

GOVERNMENT POLYTECHNIC FOR GIRLS , AHMEDABAD

Civil Engineering Department

*Shri. P.N. Patel
L.C.E.*

*Subject:- Estimating, Costing and Valuation
Subject Code:- 3350604
Semester:- 5th
Year:2020*





➤ **Unit– IV**

Th and Lab

➤ **Estimation of Civil Works**

➤ **PART-2:**

➤ **METHODS OF QUANTITY ESTIMATION/CALCULATION**

(I) Center Line method

(II) Long wall and Short wall method(LW&SW)

For Three and more Room Building plan

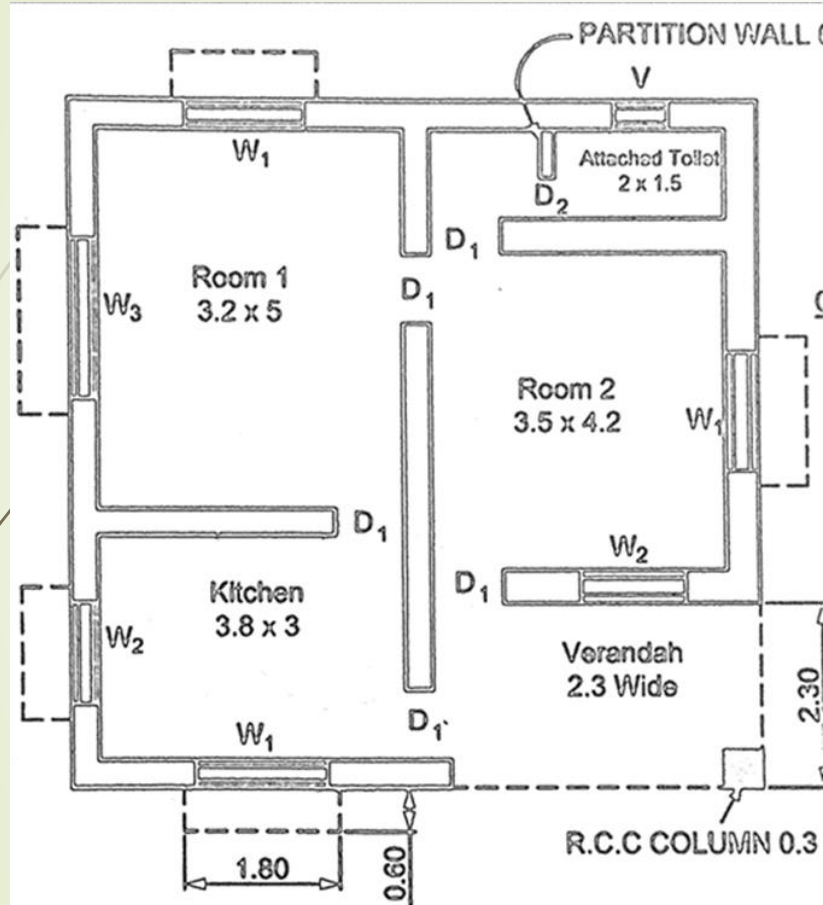
- **USE OF METHOD : Examples**

➤ **TERM WORK –PRACTICE -5**

Building Plan

and

Measurements



METHODS OF TAKING OUT QUANTITIES

OR Methods of Quantity Estimation

- ▶ The quantities like earth work, foundation concrete, brickwork in plinth and super structure etc., can be worked out by any of the following two methods:

I) Centre Line method.

(with wall junction consideration)

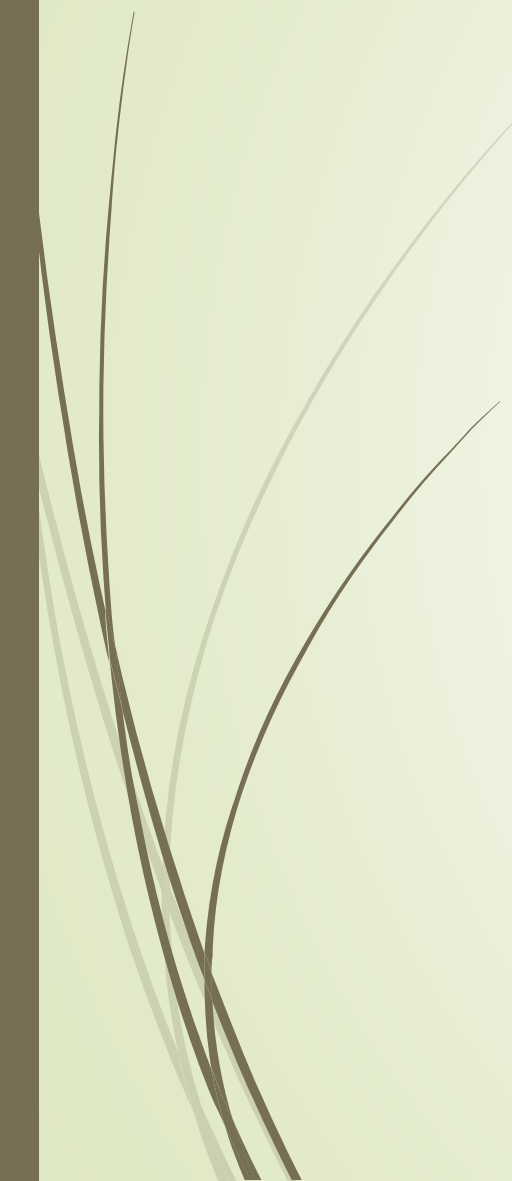
II) Long wall - Short wall method (LW & SW method)


OR

Out to Out and In to In method



I. CENTRE LINE METHOD

- This method is suitable only if the offsets are symmetrical and the building is more or less rectangular in shape. The center line of the building is determined carefully after doing deductions for repeated measurements. This center line acts as length for the complete calculations of the estimate. If the deduction is not cared for the results of estimates may be wrong. All the walls should have the same section.
- 



➤ This method is suitable for walls of similar cross sections. Here the total center line length is multiplied by breadth and depth of respective item to get the total quantity at a time. When cross walls or partitions or verandah walls join with main all, the center line Length gets reduced by half of breadth for each junction. Such junction or joints are studied carefully while calculating total center line length. The estimates prepared by this method are most accurate and quick.

➤ **For one room, $L = \text{Total center length (C/L)}$**

➤ For more than two type of wall of different thickness, the junction of wall are considered, and net center length is calculated by

➤ **$L = \text{Total C/L} - \frac{1}{2} \times \text{Width} \times \text{Total No. of junctions}$**

➤ **$L = \text{Total C/L} - \frac{1}{2} \times W \times N_j$**

II. LONG WALL-SHORT WALL METHOD


OR Out to out & In to In Method

- In this method, the wall along the length of room is considered to be longwall while the wall perpendicular to long wall is said to be short wall.
- L/W-To get the length of long wall, calculate first the center line lengths of individual walls. Then the length of long wall, (out to out) may be calculated after **adding** half breadth at each end to its center line length.

$L = \text{center length} + 1/2 \text{ width at each end}$

(for each coarse of item of works)

= C.L. + one full width (if same width on both side or at end) on both side or at each end)



► S/W- The length of short wall is measured in to in and may be found by **deducting** half breadth from its center line length at each end. The length of long wall usually decreases from earth work to brick work in super structure while the short wall increases. These lengths are multiplied by breadth and depth to get quantities.

► $L = \text{center length} - 1/2 \text{ width / breadth at each end (for each coarse of item of works)}$

= C.L. - one full width/breadth (if width is same)

REMEMBER:

► L/W- Long wall (out-to-out) =

c/c length + 1/2 breadth on one side + 1/2 breadth on the other side OR

$L = \text{c/c length} + \text{one breadth. (if breadth / width is same)}$

► S/W- Short wall length in-to-in =

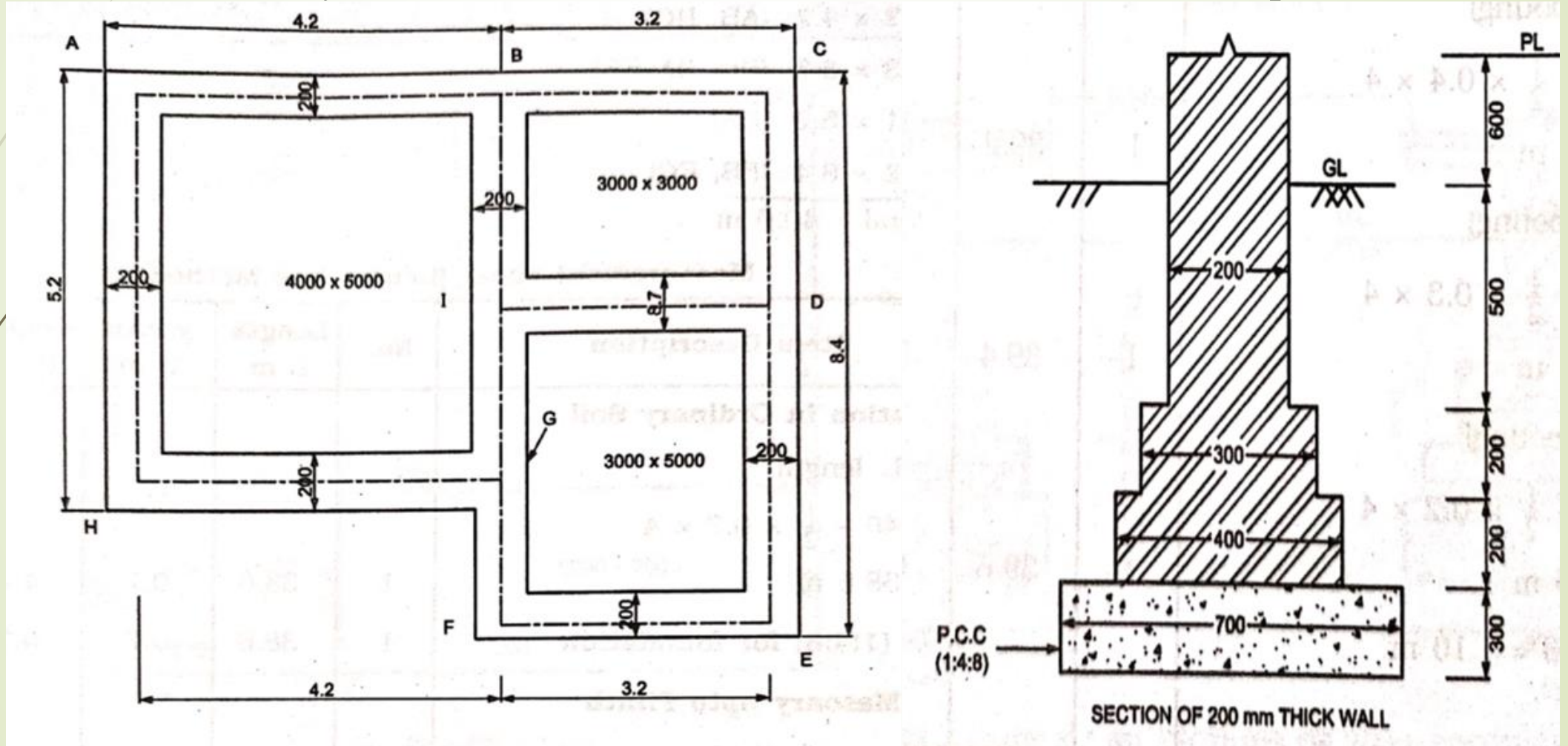
c/c length - 1/2 breadth on one side - 1/2 breadth on the other side OR

$L = \text{c/c length} - \text{one breadth. (if breadth / width is same)}$

Lecturer: Three Room Plan

Ex. 3. Find the quantity of item of work for items of work in sub structure using Center Line method and L/W & S/W method.

