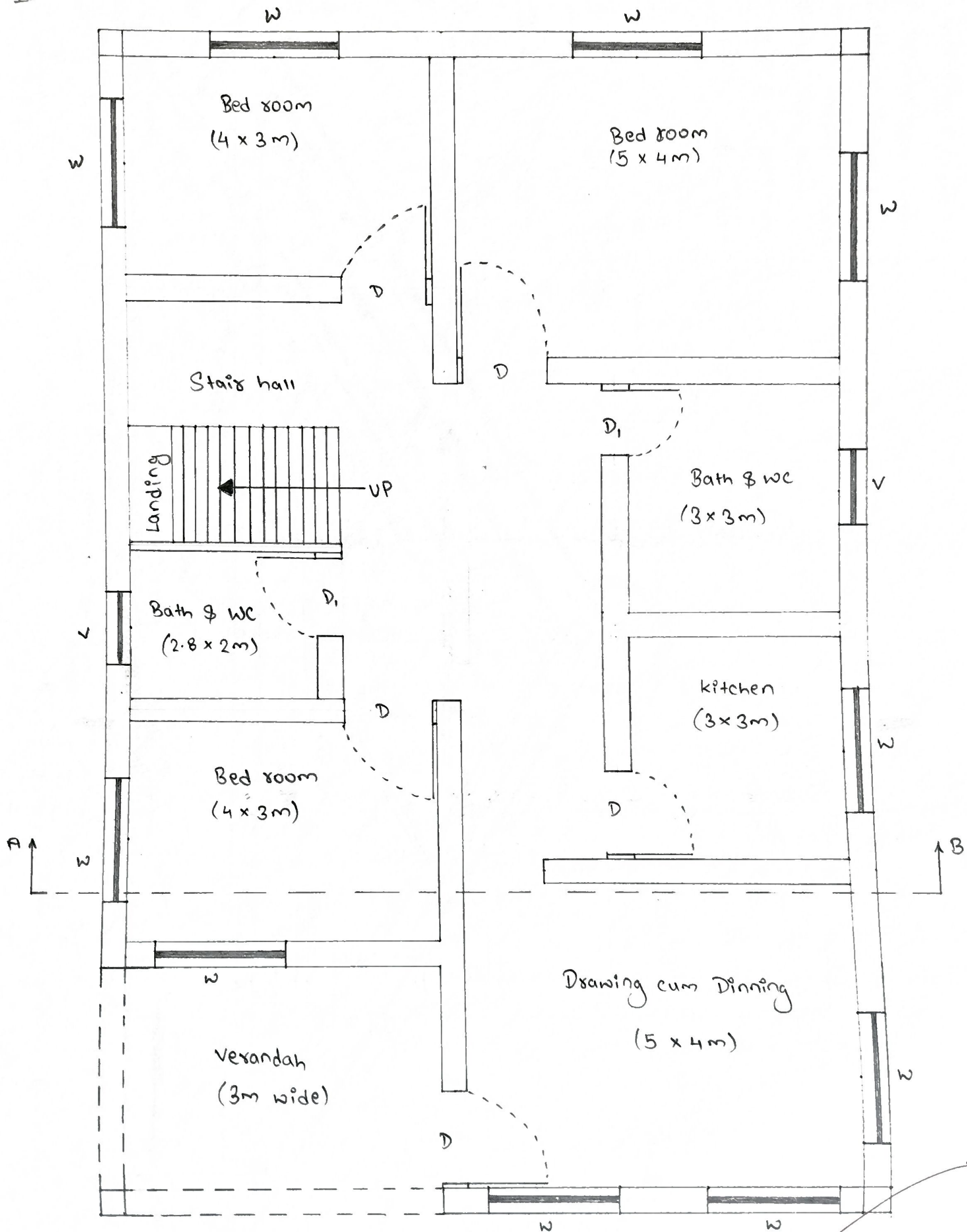


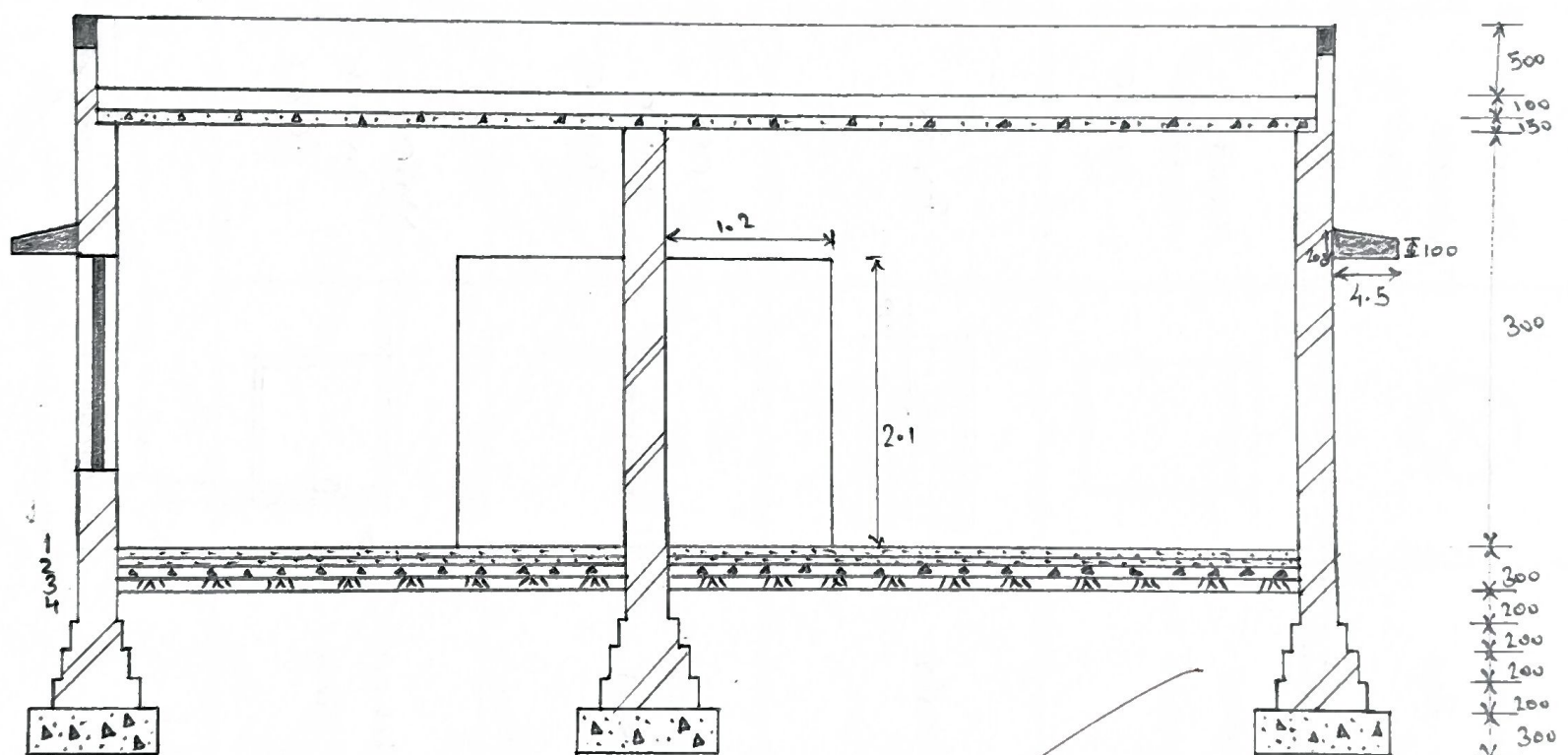
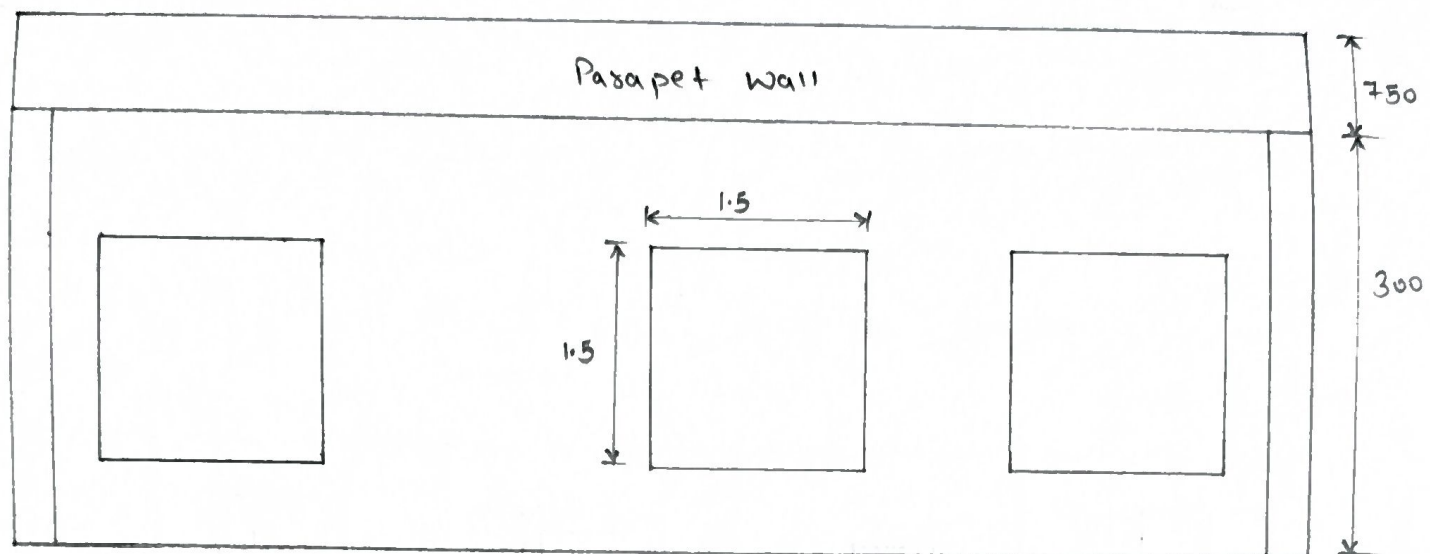
Foundation detail

- 1) 50mm thick cc wearing coat
- 2) 50mm thick cc Base coat
- 3) 100mm Sand filling.
- 4) 100mm earth filling.

(Practice)

Q.1)

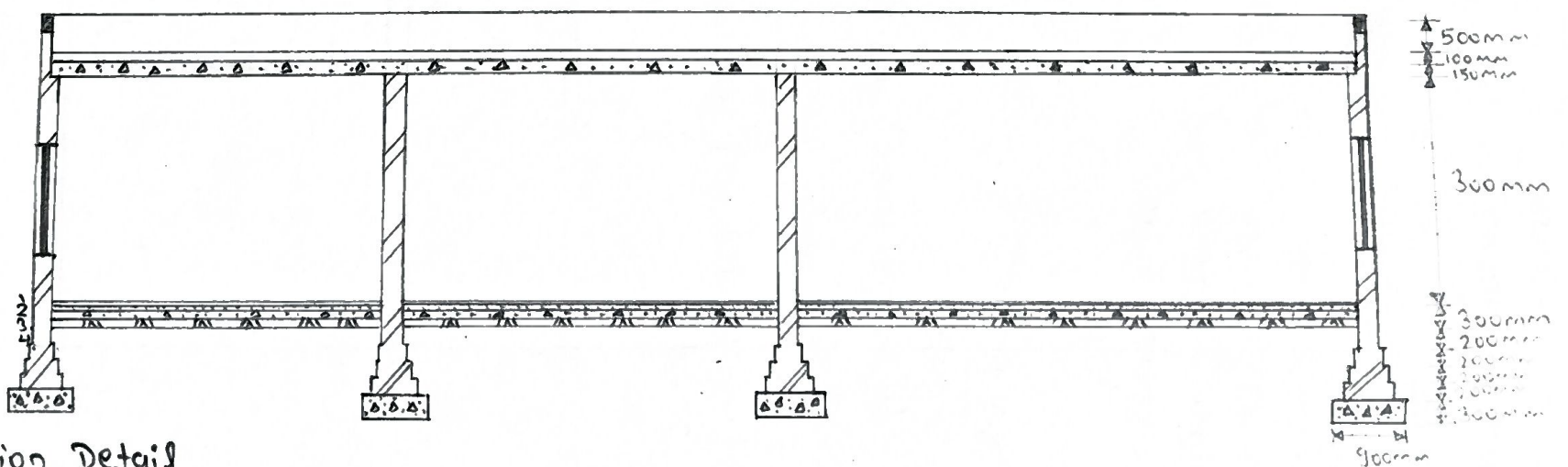
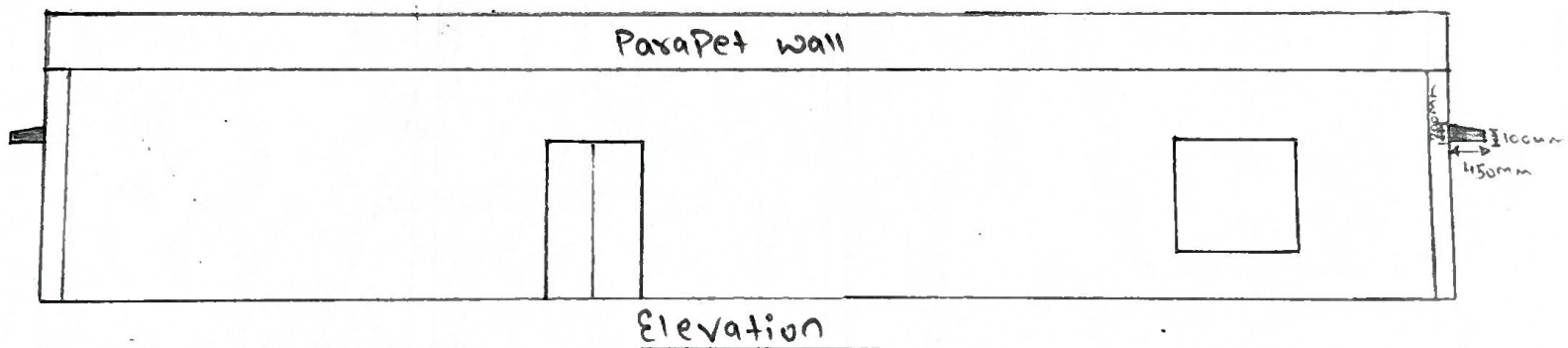
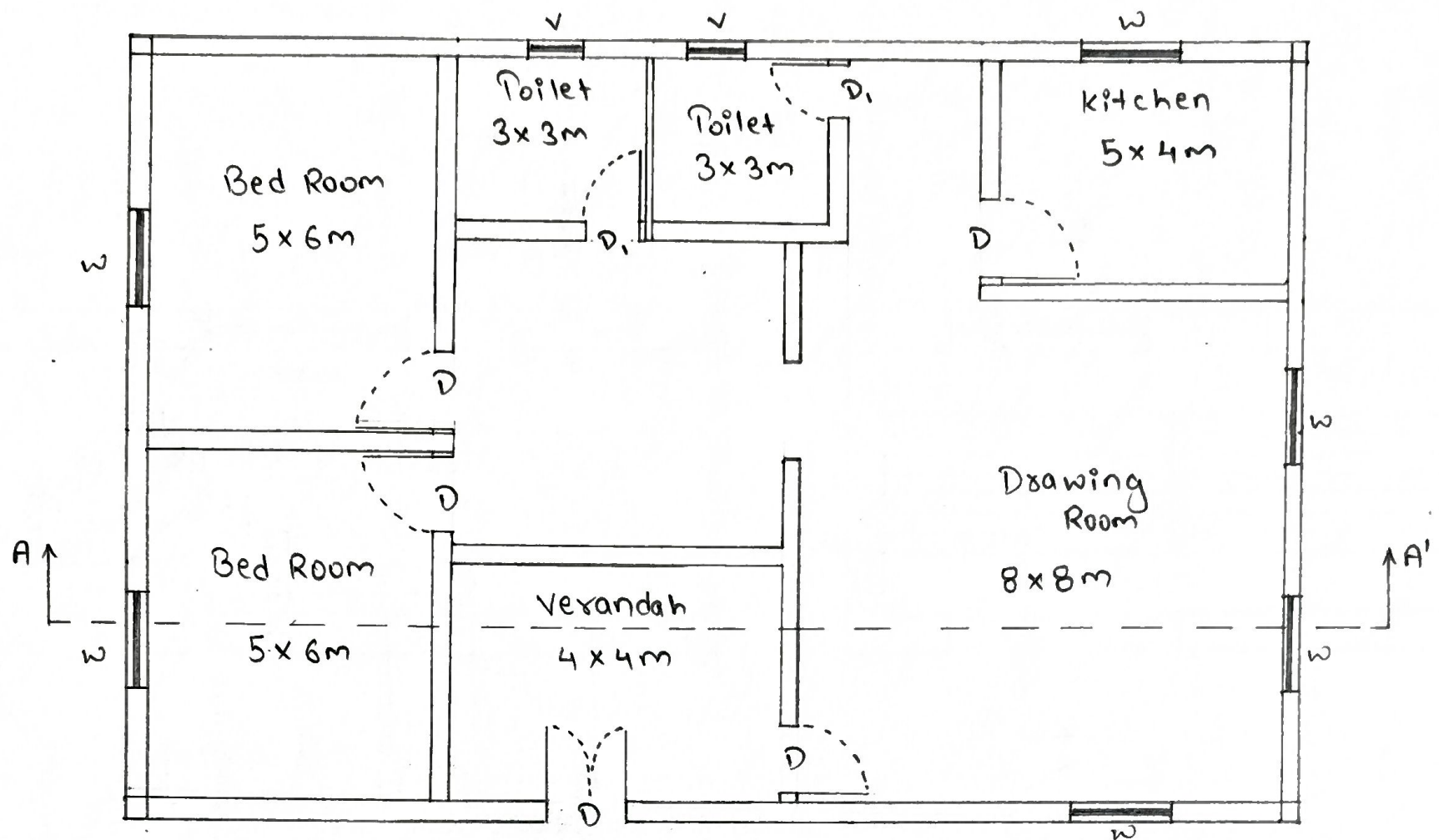




Foundation detail-

- 1) 50mm thick cc wearing coat.
- 2) 50mm thick cc Base coat
- 3) 100mm Sand filling.
- 4) 100mm earth filling.

