ESTIMATION & COST EVALUATION-I.

SYLLABUS:-

CHAPTER	NAME OF TOPICS	DATE
1.	Introduction.	05/09/2020
2.	Quantity Estimate of Building.	18/09/2020
3.	Analysis of rates and Valuation.	15/01/2021
4.		

4/9/2020

Estimation and Cost Evaluation

* Estimation is a process of calculating quantities and costs of various items required in connect with a work/project.
* It is prepared by calculating the quantities from the dimensions of the drawing for various items required to complete the project multiplied by unit cost of the item concerned.

Purpose of Estimation:-

(i) To assess the volume of work involve in project.
(ii) To arrange and organised material, manpower, Equipments and tools and plants.
(iii) To fix the project completion period.
(iv) To ascertain the fund required for completing the purpose of work.
(v) To justify the investment from cost benefit ratio.

(vi) To invite tenders and preparation of bill of quantities.

(vii) To obtain necessary administrative approval

(viii) For valuation of exhausting property.

Quantity Surveyor:-

* Quantity surveyor is a person who is responsible on estimating the quantities from the design drawings and measurement of the quantities in the site during the project implementation and preparing the current and final payments.

Duties of quantity Surveyor:-

(i) Preparing bill of quantities.

(ii) Preparing bills of part payments at intervals during the execution of work

(iii) Preparing bill of adjustment in the case of variation ordered during the execution of work.

(iv) Giving legal advice in case of court proceedings.

Essential qualities of good Surveour:-

(*) The quality surveour must be wellversed with the drawing of work.

(i) He should be able to read the drawing correctly and bill the quantities acaura-tely.

(ii) He should have through knowledge of the construction procedure to be adapted. Various items of works involve in the execution and the different material to be used in the work.

(iv) He should be able to prepare schedule to be priced by tender.

Types of Estimation:

There are types of Estimation.

(i) Approximate estimate.

(ii) Detailed estimate.

(iii) quantity estimate.

(iv) Revised estimate.

(v) Supplementary estimate.

(1) Approximate estimate :-

This is also known as pe preliminary estimate. or rough estimate.

This estimate is prepared to work out an approximate cost of the project in a short period without going in to details. This estimate is done for Preliminary financial evaluation alternatives and for administrative sanction.

(2) Detailed Estimate :-

This estimate is prepared by working out the quantities of different item of work and the working out the cost by multiplying the quantities by the respective rates. In detailed estimate provisions for any other expanses like contigency, Tools and plants, work charge establishment etc are added to the above cost to calculate the total amount required for project completion.

(3) Quantity Estimate:-

Quantity estimate or quanity surveyor is a part of detailed estimate. Which list the quantities of all the items required to complete the project. These quantitees are worked out from the drawings. The purpose of quanity estimate is to prepare bill of quantities.

(4) Revised Estimate:-

It is a detailed estimate for the revised quantities or revised rates of items of work originally provided in the estimate without any deviation in original design and Specifications approved for the project. It is required when the material cost or the material quanity deviate signifi-cantly (greater than 5%) from Sanction value.

(5) Supplementary Estimate:-

This estimate is worked out durin

progress of work due to any change or addition of works to originally approved & supplementary estimate is different from the revised in the expects that the former is worked out for the works which are not present in the original design. where as the later is worked out when there is a deviation of material from original purposal.

Abstract Estimate:-

This is the 3rd and final stage of detailed estimate. The quantity and rate of each item of work entered in an abstract form. The total cost of each item of work is now calculated by multiplying the quantities & respective rates.

Data Required:-

To make an estimate following data are necessary i.e. Drawing, Specification, Rates.

Drawing:-

For calculating quantities of various items for the work, various drawings like plan, profile, section & elevation are required.

Specification:-

Specification contains detail description of work-man-ship, materials & methods of preparation and execution for different items of the work.

Rates:-

The rate per unit of various items of work, the rate of various materials to be used in the construction, The ways for various categories of labour are required for cost estimate.

Dt - 9/9/20 Estimating & Cost Evaluation

Terminology:

1. Taking off in quantity Survey:

This is the process of finding out the

quantities for various items of works involved in a project by taking off various dimensions from plan, sections of the drawings and tabulating in a measurement sheet. The measurement sheet contains following columns like description, number, length, Breath, height and quanity.

Sl no.	Description	No	length	Breath	height	quanity	excla-nation

2. Contigencies :-

There are certain expanses which are incidental in nature and it is not possible to predict them with reasonable accuracy. To cater all such expanses an additional amount of 3% to 5% of estimated cost is provided in the total estim

3. Lump - Sum items :-

These are the small items such as front architectural or decoration work of a building, site cleaning, dressing etc

For which detailed quantities can't be taken out easily or it takes sufficent time to find the details. For such items a lump sum rate is provided in the estimate.

4. Work-charged Establishment:-

During the construction of a project considerable number of skilled Supervisors, work assitant, watch man etc are employed on temporary basics. The salaries of these persons are drawn from the lump sum amount alerted towards the work charge, establishment and lumpsum amount of 1.5 to 2% of the estimated cost is provided towards work charged establishment.

5. Tools & plants: (T & P)

Use of special type of tools and plants, like concrete mixture, Batching plants etc may be required for efficent exhibition of large projects. Such expanses about 1% to 1.5% of the estimated cast

is alerted under the head tools & plants.

6. Day work :-

During execution of a project their may be certain type of works, for which the actual quantities of labour required is difficult to measure. Ex- fine architectural works and drawings in the wall. The payment towards such item are made on the basis of actual number of days or a actual quanity of material is required. Such work are known as Day work.

Sub work :-

A large project may consist of several independent small works. Such small works are known as subwork. Ex - setting up a university may contain the construction of adminstrative building, classroom, faculty chamber, Hostel & faculty residences etc.

Prime Cost:-

Prime cost is the purchase cost of articles at a shop. Prime cost is generally referred to the supply of a particular article not for carrying out a work. The prime cost includes the cost for carriage but excludes the cost of fixing/ fittings.

Ex:- Door and windows fittings are purchased from the shop at a cost of 1000, the transportation cost is 50 & the cost for fixing/fitting is 100 ₹. Then the prime cost of the fittings are 1050.

Capital Cost:-

The capital cost is the actual amount includes in completing a work. This includes Expenditure is required in surveying, Designining, planning, Drawing, cost of materials, equipment, labours, supervision, legal expanses, Travel expanses, Tax, electricity,

contigency, water charge and any other expenses are related to the work but excluding profit.

Sl No.	Description of items	Units of measurements
1.	Earth work excalation	M^3/cum.
2.	clearing of shrubs, small trees	M^2/sq.m.
3.	Cutting of trees	number.
4.	Earth work in filling	M^3/cum.
5.	Surface dressing	M^2/sq.m.
6.	Brick work	M^3/cu.m.
7.	Brick work in Arches	M^3/cum.
8.	Reinforced Brick work	M^3/cum.
9.	Honeycomb Brick work	Sq.m/m^2.
10.	½ Half brick wall (10 c.m.)	Sq.m/m^2.
11.	Brick flat soling	Sq.m/m^2
12.	Concrete work	cum/m^3.
13.	R.C.C	M^3/cum.

14.	Fr
15.	Rei
16.	Dam
17.	Expa
18.	sto
19.	T
20.	Flo
21.	H
22.	Ce
23.	D
24.	Do
25.	W
26.	Pl
	D
27.	I

14.	From work	M^2/sq.m.
15.	Reinforcement	quintal.
16.	Dam proof course	Sq.m/m^2.
17.	Expansion joint	Running meter.
18.	stone masonary	M^3/cu.m.
19.	Terracing	M^2/sq.m.
20.	Flooring, Roofing	M^2/sq.m.
21.	Hand rails	Running meters
22.	Centring, shuttering	Sq.m/m^2.
23.	Door & window shutter	Sq.m/m^2.
24.	Door, window frame	cum.m^3.
25.	Wire, fencing	running meter.
26.	plastering, painting Distempering	Sq.m/m^2
27.	Instrument, letter, painting	Number.

Date - 7/09/2020

Plinth area :-

(i) Plinth area is the built up covered area of a building measured at floor level of any storey (each floor). plinth area is calculated by taking the external dimensions of the building at the floor level excluding plinth off set if any.

(ii) The following shall be included in the plinth area.

(a) All floors, Area of the wall at the floor level excluding plinth off set if any.

(b) Internal shaft for sanitary installation provided which area do not exceed 2m².

(c) Then the area of mumpty at terrace level.

(d) Then area of porchase (other than cantilever ↓ not supported)

The following shall not be included the plinth area :-

(i) The area of shaft more than 2 sq.m.

(ii) On encl

(iii) Sunsha

Floor

Floor

area o

-ts of

passage

Entran

Latrin

a. Sills

in th

b. Area

other

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o

(ii) On enclosed Balcony.

(iii) Sunshade, SunBreakers.

Floor Area:-

Floor area of a building is the total area of floor in between walls & consis-ts of floor of all rooms & verandah, passage, corriders, stair case room, Entrance hall, kitchen, store, Bathroom, Latrin etc.

a. Sills of doors are shall not included in the floor area.

b. Area occupied by walls, pillars or any other intermediate supports are not included in the plinth area.

