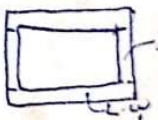
Unit-1 :- Detailed Estimates of Buildings

Methods of Detailed Estimating (or) Methods of Taking out quantities :-

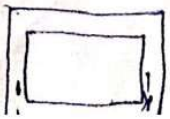
1) Long wall and short wall method (or) Individual wall method
2) Centre line method.

1) Long wall and short wall method :- In this method the lengths of walls running in one direction (long wall) are measured first out to out and that of walls running in the transverse direction (short walls) are then measured in to in. To get the length of any item of a long wall two offsets are ~~subtracted~~ adding for from the out to out length of the previous item. In the case of short wall it is determined by ~~adding~~ subtracting two offsets with the in to in of previous item.



~~2) Centre line~~

2) Centre line method :- In this method the centre line lengths of all walls are measured and the quantities are determined by multiplying the breadth and depth of the items with the centre line lengths. The centre line of all round the building usually taken first is kept ~~and~~ unaltered through out. In the centre line length of cross walls slight modifications are made by subtracting the half the width at each end. This method is used when all walls are of same thickness, Estimate can be prepared quickly by using this method and special care is to be taken at junctions.



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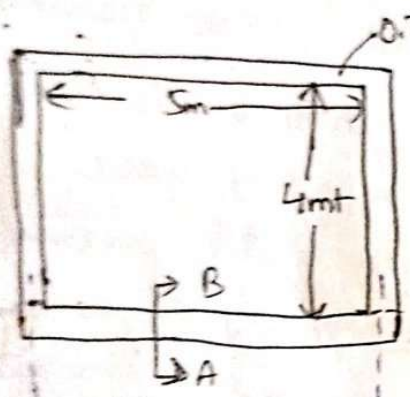
Problems

1) The plan and section of a room is given below - fig. Calculate the following quantities by Centre line met and lay wall and short wall method.

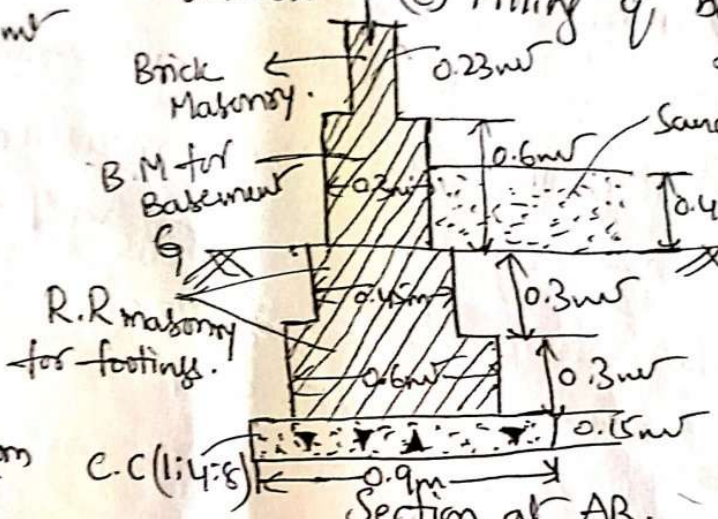
a) Earthwork excavation (b) Cement concrete (1:4:8)

c) R.R. Masonry for 1st & 2nd footing

d) Brick masonry for basement (e) filling of basement with sand.



Plan of Single Room



Sol:- 1) Centre line method :-

C.L. Length of long wall $= \frac{0.23}{2} + 5 + \frac{0.23}{2} = 5.23\text{mt}$

C.L Length of short wall $= \frac{0.23}{2} + 4 + \frac{0.23}{2} = 4.23\text{mt}$

C.L Length of a room $= 2(L+B)$

$= 2(5.23+4.23)$

$= 18.92\text{mt}$.

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...iled Estimate of Room

S.No	Description of item	Nos.	Length (m)	Breadth (m)	Depth (m)	Quantity (m³)	Total quantity (m³)
1)	Earthwork excavation for foundation around the room	1	18.92	0.9	0.75	12.77	12.77 m³
2)	C.C(1:4:8) for foundation around the room	1	18.92	0.9	0.75	2.55	2.55 m³
3)	R.R masonry for footings.						
	1st footing around the room	1	18.92	0.6	0.3	3.40 m³	5.95 m³
	2nd footing around the room	1	18.92	0.45	0.3	2.55	
						5.95 m³	
4)	B.M for basement around the room	1	18.92	0.3	0.6	3.41 m³	3.41 m³
5)	Filling the basement with sand	1	5.23−0.3 = 4.93	4.23−0.3 = 3.93	0.45	8.72	8.72 m³