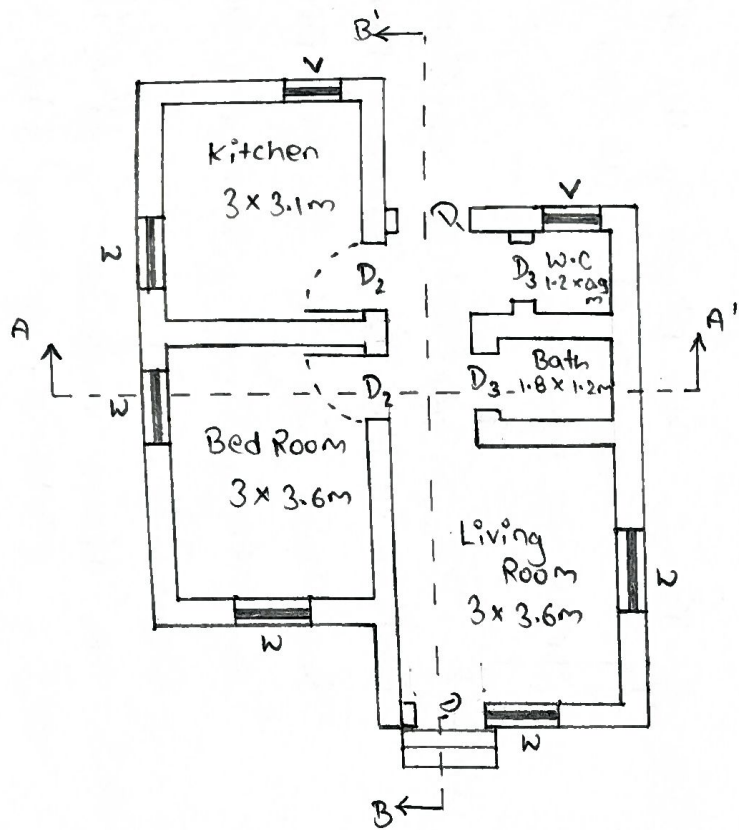
Q.1 (18 x 12) House



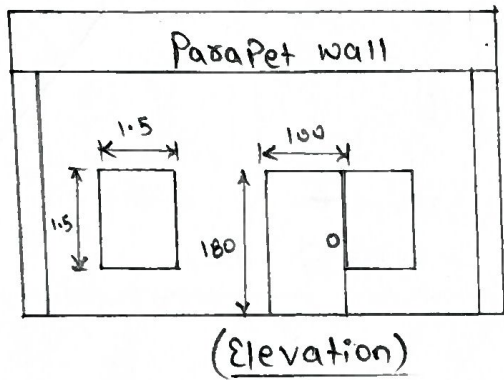
Foundation Detail

- 1) 50 mm thick CC wearing coat
- 2) 50 mm thick CC Base coat
- 3) 100 mm sand filling
- 4) 100 mm earth filling

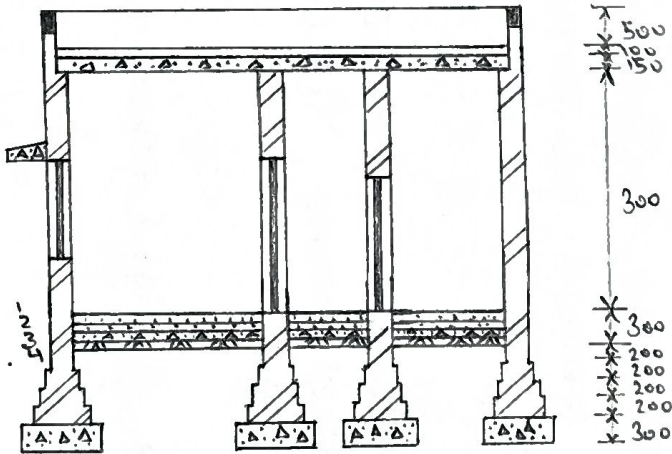
Section A-A'



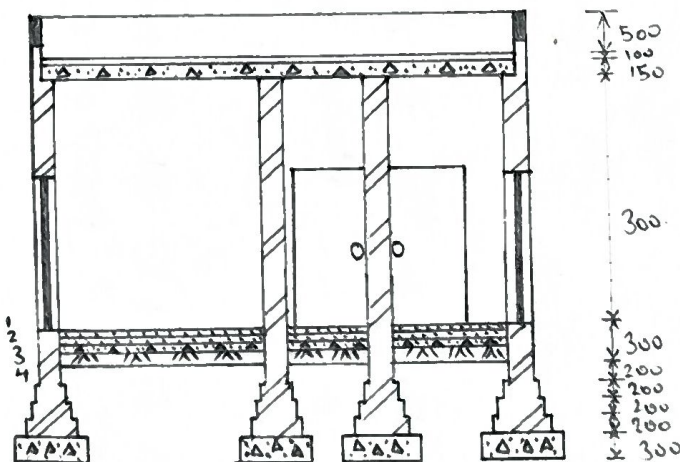
$D_1 = 100 \times 180$
 $D_2 = 90 \times 190$
 $W = 90 \times 120$
 $V = 70 \times 60$
 $D_3 = 78 \times 170$



(Elevation)



Section at
(A-A')

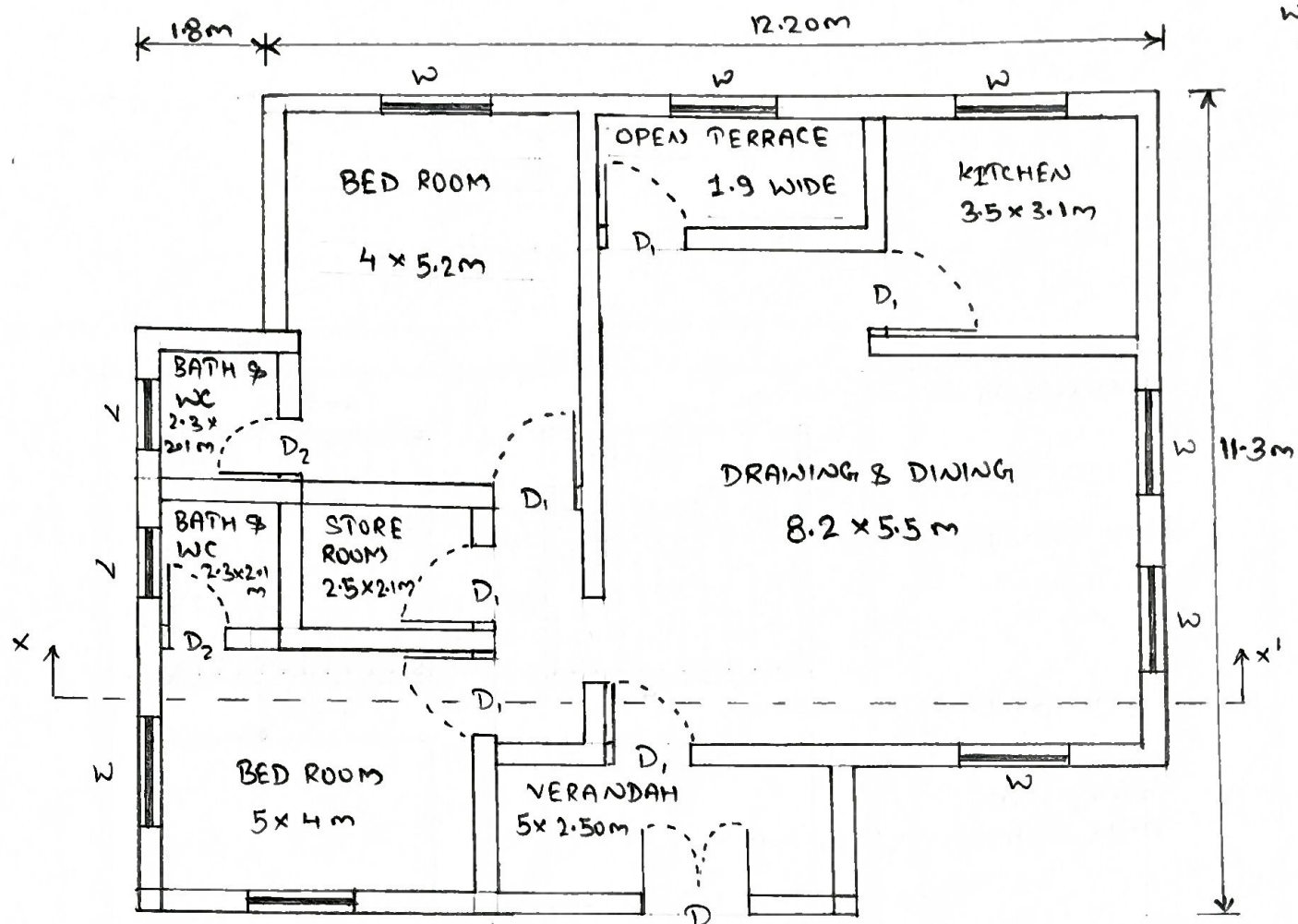


Section at
(B-B')

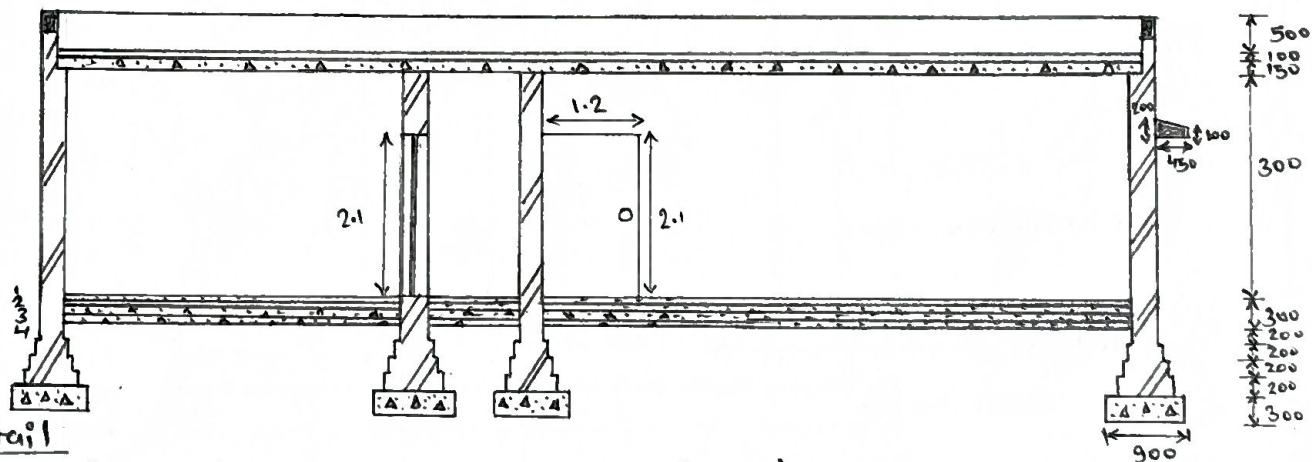
Foundation Detail

- 1) 50mm thick CC wearing coat
- 2) 50mm thick CC Base coat
- 3) 100mm Sand filling.
- 4) 100mm earth filling.

Q.2 Scale = 1:100



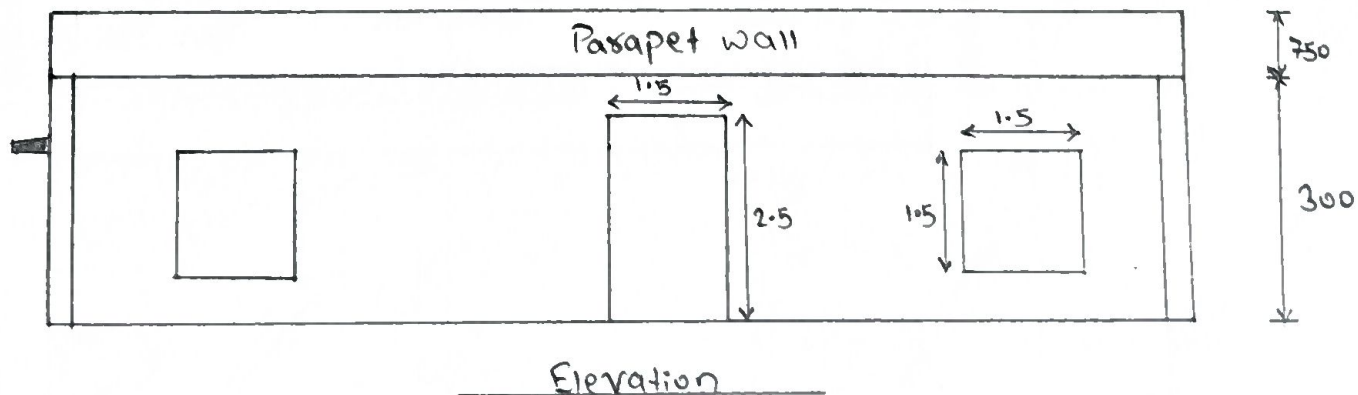
Window - 1.5×1.5
 Doors (D) - 1.5×2.5
 Doors (D₁) - 1.2×2.1
 Doors (D₂) - 0.9×1.2
 Ventilation - 1×1



Foundation Detail

- 1) 50mm thick cc wearing coat.
- 2) 50mm thick cc Base coat.
- 3) 100mm sand filling
- 4) 100mm earth filling

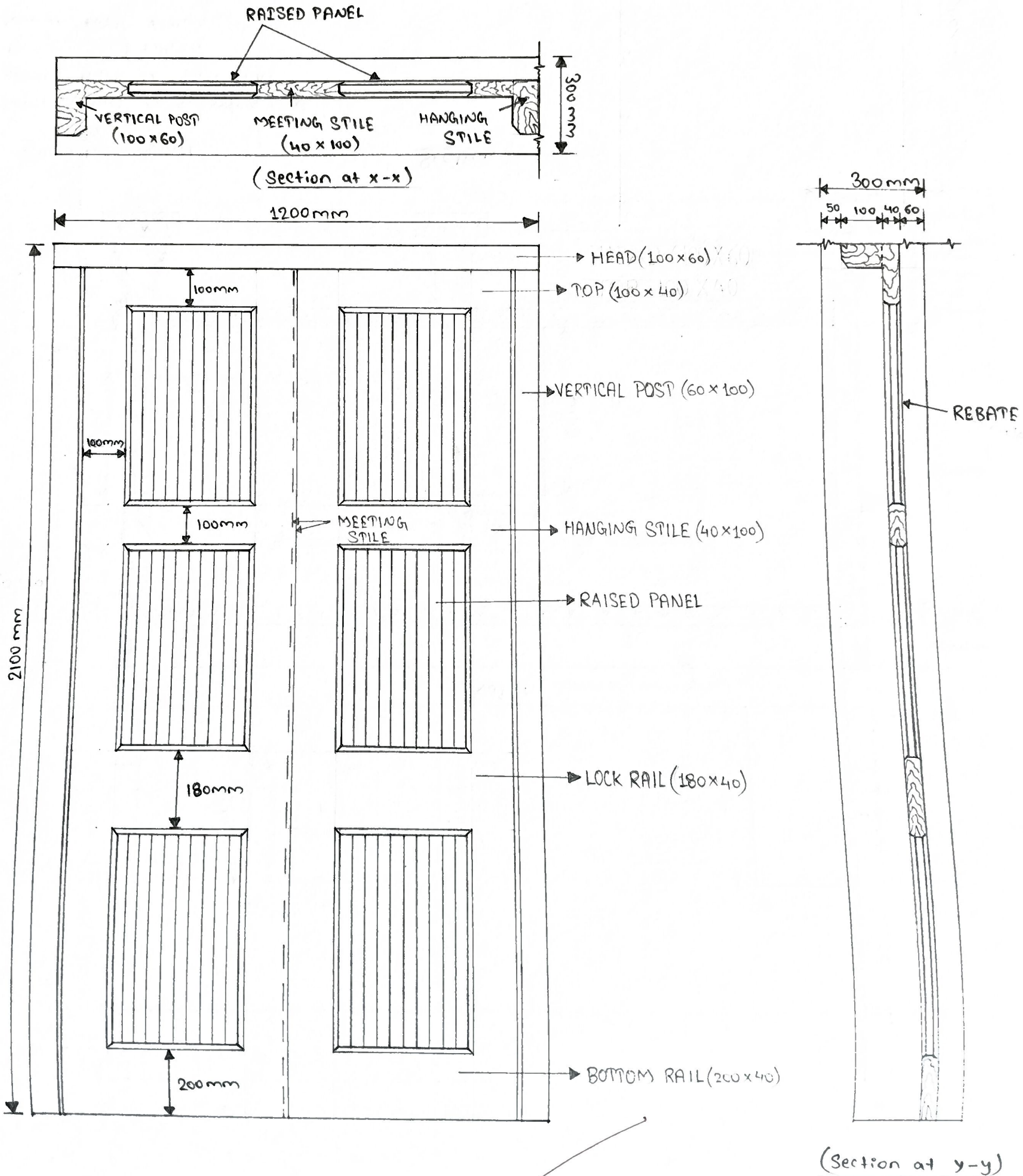
Section of (x-x')