- (i) Excavation for foundation (ii) P.C.C. (1:4:8) for footing
(iii) Brick masonry (1:6 CM) for substructure (iv) D.P.C. 10 cm Th. at plinth

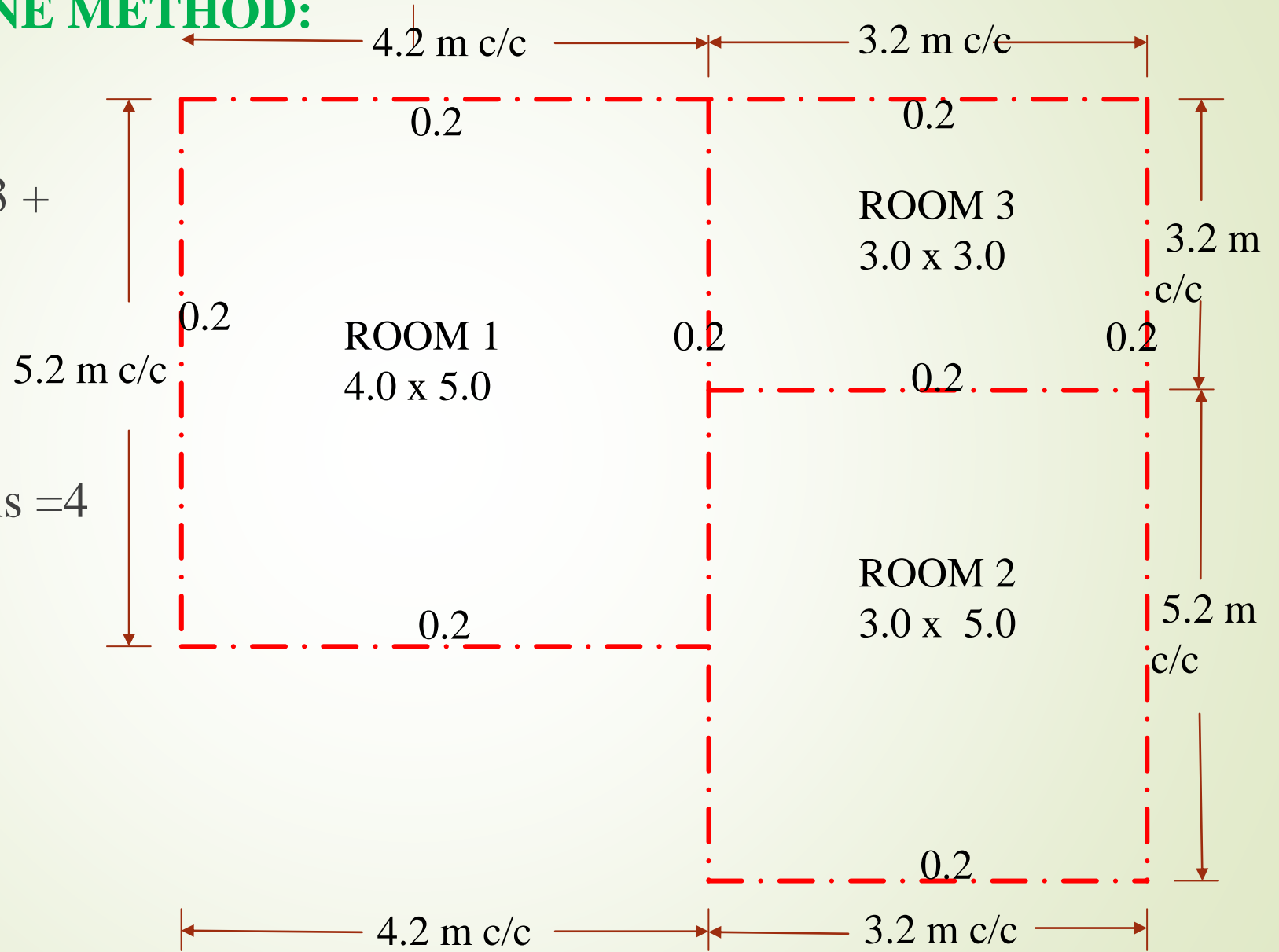


Ex. 3 Calculation of center Length:

CENTER LINE METHOD:

Total C/L =
 $4.2 \times 2 + 3.2 \times 3 +$
 $5.2 + 8.4 \times 2$
 $= 40.0 \text{ m.}$

No. of Junctions = 4



CENTER LINE PLAN

Ex. 3 Three Room Building Plan

Measurement Sheet:

Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/Th. (m)	Qty.	Total Qty.
1	Excavation in foundation L= 40 – ½ x 0.7 x4= 38.6m	1	38.6	0.7	1.2	32.424	32.42 Cu. m.
2	PCC(1:4:8) in foundation for footing	1	38.6	0.7	0.3	8.106	8.11 Cu. m.
3	1 st class brick masonry in foundation						
	1 st footing L= 40 – 1/2x 0.4 x 4	1	39.2	0.4	0.2	3.136	
	2 nd “ L= 40 - 1/2 X 0.3 x 4	1	39.4	0.3	0.2	2.364	14.21
	3 rd “ L=40 – 1/2 x 0.2 x 4	1	39.6	0.2	1.1	8.712	Cu. m.
4	D.P.C. at Plinth 10 cm Th. L=40 – ½ x 0.2 x4 = 39.6 m	1	39.6	0.2	--	7.32	7.32 Sq. m.
5	BBCC in all room (75mm Th) Room1	1	5.0	4.0	0.075	1.50	
	Room2	1	5.0	3.0	0.075	1.125	3.3
	Room 3	1	3.0	3.0	0.075	0.675	Cu. m.

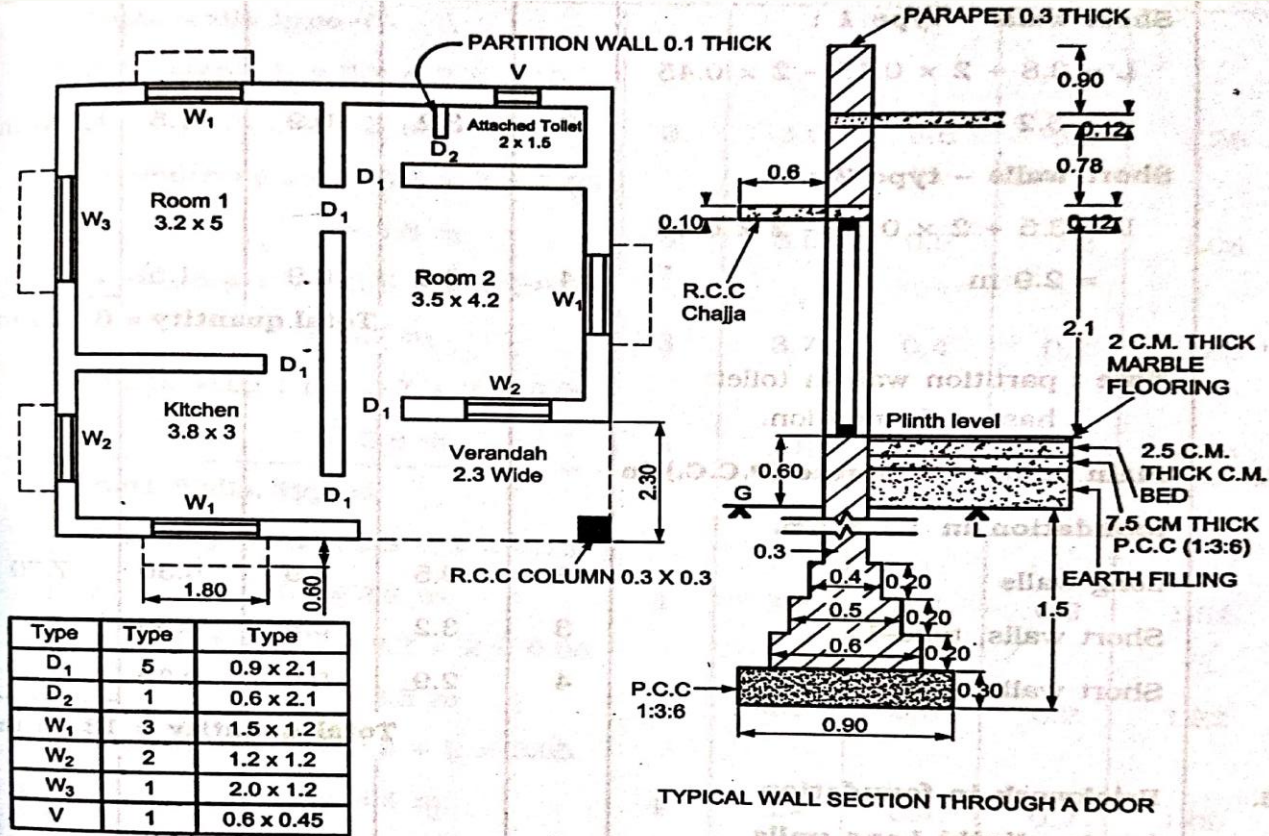
LAB PRACTICES

EXAMPLES



EX. No. 2. Find the quantity of following items from given drawing.