Long wall and short wall method

1)	Earthwork excavation for foundation					
	a) for Long wall 5.23 + 0.9 = 6.13	2	6.13	0.9	0.75	8.28
	b) for short wall 4.23 − 0.9 = 3.33 m	2	3.33	0.9	0.75	4.49
						12.77
2)	C.C (1:4:8) for					
	a) L.W (5.23+0.9=6.13)	2	6.13	0.9	0.75	1.65
	b) for S.W (4.23−0.9=3.33)	2	3.33	0.9	0.15	0.9
						2.55

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Foundation

S.No	Description of Item	NO	L	B	D	Quantity	
3)	R.R Masonry for footing.						
	I^st footing						
	for L.W = 5.23+0.6 = 5.83m	2	5.83	0.6	0.3	2.10	
	for S.W = 4.23-0.6 = 3.63m	2	3.63	0.6	0.3	1.31	
						3.41m³	3.41+2.55 = 5.96m³.
	II^nd footing						
	for L.W = 5.23+0.45 = 5.68m	2	5.68	0.45	0.3	1.53	
	for S.W = 4.23-0.45 = 3.78m	2	3.78	0.45	0.3	1.02	
						2.55m³	
4)	B.M for basement						
	for L.W = 5.23+0.3 = 5.53m	2	5.53	0.3	0.6	1.99	3.41m³
	for S.W = 4.23-0.3 = 3.93mt	2	3.93	0.3	0.6	1.42	
						3.41m³	
5)	Filling of basement with sand	1	5.23-0.3 = 4.93	4.23-0.3 = 3.93	0.45	8.72m³	8.72m³.

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Q. Prepare the detailed estimate for the following items (3)
of work for a building shown in fig.

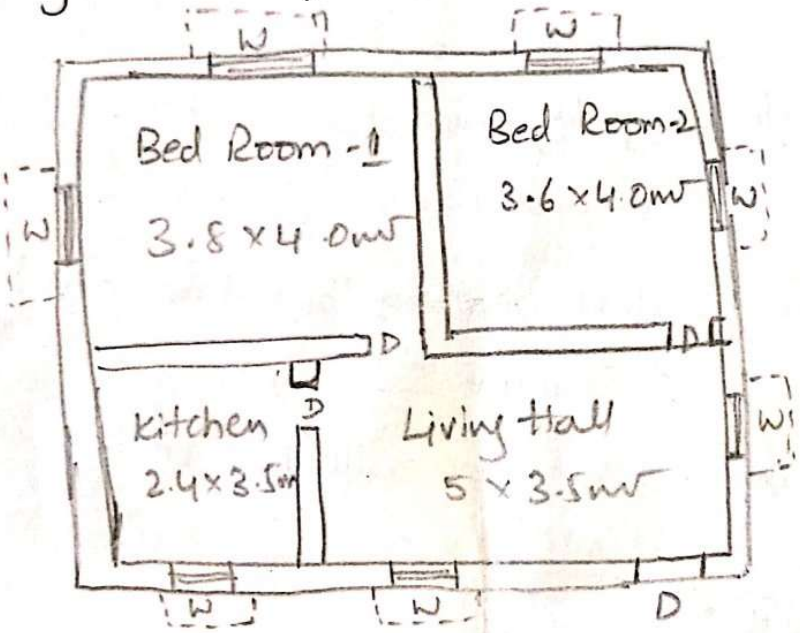
a) Earthwork excavation for foundation & C.C bed.