Circulation Area:-

Circulation area is the floor area of verandah, passage, corriders, Balcony & entrana hall, stair case Room, porchase etc which are used for movements of persons only.

Carpet Area:-

Carpet area of a building is the useful area / liveable area. This is the total (Floor area - the circulation area.)

Carpet area should exclude - Kitchen, pantery store, corridor, passage, Entrace hall, stair case, Mumpty, shaft for lives, verand, garage, canteen etc.

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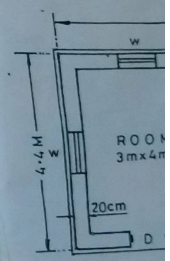
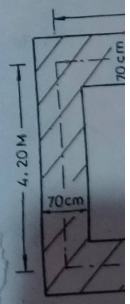
4-11. Partition w

Two roomed buil
quantities for the followin
(3) 1st class brickwork
brickwork in cement mo



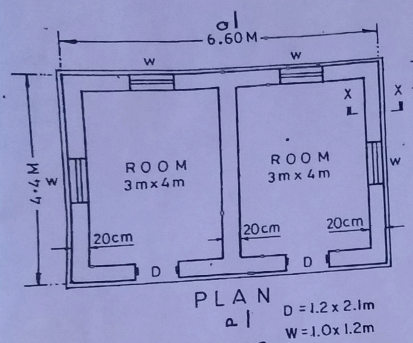


PLAN F

Centre l
+ length of cent
= 2 (6.

4-11. Partition wall — (A) Partition wall having the same section as that of main wall —

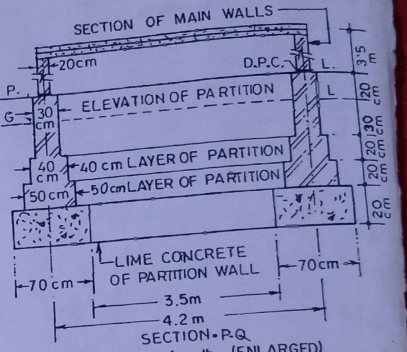
Two roomed building Fig. 4-16 shows the plan and cross section of wall of a building. Estimate the quantities for the following items (1) Earthwork in excavation in foundation, (2) Lime concrete in foundation, (3) 1st class brickwork in foundation and plinth, (4) 2.5 cm thick damp proof course and (5) 1st class brickwork in cement mortar in superstructure.



PLAN

a | D = 1.2 x 2.1m
W = 1.0 x 1.2m

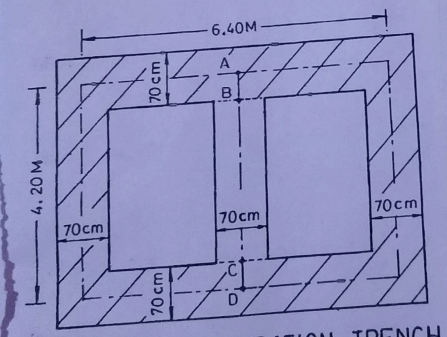
FIG. 4-16



SECTION - P.Q

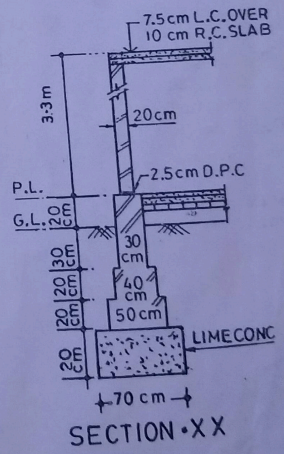
After removal of earth (ENLARGED)

FIG. 4-16(B)



PLAN FOR FOUNDATION TRENCH

FIG. 4-17



SECTION - X X

Centre line method : The total length of centre line = Length of centre line for the main outer wall + length of centre line for the partition wall.

$$= 2(6.60 - 2 \times 0.20/2 + 4.40 - 2 \times 0.20/2) + 4.40 - 2 \times 0.20/2 = 2(6.40 + 4.20) + 4.20 = 25.4 \text{ m.}$$

Item No.	Description of item	NO.	length (m)	Breadth (m)	Height (m)	Quanity	Explanatory Notes.
1.	Earthwork in excavation						Centre to centre length of long wall = 3+3+ 0.2+0.1+0.1 = 6.4m. L = c/c length of long wall + 0.7/2 + 0.7/2 = 6.4 + 0.7 = 7.1m. H = 0.2+0.2+0.2+0.3 = 0.9 Q = NO X L X B X H X100 = 2 X 7.1 X 0.7 X 0.9 X 2 = 8.946 cum/m³
	- Long wall	2	7.1	0.7	0.9	8.946	
	- short wall	3	3.5	0.7	0.9	6.615	c/c length of the short wall = = 4.4 - 0.2/2 - 0.2/2 = 4.4 - 0.2 = 4.2 L = c/c length of the sho
					Total	15.56 cum/m³	

				1	6.615	
				Total	15.56 cum/m³	

of the short wall =

$= 4.4 - \frac{0.2}{2} - \frac{0.2}{2}$

$= 4.4 - 0.2$

$= 4.2$

L = c/c length of the short wall $- \frac{0.7}{2} - \frac{0.7}{2}$

$= 4.2 - 0.7$

$= 3.5$ m.

2. Lime concrete in foundation

- Long wall	2	7.1	0.7	0.2	1.98 cum/m³
- short wall	3	3.5	0.7	0.2	1.47 cum/m³
				Total	3.46 cum/m³

L = c/c length of the long wall + 0.7

$= 6.4 + 0.7$

$= 7.1$

L = c/c length of the short wall − 0.7

$= 4.2 - 0.7$

$= 3.5$ m.

3. 1st class brick-work-						
1st footing (50 cm)						
- Long wall	2	6.9	0.5	0.2	1.38	L = c/c length of long wall $+\frac{0.5}{2}$ $+\frac{0.5}{2}$ = 6.4 + 0.5 = 6.9
- short wall	3	3.7	0.5	0.2	1.11	L = c/c length of short wall $-\frac{0.5}{2}$ $-\frac{0.5}{2}$ = 4.2 $-\frac{0.5}{2}$ $-\frac{0.5}{2}$ = 3.7
Long wall						
2nd footing (40cm)	2	6.8	0.4	0.2	1.088	L = c/c length of the long wall $+\frac{0.4}{2}$ $+\frac{0.4}{2}$ = 6.4 + 0.4 = 6.8
Short wall	3	3.8	0.4	0.2	0.91	L = c/c length of the short wall $-\frac{0.4}{2}$ $-\frac{0.4}{2}$ = 4.2 - 0.4 - 0.4

$= 6.4 + 0.4$

$= 6.8$

Short wall	3	3.8	0.4	0.2	0.91	L = c/c length of the short wall $- \frac{0.4}{2} - \frac{0.4}{2}$ $= 4.2 - \frac{0.4}{2} - \frac{0.4}{2}$ $= 3.8\,m.$
Plinth (30 cm) wall						
- Long wall	2	6.7	0.3	0.5	2.01	L = c/c length of the long wall $+ \frac{0.3}{2} + \frac{0.3}{2}$ $= 6.4 + 0.3$ $= 6.7\,m$
- short wall	3	3.9	0.3	0.5	1.755	L = c/c length of the short wall $- \frac{0.3}{2} - \frac{0.3}{2}$ $= 4.2 - 0.3$ $= 3.9\,m.$
				Total	8.26 cum/m^3.	

4. 2·5 cm. thick D.P.C						
-Long walls	2	6.6	0.2	-	2.64	L = c/c length of the long wall + $\frac{0.2}{2}$ + $\frac{0.2}{2}$ = 6.4 + 0.2 = 6.6m.
- short walls	3	4.0	0.2	-	2.40	L = c/c length of the short wall + $-\frac{0.2}{2}$ - $\frac{0.2}{2}$ = 4.2 - 0.2 = 4.0
Deduction for door opening	2	1.2	0.2	-	0.48	L = 1.2
				Total	4.56 sq.m.	Q = NO x L x B x H = 2 x 1.2 x 0.2 x - = 0.48
5. 1st class brick-work in Super-structure.						