1. Excavation in foundation
2. P.C.C.(1:3:6) for footing
3. Brick masonry (1:6CM) in sub structure
4. Brick masonry (1:4 CM) in super structure
5. R.C.C. (1:2:4) Slab 12 cm Th.
6. R.C.C. Column with footing up to slab
7. Inside plaster 12mm Th. in 1:4 CM

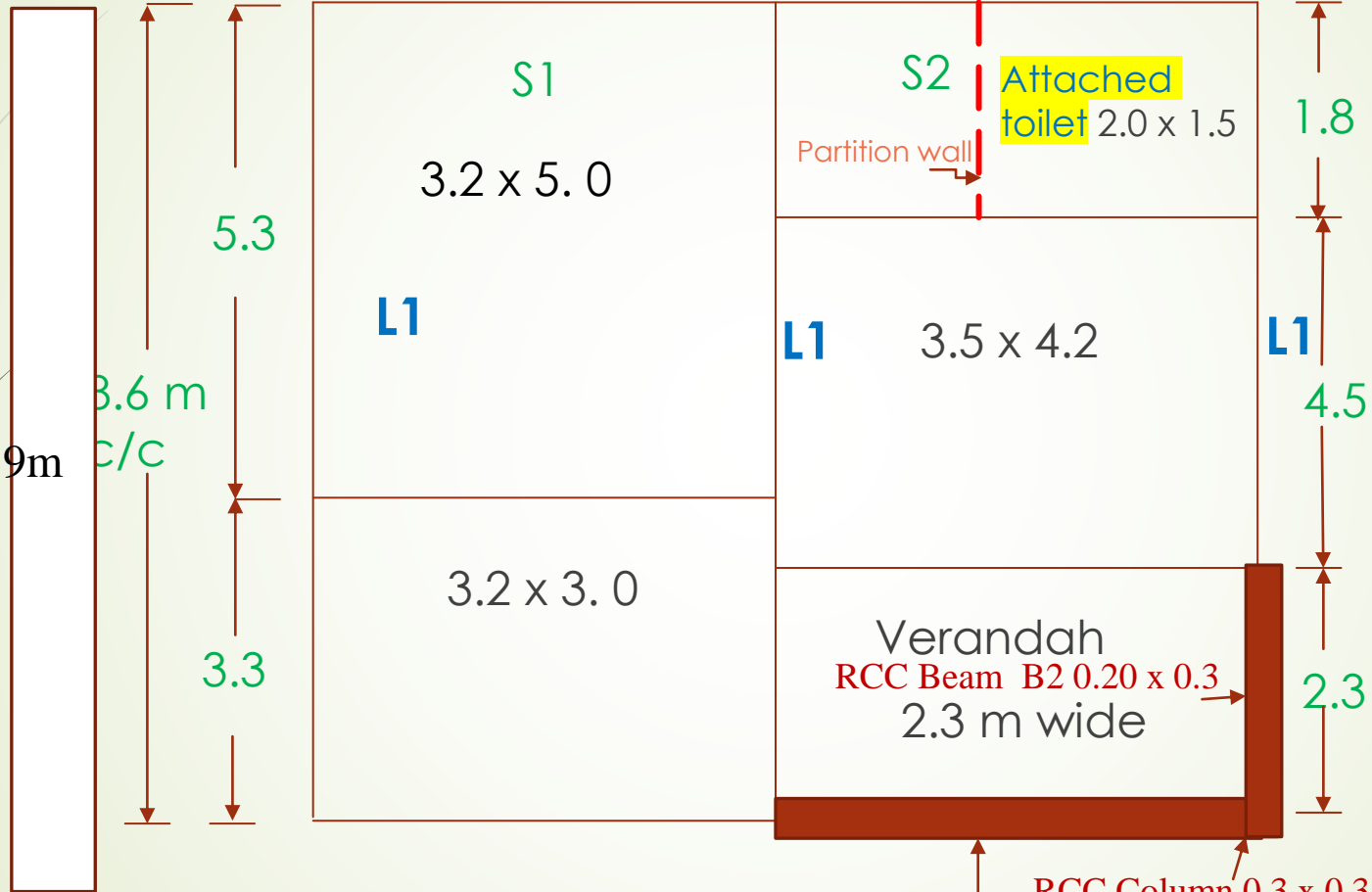


NOTE :

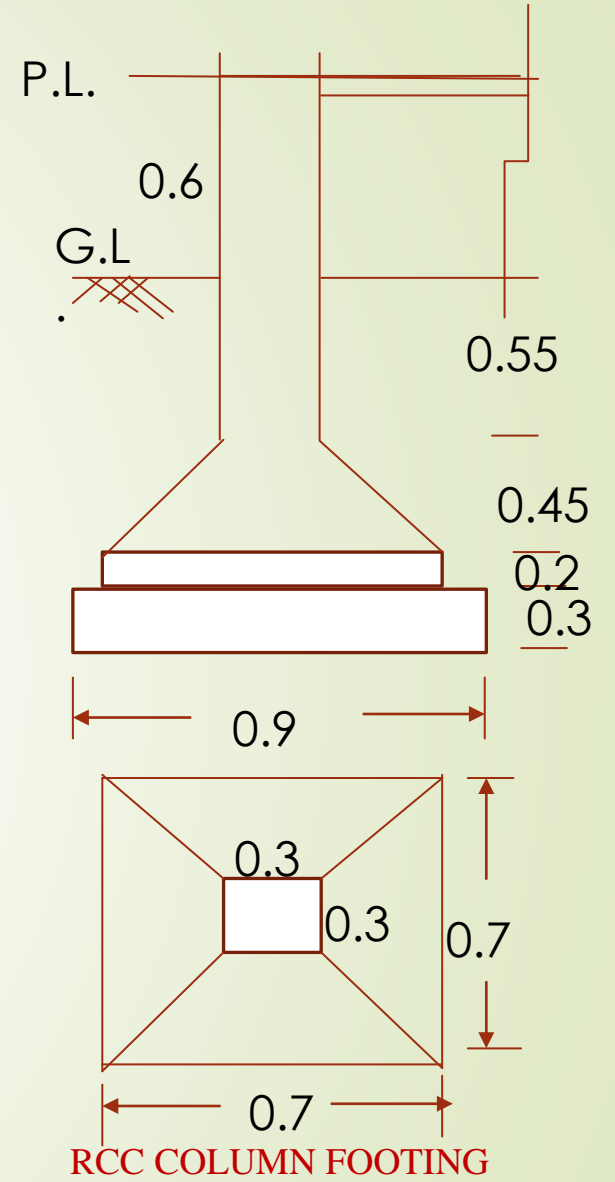
1. DRAWING IS NOT TO SCALE
2. ALL DIMENSIONS ARE IN METER UNIT OTHERWISE SPECIFIED

Out to Out Length=
8.6+0.3=8.9m

Out to Out Length= 7.3+0.3= 7.6 m



CENTER LINE PLAN



RCC COLUMN FOOTING

Total center length: 1. By center line method

- $H = 3 \times 3.5 + 4 \times 3.8 = 25.7 \text{ m}$
- $V = 8.6 \times 3 = 25.8 \text{ m}$ Total = $H + V = 51.5 \text{ m}$
- No. of junctions = 8

- 2. L/W AND S/W method:
- c/c length for L/W $L1 = 8.6 \text{ m}$ No. 3
- “ S/W $S1 = 3.5$ No. 3
- $S2 = 3.8$ No. 4

Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/ Th. (m)	Qty.	Total Qty.
4	DPC at PL L= 51.5 – 1/2x 0.3 x8 = 50.3	1	50.3	0.3	--	15.09	15.09 Sq.m.
5	1 st class brick masonry(1:4CM) in super structure CL = 51.5 -3.8 -2.3=45.40m Net L = 45.4-1/2 x 0.3 x6= 44.5 h=3.00-0.12= 2.88m Deduction: Doors D1 Window w1 w2 W3 ADD-- Parapet wall CL= 8.6 x2+ 7.3 x2	1	44.5	0.3	2.88	38.448	
		5	0.9	0.3	2.1		
		3	1.5	0.3	1.2		
		2	1.2	0.3	1.2		
		1	2.0	0.3	1.2		
						6.039	41.0
		1	31.8	0.3	0.9	8.586	Cu.m.
6	RCC slab 12 cm TH L= 8.6+ 0.3= 8.9 m B= 7.3+ 0.3 =7.6m	1	8.9	7.6	0.12	8.117	8.12 Cu.m.
	RCC Beam B1 +B2 size =0.2 mx 0.3m	1	6.7	0.20	0.30	0.402	0.402

Ex.3 Find the quantity of following item of work,

- (i) Excavation for foundation
- (ii) P.C.C. (1:4:8) for footing
- (iii) Brick masonry (1:6 CM) for substructure
- (iv) D.P.C. 10mm Th. at plinth
- (v) B.B.C.C. (1:5:10) 75mm Th. in all room