b) R.R Masonry in CM (1:6) for footing & basement

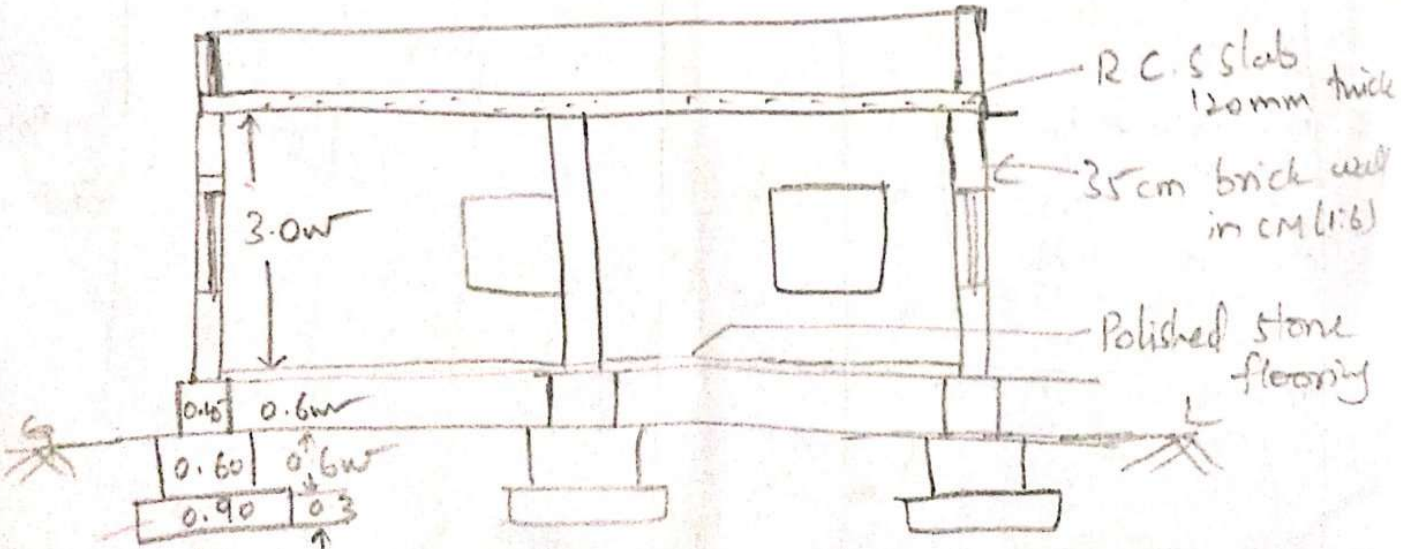
c) B.Masonry in CM (1:6) for superstructure without deductions.

d) R.C.C roof slab (1:2:4) 120 mm thick

e) Flooring with polished stones.



Plan of Building



Cross-Section.

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Soli:-

Centre line length along L.W (Horizontal) $= \frac{0.35}{2} + 3.8 + 0.35 + 3.6 + \frac{0.35}{2}$

$= 8.1\,m$

Centre line length along L.W (Vertical) $= \frac{0.35}{2} + 4 + 0.35 + 3.5 + \frac{0.35}{2}$

$= 8.2\,m$

Centre line length along around the building

$= 2(L+B)$

$= 2(8.2+8.1)$

$= 32.6\,m$.

Centre line length along long cross wall b/w Bed Room I, II & K, H.

$= \frac{0.35}{2} + 3.8 + 0.35 + 3.6 + \frac{0.35}{2} = 8.1\,m$

C.L length along short cross wall b/w bed room I & bed room II

$= \frac{0.35}{2} + 4 + \frac{0.35}{2} = 4.35\,m$

C.L length along short cross wall b/w kitchen & Hall

$= \frac{0.35}{2} + 3.5 + \frac{0.35}{2} = 3.85\,m$

Detailed Estimate

S.NO	Description of item	NO	Length	Breadth	Depth	Quantity	Total Quantity
1.	Earthwork excavation for foundations C.C bed						
	a) Foundation around the building	1	32.6	0.9	0.9	26.41	
	b) L. Cross wall b/w Bedrooms & K, H 8.1 − 0.9 = 7.2	1	7.2	0.9	0.9	5.83	49.904
	c) S. Cross wall b/w Bed room 1 & 2 4.35 − 0.9 = 3.45 m	1	3.45	0.9	0.9	2.8	
	d) S. Cross wall b/w kitchen & Hall 3.85 − 0.9 = 2.95	1	2.95	0.9	0.9	2.39	
						37.43 m³	

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5) Prepare the detailed estimate for the following items of work for a building shown in fig. (6)

