LEARNING MATERIAL

SEMESTER & BRANCH: 3RD SEMESTER CIVIL ENGINEERING

THEORY SUBJECT: ESTIMATION AND COST EVALUATION -I (TH-4)

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&

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7 sep 2020 Monday

Estimating - 1

(i) Estimate for any construction work may be defined as the process of calculating the quantities and cost of various items required in connection with the work.

(ii) It is prepared by calculating the quantities from the dimensions on the drawing for the various items required to complete the project and if multiplied by unit cost of the item concerened.

(iii) To prepare an estimate, drawing consisting of the plan, the elevation and the sections through important point along with detailed specification.

Purpose of Estimating :- 8 sep 2020

(i) To determine the necessary amount of material required by the owner to complete the work.

(ii) To determine the quantities of material required in order to programme their timely procurement.

(iii) To calculate the number of different categories of workers that are to be employed to complete the work within the scheduled time of completion.

(iv) To asses the requirement of tools, plants & equipment required to complete the work according to programme

(v) To fix up the completion period from the volume of work involved in the estimate.

(vi) To draw up a construction schedule & programme and also to arrange the funds required according to programe.

(vii) To justify the investment from benefit cost ratio for ideal investment benefit construction should be more than one.

(viii) To invite tenders & prepare the bills for payment.

(ix) An estimate for an existing property is required for valuation.

Different types of Estimate:-

① Detailed estimate:- (i) This includes details particulars for the quantities, rates and costs of all items involved for satisfactory completion of project.

(ii) Quantities of all items of work are calculated from their respective dimensions of the drawing on the measurement sheet.

(iii) Multiplying these quantities by their respective rates in separate sheet, cost of all items of work are find out individually & then noted.

② Preliminary Estimate:- 9 Sep 2020 (1st period)

→ This is an approx estimate to find out approx. cost in a short time.

→ enables the authority how much amount of money required for the completion of construction work.

→ Such estimate is framed after knowing the rate of similar works & from practical knowledge in various ways for various types of work.

Different ways to calculate preliminary estimate

(i) plinth area / square metre method

(ii) cubic rate / cubic rate method

(iii) service unit / unit rate method

Note :- Dimensions such as length, breadth & height of each item is taken out correctly from drawing and quantities are calculated.

(i) plinth area Estimate :-

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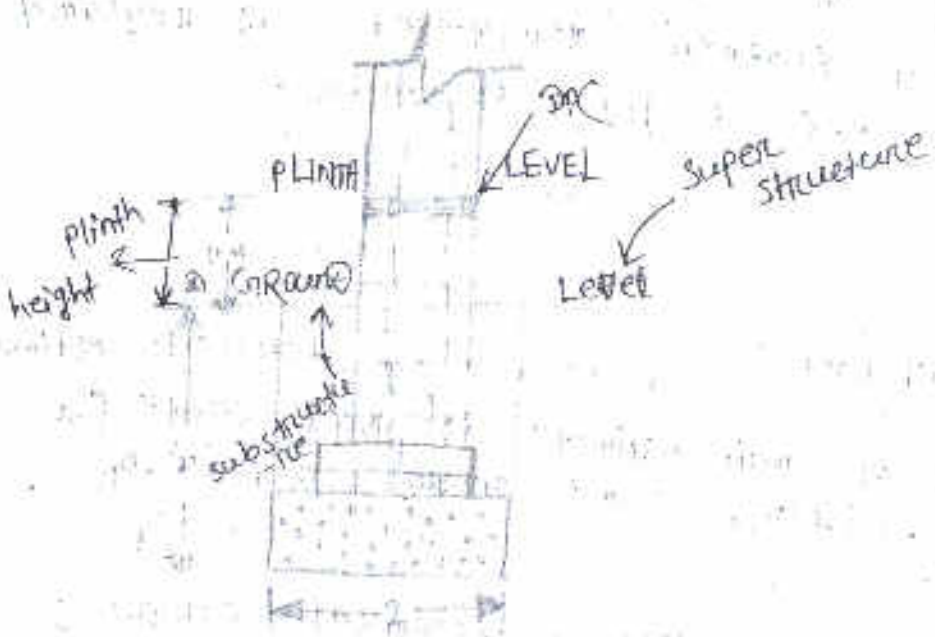
This is prepared on the basis of plinth area of a building

(ii) Cube rate method :-

It is prepared on the basic of cubical content of abuilding (Lengthx breathxheight)



(iii) Revised Estimate :-

It is a detailed estimate & It is prepared on the basis of cubical content of a building. for the revised quantities and rates of original rates & quantities.