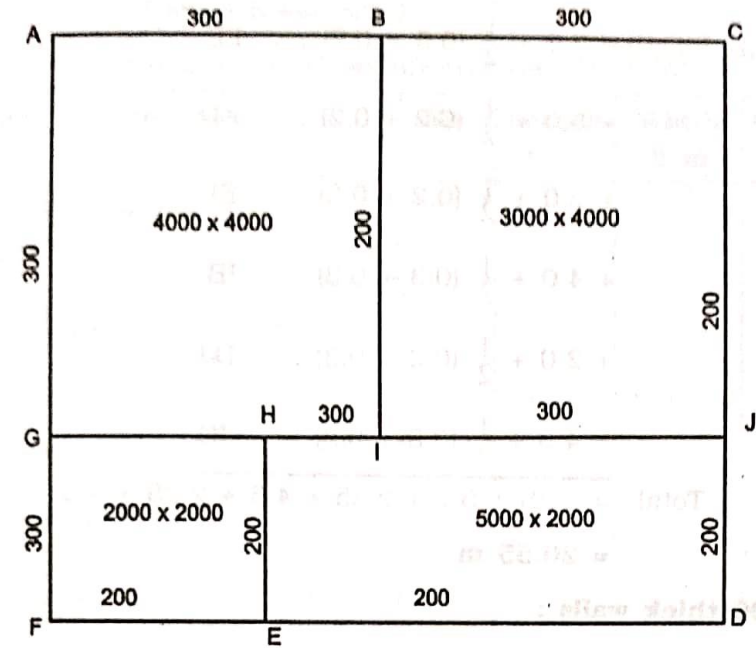
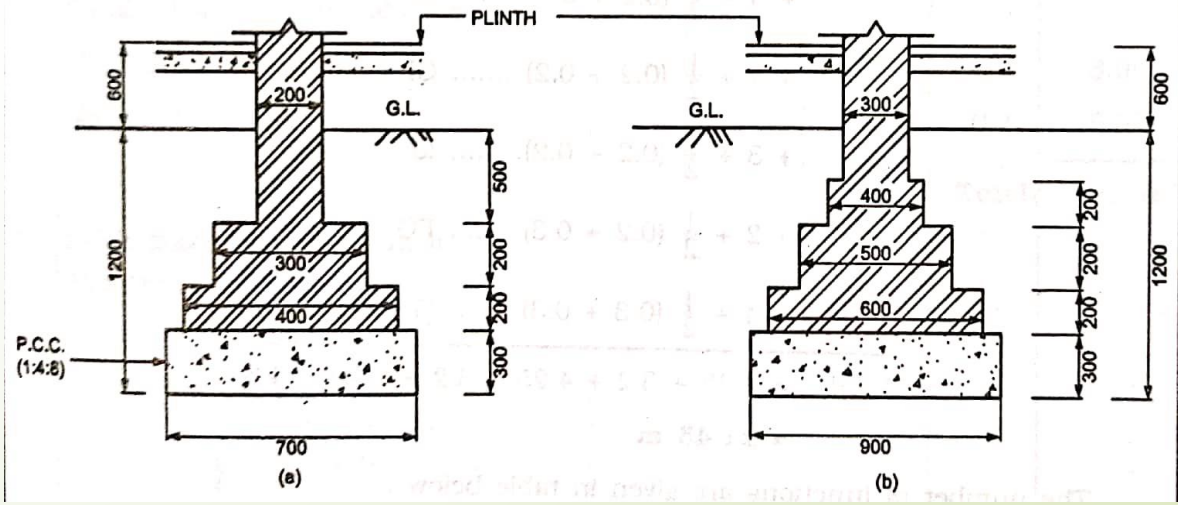
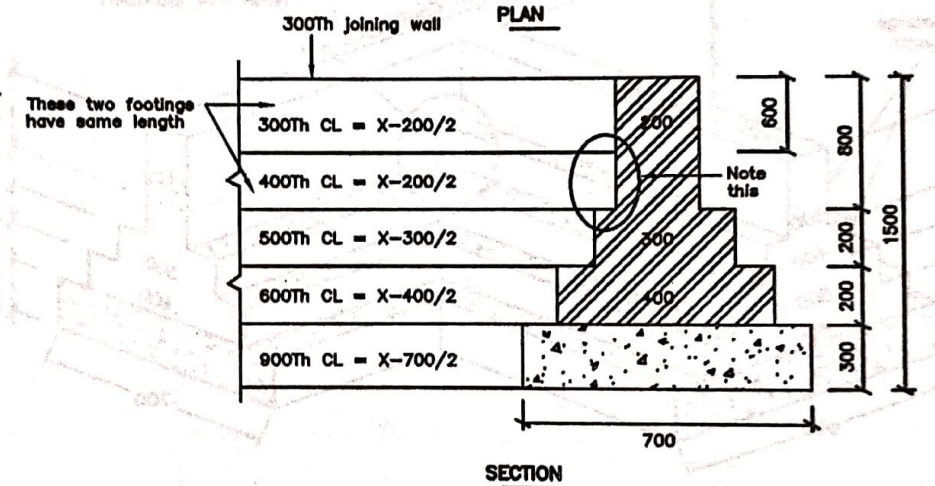
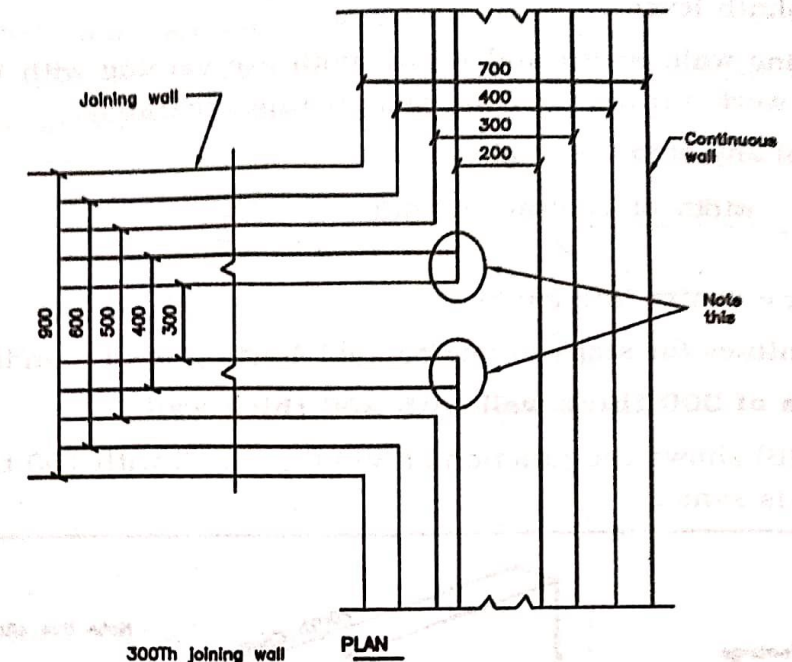
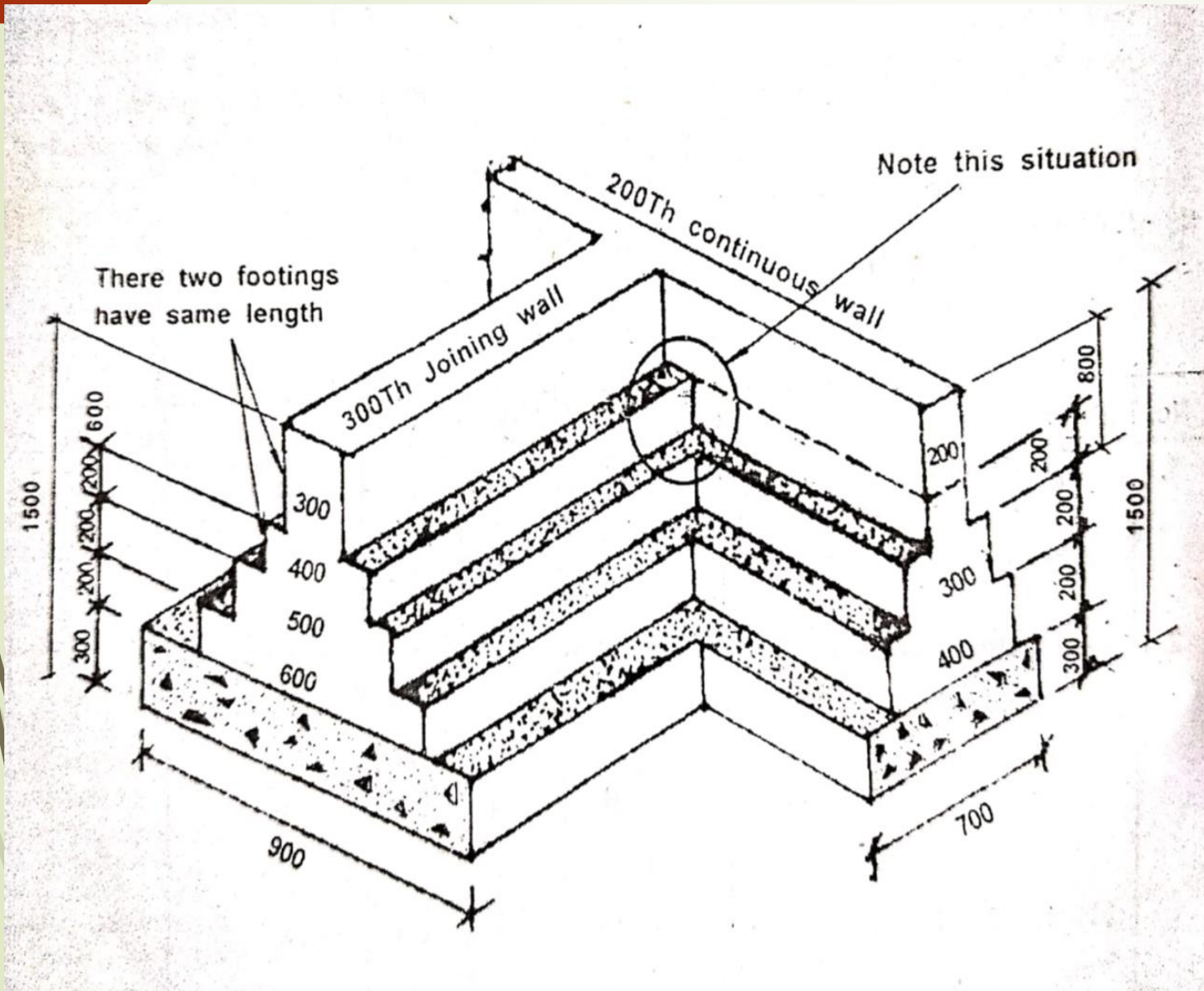