				Total	4.56 Sq.m.	Q = NO x L x B x H = 2 x 1.2 x 0.2 x - = 0.48
5.	1st class brick-work in Super-structure.					
	- Long wall	2	6.6	0.2	3.3	8.71
	- short wall	3	4	0.2	3.3	7.92
	Deduction for opening					
	- Doors	2	1.2	0.2	2.1	1.008 (-ve)
	- window	4	1.0	0.2	1.2	0.96 (-ve)
	Lintel over					
	Doors	2	1.5	0.2	0.15	0.09(-ve)
	windows	4	1.3	0.2	0.15	0.156(-ve)
					Total	14.71 cum/m3

L=1.5 = Door length
+0.15 + 0.15
= 1.5

L = window length + 0.15
+ 0.15
= 1.3

Centre line method:-

The total length of Centre line =

$= 2 \times 6.4 + 3 \times 4.2 = 25.4$ cum/m³

1. Earthwork in excavation	1	24.7	0.7	0.9	15.56 cum/m³	L = Total Centre line length $- 2 \times \frac{\text{width}}{2}$ $= 25.4 - 2 \times \frac{0.7}{2}$ $= 24.7$ m.
2. Lime concrete in foundation	1	24.7	0.7	0.2	3.46 cum/m³.	Q = 3.46 cum/m³
3. 1st class brick work in foundation and plinth						$L = 25.4 - 2 \times \frac{\text{width}}{2}$ $= 25.4 - 2 \times 0.5$

				0.2	3.46 cum/m³	

3. 1st class brick work in Foundation and plinth						
1st footing (50 cm)	1	24.9	0.50	0.20	2.49 cum/m³	L = 25.4 − 2 × width/2 = 25.4 − 2 × 0.5/2 = 24.9
2nd footing (40 cm)	1	25.0	0.40	0.20	2.00 cum/m³	L = 25.4 − 2 × width/2 = 25.4 − 2 × 0.4/2 = 25.0
plinth wall (30 cm)	1	25.10	0.30	0.50	3.77 cum/m³	L = 25.4 − 2 × width/2 = 25.4 − 2 × 0.30/2 = 25.10
				Total	8.26 cum/m³	

4. 2.5 cm. thick D.P.C	1	25.2	0.20	-	5.04 cum/m³.	L = 25.4 - 2 X 0.2/2 = 25.2m.
Deduction for door openings	2	1.20	0.20	-	0.48 ~~cum/m³~~	
				Total	4.56 Sq.m.	
5. 1st class brick work in Superstructure	1	25.2	0.20	3.3	16.63	L = 25.4 - 2 X b/2
Deduction for Door	2	1.20	0.20	2.10	1.008 (-ve)	= 25.4 - 2 X 0.2/2 = 25.2m.
Windows	4	1.00	0.20	1.20	0.96 (-ve)	

Part lintel

L = Door length + 2 X 0.15

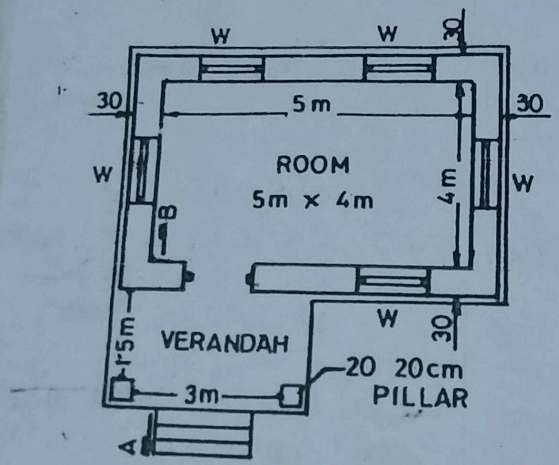
	2	1.20	0.20	2.10	1.008(-ve)	= 25.4 - 2 × 0.2/2
Windows	4	1.00	0.20	1.20	0.96(-ve)	= 25.2m.

Part lintel over						L = Door length + 2 × 0.15
Doors	2	1.50	0.20	0.15	0.09(-ve)	= 1.20 + 2 × 0.15
Windows	4	1.30	0.20	0.15	0.16(-ve)	= 1.50m.
				Total	14.41 cum/m³	L = Window length + 0.15 + 0.15
						= 1.0 + 0.15 + 0.15
						= 1.30m.

Date - 02/10/2020

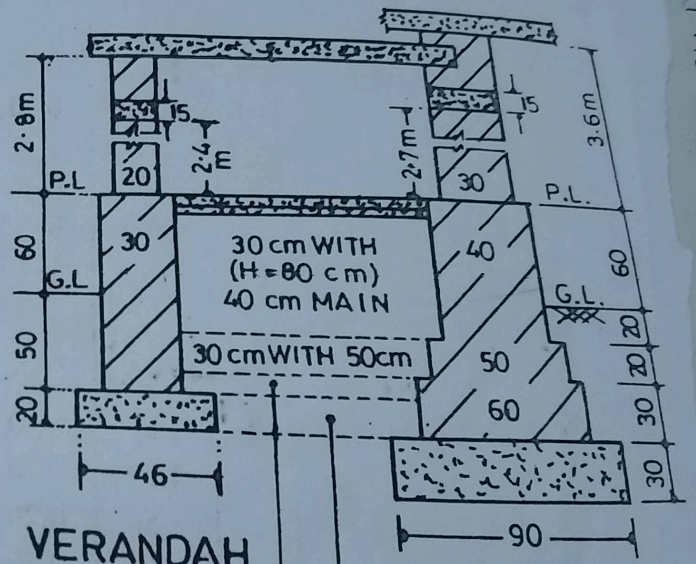
Question no.2:-

Fig. 4-20 shows the plan and sections of walls for a single roomed building with Verandah. Estimate the quantities of the following items:– (1) Earthwork in excavation in foundation. (2) Lime concrete in foundation. (3) First class brickwork in cement mortar (1:4) in foundation and plinth. (4) First class brickwork in cement mortar (1:6) in superstructure. Neglect step.



PLAN

FIG. 4-20



VERANDAH WALL

30 cm OF VERANDAH (H = 10cm) WITH 60 cm MAIN WALL

MAIN WALL

L.CONC. OF VERANDAH JOINS (H=20cm) WITH 60cm MAIN WALL

60cm MAIN WALL

1. Earthwork in excavation						
Room						
Long walls	2	6.20	0.90	1.00	11.16 cum/m³	c/c length of the long wall + 0.15 + 0.15 = 5 + 0.15 + 0.15 = 5.30m. L = c/c length of the long wall + 0.9/2 + 0.9/2 = 5.30 + 0.9/2 + 0.9/2 = 6.20m.
short walls	2	3.40	0.90	1.00	6.12 cum/m³	c/c length of the short wall = 4 + 0.15 + 0.15 = 4.30m. L = c/c length of the short wall - 0.9/2 - 0.9/2 = 3.40 m (Room)

Verandah						$L = 3.20 + \frac{0.46}{2} + \frac{0.46}{2}$
Front, Long wall	1	3.66	0.46	0.70	1.18 cum/m^3	$= 3.66m$. (Verandah)
Side, short wall	2	1.07	0.46	0.70	0.69 cum/m^3	$L = 1.75 - \frac{0.90}{2} - \frac{0.46}{2}$ $= 1.07m$.
				Total	19.15 cum/m^3.	

2. Lime concrete in foundation

Room

L = c/c length of the long wall $+ \frac{0.9}{2} + \frac{0.9}{2}$

$= 5.30 + \frac{0.9}{2} + \frac{0.9}{2}$

Long wall	2	6.20	0.90	0.30	3.35 cum/m^3	$= 6.20m$.
Short walls	2	3.40	0.90	0.30	1.83	$L = 4.30 - \frac{0.9}{2} - \frac{0.9}{2}$

Verandah						
Front, Long wall	1	3.66	0.46	0.70	1.18 cum/m³	L = 3.20 + 0.46/2 + 0.46/2 = 3.66m. (Verandah)
Side, short wall	2	1.07	0.46	0.70	0.69 cum/m³	L = 1.75 − 0.90/2 − 0.46/2 = 1.07m.
				Total	19.15 cum/m³.	

2. Lime concrete in foundation

Room

Long wall	2	6.20	0.90	0.30	3.35 cum/m³	L = c/c length of the long wall + 0.9/2 + 0.9/2 = 5.30 + 0.9/2 + 0.9/2 = 6.20m.
Short walls	2	3.40	0.90	0.30	1.83 cum/m³	L = 4.30 − 0.9/2 − 0.9/2 = 3.40m.

3. First class brick (1:4) in foundation and plinth

Room

1st footing (60 cm)

Long walls -	2	5.9	0.6	0.3	2.12 cum/m3	L = c/c length of the longwall + 0.6 = 5.3 + 0.6 = 5.9m.
short walls -	2	3.7	0.6	0.3	1.33 cum/m3	L = c/c length of the short wall - $\frac{0.6}{2}$ - $\frac{0.6}{2}$ = 4.3 - 0.6 = 3.7

2nd footing (50 cm)

Long wall -	2	5.8	0.5	0.2	1.16 cum/m3	L = c/c length of the long wall + 0.5 = 5.3 + 0.5 = 5.8m.

Footing (50 cm)						= 4.3 - 0.6 = 3.7
Long wall -	2	5.8	0.5	0.2	1.16 cum/m³	L = c/c length of the long wall + 0.5 = 5.3 + 0.5 = 5.8m.
short wall -	2	3.8	0.50	0.2	0.76 cum/m³	L = c/c length of the short wall - 0.5 = 4.3 - 0.5 = 3.8
plinth wall - Long wall	2	5.7	0.40	0.80	3.65 cum/m³	L = c/c length of the long wall + $\frac{0.4}{2}$ + $\frac{0.4}{2}$ = 5.3 + 0.4 = 5.7 m.
- short wall	2	3.9	0.4	0.8	2.50 cum/m³	L = c/c length of the short wall - $\frac{0.4}{2}$ - $\frac{0.4}{2}$ = 4.3 - 0.4 = 3.9m.