It is required for following Reasons :-

(i) when a sanctioned estimate is likely to exceed more than 5%.

10 Sep 2020

(ii) when there are material deviation from original proposal.

(iii) when the expenditure of work exceeds or likely to exceed by more than .

NOTE :- When sanctioned estimate is more than the actual estimate, revised

Supplementary Estimate :-

xox

It is a detailed estimate and it is prepared when additional works are required to supplement the original work or when further development is required during the progress of work.

Annual maintenace :- It is also a detailed estimate & Some % of main estimate is kept aside for annual maintenace and annual repair of structure.

Contigency :- → it indicates incidental expenses of miscellaneous character which can't be classified under any item of estimate.

→ Generally 3-5% of estimated cost kept aside for contigency purpose.

Work - charge establishment :-

→ This amount is charged to work directly during the construction of a building or a project.

→ A certain number of work, supervision is required to be employed and their salaries paid from the amount of work charge establishment.

→ This services at terminated the expiry of sanction period of object.

→ It 1.5 to 2% of estimated cost.

Unit measurement :-

Plinth area - It is the total covered up area of a building.

- it is calculated by taking the external dimension of a building at the floor level excluding plinth offset if any.

Floor area :- In includes total area of floor in between when floor area = plinth area - area occupied by wall.

Circulation area :- The area which is used for movement of resident is known as Circulation area.

→ It includes corridors, entrance halls, staircase etc.

It is two types :- i) Horizontal circulation area

area used for horizontal movement of users

Ex :- Verandah,

(ii) vertical circulation area:-

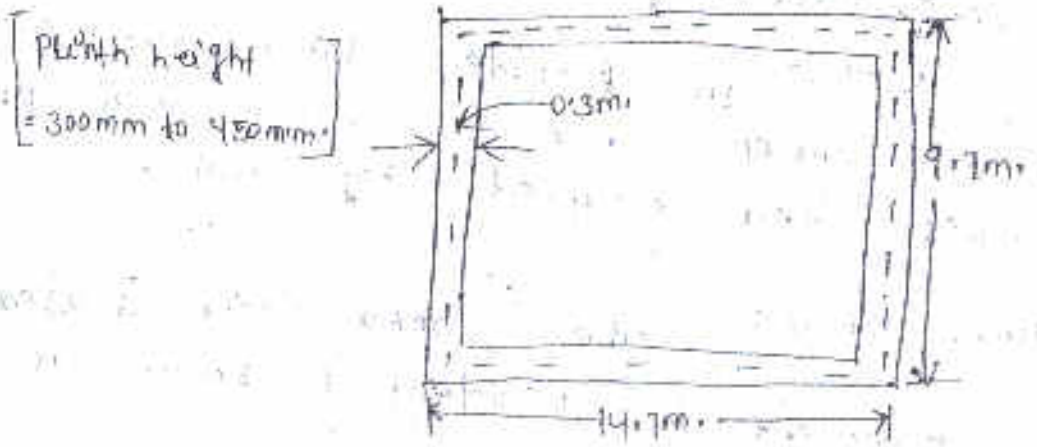
area used for vertical movement of users.

Ex :- Stair, Lift, Lift.

→ 4.5% of plinth area is consideres for vertical circulation area.

11 Sep 2020

1Q The plan of building is in the form of rectangle with center line dimension of out wall at 14.7m. x 9.7m. The thickness of wall in superstructure is 0.30m. what is the floor area of a building.



Length inside (Li) $= 14.7 - \frac{0.32}{2} - \frac{0.32}{2}$

$= 14.7 - 0.15 - 0.15$

$= 14.4m.$

breadth inside (bi) $= 9.7 - \frac{0.3}{2} - \frac{0.3}{2}$

$= 9.4m$.