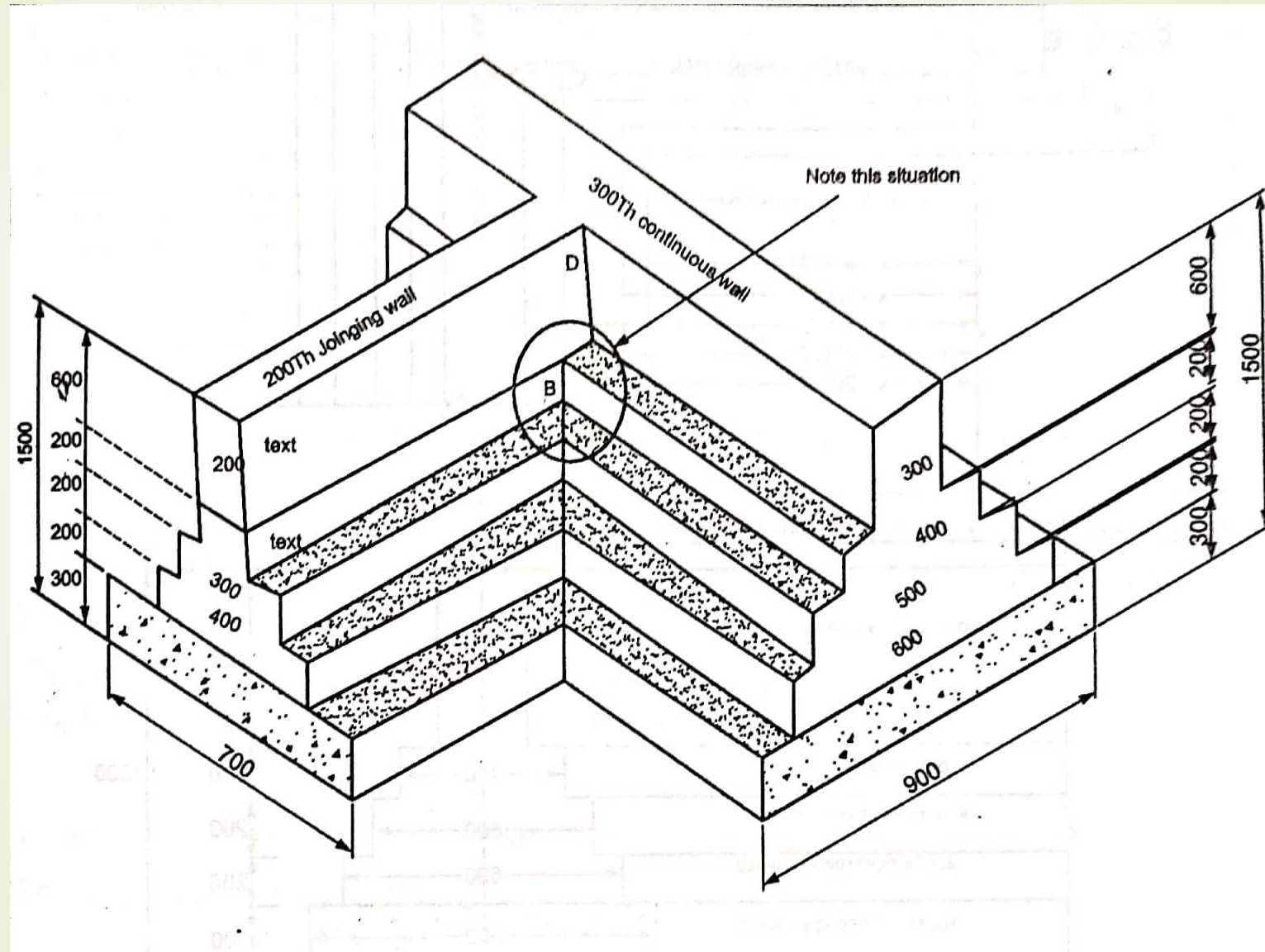
FIG. EXAMPLE-2 (A)



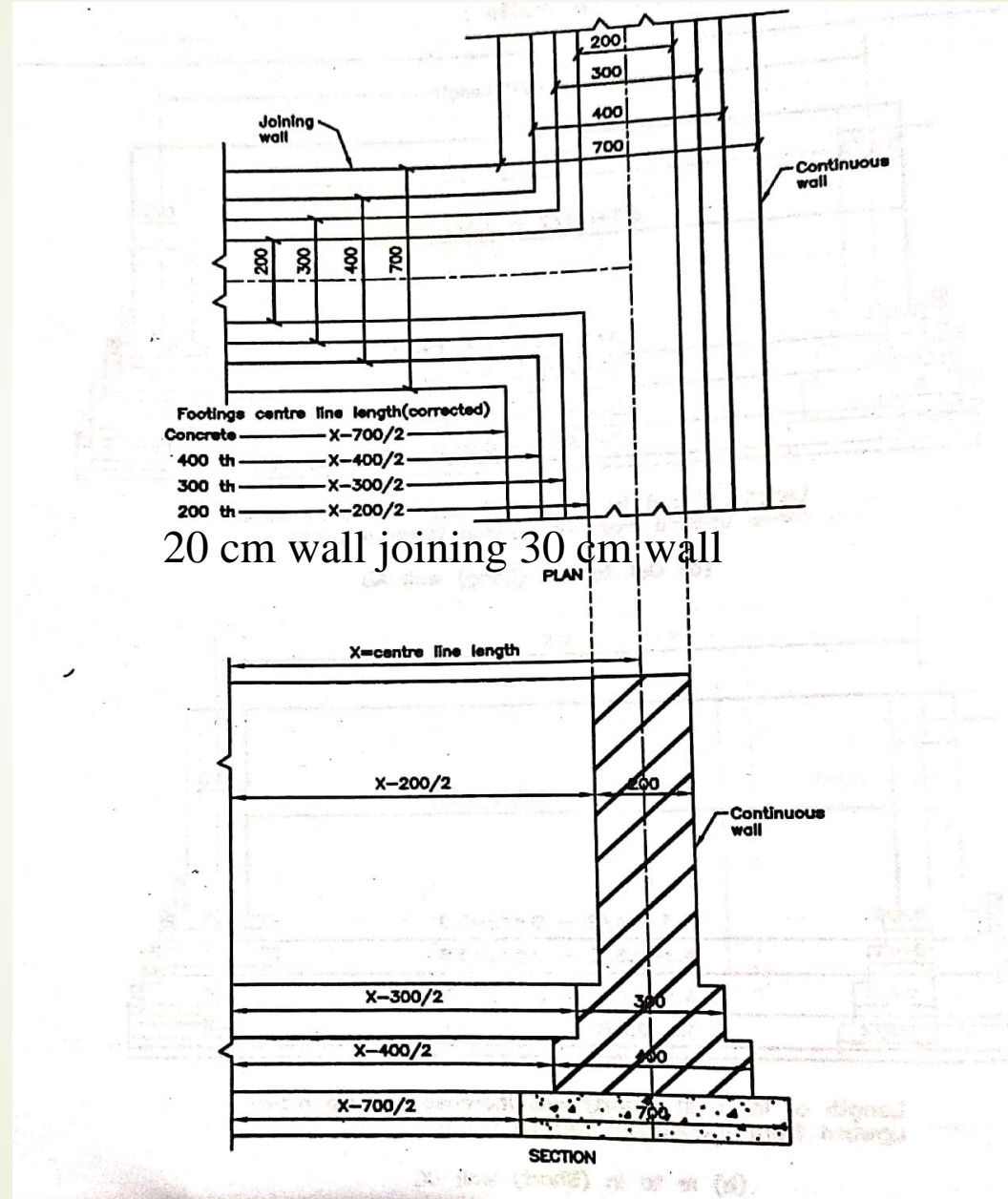
Two different type of wall footing are joining-
 (i) 30 cm wall joining 20 cm wall



(ii) 20 cm wall joining 30 cm wall



20 cm wall joining 20 cm wall



Calculation of Center Length:

For 30 cm wall:

Total C/L =

$$AB, GI = (4.0 + 0.15 + 0.10) \times 2 = 8.50$$

$$BC = (3.0 + 0.2) \times 2 = 6.40$$

$$AG = (4.0 + 0.3) \times 1 = 4.30$$

$$GF = (2.0 + 0.15 + 0.10) \times 1 = 2.25$$

$$\text{Total} = 21.45 \text{ m}$$

For 20 cm wall:

$$BI, CJ = (4.0 + 0.15 + 0.15) \times 2 = 8.60$$

$$JD, HE = (2.0 + 0.15 + 0.10) \times 2 = 4.50$$

$$ED = 5.0 + 0.10 + 0.10 = 5.20$$

$$EF = 2.0 + 0.15 + 0.10 = 2.25$$

$$\text{Total} = 20.55 \text{ m}$$

For 30 cm wall = Net length =

Total C/L - $\frac{1}{2} \times W_{30} \times N_j$ - $\frac{1}{2} \times W_{20} \times N_j$

For 20 cm wall =

Net length =

Total C/L - $\frac{1}{2} \times w_{20} \times N_j$ - $\frac{1}{2} \times W_{30} \times N_j$

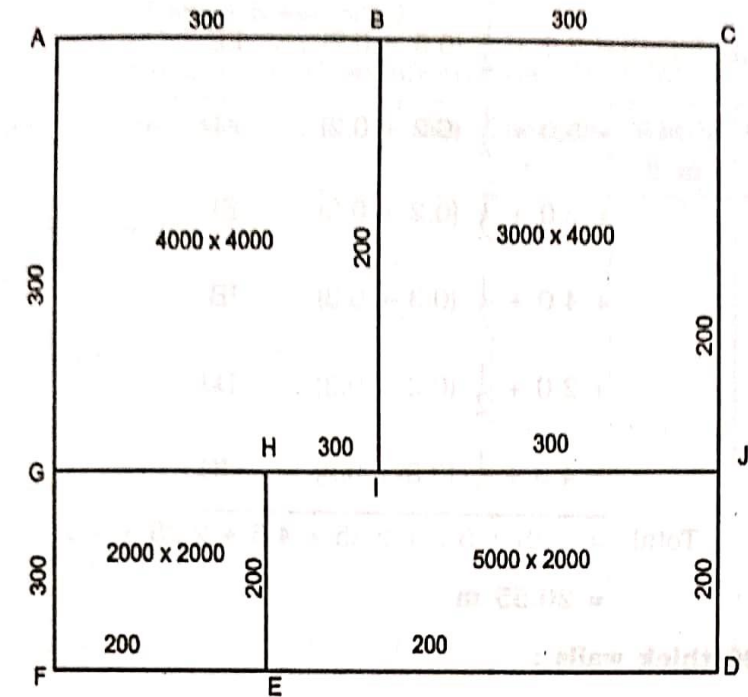
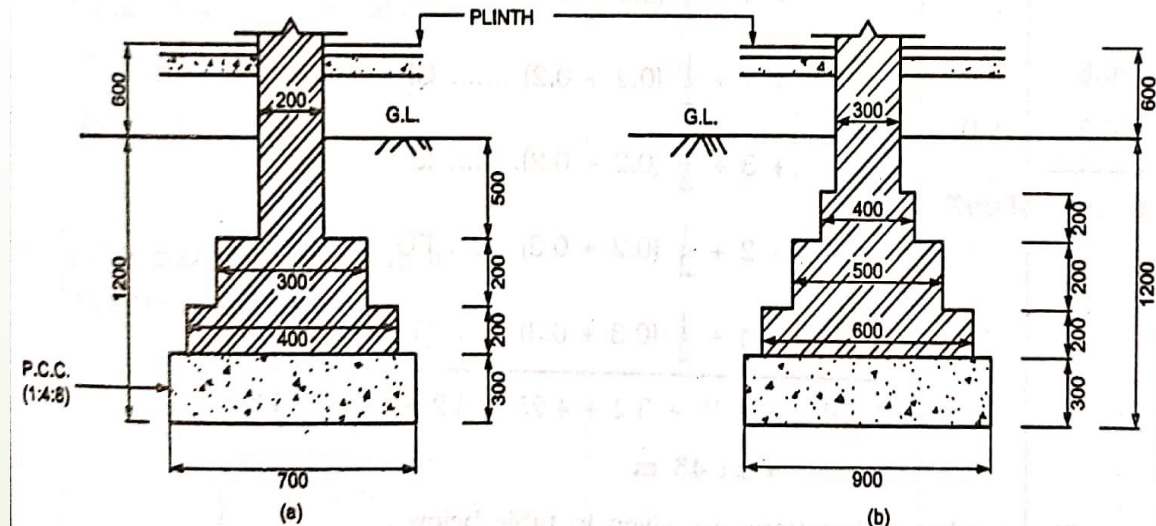