Elevation

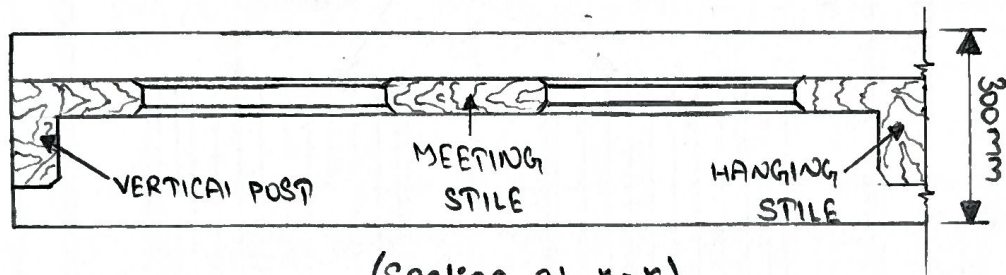
Door -

↳ fully Panelled Door -

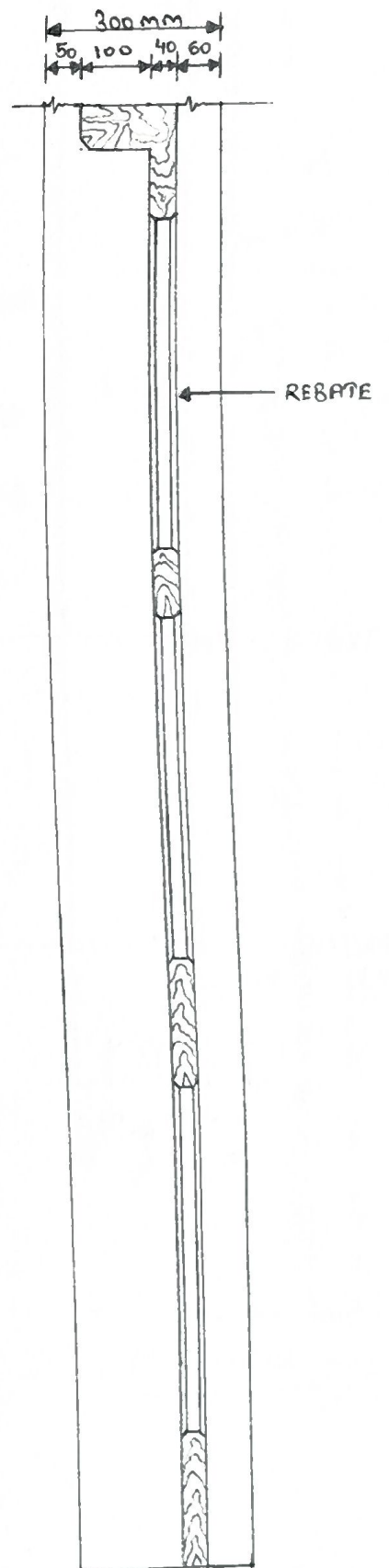
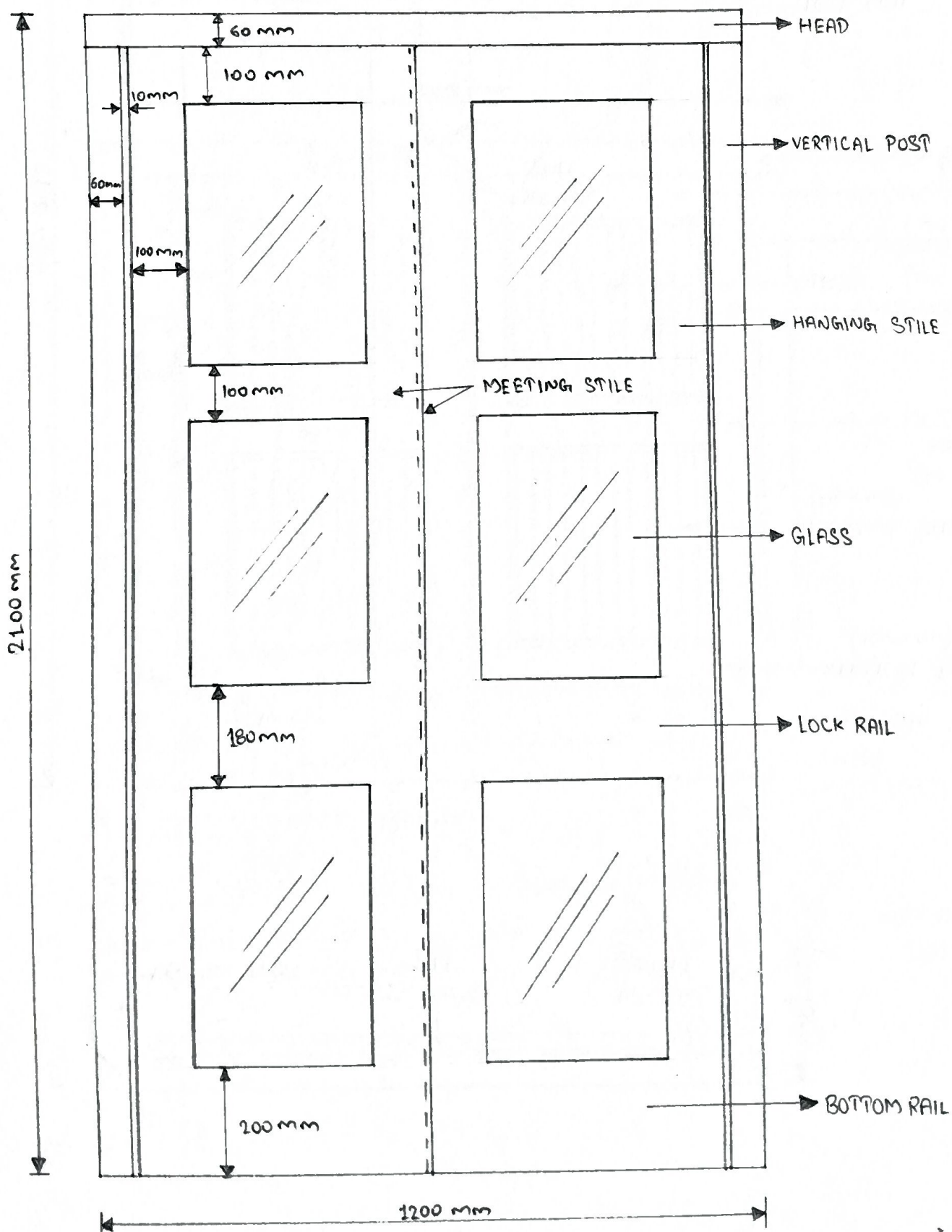


(Section at y-y)

2) Fully Glazed Shutters -

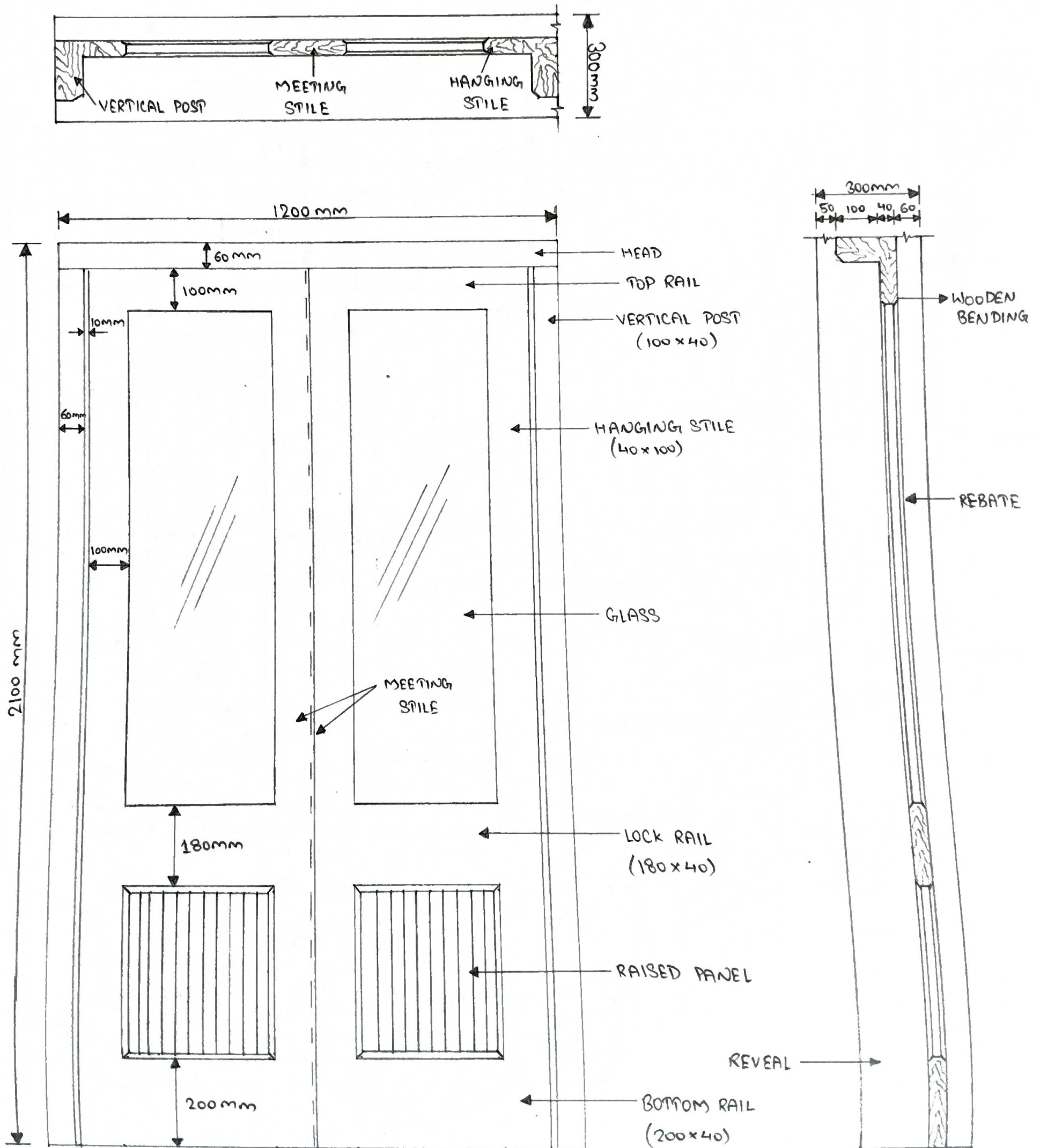


(Section at x-x)



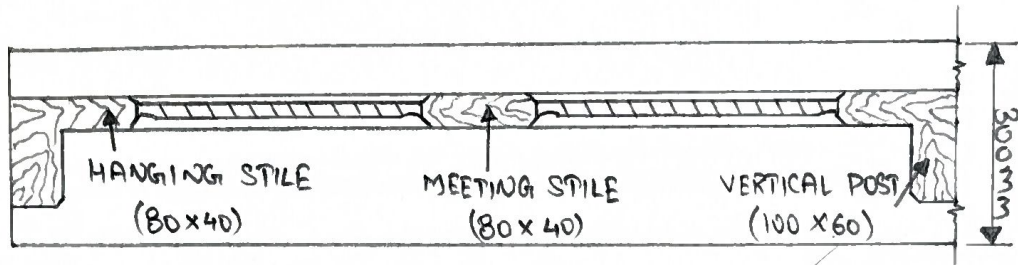
(Section at y-y)

3) Half glazed Shutter :-

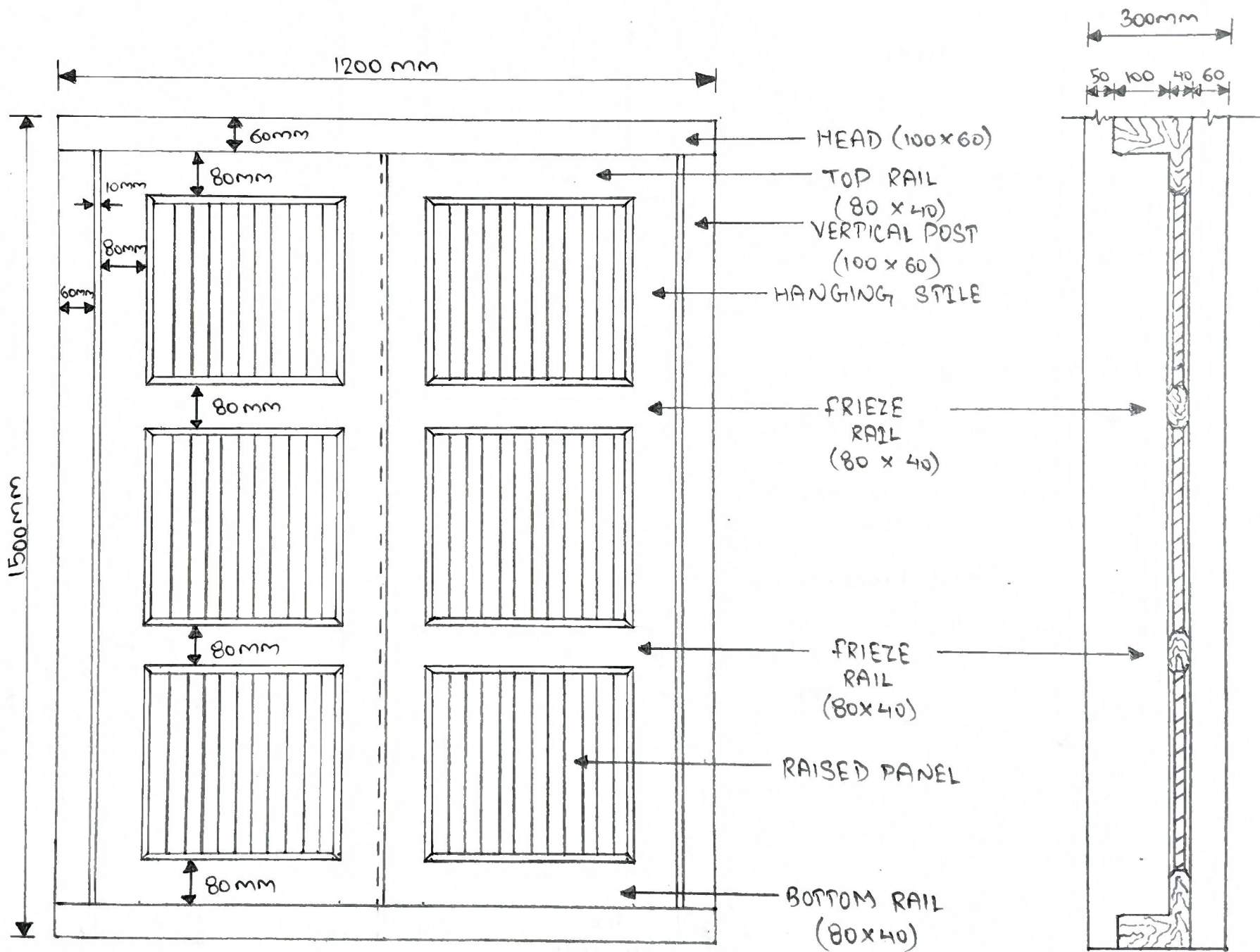


Window -

1) A six parallel window :-

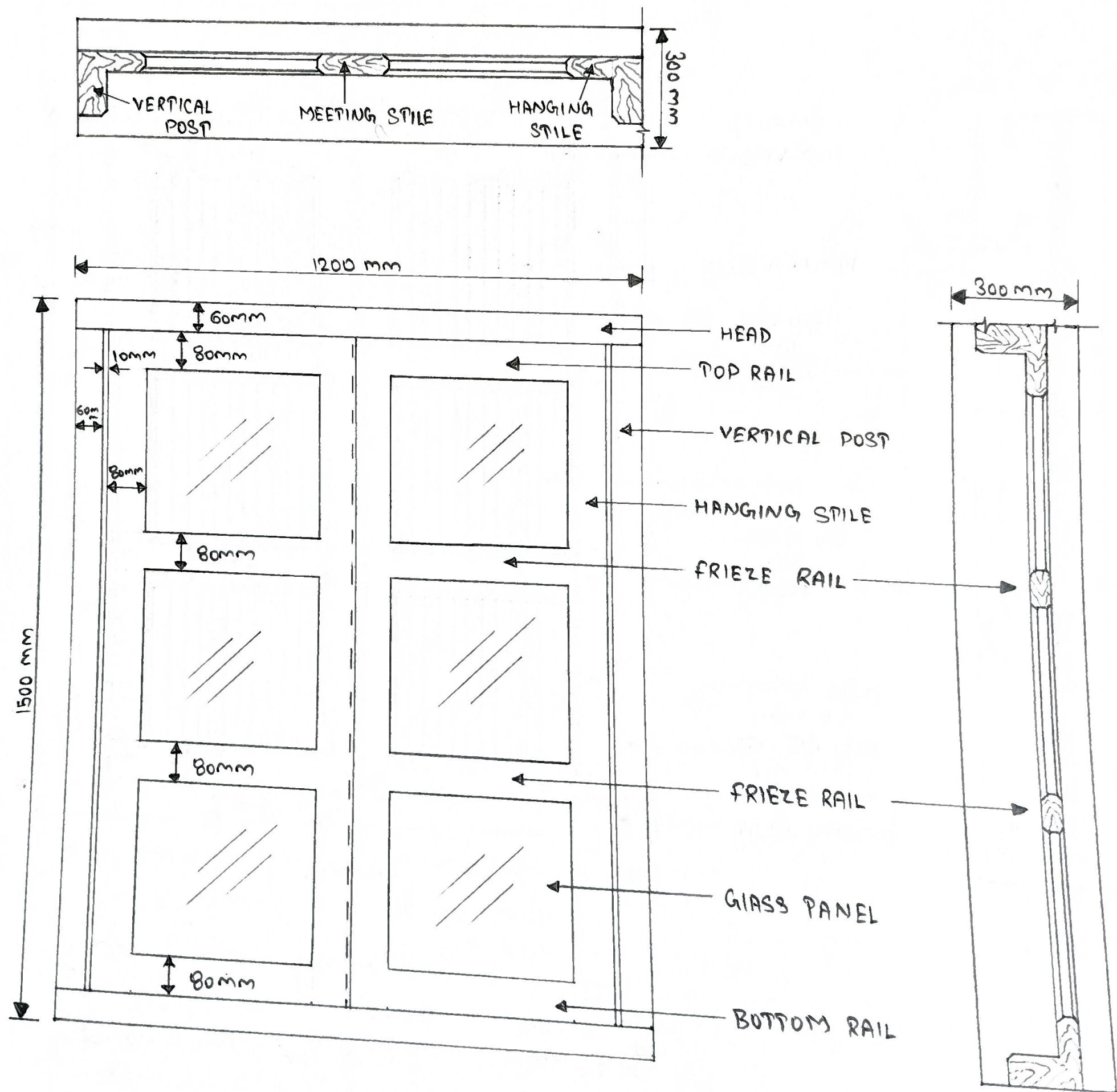


(Section at x-x)