Floor area $= 14.4 \times 9.4 = 135.36 m2$

Plinth area = (Length outside x breadth out side)

$= \left[14.7 + \frac{0.3}{2} + \frac{0.3}{2}\right] \times \left[9.7 + \frac{0.3}{2} + \frac{0.3}{2}\right]$

$= 15 \times 10 = 150 m^2$

12 sep 2020

unit Measurement

Description	unit
① Earthwork Excavation	m^3
② Rock Excava	m^3
③ Earth fill	m^3
④ Surface dressing	m^2
⑤ Soil Levelling	m^2
⑥ Quarrying Stones	m^3
⑦ Blasting of rocks	m^3
⑧ Cutting of tress	Nos.
⑨ Cement Concret	m^3
⑩ Reinforced cement concrete	m^3
⑪ Damp proof course	m^2
⑫ Brick masonary	m^3
⑬ Honey combed brickwork	m^2

(14) Reinforcement brickwork ——→ m3

(15) Brick edging ——→ m

(16) Steel Reinforcement ——→ kg / quintals

(17) Plastering ——→ m2

(18) painting ——→ m2

14 Sep 2020 : Monday 1st period

Degree of accuracy :-

——— xox ———

> It is observed in preparing an estimate depends upon the rate of item and unit payment

> Higher the rates, greater will be accuracy with which quantities can be calculated

> Generally dimesions should be measured to the nearest 1cm (0.01m), areas should be measured to the nearest 0.01m2 & cubic content should be nearest to 0.01m3 (1cum)

> Thickness of slabs, partitions etc. and sectional dimensions of columns, pillors, beam etc should be taken nearest to 0005 m. i.e half centimetre

Quantity Estimate of a building :-

——— xox ———

The estimation of a building quantities like earth work excavation foundation concrete, brickwork in plinth and superstructure etc can be don by following methods :-

(i) Long wall & short wall method

(ii) Centre line method

(iii) partly centre line & short wall method

(1) Long wall & short wall method :-

→ In this method, long wall of a room is considered as long wall and perpendicular to long wall is called short wall.

→ To get long wall & short wall first calculate centre line of individual wall.

→ Long wall can be calculated by adding half width of wall at each end to its centre line and short wall length can be calculated inside by deducting half width of wall each end.

→ These length are multiplied by breadth & depth to get quantities.

Long wall out-to-out

= centre to centre length + half breadth one side + half breadth an other side.

Short wall = centre to centre length - half breadth on one side - half breadth on other side.

16 Plan represent plan of superstructures & of a single room building 5m x 4m and section represent the cross section of wall with foundation estimate the quantities

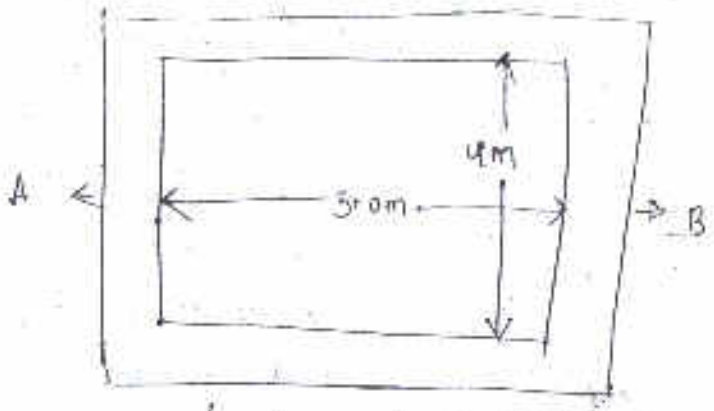
(i) Earth work in excavation in foundation.
(ii) brick work in foundation & plinth.
(iii) Concrete in foundation.
(iv) Brick work in superstructure

Sol

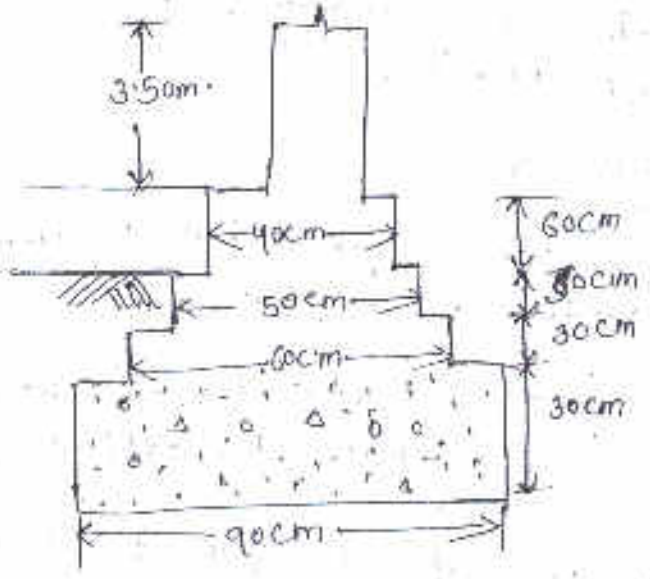
Long wall (c/c) = $5.0 + \frac{0.3}{2} + \frac{0.3}{2} = 5.3m$.