FIG. EXAMPLE-2 (A)



Wall junctions:


Sr.No.	Joining Wall	Junction with continuous wall having thickness	
		20 cm wall	30 cm wall
1.	20 cm wall	1 (E)	3 (H, I, B)
2.	30 cm wall	1 (J)	1 (G)

LAB PRACTICE : Ex. 3 Three room building (with different wall Thickness)

Measurement Sheet:

Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/ Th. (m)	Qty.	Total Qty.
1	Excavation in foundation For 20 cm wall: L= 20.55- 1/2 x 0.7x 1- 1/2 x 0.9 x3	1	18.85	0.7	1.2	15.834	38.13 Cu. m
	For 30 cm wall: L = 21.45- 1/2 x 0.7x1-1/2 x 0.9 x1	1	20.65	0.9	1.2	22.3	
2	P.C.C.(1:4:8) in foundation for footing 20 cm	1	18.85	0.7	0.3	3.96	9.53 Cu. m.
	30 cm	1	20.65	0.9	0.3	5.57	
3	1 st class brick masonry in foundation Up to Plinth For 20 cm wall: 1 st footing (40 cm)	1	19.45	0.4	0.2	1.556	
	2 nd L= 20.55 -1/2 x 0.3 x1 -1/2x0.5x 3	1	19.65	0.3	0.2	1.179	
	3 ^d L= 20.55- 1/2 x 0.2x1- 1/2 x 0.4 x3	1	19.85	0.2	0.2	0.79	
	4 th L= 20.55- 1/2 x 0.2x1 -1/2 x 0.3 x3	1	20.0	0.2	0.9	3.60	

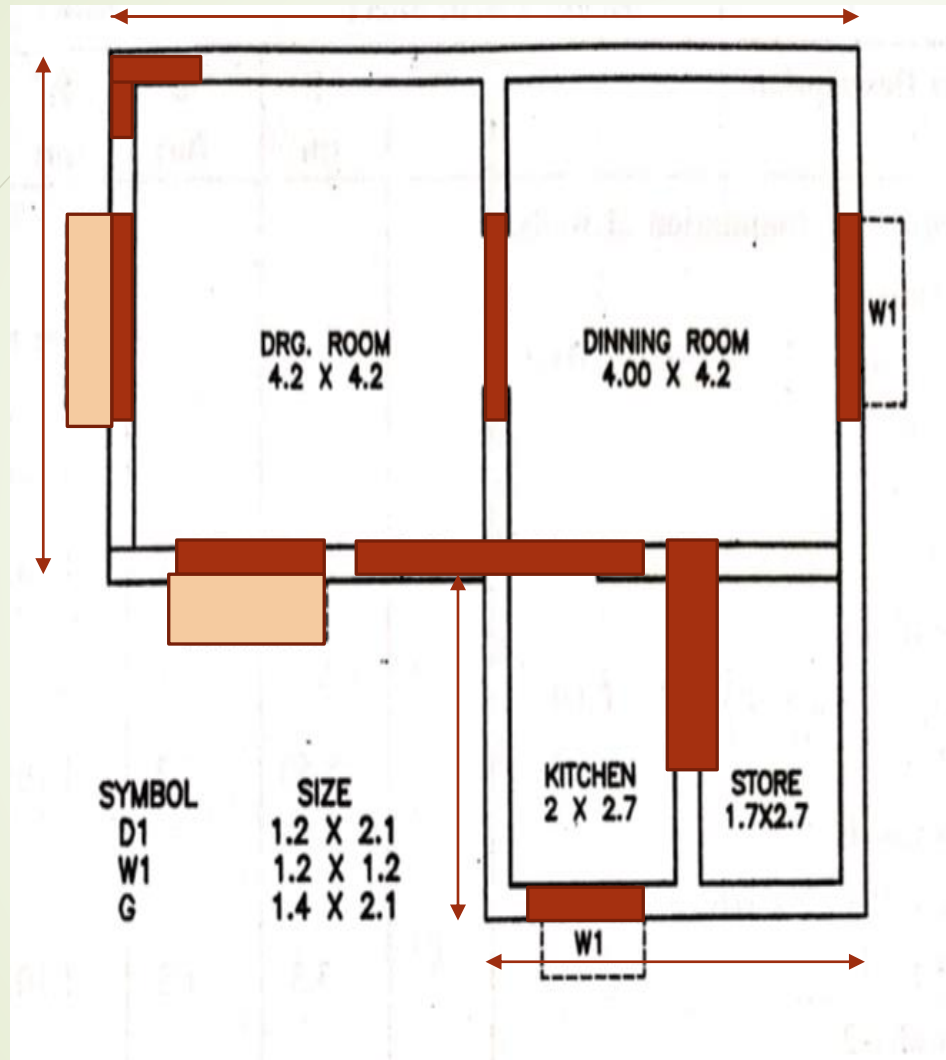
Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/Th. (m)	Qty.	Total Qty.
	For 30 cm: 1 st footing (60 cm) L= 21.45 - 1/2 x 0.6 x 1 - 1/2 x 0.4 x 1 2 nd L= 21.45 -1/2 x 0.5 x1- 1/2 x 0.3x1 3 ^d L=21.45 -1/2 x 0.4 x1- 1/2 x 0.2x1 4 th L=21.45 -1/2 x 0.3 x1- 1/2 x 0.2x1	1 1 1 1	20.95 21.05 21.15 21.20	0.6 0.5 0.4 0.3	0.2 0.2 0.2 0.9	2.514 2.105 1.692 5.724	19.16 Cu. m.
4	D.P.C.10 CM Th. At Plinth 20 cm Wall 30 cm Wall	1 1	20.0 21.2	0.2 0.3	-- --	4.0 6.36	10.36 Sq. m.
5	B.B.C.C. (1:5:10) in Room(75mm Th.) Room 1 " 2 " 3 " 4	1 1 1 1	4.0 4.0 5.0 2.0	4.0 3.0 2.0 2.0	0.075 " " "	1.2 0.9 0.75 0.3	3.15cu. m.



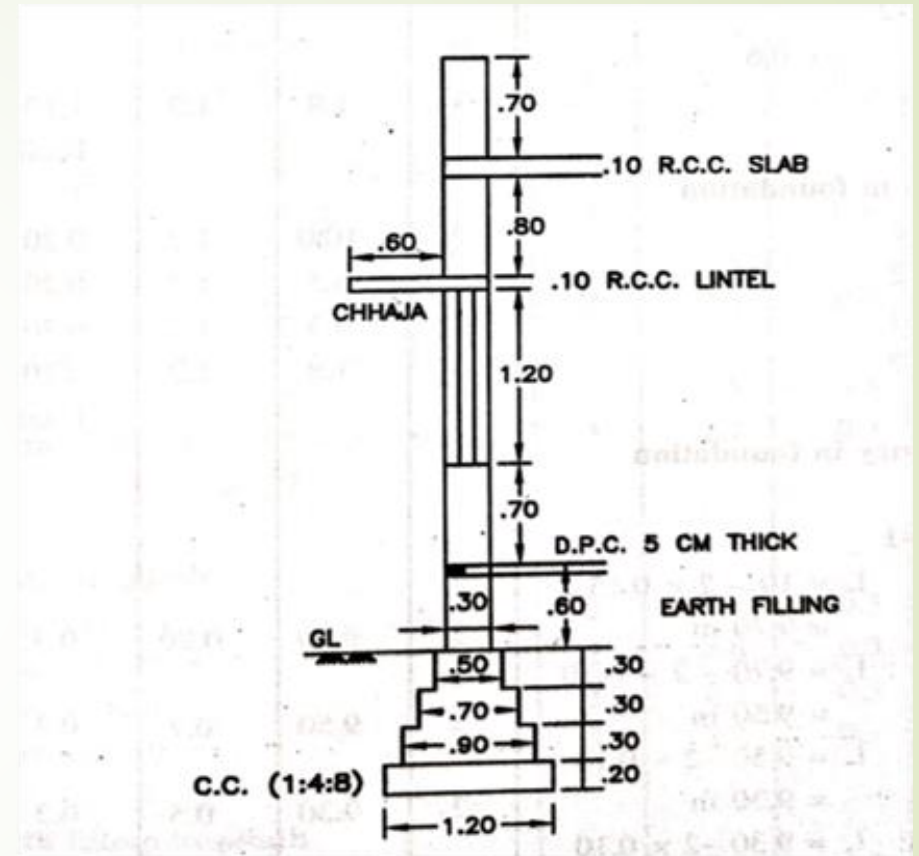
EX. No. 4 . Find the quantity of following items from given drawing.