Verandah

Front Long wall (30cm)	1	3.50	0.30	1.10	1.16 cum.	L = c/c length of the short wall + $\frac{0.30}{2}$ + $\frac{0.30}{2}$ = 3.20 + 0.15 + 0.15 = 3.50m.
Short wall						1st layer = $\frac{h}{10}$ c.m. 2nd layer = 20 c.m. 3rd layer = 80 c.m.
(i) 1st layer	2	1.3	0.3	0.1	0.078 cum/m³	L = c/c length of short wall = 1.75 - $\frac{0.3}{2}$ - $\frac{0.6}{2}$ = 1.75 - $\frac{0.3}{2}$ - $\frac{0.6}{2}$ = 1.3m.
(ii) 2nd layer	2	1.35	0.3	0.2	0.162 cum/m³	L = c/c length of short wall - $\frac{0.3}{2}$ - $\frac{0.5}{2}$

(i) 1st layer	2	1.3	0.3	0.1	0.078 cum/m³	L = c/c length of short wall $-\frac{0.3}{2}-\frac{0.6}{2}$ $= 1.75-\frac{0.3}{2}-\frac{0.6}{2}$ $= 1.75-\frac{0.3}{2}-\frac{0.6}{2}$ $= 1.3m.$
(ii) 2nd layer	2	1.35	0.3	0.2	0.168 cum/m³	L = c/c length of short wall $-\frac{0.3}{2}-\frac{0.5}{2}$ $= 1.75-\frac{0.3}{2}-\frac{0.5}{2}$ $= 1.35m$
(iii) 3rd layer	2	1.4	0.3	0.8	0.67 cum/m³	L = c/c length of short wall $-\frac{0.3}{2}-\frac{0.4}{2}$ $= 1.75-\frac{0.3}{2}-\frac{0.4}{2}$ $= 1.4m.$
				Total	13.59 cum/m³	
4. 1st class brick work (1:6) in Superstructure						
Room						L = c/c length of the long wall + 0.3 $= 5.3+0.3$ $= 5.6m.$
Long walls	2	5.6	0.3	3.6	12.10 cum/m³	

short walls -	2	4.0m.	0.3	3.6	8.64 cum/m³	L = c/c length of the short wall − 0.3 = 4.3 − 0.3 = 4.0m.
Verandah						
Front long wall	1	3.4	0.2	0.25	0.17 cum/m³	L = c/c length of verandah front long wall + 0.2 = 3.2 + 0.2 = 3.4m.
Side short wall	2	1.5	0.2	0.25	0.15 cum/m³	L = c/c length of verandah side short wall − 0.3/2 = 0.2/2 = 1.5m.
pillar	2	0.2	0.2	2.4	0.192 cum/m³	
Deduction						

Pillar	2	0.2	0.2	2.4	0.192 cum/m³	Side short wall - 0.3/2 - 0.2/2 = 1.5m.

Deduction For opening

Door	1	1.2	0.3	2.1	0.756 (-)	
Window	5	1.0	0.3	1.2	1.8 (-)	Total centre length = (2 X 5.3) + (4.3 X 2) = 19.2
Lintel band over opening	1	19.2	0.3	0.15	0.864 (-)	
				Total	17.832 cum/m³.	

Centre line Method:-

Total Centre line method for Room

$= (5.3 \times 2) + (4.3 \times 2)$

$= 19.2\,m.$

Total Centre line method for Verandah

$= (3.2 \times 1) + (1.76 \times 2)$

$= 6.7\,m.$

1. Earthwork excavation						
Room -	1	19.2	0.9	1.00	19.28 cum/m^3	
Verandah -	1	5.80	0.46	0.7	1.87 cum/m^3	$L = 6.70 - 2 \times \frac{0.9}{2}$ $= 5.80m.$
				Total	19.15 cum/m^3.	

				Total	19.15 cum/m³.	= 5.80m.
2. Lime concrete in foundation						
Room	1	19.2	0.9	0.3	5.18 cum/m³.	
Verandah	1	6.10	0.46	0.30	0.841 cum/m³.	L = 6.7 − 2 × 0.6/2 = 6.10m.
3. First class brick-work in foundation (1:4)						
Room						
1st footing (60 cm)	1	19.2	0.6	0.3	3.456 cum/m³.	
2nd footing (50 cm)	1	19.2	0.5	0.2	1.92 cum/m³.	

Plinth wall	1	19.2	0.4	0.8	6.14	
Verandah:-						
1st layer :-	1	6.1	0.3	0.1	0.18	$L = 6.7 - 2 \times \frac{0.6}{2}$ $= 6.1$ m.
2nd layer (50)	1	6.2	0.3	0.2	0.372	$L = 6.7 - 2 \times \frac{0.5}{2}$ $= 6.2$ m.
3rd layer (40)	1	6.3	0.3	0.8	1.512	$L = 6.7 - 2 \times \frac{0.4}{2}$ $= 6.3$ m.
				Total	13.58 cum/m³.	

: First class Brick work in Superstructure

				Total	13.58 cum/m3.

$= 6.3\ m$

4. First class Brick work in Superstructure

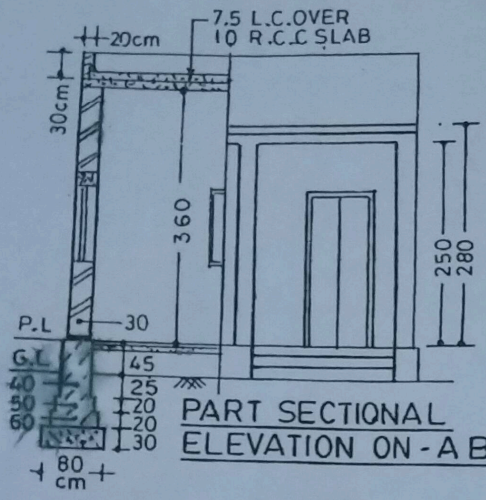
Room	1	19.2	0.3	3.6	20.74
Verandah	1	6.4	0.2	0.25	0.32
Pillar	2	0.2	0.2	2.4	0.192
Deduction for opening-					
Door -	1	1.2	0.3	2.1	0.756(-)
Window -	5	1.0	0.3	1.2	1.8 (-)
Lintel band over opening	1	19.2	0.3	0.15	0.864(-)
				Total	17.83 cum/m3

$L = 6.7 - 2 \times \frac{0.3}{2}$

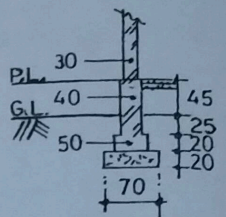
$= 6.4m.$

Building 1A. The plan and sections of an one roomed building is shown in Fig. 5-1A. Prepare quantity estimate for the following items of work.

(1) Earthwork in excavation in foundation, (2) Earthwork in plinth filling, (3) Lime concrete in foundation, (4) First class brickwork in cement mortar (1:6) for foundation and plinth, (5) 2.5 cm thick damp proof course, and (6) First class brickwork in superstructure.



PART SECTIONAL ELEVATION ON - A B C D

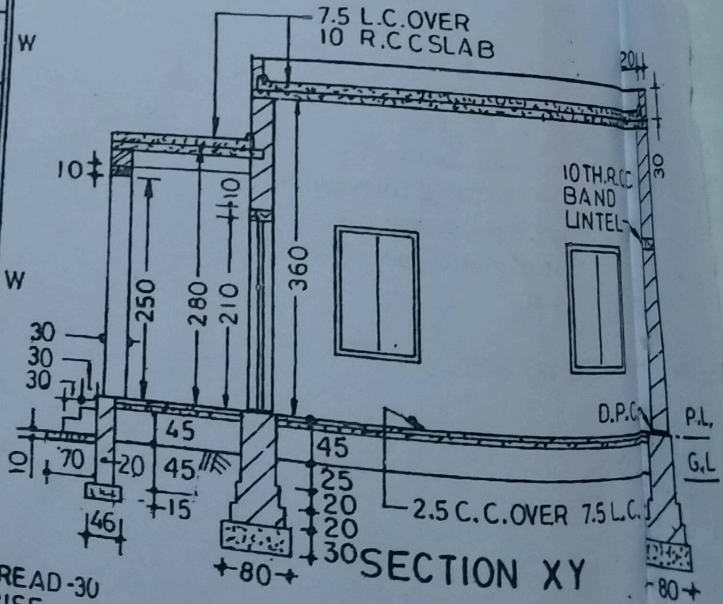


PILLAR FOUNDATION

SCHEDULE

DOOR	D =	110×210
WINDOW	W =	90×150
SHELF	S =	90×150

PLAN



SECTION XY

FIG. 5-1A

DIMENSIONS ARE IN CMS

Here,

Room - c/c length of the long wall = $5 + \frac{0.3}{2} + \frac{0.3}{2} = 5.30\text{m}$.

c/c length of the short wall = $4.2 + \frac{0.3}{2} + \frac{0.3}{2} = 4.50\text{m}$.

Verandah - c/c length of the long wall = 4.50m.

c/c length of the side short wall = $2 + \frac{0.3}{2} + \frac{0.3}{2} = 2.30\text{m}$.