Short wall (c/c) = $4.0 + \frac{0.3}{2} + \frac{0.3}{2}$

= 4.3m.



(Plan of Supper structure wall)



30+30+30 = 90cm

(section on A-B)

Plan of second footing

Long wall $5.3 + \frac{0.4}{2} + \frac{0.4}{2} = 5.3 + 0.4 = 5.7m$.

short wall $= 4.3 - \frac{0.4}{2} - \frac{0.4}{2} = 4.3 - 0.4 = 3.9m$.

Plan of 1st footing

Long wall $= 5.3 + \frac{0.6}{2} + \frac{0.6}{2} = 5.3 + 0.6 = 5.9m$.

Short wall $= 4.3 - \frac{0.6}{2} - \frac{0.6}{2} = 4.3 - 0.6 = 3.7m$

Long wall Length out-to-out

xox

= Centre to ~~Centre~~ centre length + half breadth on one side + half breadth on other side.

Short wall length in-to-in = Centre to Centre length

xox

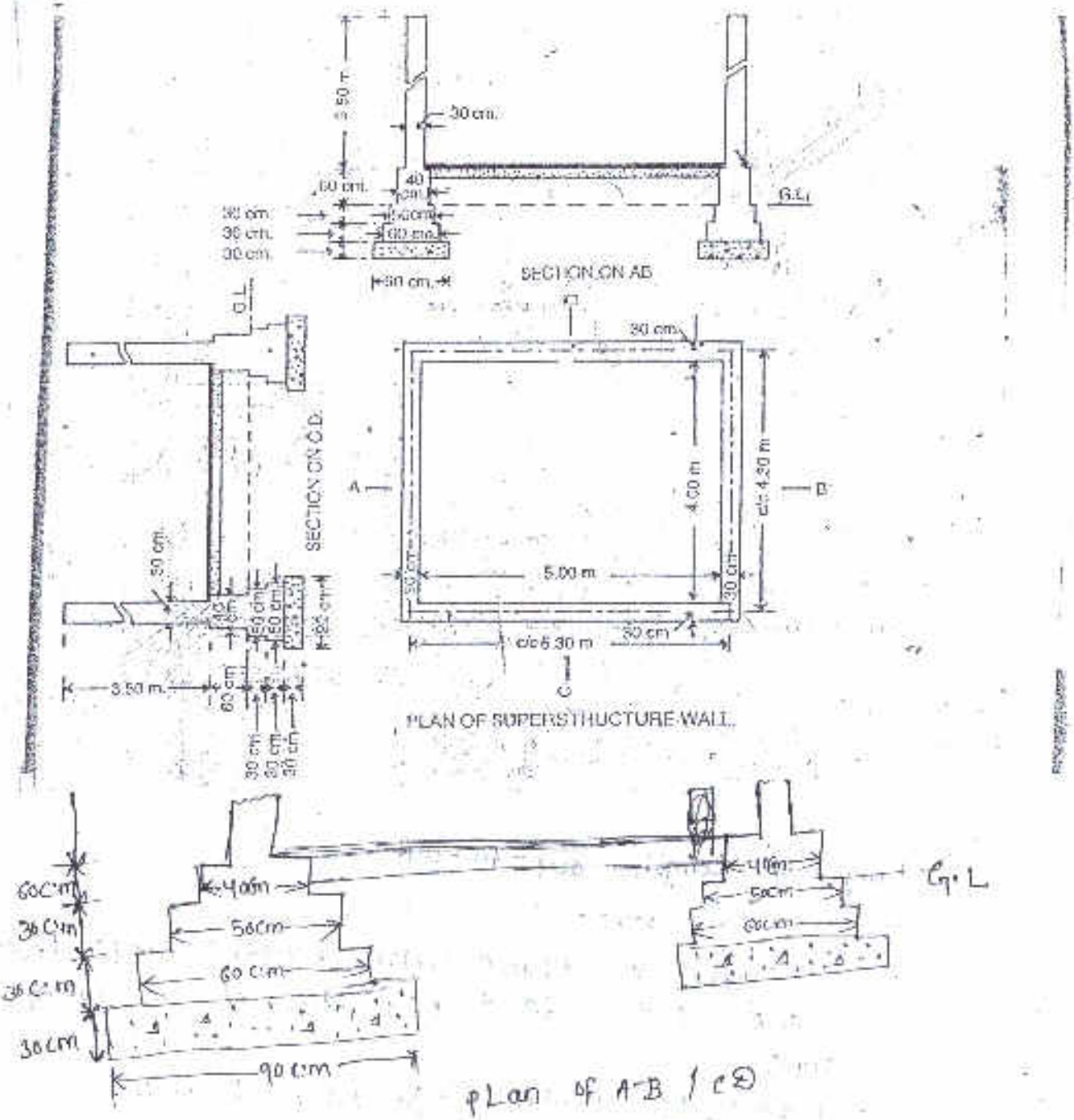
- one breadth.