a) Earthwork excavation in hard soils for foundation & C.C bed

b) R.R Brick masonry in CM (1:6) for footings and basement

c) Brick masonry in CM (1:6) for superstructure with R.C.C lintel

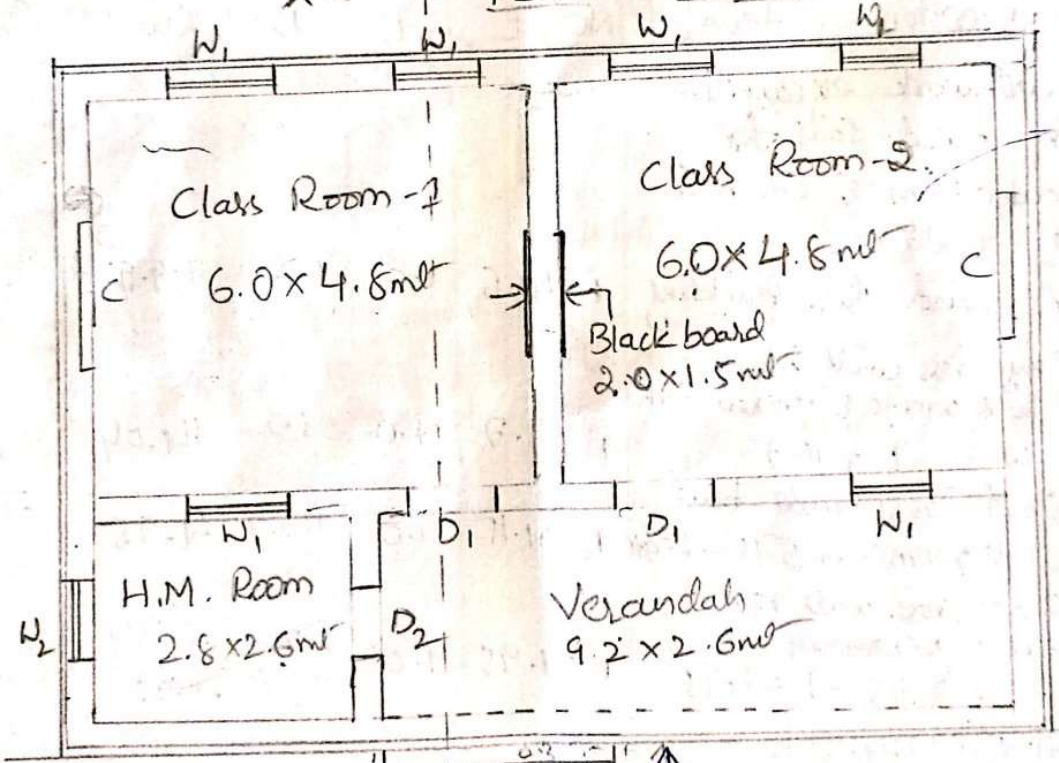
Deductions

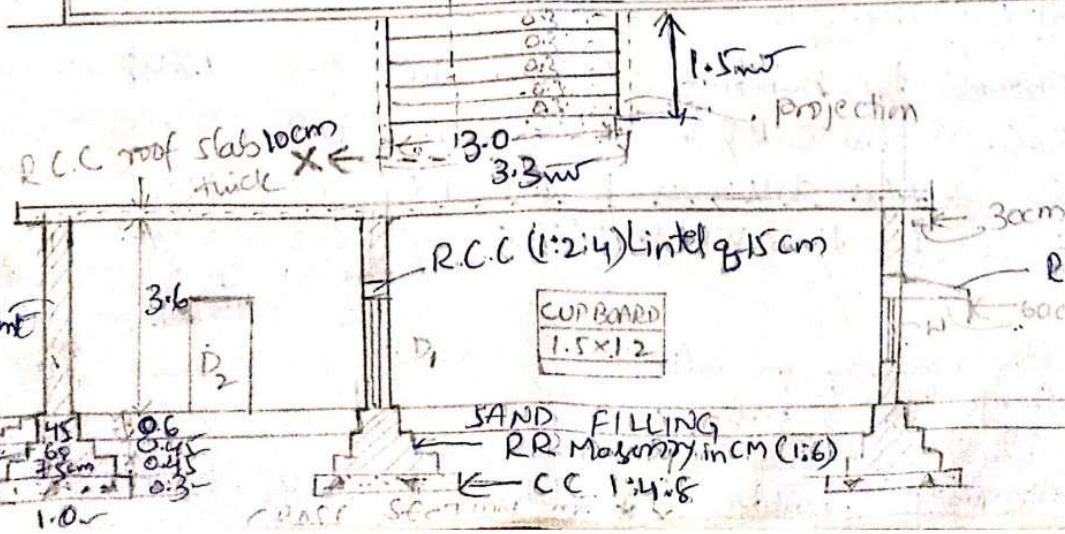
d) Plastering with CM (1:5) for walls on both sides.

e) R.C.C roof slab 10 cms thick

f) R.C.C required for foundation & steps (7) Brick masonry for steps.

PLAN OF SCHOOL BUILDING





Centre line length along long wall (I)

$= \frac{0.35}{2} + 6 + 0.35 + 6 + \frac{0.35}{2}$

$= 12.7$ mt

Centre line length along short wall (II)

$= \frac{0.35}{2} + 4.8 + 0.35 + 2.6 + \frac{0.35}{2}$

$= 8.1$ mt

Long Cross wall b/w class rooms & verandah, HM

$= 12.7$ mt

Short cross wall b/w class rooms $\overset{I \& II}{\Rightarrow} \frac{0.35}{2} + 4.8 + \frac{0.35}{2} = 5.15$ mt

Short cross wall b/w HM & verandah $= \frac{0.35}{2} + 2.6 + \frac{0.35}{2} = 2.95$ mt