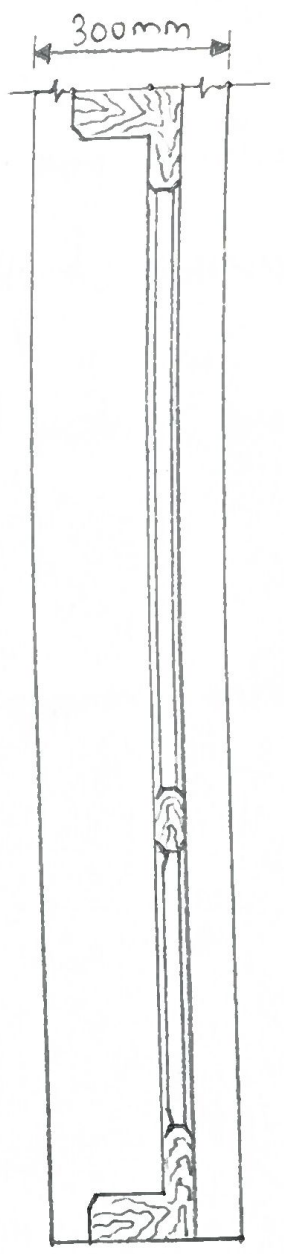
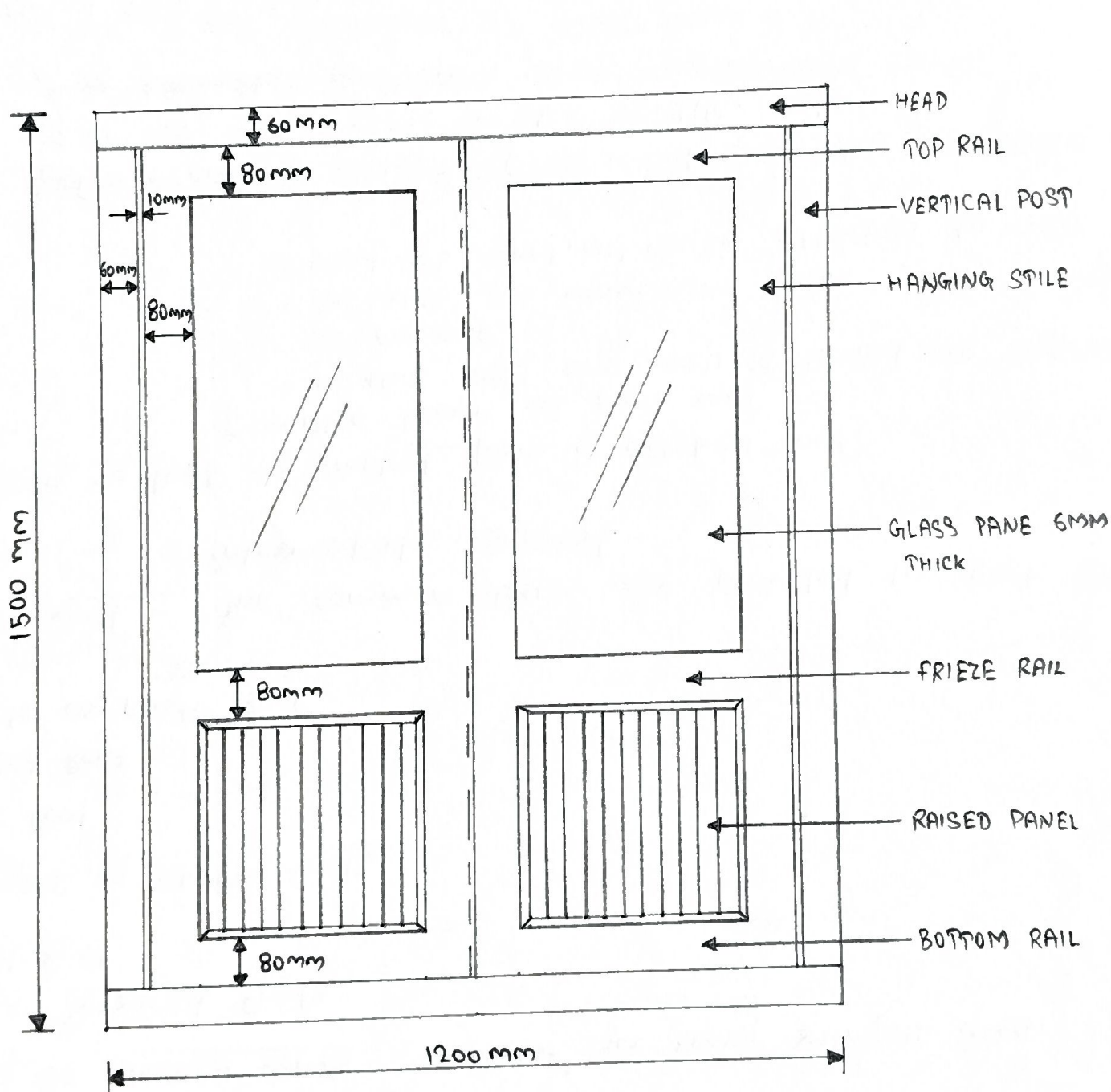
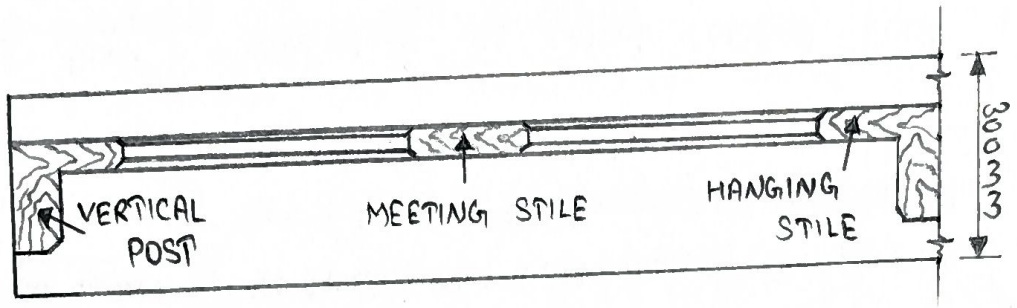


(Section at y-y)

2) A neat Labelled elevation :-



3) The detailed plan and elevation for half glazed half panelled window :-



ROOFS

- A Roof is a covering on the enclosure made for a building.
- It is essentially provided to protect the inhabitants from the effect of Sun, say, wind etc...

→ Classification of Roofs:

1) Sloping or Pitched Roofs - Suitable for heavy rainfall area.

2) Flat or Terraced Roofs

3) Curved Roof

→ Three types of sloping Roofs -

i) Single Roof

ii) Trussed Roof

iii) Double or gabled Roof

i) Single Roof - The common rafters are provided to each slope without any intermediate support.

a) Lean to Roof - • Simplest form of pitched roof.

• Also known as pent roof.

• In this roof one wall is carried up sufficiently higher than other one.

• Suitable for maximum span 2.4m.

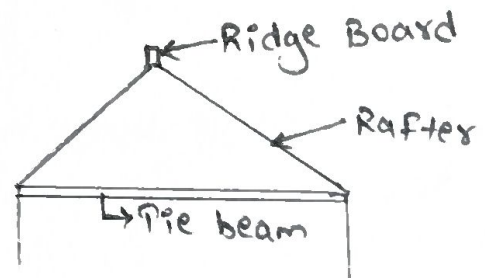
• Used for Shed, out house attached to main building, verandah etc.

b) Couple Roof - • common rafters slope upward from the opposite wall and they meet on ridge piece in the middle.

• Suitable for span up to 3.6 m.

c) Couple closed Roof - • Suitable for span up to 4.2m

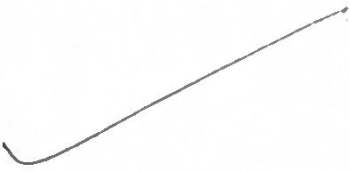
i) Tie beam - It prevents tendency of rafters to spread out & danger of overbusting of wall is avoided.



d) Colours beam Roof - variation of couple closed roof, tie beam raised and placed at a higher level. The tie beam is then known as colour beam.

• It is provided to increase the height of roof & adopted up to maximum span 4.8m.

e) Colours & Sizes Roof - Similar to the colour beam except that two colour beams which are crossing each other to present an appearance of sizes are provided.

- ii) Trussed Roof - • When the span exceed 4.8 m & when there are no inside supporting wall or partition for the purlin, the frame structure known as trussed.
- Spacing of trussed depends upon the load on the roof. position of cross wall, span & material of the trussed
 - Usual form of roof trussed - king post trussed, Queen post trussed, steel trussed truncated trussed, composite trussed.
- iii) Double or purlin Roof - • Span exceed about 2.4 m the necessary size for the rafter becomes un-economical. hence, in order to reduce size of rafter the intermediate support called purlin. are introduced under the rafter.
- Each rafter is supported at three points -
 - 1) At the bottom on wall through the wall plate
 - 2) At the top by the ridge beam.
 - 3) At a centre by the purlin.
- 

→ King Post Trussed -

Scale - 1:50

Span :- 12m

Wall thickness = 400

Effective span = 5mm

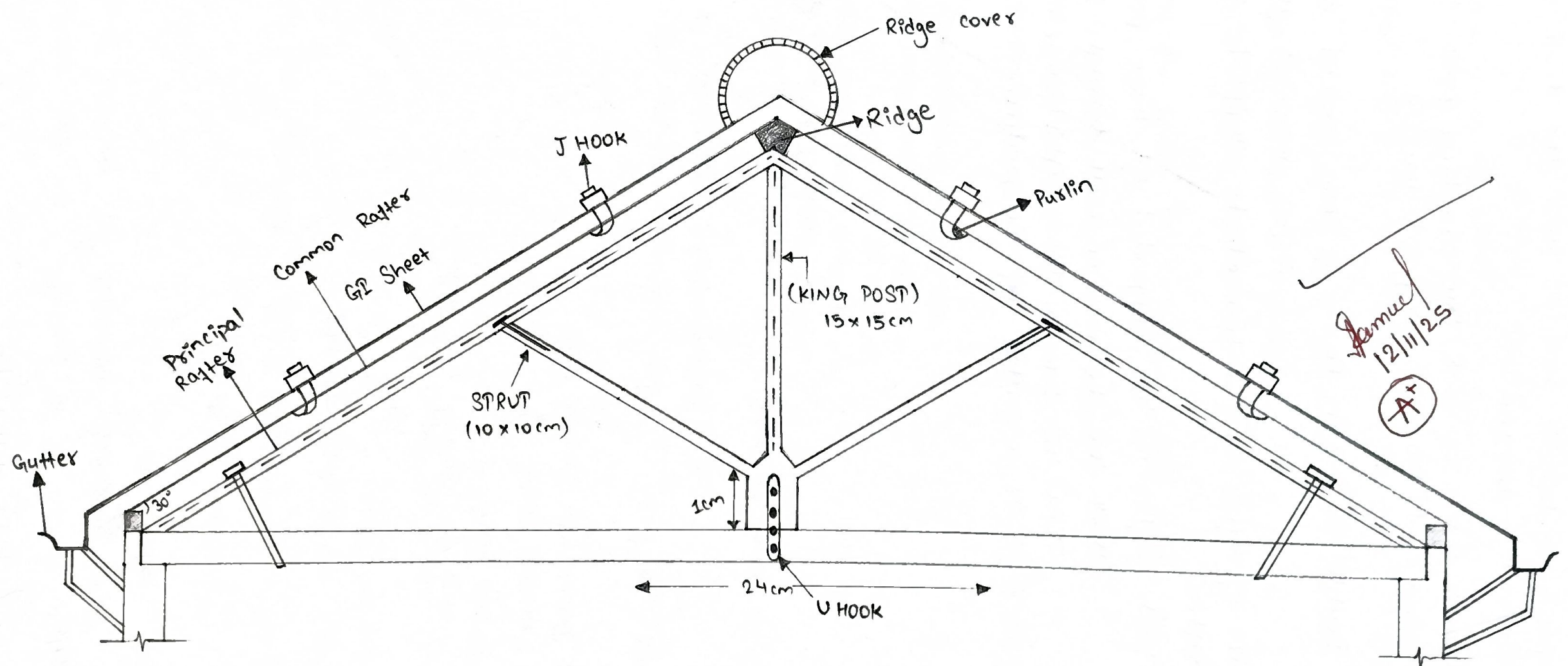
Tie beam : 30 x 15 cm

Principle Rafter : 15 x 15 cm

Common Rafter : 15 x 15 cm

Strut : 10 x 10 cm

King post : 15 x 15 cm



→ Queen Post :-

Wall thickness : 40 cm

Span = 10 m

Tie beam = $15 \times 15 \text{ cm}$

Principle Raytex = $18 \times 15 \text{ cm}$

Common Rafter = $18 \times 15 \text{ cm}$

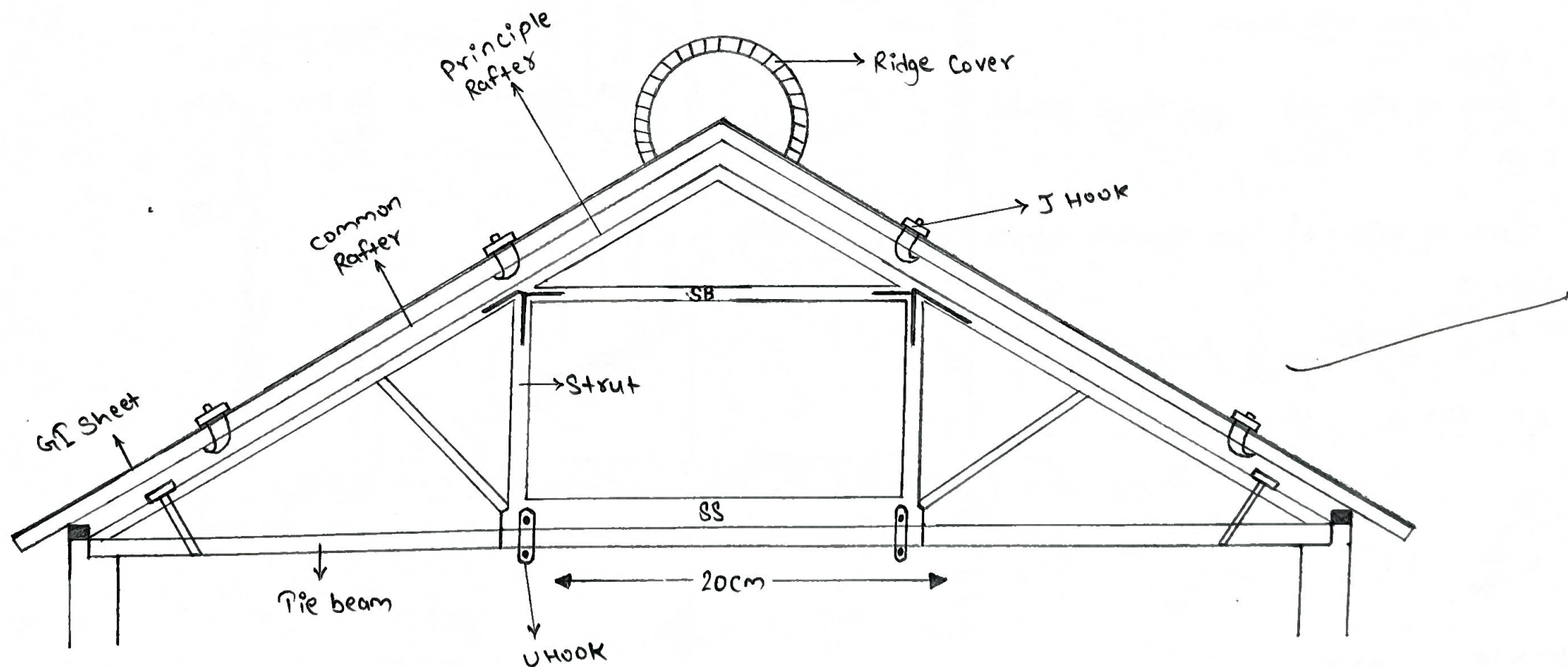
Strut / Stroe = $10 \times 8 \text{ cm}$

Queen Post = $18 \times 15 \text{ cm}$

Straining sim = $8 \times 10 \text{ cm}$

Steining beam = $15 \times 12 \text{ cm}$

Pexlean = 25x25cm



Que. 1) Draw a diagram of Steel Roof Truss with effective span of 7500.