Q1 Q- plan supersuts the plan of superstructure wall of a single room building 5m x 4m and section supersuts the cross-section of the wall with foundation. Estimate the quantities of

(i) Earthwork in excavation in foundation.

(ii) Concrete in foundation.

(iii) Brickwork in foundation & plinth



Soln:- Length of long wall center to centre

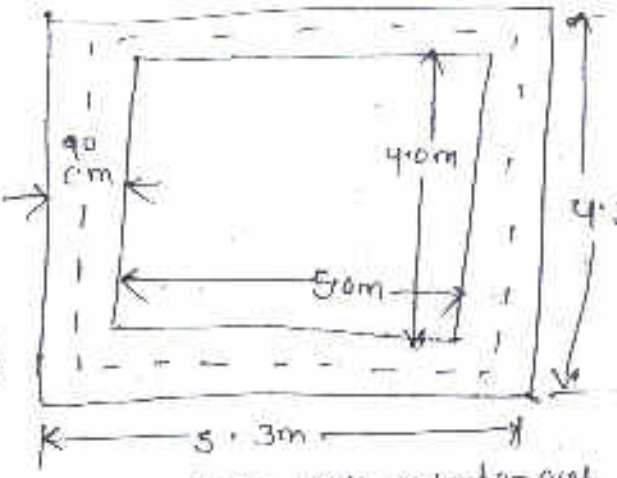
$$= 5.0 + \frac{0.3}{2} + \frac{0.3}{2} = 5.30\text{m}.$$

Length of short wall centre to centre

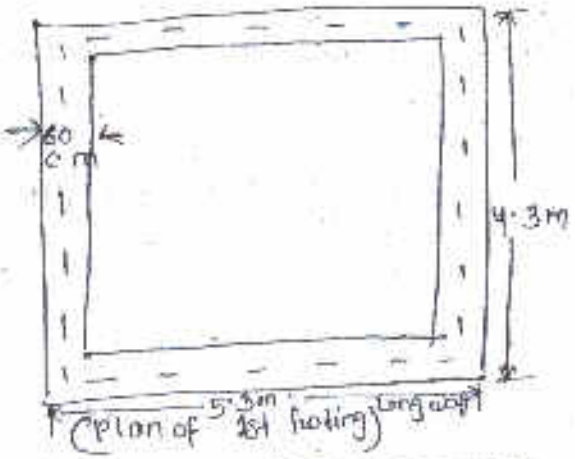
$$= 4.0 + \frac{0.3}{2} + \frac{0.3}{2} = 5.30\text{m}.$$

* To estimate the quantities ; the plan of foundation trench and foundation concrete , the plan of each footing or steps of the wall may be imagined by drawing .