1. Excavation in foundation
2. C.C.(1:4:8) for footing
3. Brick masonry (1:6CM) for sub structure
4. D.P.C. 5 cm. Th. At plinth level
5. R.C.C. (1:2:4) LINTEL 10cm Th. with chajja and R.C.C. slab
6. 12mm th smooth cement plaster in Drg. room
7. Ceiling plaster in all rooms
8. Outside plaster 20mm th on all side

EX.4.

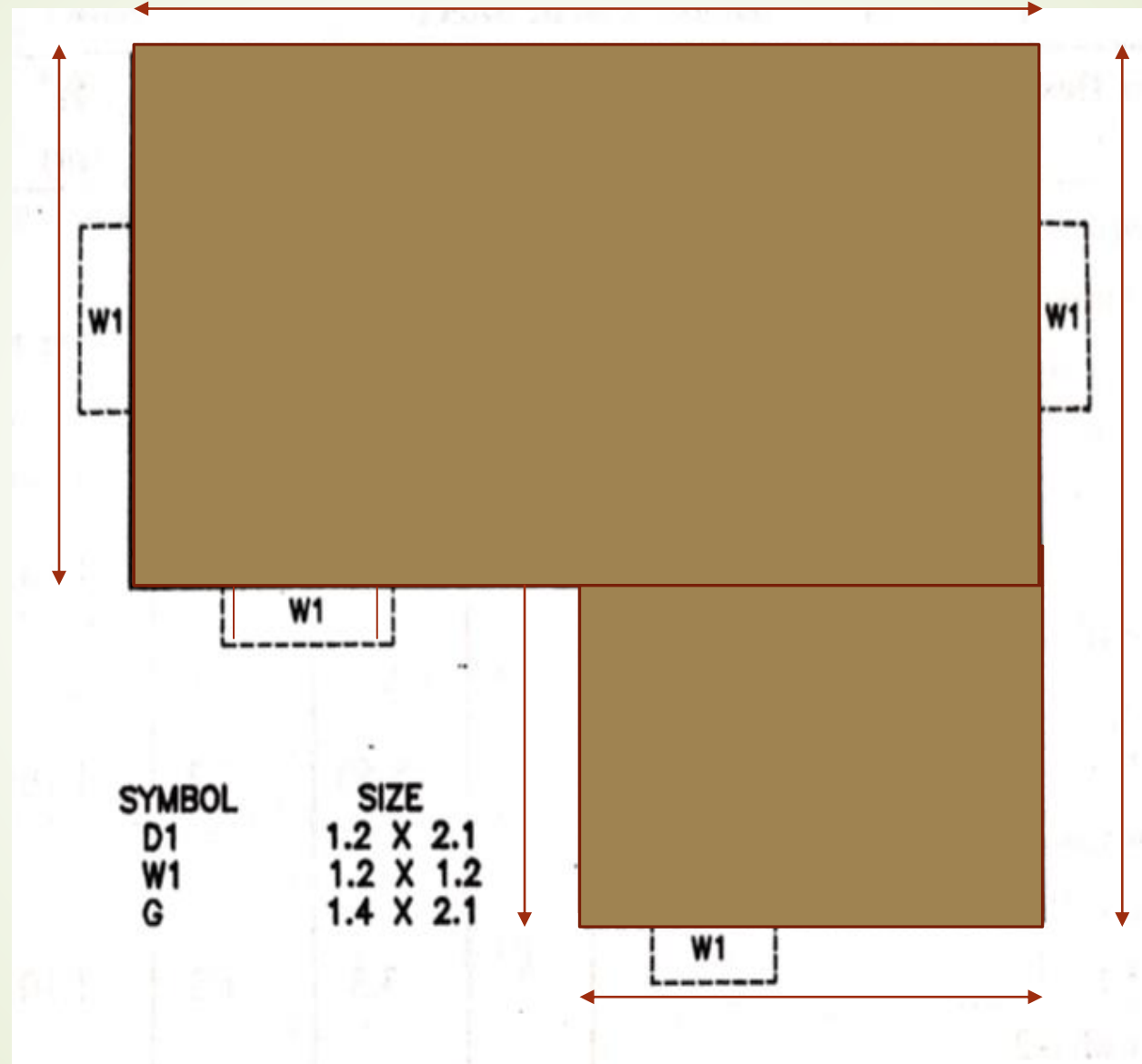


G.F.PLAN

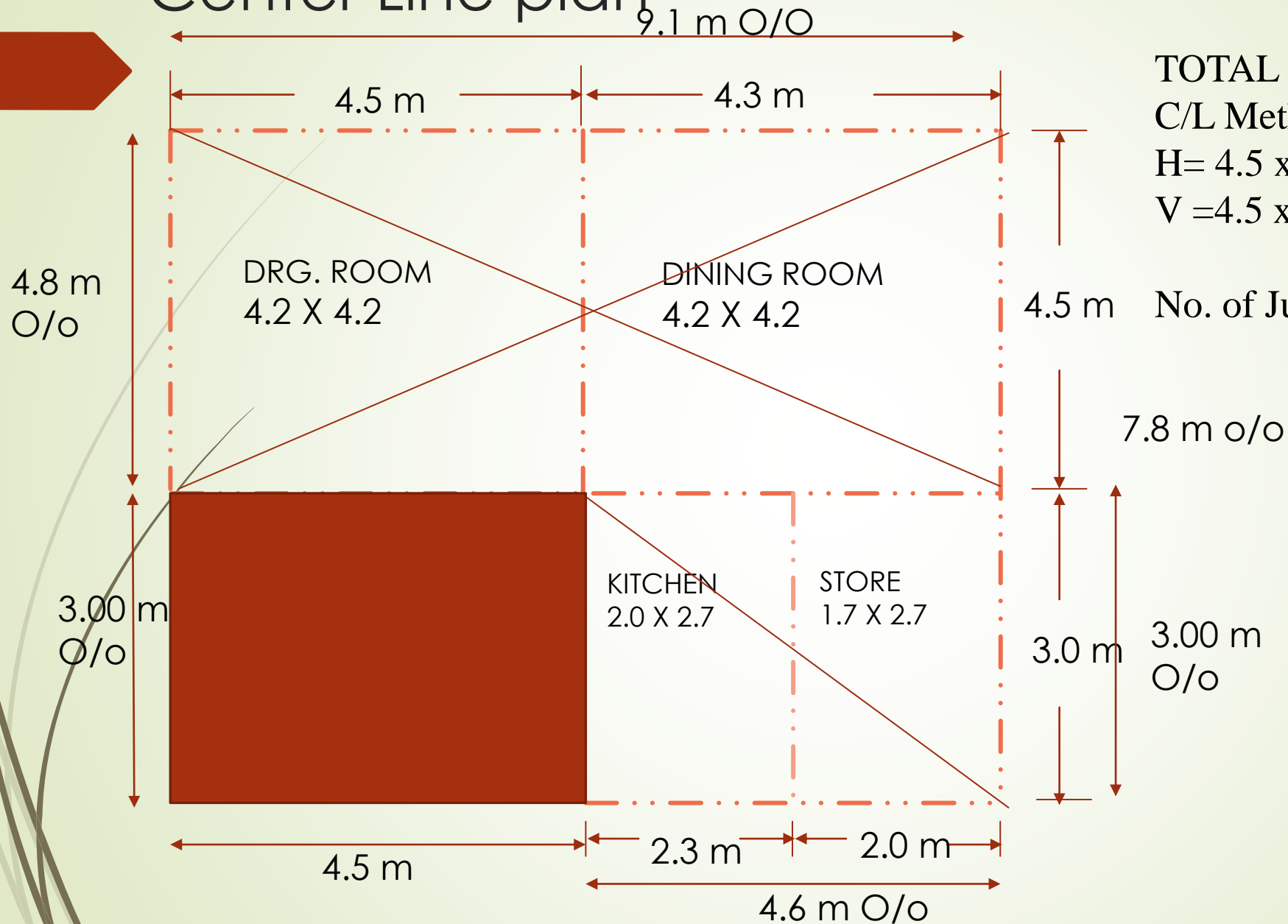


Wall Section with footing

RCC Lintel



Center Line plan



TOTAL LENGTH :

C/L Method: c/c length

$$H = 4.5 \times 2 + 4.3 \times 3 = 21.90$$

$$V = 4.5 \times 3 + 3 \times 3 = 22.50$$

44.40 m

No. of Junction NJ = 6

Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/Th. (m)	Qty.	Total Qty.
1	Excavation L= 44.4 -1/2 x 1.2 x 6	1	40.8	1.2	1.1	53.85	53.8 Cu.m.
2	C.C. 1:4:8 in foundation	1	40.8	1.2	0.2		9.79 Cu.m.
3.	Brick masonry in sub structure						
	1 st layer L =44.4 – 1/2x0.9 x6	1	41.7	0.9	0.3	11.25	
	2 nd L= 44.4. -1/2 x0.7x6	1	42.3	0.7	0.3	8.88	
	3 rd L= 44.4 -1/2 x 0.5 x 6	1	42.9	0.5	0.3	6.43	33.73
	Fr GL to PL L = 44.4 -1/2 x0.3 x6	1	43.5	0.3	0.55	7.17	Cu.m.
4.	DPC @ PL , 5 cm Th.	1	43.5	0.3	--	13.05	13.05 Sq.m.