Principle rafter - $100 \times 100 \times 6$

Strut - $75 \times 75 \times 6$

tie Beam - $100 \times 100 \times 6$

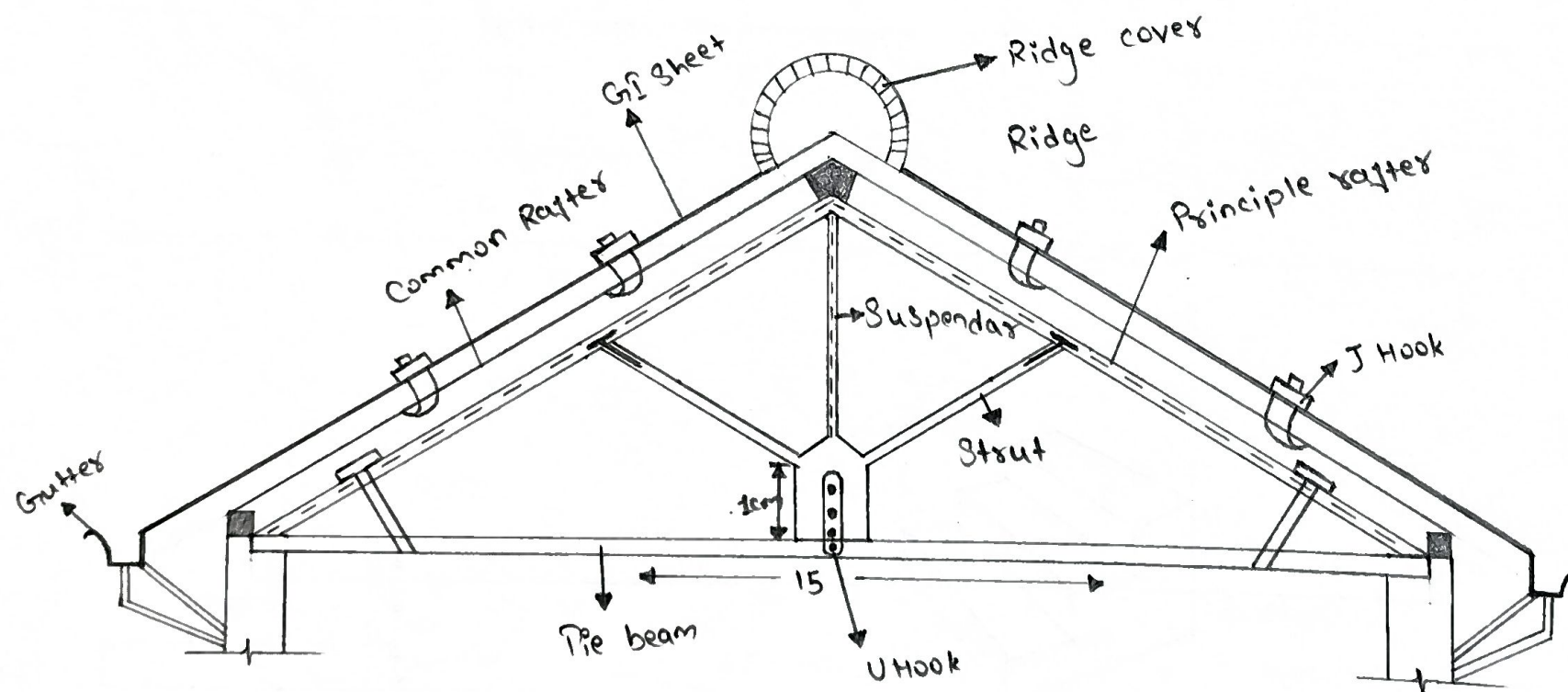
Suspending - $75 \times 75 \times 6$

Tie - $75 \times 75 \times 6$

Assume :-

Common Rafter = 15×15

Scale (1:50)



→ Stair Case:-

Q.1 Draw plan and section of the dog leg stair case for Residential building with the following Detail -

a) Wall thickness - 20cm

b) Slab thickness - 15cm or 0.15m

c) Rise - 15cm or 0.15m

d) Tread - 30cm or 0.3

e) floor height - 3.6m

Ans. * Assume :-

Landing - 1.2m

Scale - 1:50

* Calculation :-

$$\text{No. of Rise} = \frac{\text{Floor height} + \text{Slab thickness}}{\text{one rise length}} = \frac{3.6 + 0.15}{0.15} = 25$$

$$\begin{aligned} \text{No. of tread} &= (\text{No. of rise} - 1) \text{ for single stair} \\ &= 24 \end{aligned}$$

$$\begin{aligned} \text{No. of tread} &= (\text{No. of rise} - 2) \text{ for double stair} \\ &= 24 - 2 \\ &= 22 \end{aligned}$$

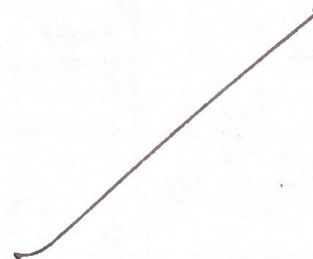
$$= \frac{22}{2} \times 30 = \frac{330}{50} = 6.6$$

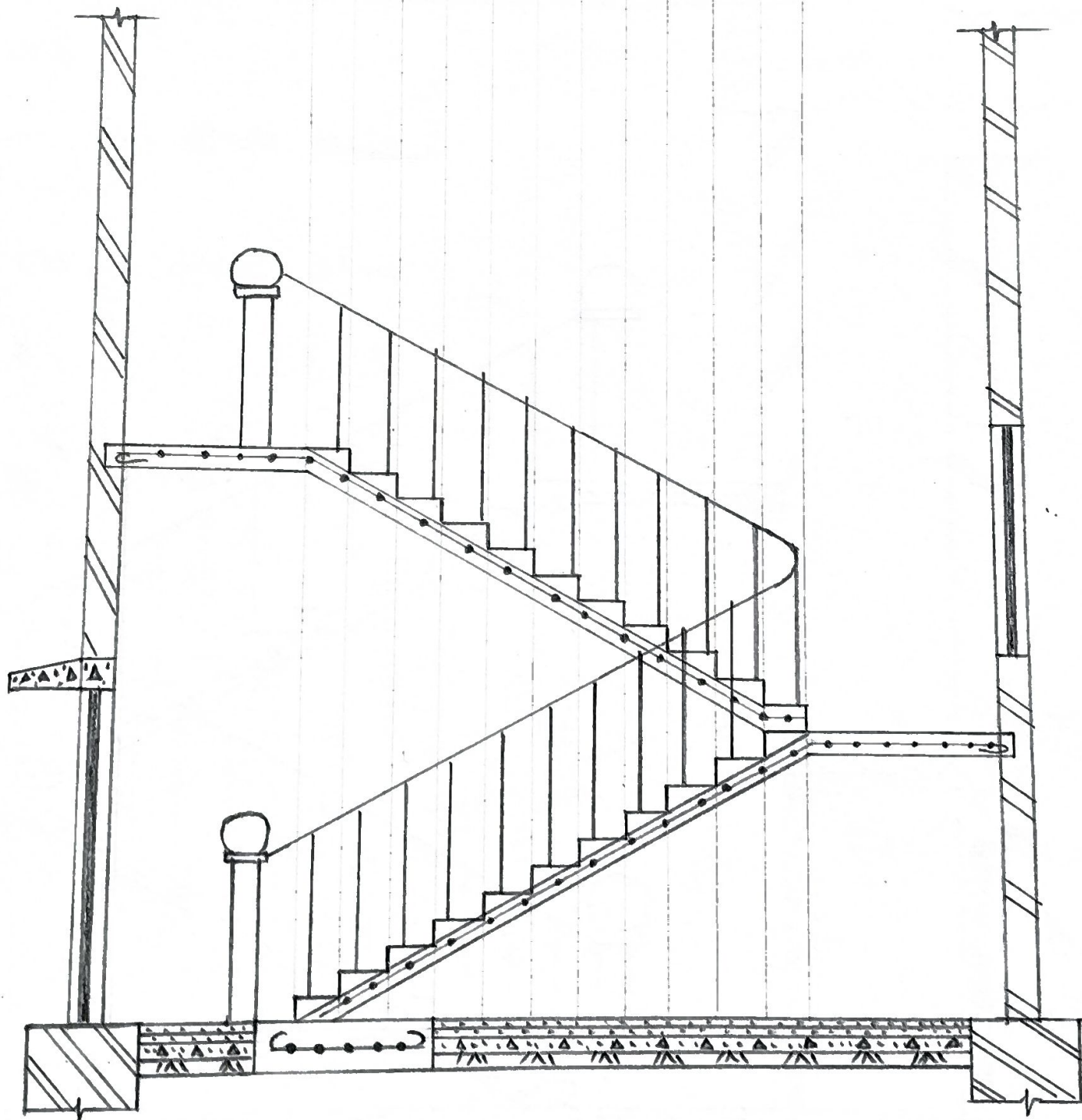
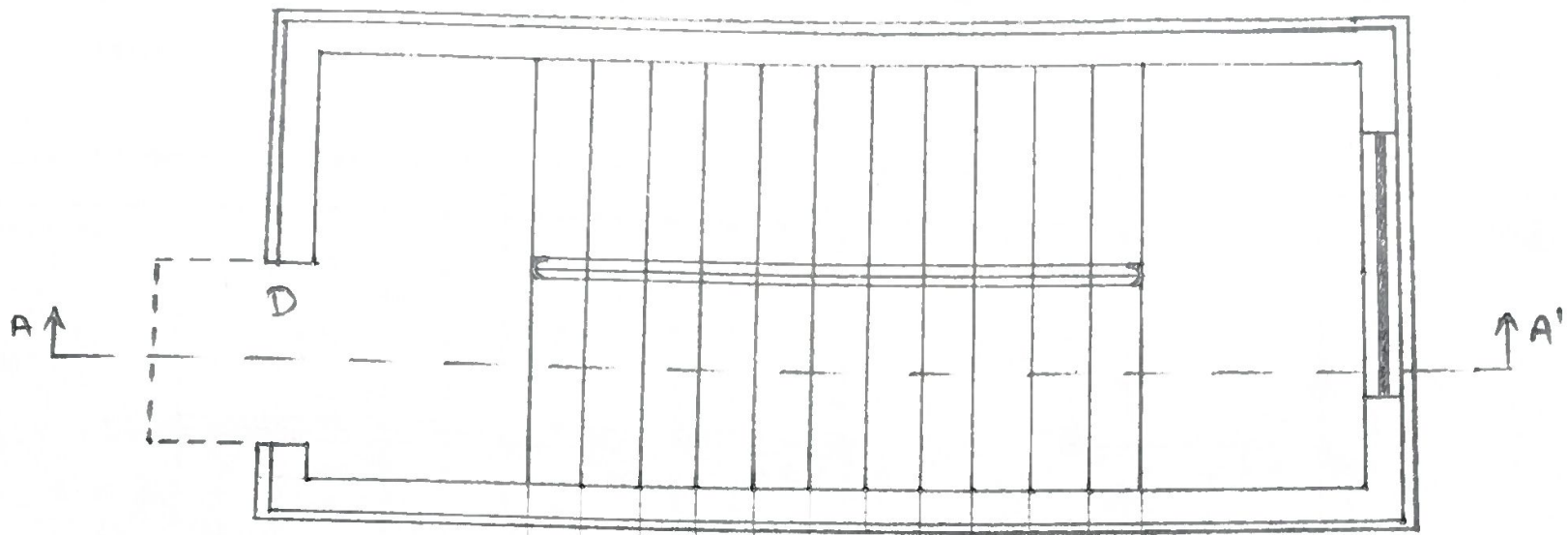
$$\text{* Lintel Rise} = \frac{60}{50} = 1.2$$

$$\text{* Window} = 1.5 \times 1.5 = \frac{1.5 \times 100}{50} = 3\text{cm}$$

$$\text{floor height} = \frac{3.6 \times 100}{50} = 7.2$$

$$\text{wall thickness} = \frac{20 \text{ cm}}{50} = 0.4$$





Q.2) Draw a designed dog legged stair for a building in which vertical distance of floors is 3.2m & going space is available in 6.1m designed & draw.

Ans. * Assume :-

Trade - 250mm, Rise - 150mm, landing - 2.5m

Wall thickness - 30cm

Slab thickness - 15cm

* Calculation :-

$$\text{No. of rise} = \frac{3.2 + 0.15}{0.15} = 23$$

$$\text{No. of trade} = (23 - 1) \text{ for single stair} \\ = 22$$

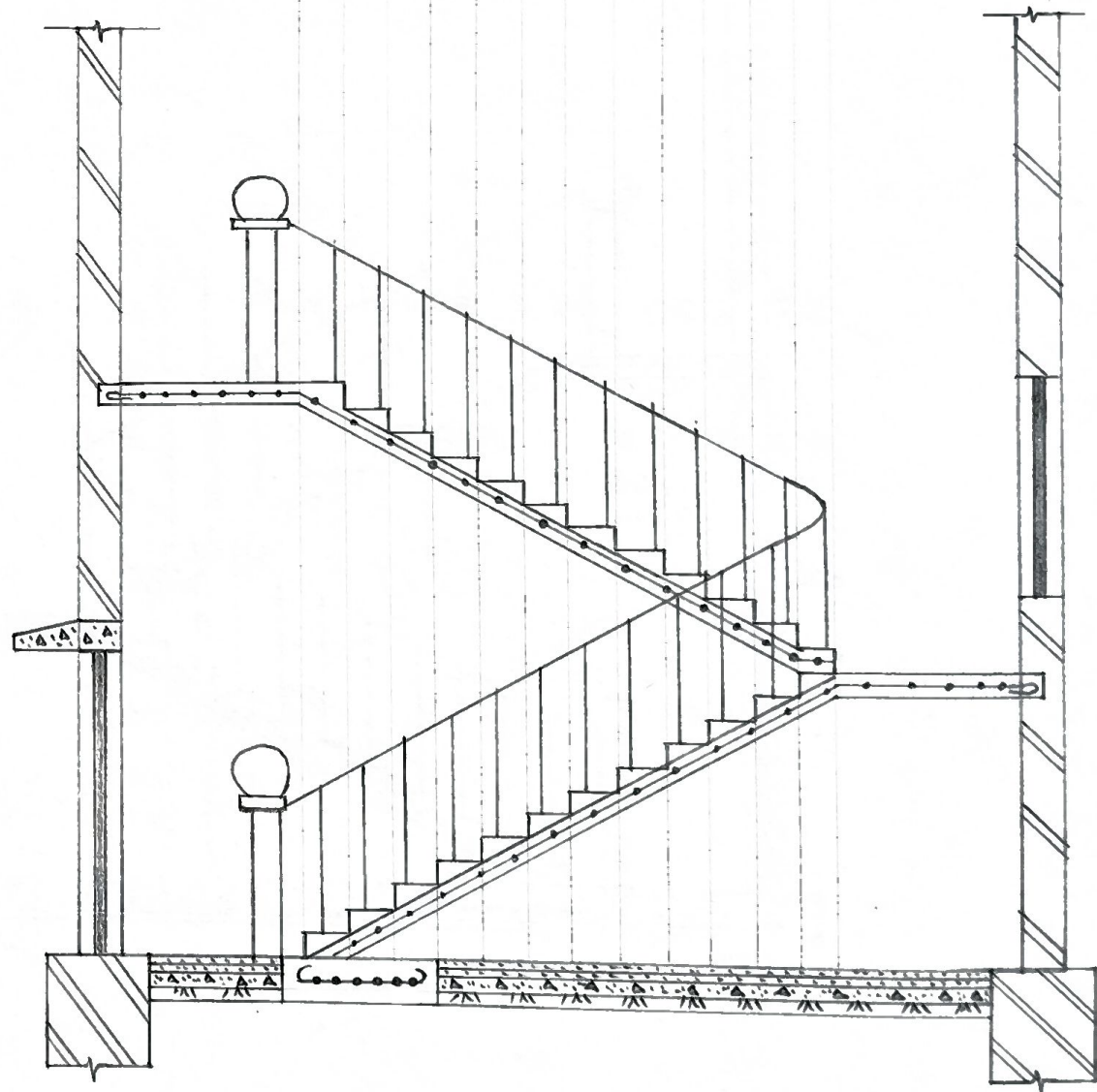
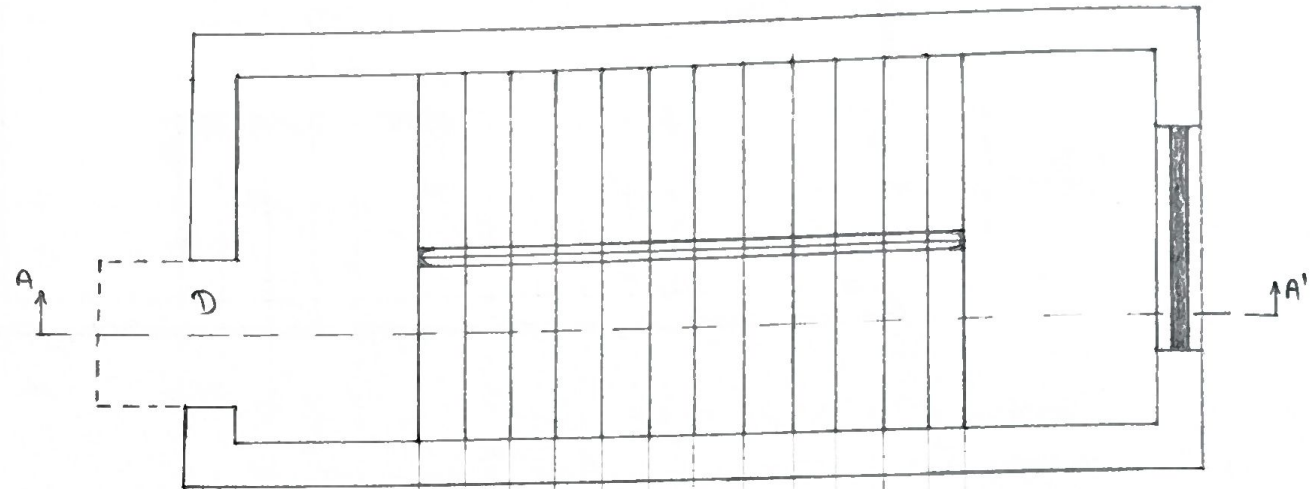
$$\text{No. of trade} = (22 - 2) \text{ for double stair} \\ = 20$$

$$\text{Floor height} = \frac{3.2 \times 100}{50} = 6.4$$

$$\text{Wall thickness} = \frac{30}{50} = 0.6$$

$$= \frac{6.1 \times 100}{50}$$

$$= 12.2 \text{ cm.}$$



Q.3) A stair case is needed to connect two floor separated by 3.20m height. The going space is available 4.30m.
Design and draw detail sketch for the stairs of the floors are residential building