Specifications

$D_1 = 1.0 \times 2.0$

$D_2 = 0.75 \times 2$ mt

$W_1 = 1.2 \times 1.2$ mt

$W_2 = 0.9 \times 1.2$ mt

Cupboard wall width = 0.2 mt

Centre line length along around the building

$= 2(L+B) \Rightarrow 2(12.7 + 8.1) \Rightarrow 41.6$ mt

S.NO	Description of item	NO	L	B	D	Quantity	Total Quantity (m^3)
1.	Earthwork excavation in hard soils for foundation & CC bed						
	a) foundation						
	Around the building	1	41.6	1.0	1.2	49.92 m^3	
	Long cross wall b/w class rooms & verandah $12.7 - 1 = 11.7$	1	11.7	1.0	1.2	14.04	
	Short cross wall b/w class rooms $\Rightarrow 5.15 - 1 = 4.15$	1	4.15	1.0	1.2	4.98	71.28 + 17.82 $\Rightarrow 89.1\ m^3$
	Short cross. wall b/w HM & verandah $= 2.95 - 1 = 1.95$	1	1.95	1.0	1.2	2.34	
						71.28	
	b) C.C (1:4:8) bed						
	Around the building	1	41.6	1.0	0.3	12.48	
	L.C.W b/w C.R & V	1	11.7	1.0	0.3	3.51	
	S.C.W b/w class rooms	1	4.15	1.0	0.3	1.245	
	S.C.W. b/w H.M & verandah	1	1.95	1.0	0.3	0.585	
						17.82	
2.	R.R masonry in CM (1:6) for footings & basement						
	a) Footings: (i) 1st footing						
	Around the building	1	41.6	0.35	0.45	14.04	

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No	Description of item	No	L	B	D	Quantity	Total Quantity
	L.C.W blw C.R & Verandah						
	12.7 − 0.75 ⇒ 11.95	1	11.95	0.75	0.45	4.033	(2)
	S.C.W blw classrooms						
	5.15 − 0.75 ⇒ 4.40	1	4.40	0.75	0.45	1.485	
	S.C.W blw HM & Verandah						
	2.95 − 0.75 ⇒ 2.20	1	2.20	0.75	0.45	0.7425	
	5th footing						
	Abround the building	1	41.6	0.60	0.45	11.232	
	L.C.W blw C.R & Verandah						
	12.7 − 0.6 ⇒ 12.1	1	12.1	0.60	0.45	3.267	
	S.C.W blw classrooms						
	5.15 − 0.6 ⇒ 4.55	1	4.55	0.60	0.45	1.2285	53.146 m^3
	S.C.W blw HM & verandah						
	2.95 − 0.6 ⇒ 2.35	1	2.35	0.60	0.45	0.6345	
	Basement						
	Abround the building	1	41.6	0.45	0.60	11.232	
	L.C.W blw C.R & Verandah						
	12.7 − 0.45 = 12.25	1	12.25	0.45	0.60	3.3075	
	S.C.W blw class rooms						
	5.15 − 0.45 = 4.7	1	4.7	0.45	0.60	1.269	
	S.C.W blw HM & Verandah					0.675	
	2.95 − 0.45 = 2.5	1	2.5	0.45	0.60	53.146	
(3)	Brick masonry in CM(1:6) for superstructure with deductions.						
	Abround the building	1	41.6	0.35	3.6	52.416	
	L.C.W blw C.R & Verandah						
	12.7 − 0.35 ⇒ 12.35	1	12.35	0.35	3.6	15.561	
	S.C.W blw class rooms						
	5.15 − 0.35 ⇒ 4.8	1	4.80	0.35	3.6	6.048	
	S.C.W blw HM & Verandah					3.276	
	2.95 − 0.35 ⇒ 2.6	1	2.60	0.35	3.6	77.301	

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S.No	Description of item	NO	L	B	D	Quantity
	Deductions					
	Doors D_1	2	1.0	0.35	2.0	1.4
	Door D_2	1	0.75	0.35	2.0	0.525
	Windows W_1	6	1.20	0.35	1.20	3.024
	" W_2	1	0.9	0.35	1.20	0.378
	Lintels over Doors $-D_1$ $(1+0.15+0.15=1.3)$	2	1.30	0.35	0.15	0.1365
	Door $-D_2$ $(6.75+0.3)=1.05$	1	1.05	0.35	0.15	0.0551
	Windows $-W_1$ $(1.2+0.3=1.5)$	6	1.50	0.35	0.15	0.4725
	Window $-W_2$	1	1.20	0.35	0.15	0.063
	Cupboard $-C$	2	1.80	0.35	0.15	0.189
	Deduction for Verandah wall, front side only	1	9.20	0.35	2.6	8.372
	Cup boards $-C$	2	1.50	0.2 (wall thick)	1.20	0.72
						15.3351
(4)	Plastering with CM (1:5) for walls on both sides					
	Inside					
	Class rooms 1 & 2					
	$2(6+4.8) = 21.6$	2	21.6	—	3.6	155.52
	HM room					
	$2(2.8+2.6) = 10.8$	1	10.8	—	3.6	38.88
	Verandah front side					
	$1\times9.2+2\times2.6$	1	14.4	—	3.6	51.84
						59.58
	Outside					
	2 (length wise) $(0.35+6+0.35+6+0.35)+(0.35+2.8+0.35)$	1	6.55	—	3.6	59.58
	2 (width wise) $(0.35+4.8+0.35+2.6+0.35)$ $\Rightarrow 16.9$	1	16.9	—	3.6	60.84
						354.06
	Deductions					
	Doors $-D_1$	2	1.0	—	2.0	4.0
	Door $-D_2$	1	0.75	—	2.0	1.5
	Windows $-W_1$	6	1.20	—	1.20	8.64
	Windows $-W_2$	1	0.90	—	1.20	1.08