1.	Earthwork in excavation in foundation						
	Room-						
	Long walls	2	6.10	0.80	0.95	9.27	$L = 5.30 + \frac{0.80}{2} + \frac{0.80}{2} = 6.10\text{m}$
	short walls	2	3.70	0.80	0.95	5.62	$L = 4.50 - \frac{0.80}{2} - \frac{0.80}{2} = 3.70\text{m}$
	Verandah-						
	Front longwall	1	3.10	0.46	0.60	0.86	
	Side short walls	2	1.55	0.46	0.60	0.86	

Long walls	2	6.10	0.80	0.95	9.27	$L = 5.30 + \frac{0.80}{2} + \frac{0.80}{2} = 6.10m$
short walls	2	3.70	0.80	0.95	5.62	$L = 4.50 - \frac{0.80}{2} - \frac{0.80}{2} = 3.70m$
Verandah-						
Front longwall	1	3.10	0.46	0.60	0.86	
Side short walls	2	1.55	0.46	0.60	0.86	
Pillar	3	0.70	0.70	0.6	0.96	
step	1	2.20	0.57	0.10	0.13	$L = 2 + 0.1 + 0.1 = 2.20m$. $B = 0.70 - 0.13 = 0.57m$.
				Total	17.70 cum/m3	

2. Earthwork in filling in plinth

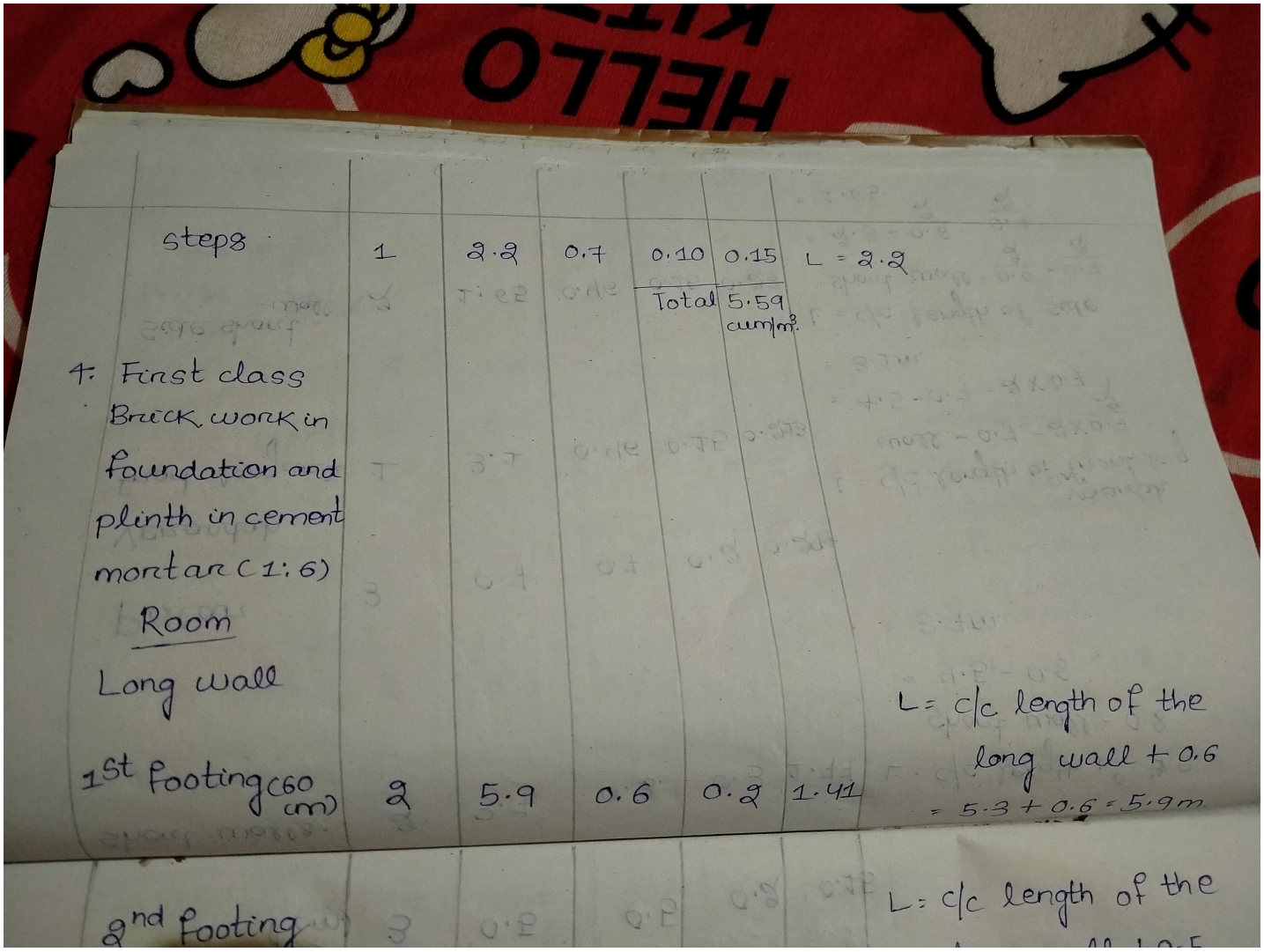
Room	1	4.90	4.10	0.375	7.53	$L = 5.30 - \frac{0.40}{2} - \frac{0.40}{2} = 4.90m$.
Verandah	1	4.50	2.10	0.375	3.54	

	Deduction for Pillar projection					
	End pillar	2	0.20	0.20	0.375	0.03 (-)
	Central pillar	1	0.40	0.20	0.375	0.03 (-)
3.	Lime concrete in foundation					
	Room					
	Long walls -	2	6.1	0.8	0.3	2.93
	Short walls -	2	3.7	0.8	0.3	1.77

L = c/c length of the long wall + 0.8
= 5.3 + 0.8
= 6.1m

L = c/c length of the

			0.8	0.3	2.93	= 5.3 + 0.8 = 6.1m
Short walls	2	3.7	0.8	0.3	1.77	L = c/c length of the short wall - 0.8 = 4.5 - 0.8 = 3.7m.
Pillar	3	0.7	0.7	0.2	0.294	
Verandah- Front long wall	1	3.1	0.46	0.15	0.213	L = c/c length of verandah front long wall - $0.7 - 2 \times \frac{0.7}{2}$ = $4.5 - 0.7 - 2 \times \frac{0.7}{2}$ = 3.1m.
Side short wall	2	1.65	0.46	0.15	0.23	L = c/c length of side short wall - $\frac{0.6}{2} - \frac{0.7}{2}$ = $2.3 - \frac{0.6}{2} - \frac{0.7}{2}$ = 1.65



steps	1	2.2	0.7	0.10	0.15	L = 2.2
				Total	5.59 cum/m³	

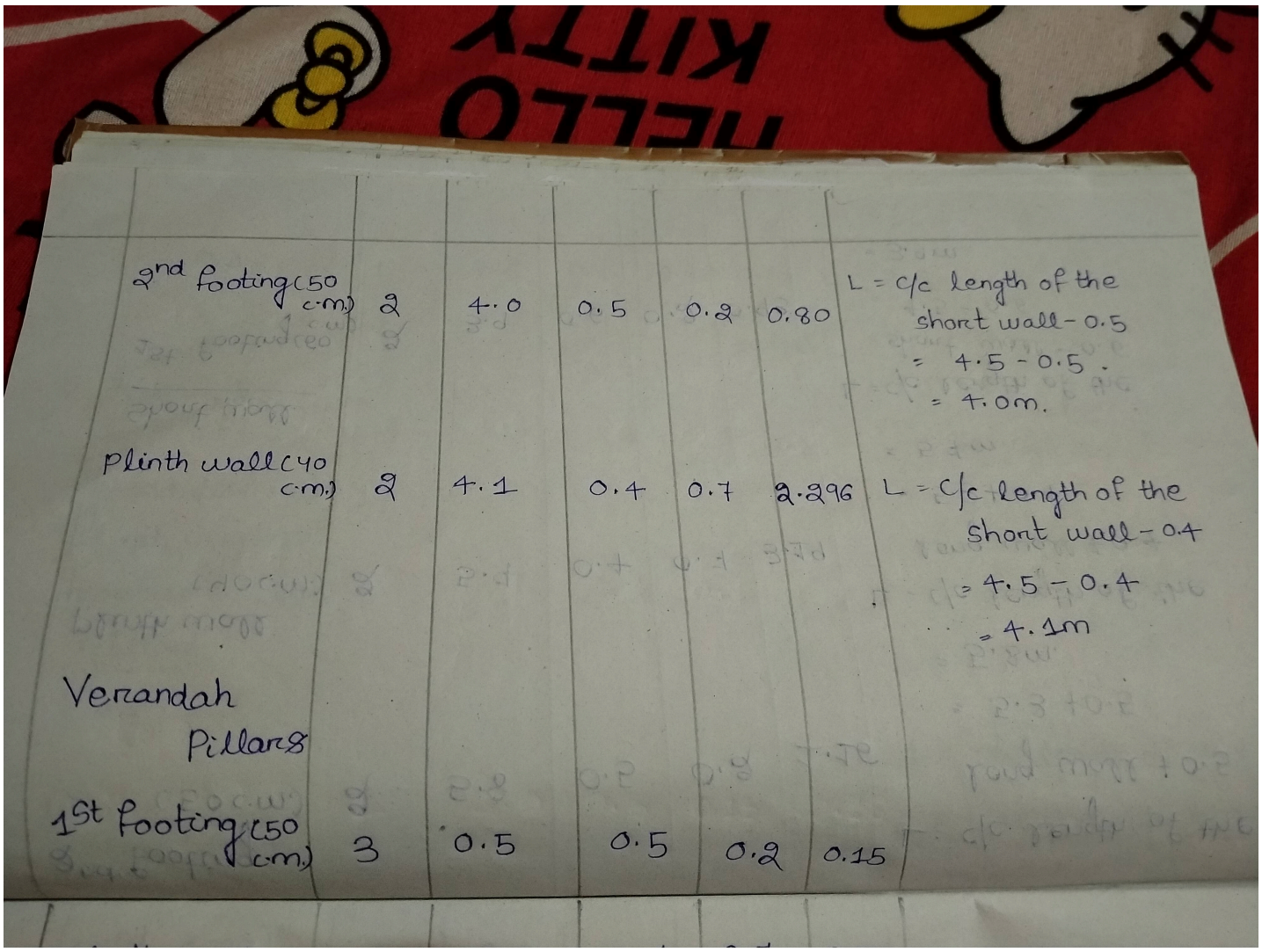
4. First class Brick work in foundation and plinth in cement mortar (1:6)