Ans. * Assume :-

Trade - 250mm

Rise - 150mm

landing - 1.2m

slab thickness - 15cm

wall thickness - 30cm

* calculation:-

$$\text{no. of rise} \rightarrow \frac{3.2 + 0.15}{0.15} = 23$$

$$\text{no. of trade} = (23 - 1) \text{ for single stair} \\ = 22$$

$$\text{no. of trade} = (22 - 2) \text{ for double stair} \\ = 20$$

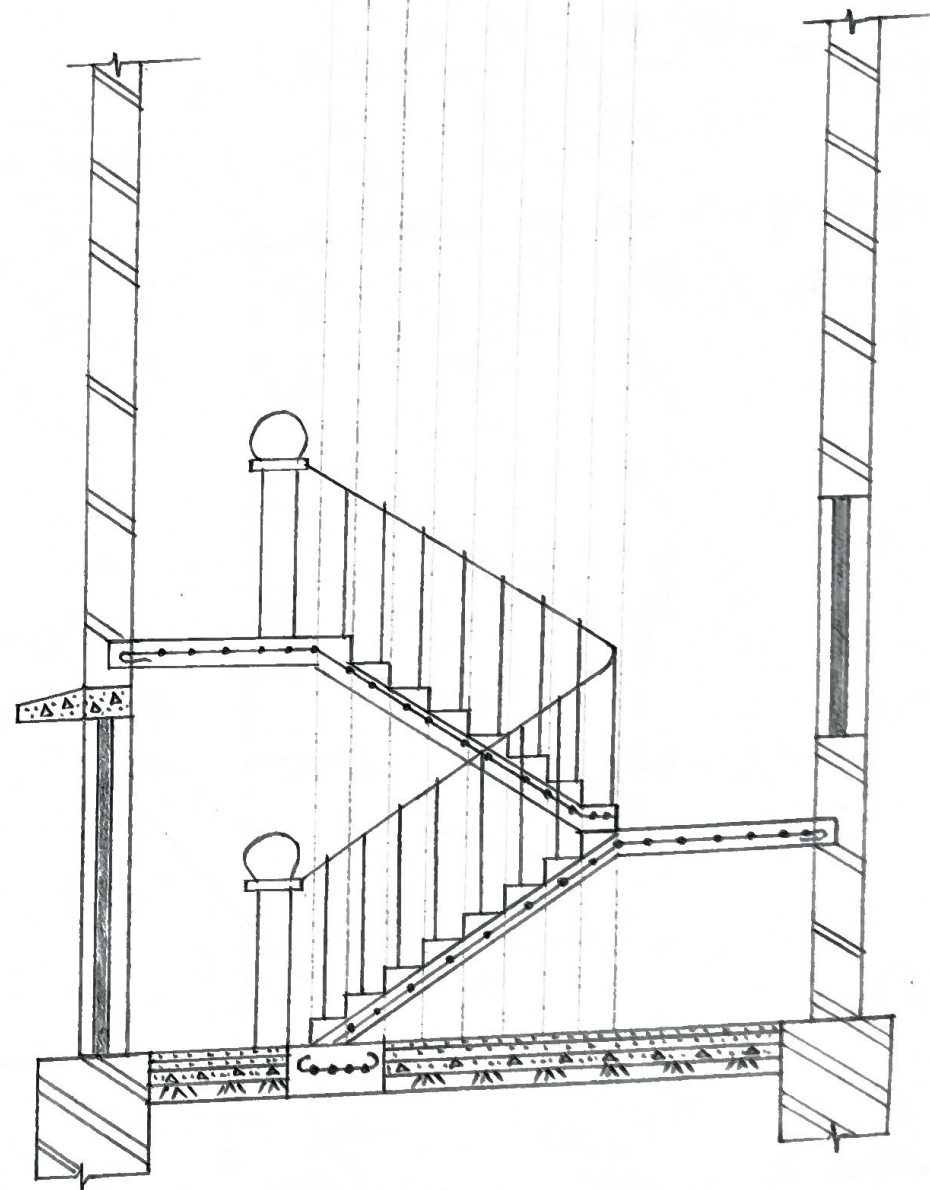
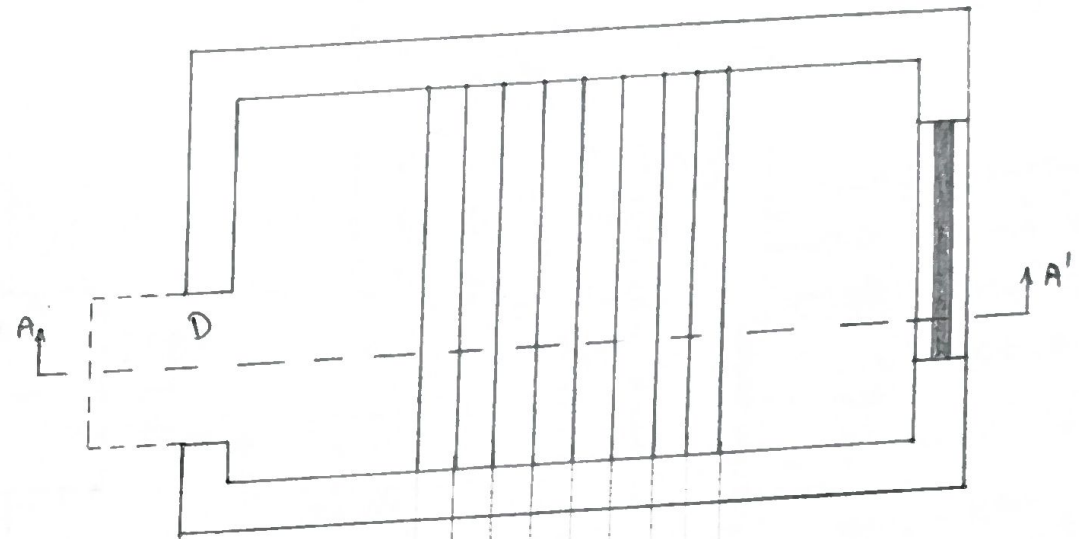
$$\text{floor height} = \frac{3.20 \times 100}{50} = 6.4$$

$$\text{wall thickness} = \frac{30}{50} = 0.6\text{mm}$$

$$\frac{4.30 \times 100}{50}$$

$$\text{going } A = 8.6$$

$$\text{Trade} = \frac{3.8}{0.5} = 7.6$$



Q.4) Stair room : $5.4 \times 3 \text{ m}$
 Height of room : 3.5 m
 Landing width : 1.2 m
 Rise : 0.15 m
 Trade : 0.30 m

Ans. Assume:-

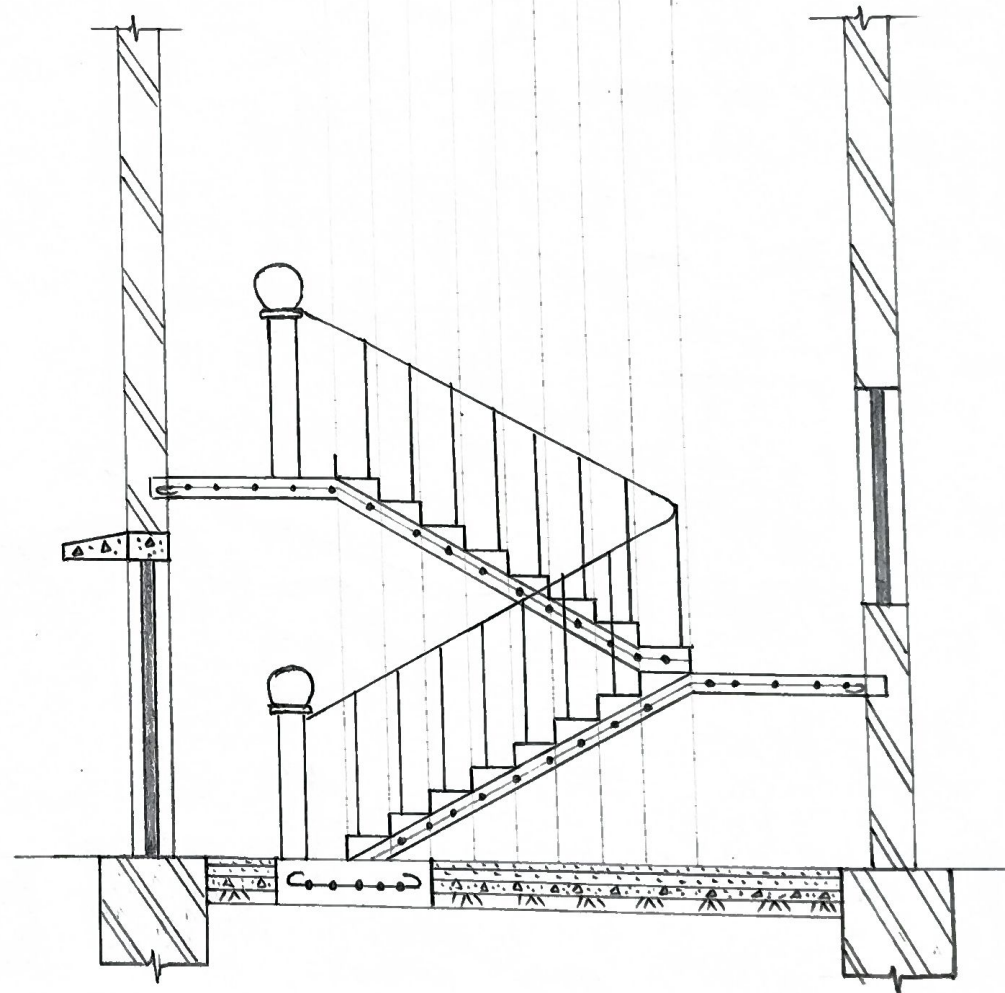
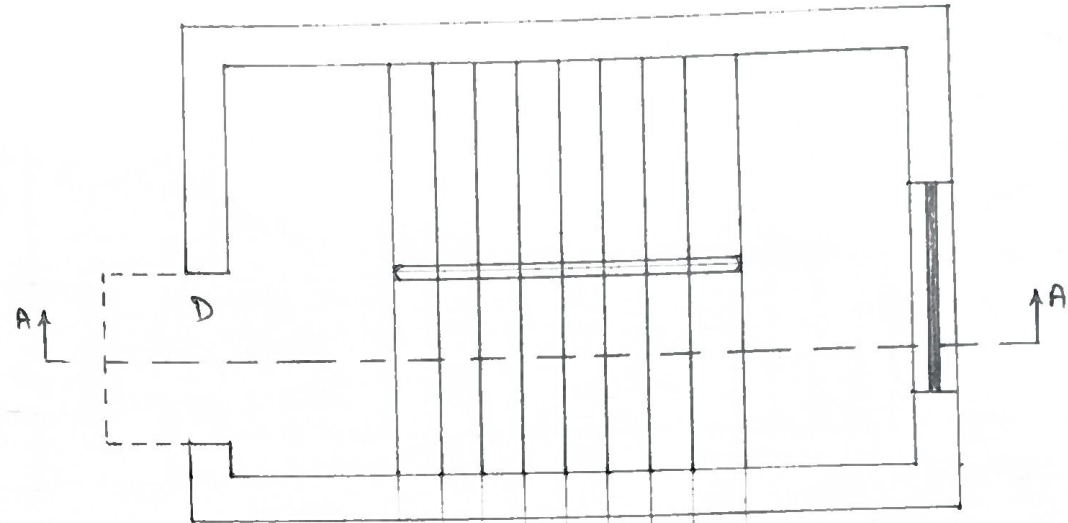
Floor height : 3.2 m
 Slab thickness : 0.15 m
 Wall thickness : 30 cm
 Scale : $1:50$

Calculation:-

$$\text{No. of rise} = \frac{3.2 + 0.15}{0.15} = 23$$

$$\begin{aligned} \text{No. of trade} &: (\text{No. of rise} - 1) \text{ for single floor} \\ &: 23 - 1 \\ &: 22 \end{aligned}$$

$$\begin{aligned} \text{No. of trade} &: (\text{No. of rise} - 2) \text{ for double floor} \\ &: 22 - 2 \\ &: 20 \end{aligned}$$



Q.5) A Double
 $2 \text{ m} \times 4 \text{ m}$

Trade
 Rise :

Q.6) Assume

Floor
 Wall +
 Slab
 Landing
 Height

Calculation

No. of rise

No. of trade

No. of trade

Q.5) A doglegged stairs case room has size of $2\text{m} \times 4.5\text{m}$ draw plain & sectional elevation

Grade : $25\text{cm} = 0.25\text{m}$

Rise : $15\text{cm} = 0.15\text{m}$

Q.6) Assume :-

Floor height : 3.2m

Wall thickness : 30cm

Slab thickness : 0.15m

Landing width : 0.5m & 0.45m

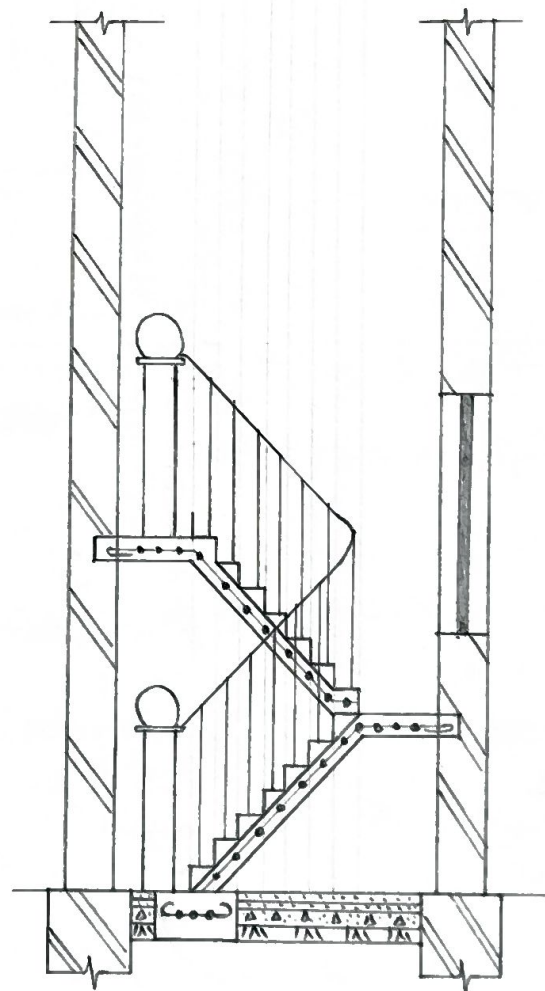
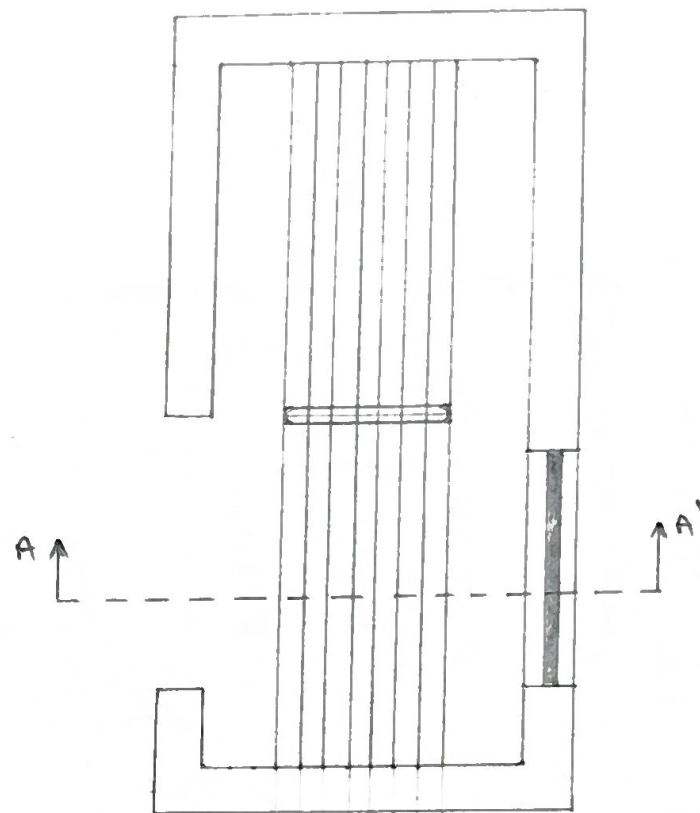
Height of room : 3.2m

Calculation :-

$$\text{No. of rise} = \frac{3.2 + 0.15}{0.15} = 23$$

$$\begin{aligned}\text{No. of trade} &= (\text{No. of rise} - 1) \text{ for single floor} \\ &= 23 - 1 \\ &= 22\end{aligned}$$

$$\begin{aligned}\text{No. of trade} &= (\text{No. of rise} - 2) \text{ for double floor} \\ &= 22 - 2 \\ &= 20\end{aligned}$$



Isometric and Perspective Projection (Drawing)

9) Eye

- i) Perspective give the apperance of an object as it appears to the human eye.
- ii) Eg:- If an observer stand in the railway track. The railway lines appears to meet at a point. Even the sleepers seem to be shortning in length as they recede from the eye.
- iii) If such view is drawn with the help of drawing instrument on a plane is known as perspective projection.

* Terminology :-

- 1) Picture plane :- The imaginary vertical plane betⁿ the observer & the object on which the perspective is obtain. is known as Picture plane (PP).
- 2) Ground line :- The line of interaction of ground plane an vertical plane is called Ground line. (GL)
- 3) Station point :- It is the point of sight where all projector converge.
- 4) Centre of vision :- The point where the line of vision pierce the picture plane is centre of vision.

5) Horizon :- Horizontal line drawn through the centre of vision on the picture plane.

6) Vanishing point :- It is a point on the picture plane where all the parallel line appear to converge.

7) Angle of vision :- Draw the plane of the object. Join the station point with two extreem corner of the object

8) Measuring Line :- The intersection of plane of the object with the picture plane give the true height. at the point of interaction. when measured in Elevation.

→ Some time measuring line is obtain - ed by extending any edge of the object to meet the picture plane an height are then measured on this line

Questi.