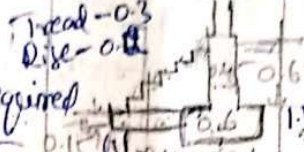
(5)

366.66 − 15.22 = 351.44 m²

S.No	Description of item	No	L	B	D	Quantity	Total Quantity
(5)	R.C.C (1:2:4) roof slab of 10cm thickness.						(8)
	length wise 0.3 + 0.35 + 6 + 0.35 + 6 + 0.35 + 0.3 = 13.65						
	width wise 0.3 + 0.35 + 4.8 + 0.35 + 2.6 + 0.35 + 0.3 = 9.05	1	13.65	9.05	0.1	12.353	12.353
6)	Cubical concrete required for foundations of Brick Masonry steps for steps	1	3.3	1.5+0.15 −0.075 = 1.575	0.15	0.779 m^3	0.779 m^3
7)	Brick masonry for steps						
	1st step	1	3.0	1.5	0.12	0.54 0.432	
	IInd step	1	3.0	1.2	0.12	0.324	1.62
	IIIrd step	1	3.0	0.9	0.12	0.246	2.025 m^3
	IVth step	1	3.0	0.6	0.12	0.108	
	Vth step	1	3.0	0.3	0.12	0.135	
						1.62	

Tread = 0.3
Rise = 0.12

0.6 − 0.45 = 0.15 = 0.075



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Prepare a detailed estimate for the following items of works from fig.

1) R.C.C (1:1½:3) for columns upto ground level
2) BM in CM(1:5) with ac

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← Continuing Sd:-2)2) R.R Masonry for footings & Basement

Footing						
Around the Building	1	32.6	0.6	0.6	11.736	
L.C/W b/w B.R-I & II & K & H						
8.1 − 0.6 = 7.5	1	7.5	0.6	0.6	2.7	
S.C/W b/w B.R-I & II 4.35-0.6	1	3.75	0.6	0.6	1.35	
S.C/W b/w K & H = 3.85-0.6	1	3.25	0.6	0.6	1.17	
						29.794 m³
Basement						
Around the Building	1	32.6	0.45	0.6	8.802	
L.C/W = 8.1 − 0.45	1	7.65	0.45	0.6	2.065	
S.C/W S1 = 4.35 − 0.45	1	3.9	0.45	0.6	1.053	
S.C/W S2 = 3.85 − 0.45	1	3.4	0.45	0.6	0.918	
					29.794	

(3) B.M for superstructure without deductions

Around the Building	1	32.6	0.35	3	34.23	
L.C/W = 8.1 − 0.35	1	7.75	0.35	3	8.1375	50.2425 m³
S.C/W S1 = 4.35 − 0.35	1	4.0	0.35	3	4.2	
S.C/W S2 = 3.85 − 0.35	1	3.5	0.35	3	3.675	
					50.2425	

4) R.C.C roof Slabs (1:2:4)
120mm thick
Length wise (H)
0.35 + 3.8 + 0.35 + 3.6 + 0.35 ⇒ 8.45
Width wise (V)
0.35 + 4 + 0.35 + 3.5 + 0.35 ⇒ 8.55