Room

Long wall

1st footing (60 cm)	2	5.9	0.6	0.2	1.41	L = c/c length of the long wall + 0.6 = 5.3 + 0.6 = 5.9 m
2nd footing						L = c/c length of the

1st footing (60 cm)	2	5.9	0.6	0.2	1.41	L = c/c length of the long wall + 0.6 = 5.3 + 0.6 = 5.9m.
2nd footing (50 c.m.)	2	5.8	0.5	0.2	1.16	L = c/c length of the long wall + 0.5 = 5.3 + 0.5 = 5.8m.
plinth wall (40 c.m.)	2	5.7	0.4	0.7	3.19	L = c/c length of the long wall + 0.4 = 5.3 + 0.4 = 5.7m.
Short wall						
1st footing (60 c.m.)	2	3.9	0.6	0.2	0.93	L = c/c length of the short wall - 0.6 = 4.5 - 0.6 = 3.9m.



2nd footing (50 c.m.)	2	4.0	0.5	0.2	0.80	L = c/c length of the short wall − 0.5 = 4.5 − 0.5 = 4.0m.
Plinth wall (40 c.m.)	2	4.1	0.4	0.7	2.296	L = c/c length of the short wall − 0.4 = 4.5 − 0.4 = 4.1m
Verandah Pillars						
1st footing (50 c.m.)	3	0.5	0.5	0.2	0.15	

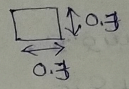
Pillars						
1st footing (50 c.m.)	3	0.5	0.5	0.2	0.15	
Plinth wall (40 c.m.)	3	0.4	0.4	0.7	0.34	
Verandah dwarf front wall						
1st layer (50 c.m.)	1	3.5	0.2	0.90	0.14	L = c/c distance - 2 $\times \frac{0.5}{2}$ - 0.5 = 4.5 - 2 $\times \frac{0.5}{2}$ - 0.5 = 3.5 m.
2nd layer (40 c.m.)	1	3.7	0.2	0.7	0.518	L = c/c distance - 2 $\times \frac{0.4}{2}$ - 0.4 = 4.5 - 2 $\times \frac{0.4}{2}$ - 0.4 = 3.7 m.

Verandah side short wall						
1st layer (50 cm.)	2	1.8	0.2	0.2	0.144	L = c/c distance $-2 \times \frac{0.5}{2}$ $= 1.8$m.
2nd layer (40 cm.)	2	1.9	0.2	0.7	0.532	L = c/c distance $-2 \times \frac{0.4}{2}$ $= 1.9$m.
Steps						
(1st step)	1	2.0	0.6	0.15	0.18	
(2nd step)	1	2.0	0.3	0.15	0.09	

				0.7	0.532	L = c/c distance $= 2 \times \frac{0.4}{2}$ = 1.9m.
	Steps (1st step)	1	2.0	0.6	0.15	0.18
	(2nd step)	1	2.0	0.3	0.15	0.09
					Total	11.894 cum/m³
5.	2.5 cm thick damp proof course					
	Room					
	Long walls	2	5.6	0.3	-	3.36
	short walls	2	4.2	0.3	-	2.52

L = c/c length of the long wall + 0.3
= 5.3 + 0.3
= 5.6m.

L = c/c length of the short wall - 0.3
= 4.5 - 0.3
= 4.2m.

Verandah Pillars	3	0.3	0.3	–	0.27	
Deduction for opening						
Door	1	1.1	0.3	–	0.33(-)	
				Total	5.82 sq.m.	

6. 1st class brick work in Superstructure (cement mortar) ~~(1:6)~~

Room

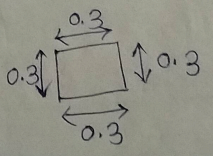
L = c/c length of th

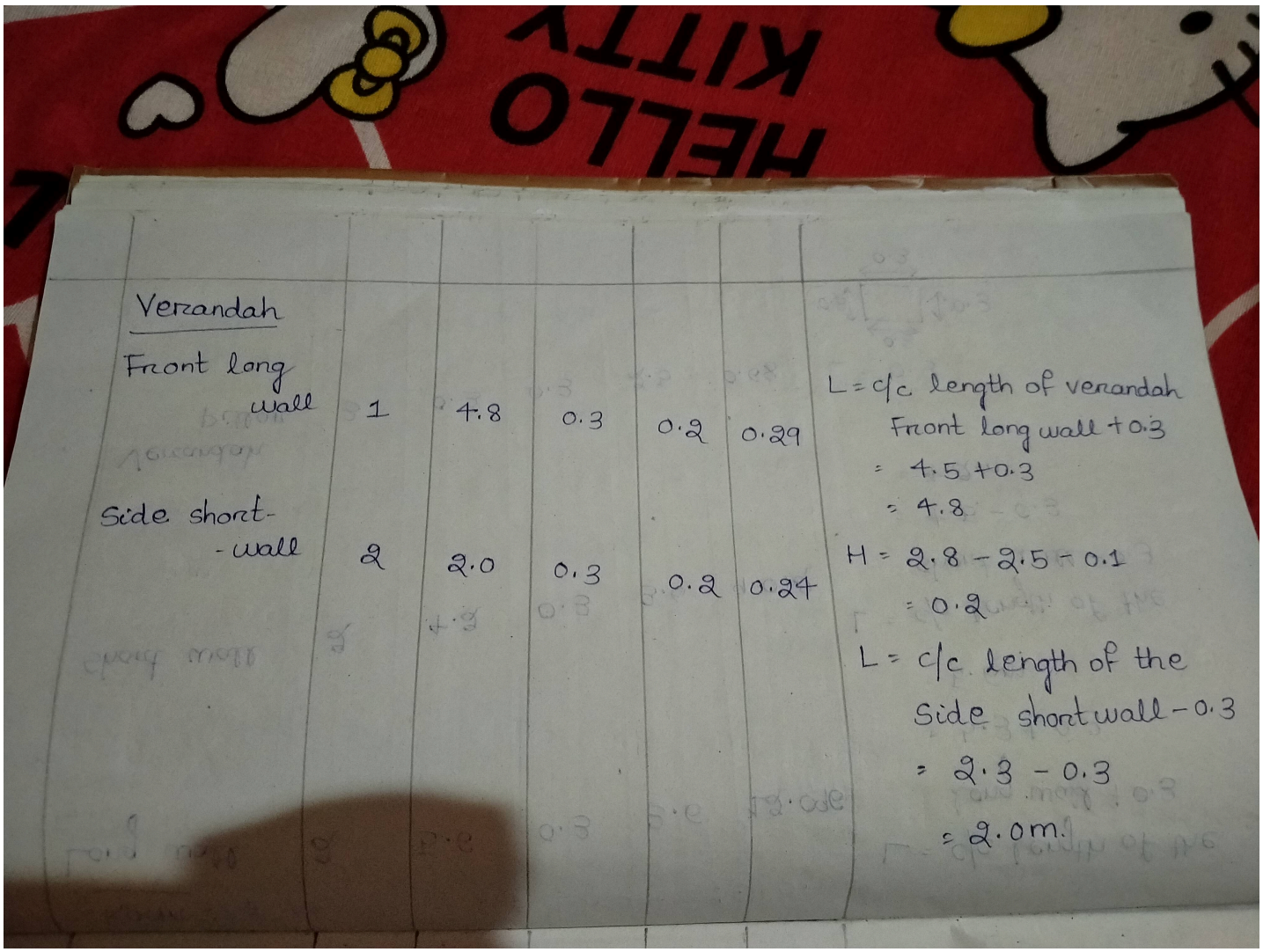
	Door	1	1.1	0.3	-	0.33 (-)
					Total	5.82 Sq.m.