1) A Rect
Pictu
Draw

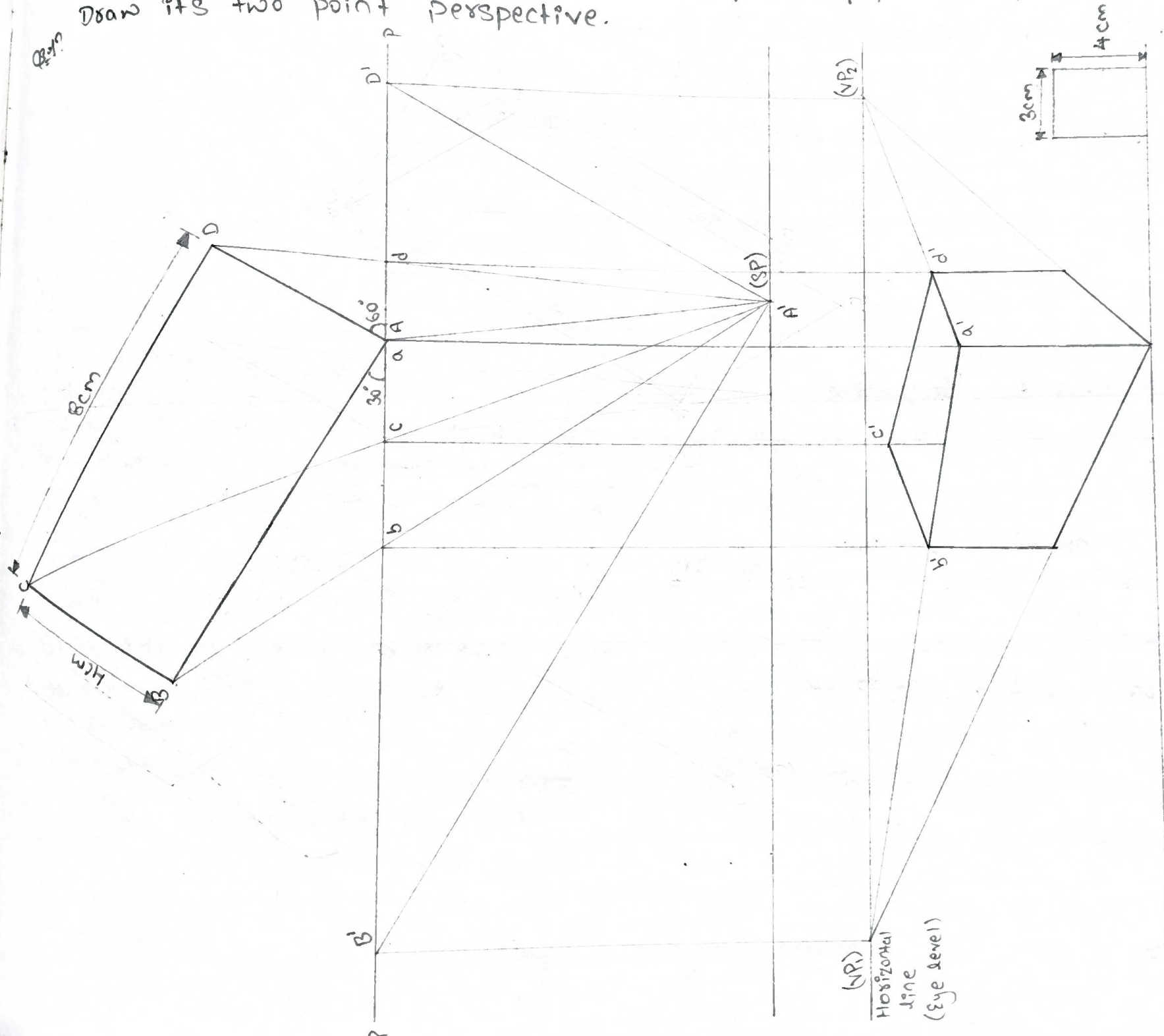
Q. 10



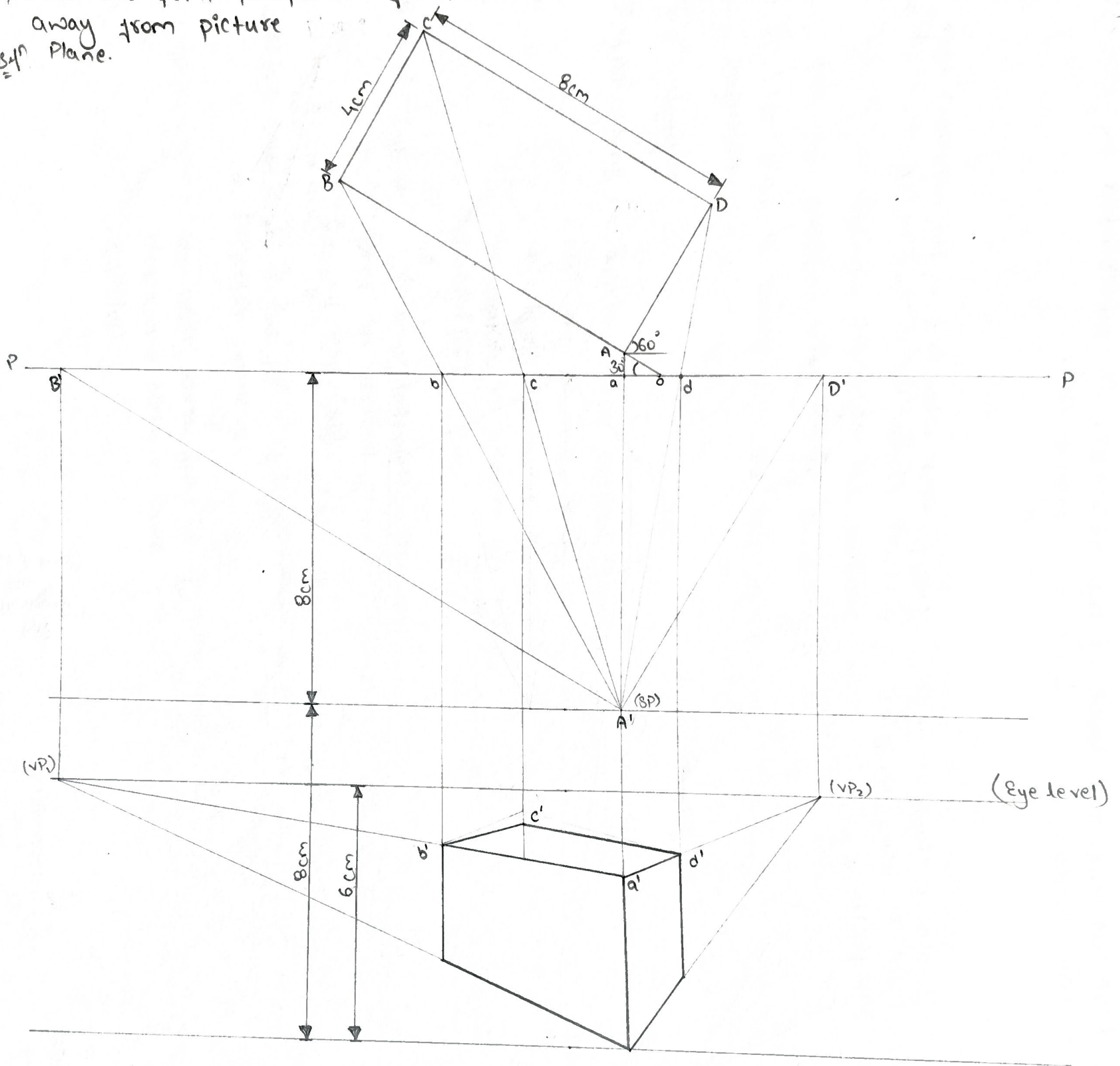
9) Eye level :- It is a line at the eye level of the observer is represented by straight line. It's true height is measured from ground line.

Question :-

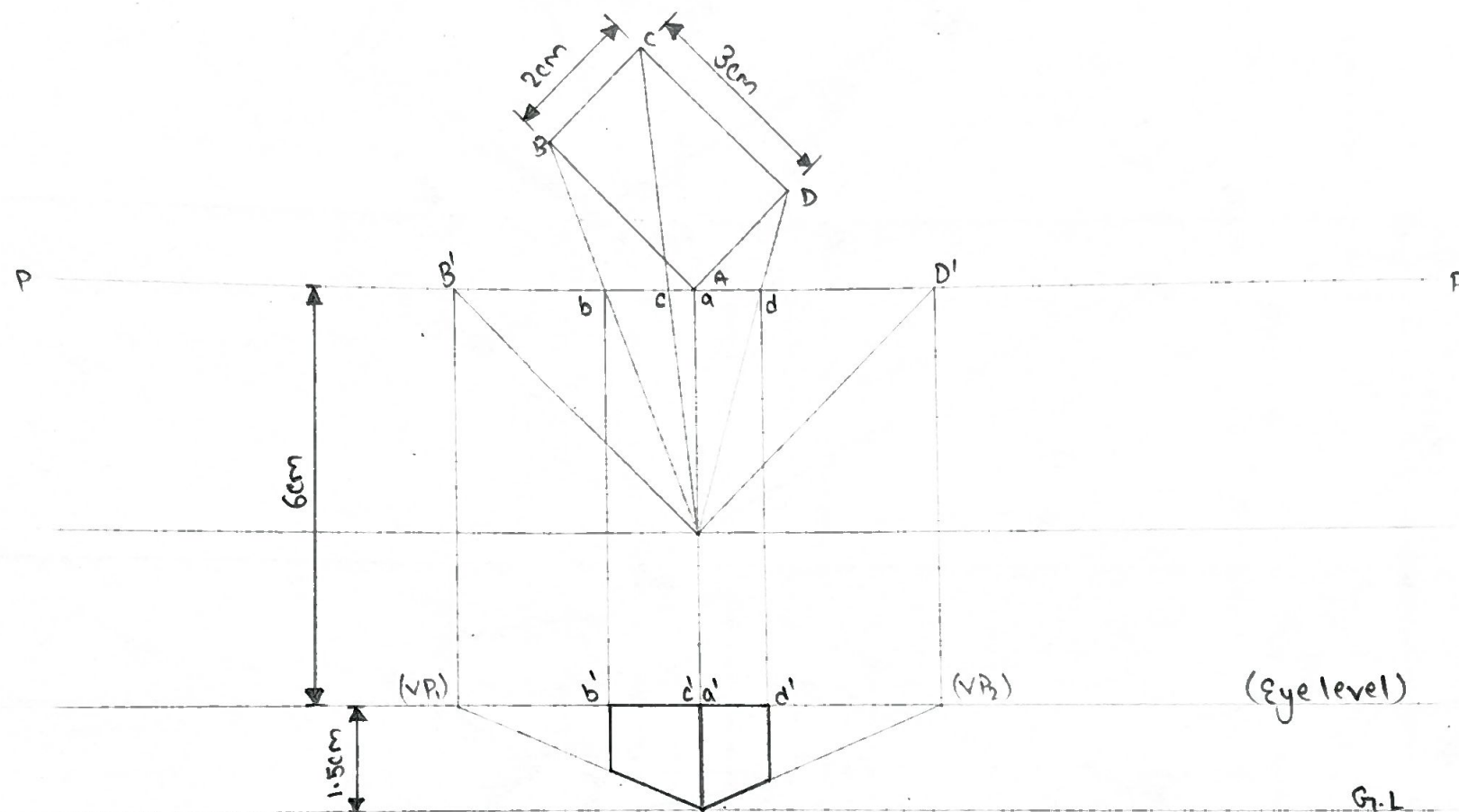
4) A Rectangular edge of base 8cm & sides at ends 3x4cm Rest with one of its vertical edge in picture plane. Station Point is 8cm in front of picture plane. The height of observer is 6cm. Draw its two point perspective.



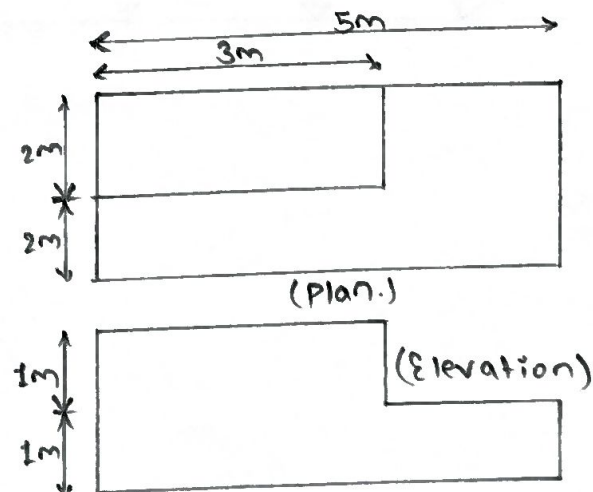
2. Draw two point perspective for previous question when the object is 1cm away from picture plane.



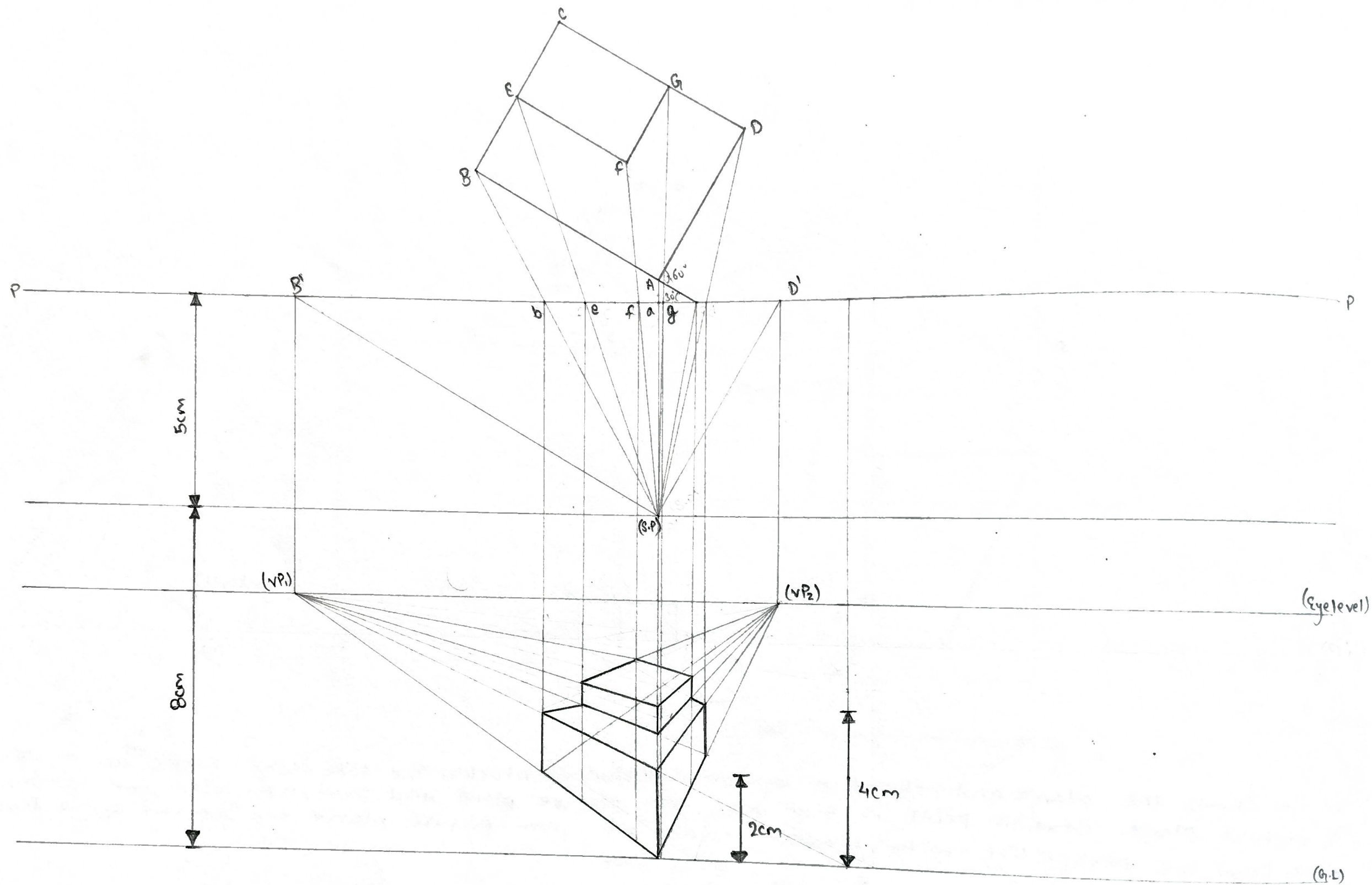
3) Draw two point perspective view of a rectangular block $3 \times 2 \text{ cm} \times 1.5 \text{ cm}$ resting on horizontal plane on $3 \text{ cm} \times 2 \text{ cm}$ face with its vertical face making an angle of 45° with vertical plane. The observer is at a distance of 6 cm from picture plane assume (eye level) at 1.5 cm .