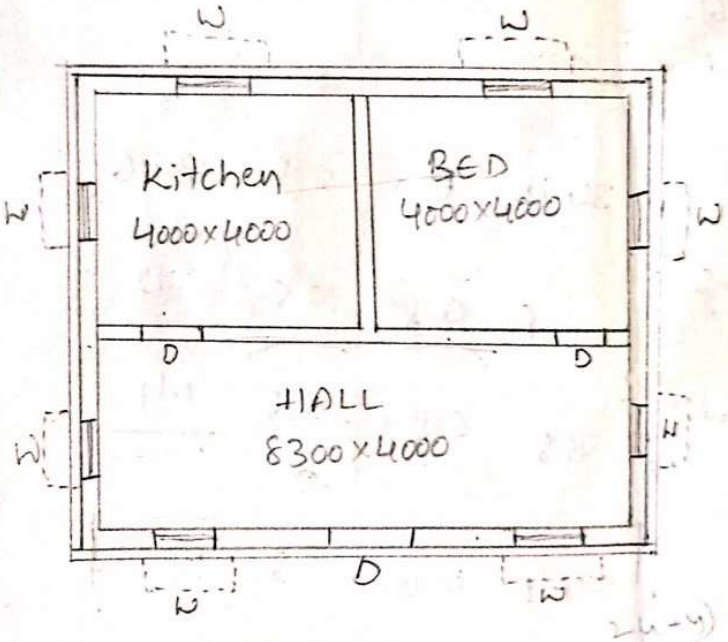
	1	8.45	8.55	0.12	8.669	8.669 m³

5) Flooring with Polished stones

Inside B.R-I	1	3.8	4.0	—	15.2	
B.R-II	1	3.6	4.0	—	14.40	55
Kitchen	1	2.4	3.5	—	8.4	
Hall	1	5.0	3.5	—	17.5	
					55.50	

From enclosed fig. Calculate the quantities of the following Items of work:

1) Earthwork excavation for foundation
2) Brick masonry in CM (1:6) for superstructure without deductions.
3) ~~Plastering to ceiling with CM (1:3)~~
4) RR masonry in CM (1:6) for footing and basement
5) Interior plastering with deductions.
6) R.C.C. roof slab and R.C.C (1: 1½ :3) for lintels.



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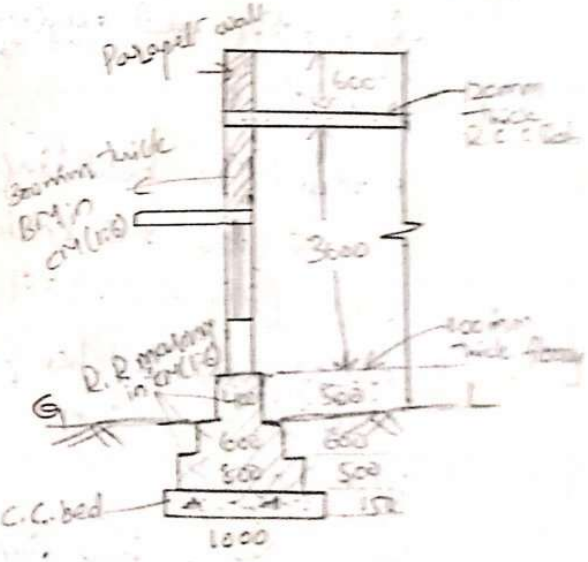

Cross Section

Specifications

D = 1.2 × 2.1 m²

W = 1.5 × 1.5 m²

R.C.C lintel thick 150 mm

C.L length of LW = $\frac{0.3}{2} + 8.3 + \frac{0.3}{2} = 8.6$m

C.L length of SW = $\frac{0.3}{2} + 4 + 0.3 + 4 + \frac{0.3}{2} = 8.6$m

Short cross wall b/w kitchen & BR = $\frac{0.3}{2} + 4 + \frac{0.3}{2} = 4.3$m

C.L length around the building

= 2 (8.6 + 8.6)

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S.No	Description of item	No	L	B	D	Quantity in m^3	
1.	Earthwork excavation for foundations						
	Around the building	1	34.4	1.0	1.25	43.0	
	Long cross wall blw Bed, kitchen and Hall (8.6 − 1) = 7.6 (by we are doing means already we included in above the building)	1	7.6	1.0	1.25	9.5	56.625 m^3
	Short cross wall blw kitchen & bed (4.3 − 1) = 3.3	1	3.3	1.0	1.25	4.125	
						56.625	
2.	R.R masonry in cm(1:6) for footings and basement						
	I st footing						
	Around the building	1	34.4	0.8	0.5	13.76	
	L.cw blw bed, kitchen & hall (8.6 − 0.8) = 7.8	1	7.8	0.8	0.5	3.12	
	S.cw blw kitchen & bed 4.3 − 0.8 = 3.5	1	3.5	0.8	0.5	1.4	
	II nd footing						
	Around the building	1	34.4	0.6	0.6	12.384	
	LCW blw bed, kitchen & hall 8.6 − 0.6 = 8	1	8.0	0.6	0.6	2.88	44.176 m^3
	SCW blw kitchen & bed 4.3 − 0.6 = 3.7	1	3.7	0.6	0.6	1.332	
	Basement						
	Around the building	1	34.4	0.4	0.5	6.88	
	LCW blw bed, kitchen, Hall 8.6 − 0.4 = 8.2	1	8.2	0.4	0.5	1.64	
	SCW blw kitchen & bed 4.3 − 0.4 =	1	3.9	0.4	0.5	0.78	
						44.176	