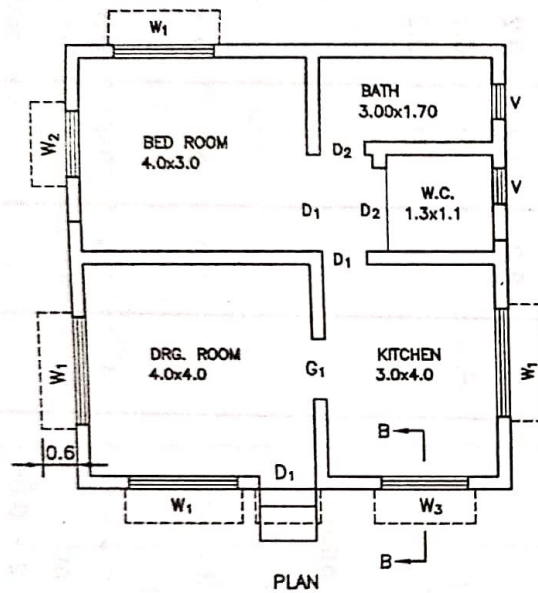
Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/Th. (m)	Qty.	Total Qty.
4	RCC Lintel provide only on opening						
	Door L= 1.2 +2 x 0.3= 1.8	1	1.8	0.3	0.1	0.054	0.615 Cu.m.
	W1 L =	4	1.8	0.3	0.1	0.216	
	G L= 1.4 + 2x0.3	2	2.0	0.3	0.1	0.12	
	Corner bands L = 0.75x2	5	1.5	0.3	0.1	0.225	
OR Provide lintel on full wall	1	43.5	0.3	0.1	1.31	1.31 Cu.m.	
5.	RCC Chajja W- L = 1.2 + 0.1 x2	4	1.4	0.6	0.1	0.34	0.34 Cu.m.
6	RCC Slab 10 cm Th. Part 1	1	9.1	4.8	0.1	4.368	5.75
	Part 2	1	4.6	3.0	0.1	1.38	Cu.m.
	OR Slab 1 – OTS						OR
	Slab	1	9.1	7.8	0.1	7.098	5.75
	Deduct OTS	1	4.5	3.0	0,1	- 1.35	Cu.m.

Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/Th. (m)	Qty.	Total Qty.		
7	Smooth cement plaster in drawing room Side	4	4.2	---	2.8	<u>47.04</u>	42.66 Sq.m.		
	Deduction Gap Window W1	1	1.4	---	2.1	2.94			
		2x1/2	1.2	---	1.2	<u>1.44</u>			
8	Ceiling Plaster	Drawing	1	4.2	4.2	---	17.64	44.43 Sq.m.	
		Dining	1	4.0	4.2	--	16.8		
		Kitchen	1	2.0	2.7	---	5.4		
		Store	1	2.7	1.7	---	4.59		
9.	Out side plaster on wall 20mm Th. H = 0.6+2.8+0.1 +0.7 = 4.2 m	Front and back side	2	9.1	--	4.2	76.44	137.82 Sq.m.	
			2	7.8	--	4.2	<u>65.52</u>		
							<u>141.96</u>		
		Deduction Door D1	1x1/2	1.2	--	2.1	1.26		

LAB Practice:

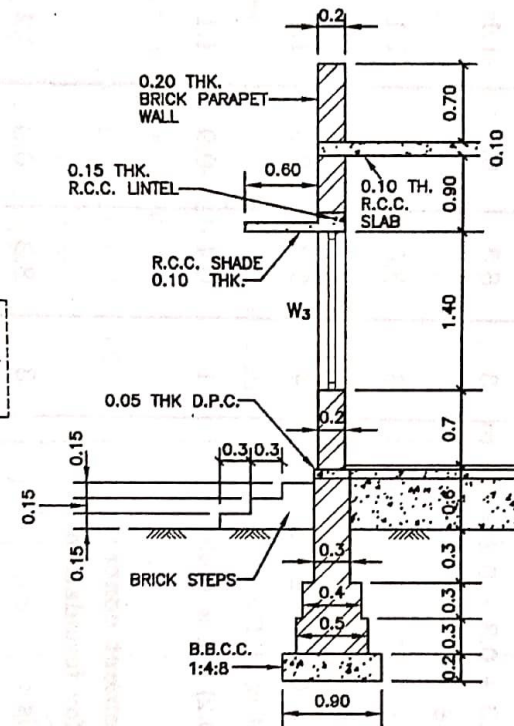
EX. No. 5. Find the quantity of following items from given drawing.

- (I)
1. Excavation in foundation
 2. B.B.C.C.(1:4:8) for footing
 3. Brick masonry (1:6CM) for sub structure
 4. 1ST cl. Brick masonry in super structure
 5. R.C.C. (1:2:4) Chajja ,Loft , Plinth beam and R.C.C. slab
 6. Glazed tile flooring with 2.00mt height dado
 7. Brick work for partition wall at Parapet



DOOR-WINDOW SCHEDULE

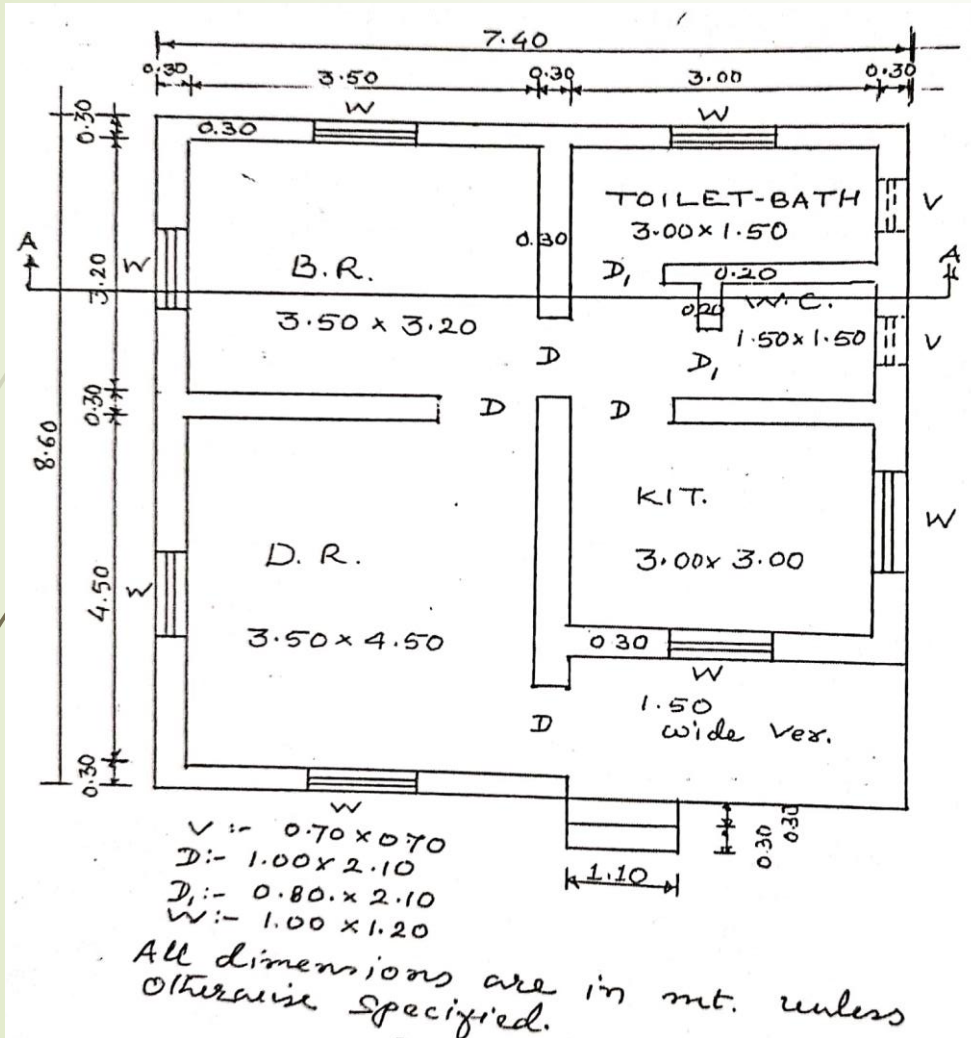
- $D_1 = 1.10 \times 2.10$
- $D_2 = 0.90 \times 2.10$
- $G_1 = 1.20 \times 2.10$
- $W_1 = 1.80 \times 1.40$
- $W_2 = 1.20 \times 1.40$
- $W_3 = 1.50 \times 1.40$
- $V = 0.60 \times 0.60$



NOTES:-

ALL DIMENSIONS ARE IN METER
NOT TO SCALE

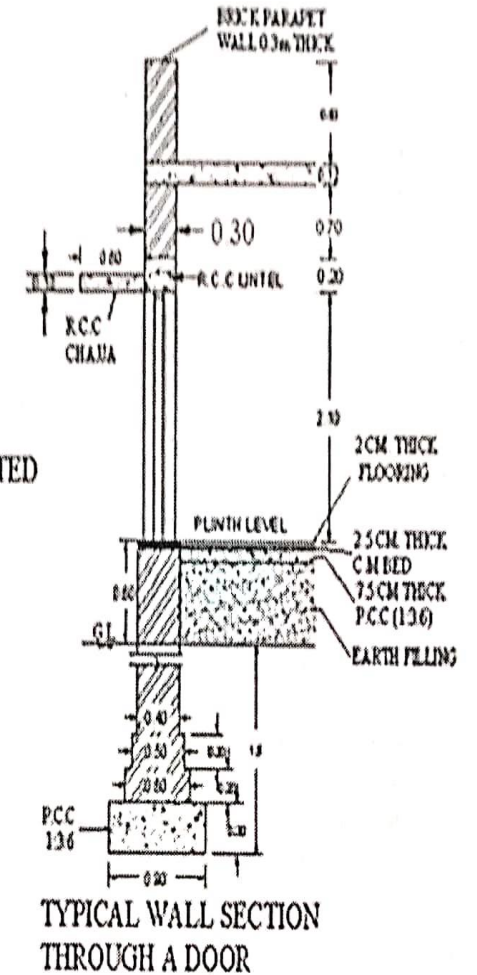
EX. 6. Find the quantity for (i) Excavation in foundation(ii) P.C.C.(1:3:6) in foundation(iii) 1st class brick masonry in foundation up to plinth(iv) Door and Windows (v) Skirting and flooring in room only (vi) Glazed Tile flooring in Toilet and W.C. with Dado up to lintel height.



SCHEDULE OF OPENING:

- D : 100 x 210 CM. FULLY PANNELED
- D₁ : 80 x 210 CM.
- W : 180 x 150 CM. PARTLY PANNELED
- W₁ : 100 x 120 CM. PARTLY GLAZED
- V : 80 x 50 CM. FULLY GLAZED

- (1) ALL DIMENSION ARE IN METER OTHERWISE STATED
- (2) LINTEL BEARING 15 CM ON BOTH SIDE
- (3) DOOR-WINDOW FRAME 5.0 x 12.0 CM SIZE
- (4) TREAD - 30 CM, RISER - 15 CM
- (5) FLOORING AS SHOWN
- (6) ALL WALLS ARE 30 CM THICK





THANK YOU...