6. 1st class brick work in Superstructure (cement mortar) (1:6)

Room

Long wall	2	5.6	0.3	3.6	12.096	L = c/c length of the long wall + 0.3 = 5.3 + 0.3 = 5.6m
Short wall	2	4.2	0.3	3.6	9.072	L = c/c length of the short wall - 0.3 = 4.5 - 0.3 = 4.2m
Verandah pillar	3	0.3	0.3	2.5	0.68	L = 0.3





Verandah

Front long wall	1	4.8	0.3	0.2	0.29	L = c/c length of verandah Front long wall + 0.3 = 4.5 + 0.3 = 4.8
Side short-wall	2	2.0	0.3	0.2	0.24	H = 2.8 − 2.5 − 0.1 = 0.2

L = c/c length of the Side short wall − 0.3
= 2.3 − 0.3
= 2.0m.

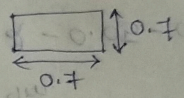
Side short wall - 0.3
= 2.3 - 0.3
= 2.0m.

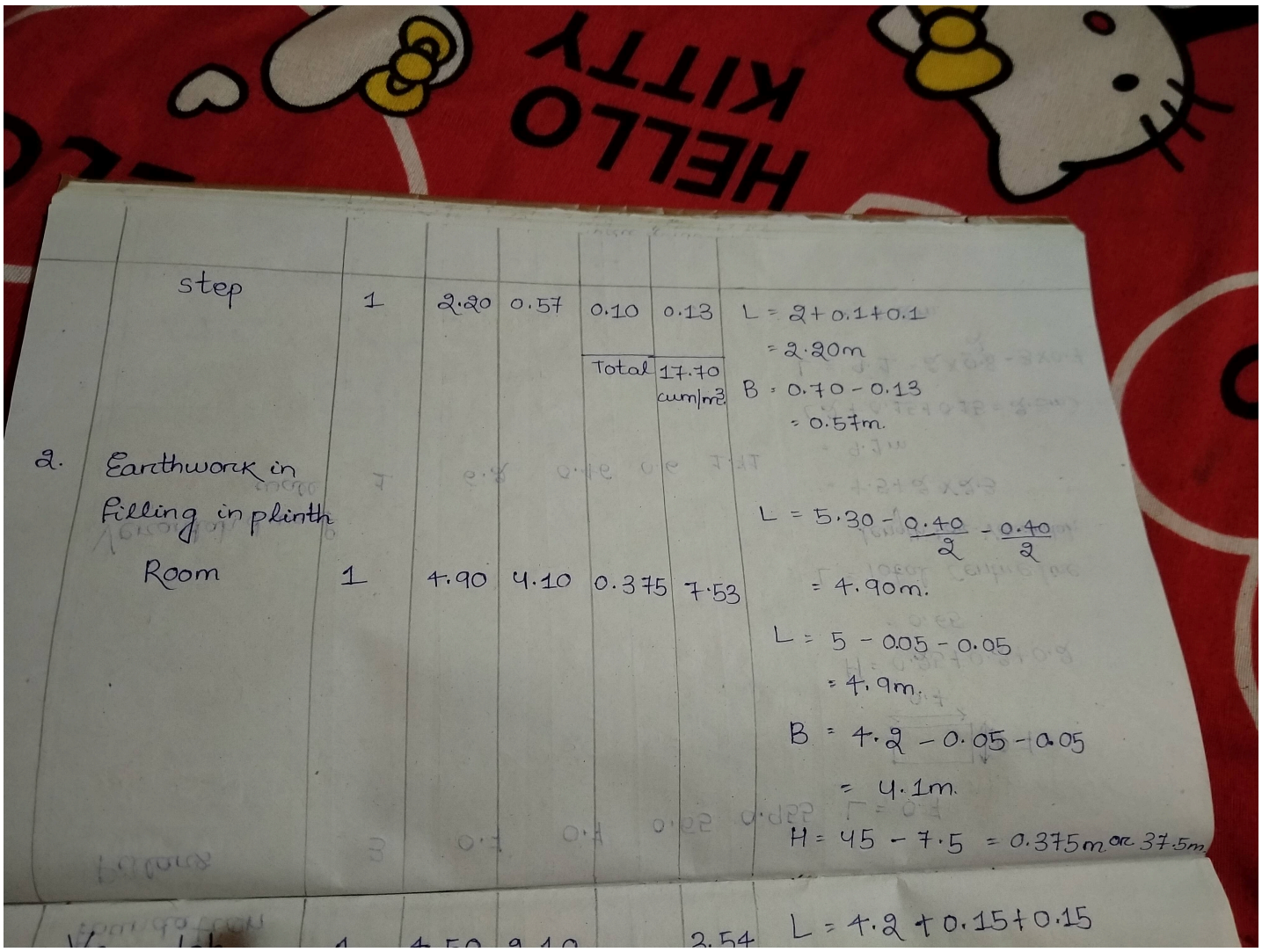
Parapet						
Long wall	2	5.6	0.2	0.3	0.67	L = c/c length of the long wall + 0.3 = 5.3 + 0.3 = 5.6m.
short wall	2	4.4	0.2	0.3	0.53	L = (2 X 5.3) + (2 X 4.5) = 19.6m.
Deduction for opening						
Door	1	1.1	0.3	2.1	0.693 (-ve)	
Window	5	0.9	0.3	1.5	2.03 (-ve)	
shelves	1	0.9	0.2	1.5	0.27 (-ve)	
lintel Band	1	19.6	0.3	0.1	0.588	
					Total	20.00 cum/m³

Centre to Centre length of long wall = 5 + 0.15 + 0.15
= 5.3m.

Centre line length of short wall = 4.2 + 0.15 + 0.15
= 4.5m.

1.	Earthwork in excavation in Foundation trenches Room	1	19.6	0.8	0.95	14.896	Total Centre to Centre length For Room = (2 X 5.3) + (2 X 4.5) = 19.6 H = 0.25 + 0.2 + 0.2 + 0.3 = 0.95
	Pillars	3	0.7	0.7	0.65	0.955	L = 0.7

Room		19.6	0.8	0.95	14.896	= 19.6 H = 0.25 + 0.2 + 0.2 + 0.3 = 0.95
Pillars	3	0.7	0.7	0.65	0.955	L = 0.7  H = 0.25 + 0.2 + 0.2 = 0.65
Verandah dwarf wall	1	6.2	0.46	0.6	1.71	L = Total Centre line length For Verandah = 4.5 + 2 X 2.3 = 9.1m (2 + 0.15 + 0.15 = 2.3m) L = $9.1 - 2 \times \frac{0.8}{2} - 3 \times 0.7$ = 6.2m.



	step	1	2.20	0.57	0.10	0.13	L = 2+0.1+0.1 = 2.20m
					Total	17.70 cum/m³	B = 0.70 − 0.13 = 0.57m.
2.	Earthwork in filling in plinth						L = 5.30 − 0.40/2 − 0.40/2 = 4.90m.
	Room	1	4.90	4.10	0.375	7.53	L = 5 − 0.05 − 0.05 = 4.9m.
							B = 4.2 − 0.05 − 0.05 = 4.1m.
							H = 45 − 7.5 = 0.375m or 37.5m
		1	4.50	9.10		2.54	L = 4.2 + 0.15 + 0.15

- 0.05 - 0.05
= 4.9m.