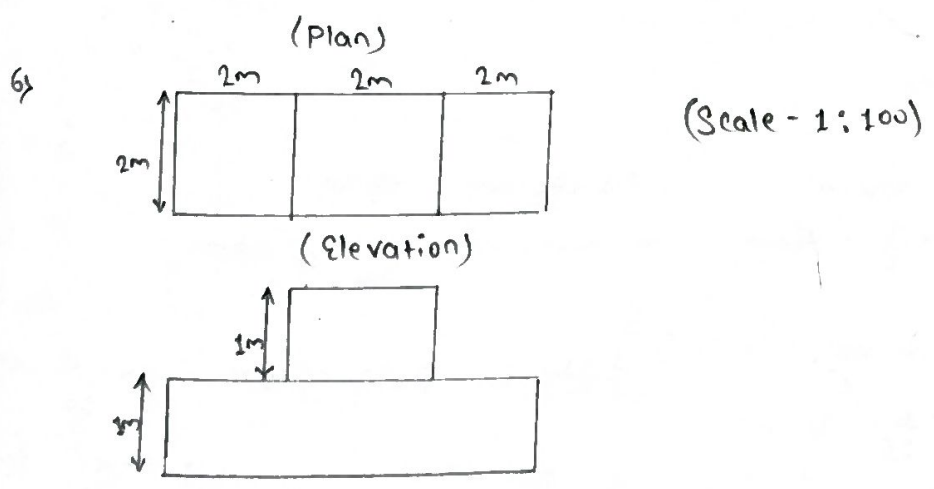
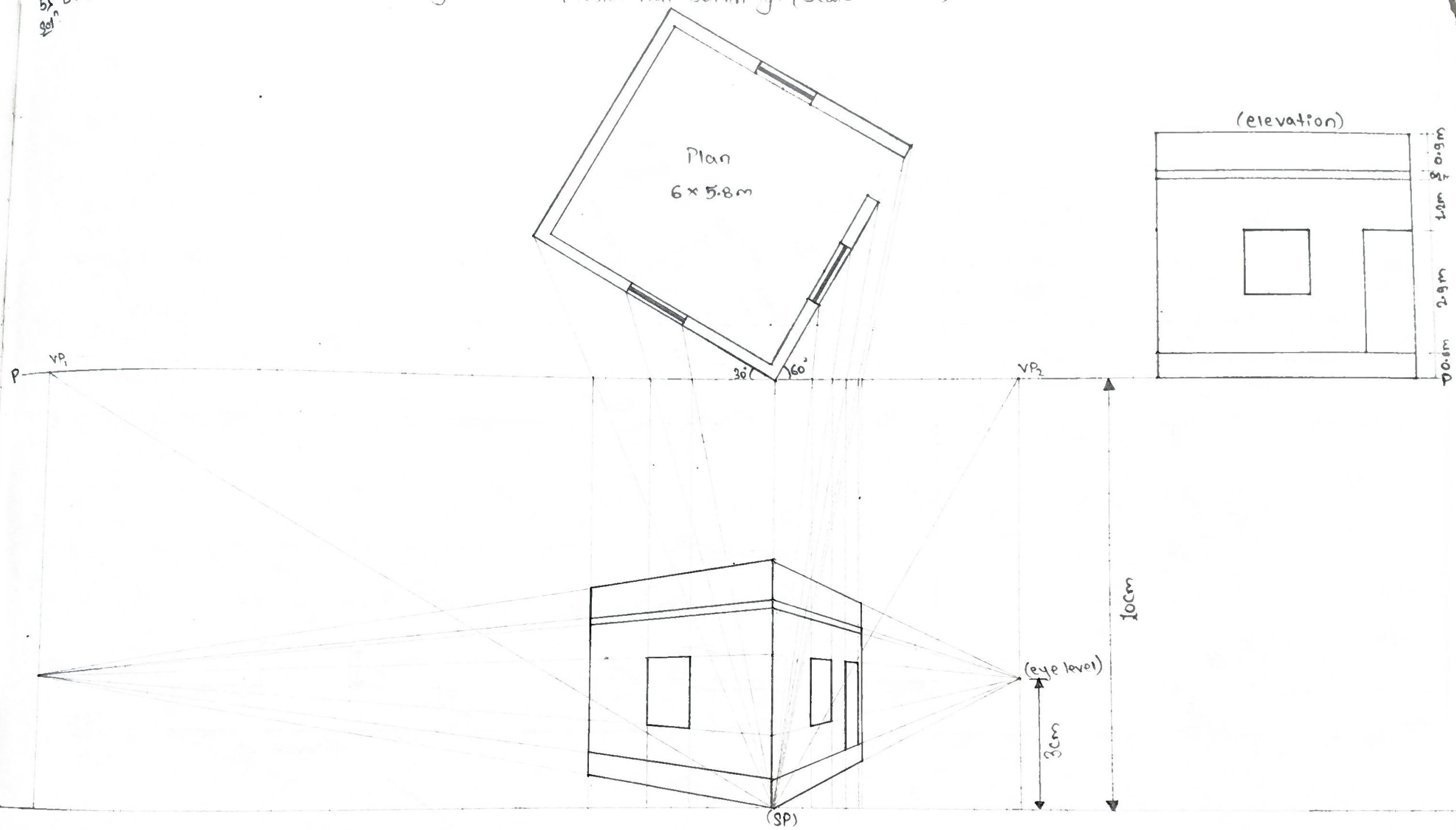
4) The fig. Shows the plan and elevation of combination of blocks. The long edge make an angle of 30° to picture plane. Station point is 5 m from the picture plane and in line with the center of block. Draw the perspective with nearest corner 1 m from picture plane and height of eye level is 4 m .



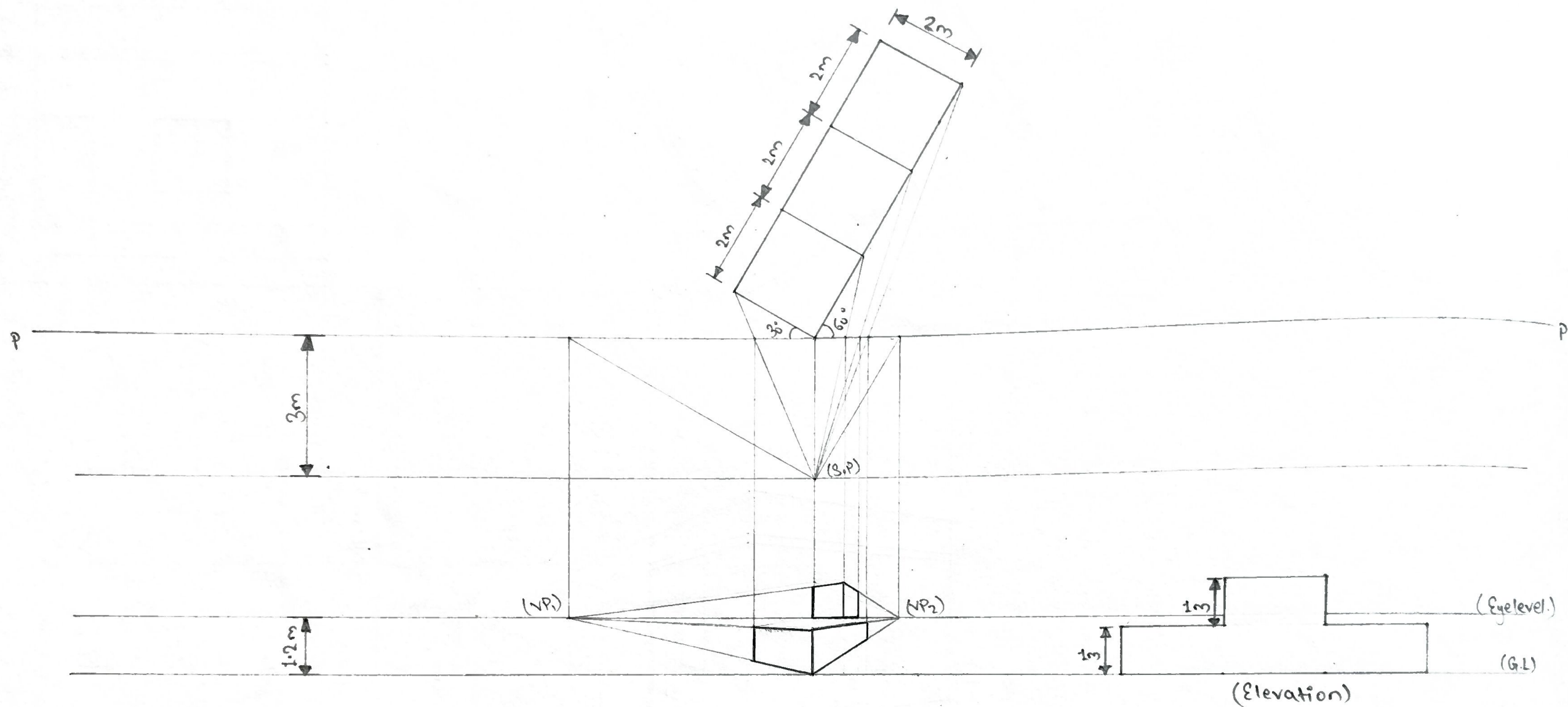
Q. 17.



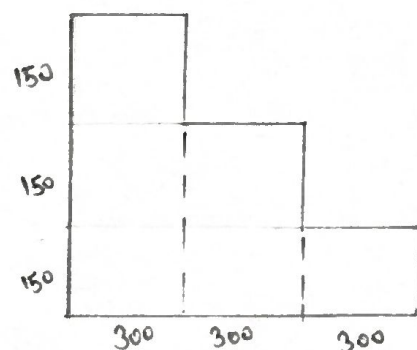
5) Draw a perspective view of a single room of residential building. (Scale - 1:100)



Q.17



77



(Scale :- 1:25)

all ratio in mm.

8

change all mm in cm.

Calculation:-

$$1) 1000 \text{ mm} = 100 \text{ cm}$$

$$100 \times \frac{1}{25} = 4 \text{ cm.}$$

$$2) 300 \text{ mm} = 30 \text{ cm}$$

$$30 \times \frac{1}{25} = 1.2 \text{ cm}$$

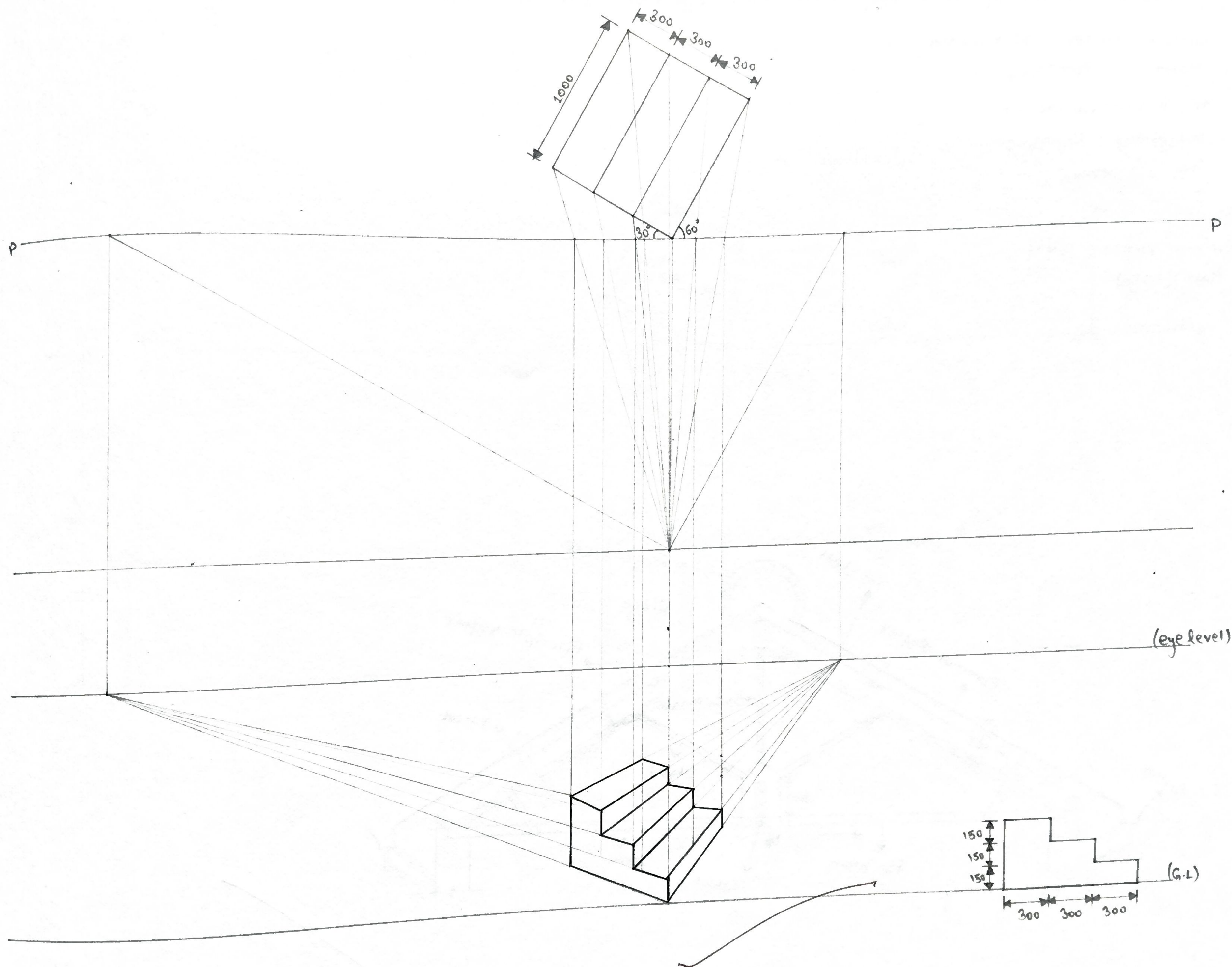
$$3) 150 \text{ mm} = 15 \text{ cm}$$

$$15 \times \frac{1}{25} = 0.6 \text{ cm}$$

$$+ \text{Station point} = 2 \text{ m} = 2 \times \frac{100}{25} = 8 \text{ cm}$$

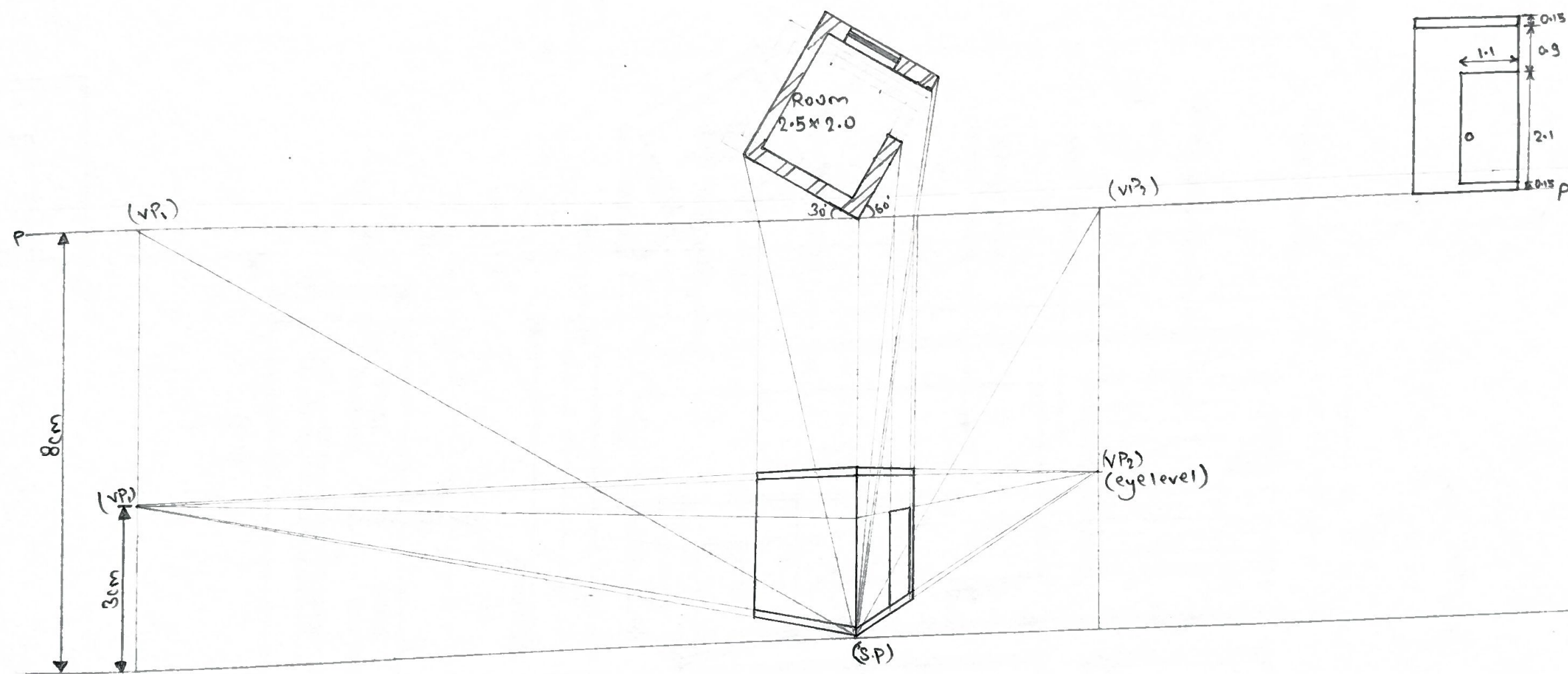
$$+ \text{eye level} = 1.5 \text{ m} = 1.5 \times \frac{100}{25} = 6 \text{ cm}$$

Q.17

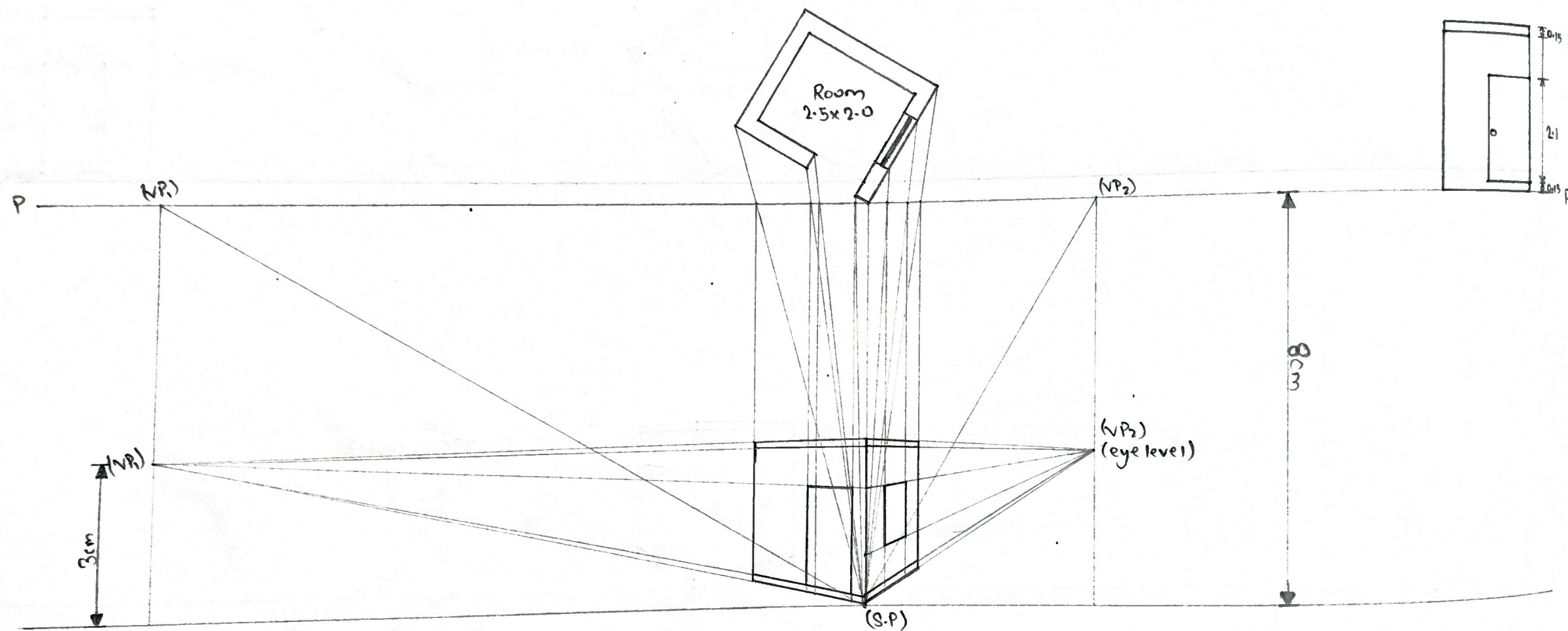


Ques. 27 Draw a perspective view of a single room of residential building (Scale 1:100)

Q17-14



Second step



your