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Description of item	No	L	B	D	Quantity	Total Quantity
3. Brick masonry in CM (1:6) for superstructure without deductions.						10
Around the building	1	34.4	0.3	3.6	37.152	
LCW b/w K, B & H 8.6 − 0.3 = 8.3	1	8.3	0.3	3.6	8.964	56.624 m³
SCW b/w K & B 4.3 − 0.3 = 4.0	1	4.0	0.3	3.6	4.32	
Around building parapet wall	1	34.4	0.3	0.6	6.192	
					56.624	
4. Interior plastering with deductions						
Inside						
Around the kitchen room (also around wall (size of room)) 4 × 4	1	16.00	—	3.6	57.6	
Around bed room 4 × 4	1	16.00	—	3.6	57.6	
Around hall 2 × 8.3 + 2 × 4 = 24.6	1	24.6	—	3.6	88.56	178.2 m²
					203.76	
Deductions						
For Doors D	3	1.2	—	2.1	7.56	
For windows W	8	1.5	—	1.5	18.00	
					25.56	

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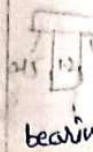
5. R.C.C roof slab and R.C.C for lintels

Roof slab

Horizontal
$0.3 + 8.3 + 0.3 = 8.9$
vertical
$0.3 + 4 + 0.3 + 4 + 0.3 = 8.9$

		1	8.9	8.9	0.12	9.5052

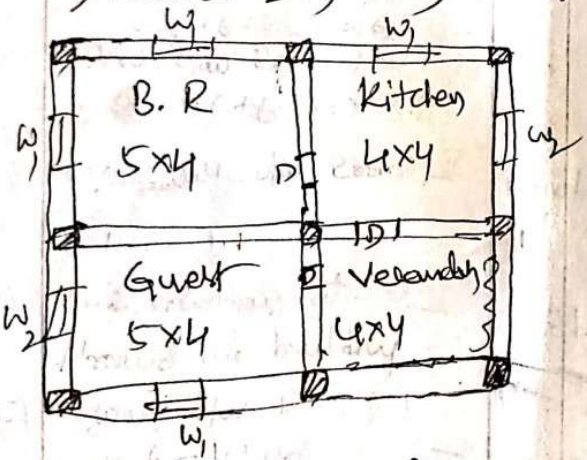
R.C.C (1:1½:3) for lintels over

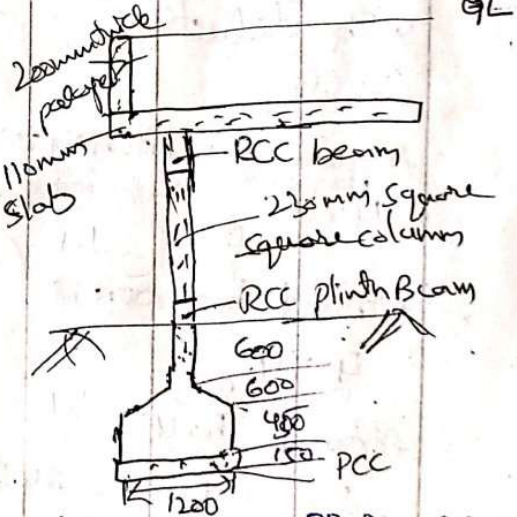


10.1532 m³

Doors	D	3	1.5	0.3	0.15	0.2025
Windows	W	8	1.8	0.3	0.15	0.648
						10.1532

6. From enclosed ff. Calculate the quantities of following items of work
a) Earthwork excavation for all column footings
b) PCC (1:4:8) using 40mm HBG metal for foundations (under columns only)
c) RCC (1:1½:3) using HBG metal for all column footings & upto GL.





Soln:-

1) Earthwork excavation for all column footing

	9	1.2	1.2	1.8	23.33	23.33 m³

2) PCC (1:4:8) using 40mm HBG for foundation under column only

	9	1.2	1.2	0.15	1.94	1.94 m³

3) RCC using HBG metal for all column footings & upto GL.

$\frac{h}{3}\left(A^2 + a^2 + \sqrt{A^2 a^2}\right)$

a) Rectangular portion	9	1.2	1.2	0.45	5.83	10.15 m³
b) Trapezoidal portion	9	$\frac{1.2^2 + 0.23^2}{2}$		0.6	4.03	
c) Column upto GL	9	0.23	0.23	0.6	0.29	
					10.15 m³	

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