B = 4.2 - 0.05 - 0.05
= 4.1m

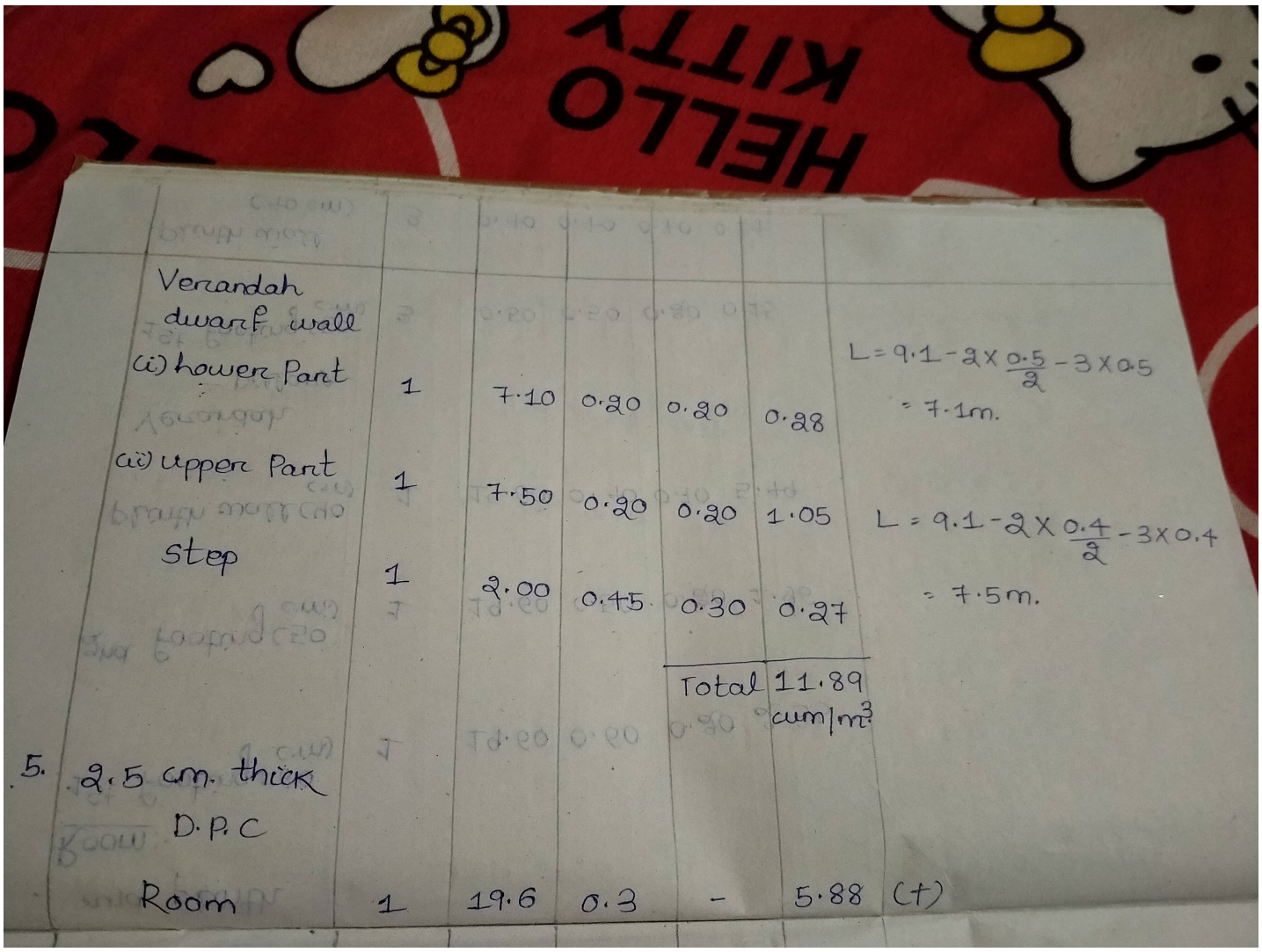
H = 45 - 7.5 = 0.375m or 37.5m

Verandah	1	4.50	2.10	3.54	L = 4.2 + 0.15 + 0.15 = 4.5m. B = 2 - 0.05 - 0.15 = 1.8m.
Deduction for pillar projection					
End pillar	2	0.20	0.20	0.03 (-ve)	
Central pillar	1	0.40	0.20	0.03 (-ve)	
			Total	11.04 cum/m³	

3. lime concrete in foundation

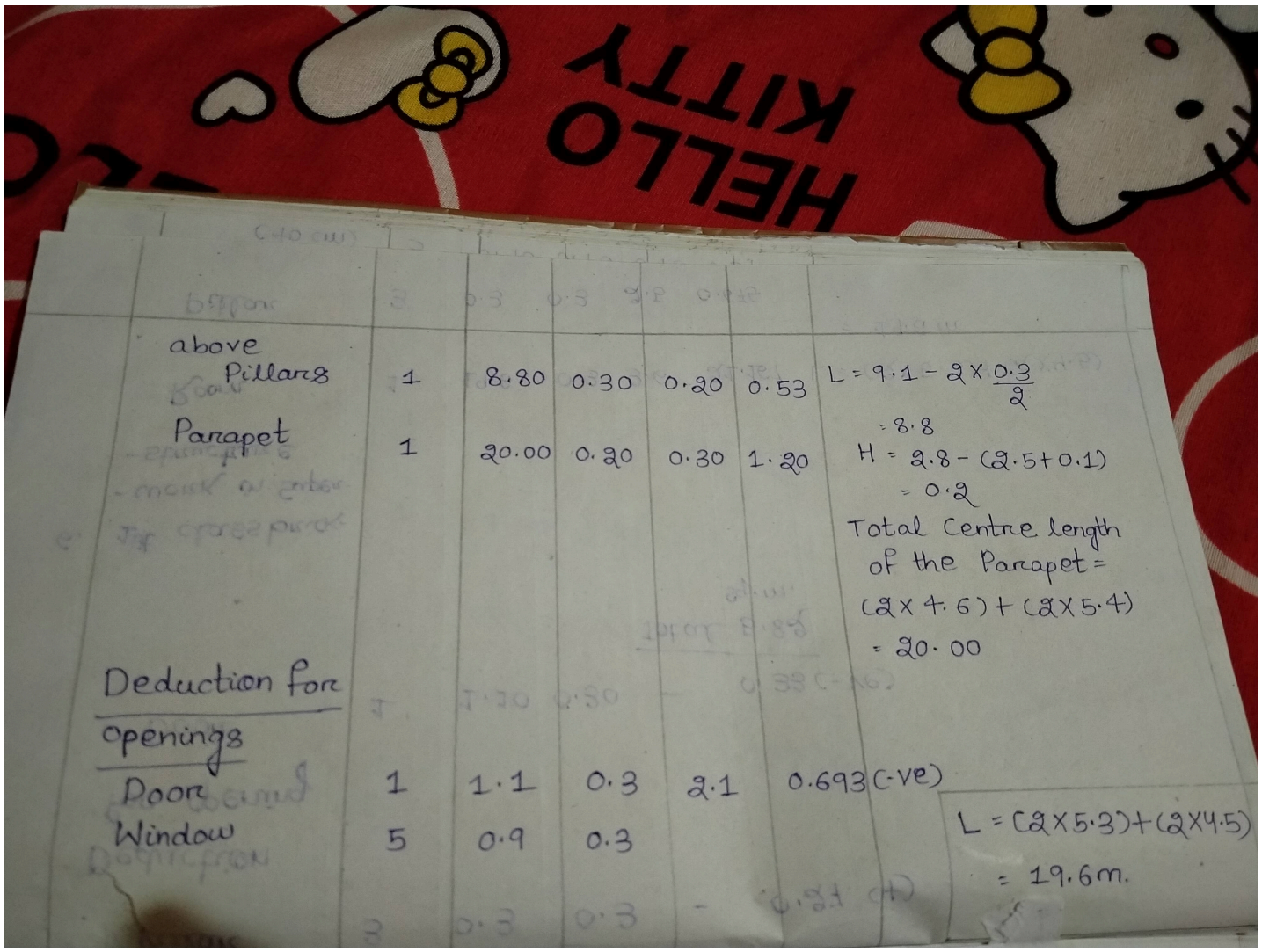
	Room	1	19.60	0.80	0.30	4.70	H = 0.3 (concrete) L = 19.6
	Verandah dwarf wall	1	6.4	0.46	0.15	0.44	
	Pillar	3	0.70	0.70	0.20	0.29	
	Step	1	2.20	0.70	0.10	0.15	
					Total	5.58 cum/m^3	
4.	1st class brick-work in foundation						

			0.70	0.10	0.15	
				Total	5.58 cum/m³	
4.	1st class brick-work in foundation and plinth					
	Room:-					
	1st Footing (60 cm)	1	19.60	0.60	0.20	2.35
	2nd Footing (50 cm)	1	19.60	0.50	0.20	1.96
	Plinth wall (40 cm)	1	19.60	0.40	0.70	5.49
	Verandah Pillars -					
	1st Footing (50 cm)	3	0.50	0.50	0.20	0.15
	Plinth wall (40 cm)	3	0.40	0.40	0.70	0.34



	Verandah dwarf wall						
	(i) lower Part	1	7.10	0.20	0.20	0.28	$L = 9.1 - 2 \times \frac{0.5}{2} - 3 \times 0.5$ $= 7.1m.$
	(ii) upper Part	1	7.50	0.20	0.20	1.05	$L = 9.1 - 2 \times \frac{0.4}{2} - 3 \times 0.4$ $= 7.5m.$
	Step	1	9.00	0.45	0.30	0.27	
					Total	11.89 cum/m^3	
5.	2.5 cm. thick D.P.C						
	Room	1	19.6	0.3	-	5.88	(t)

		1	2.00	0.45	0.30	0.27	$2 \times \frac{0.4}{2} - 3 \times 0.4$ = 7.5m.
					Total	11.89 cum/m³	
5.	2.5 cm. thick D.P.C						
	Room	1	19.6	0.3	-	5.88 (+)	
	Pillar	3	0.3	0.3	-	0.27 (+)	
	Deduction For opening						
	Door	1	1.10	0.30	-	0.33 (-ve)	
					Total	5.82 sq.m.	
6.	1st class brick-work in Super-structure						
	Room	1	19.6	0.3	3.6	21.167	L = (2×5.3) + (2×4.5) = 19.6 m
	Pillar	3	0.3	0.3	2.5	0.675	



above Pillars	1	8.80	0.30	0.20	0.53	$L = 9.1 - 2 \times \frac{0.3}{2}$ $= 8.8$
Parapet	1	20.00	0.20	0.30	1.20	$H = 2.8 - (2.5 + 0.1)$ $= 0.2$
						Total Centre length of the Parapet = $(2 \times 4.6) + (2 \times 5.4)$ $= 20.00$
Deduction for openings						
Door	1	1.1	0.3	2.1	0.693 (-ve)	
Window	5	0.9	0.3			$L = (2 \times 5.3) + (2 \times 4.5)$ $= 19.6m.$