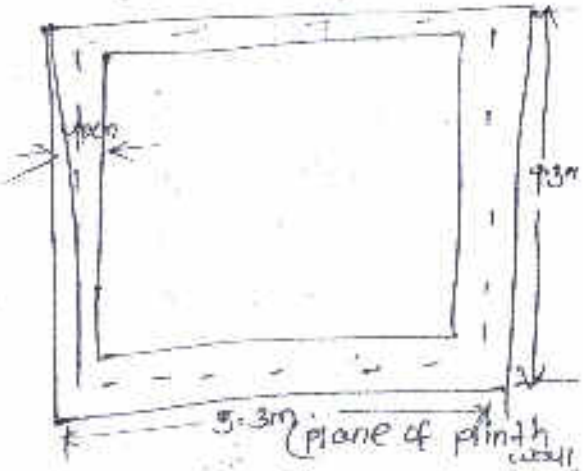
* When the long wall in-to-in and short wall in-to-in of each part may be dealt one by one .



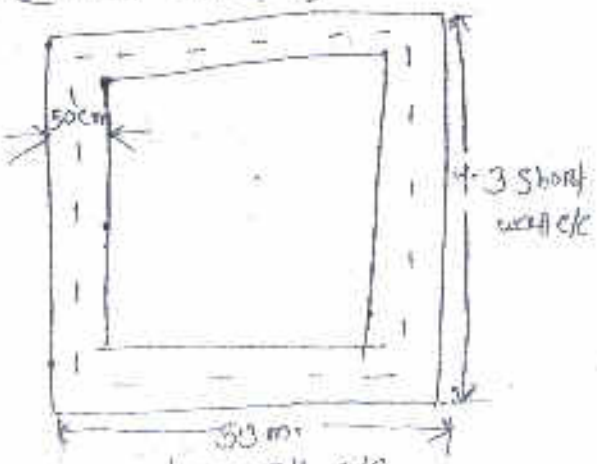
(plan of earthwork in excavation in foundation)



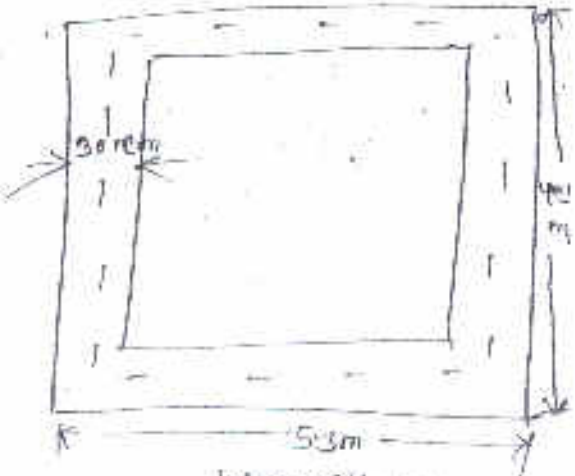
(plan of 1st footing)



(plane of plinth)



(plan of 2nd footing)



(plan of superstructure wall)

Details of measurement and calculation of quantities :-

Item no.	Particulars of item	NO	Length	Breadth	Height of depth	Quantity	Explanatory note.
1	Particular Earth work in excavation in foundation						
	Long walls	2	6.20m.	0.90m.	0.90m	10.04	5.3+0.9=6.2
	short walls	2	3.40m.	0.90m.	0.90m.	5.51	4.3-0.9=3.40
					Total	15.51 cum	
(2)	Concrete in foundation						
	long wall	2	6.20m	0.90m	0.3m	3.35	
	Short wall	2	3.40m	0.90m.	0.3m.	1.83	
					Total	6.18 cum	
(3)	Brick work in foundation & plinth						
	Long wall						
	1st footing	2	5.90m	0.60m.	0.30m	2.13m	5.3+0.6=5.9
	2nd footing	2	5.80m.	0.50m.	0.30m	1.74m.	5.3+0.5=5.8
	plinth wall	2	5.70m.	0.40m.	0.60m	2.74m.	5.3+0.4=5.7
	Short wall						
	1st footing	2	3.70m.	0.60m.	0.30m.	1.33m.	4.3-0.6=3.7
	2nd footing	2	3.80m.	0.50m.	0.30m	1.14m.	4.3-0.5=3.8
	plinth wall	2	3.90m.	0.40m.	0.60m	1.87m.	4.3-0.4=3.9
					total	10.96 cum	
(4)	Brickwork in super structure						
	Long wall	2	5.60m.	0.3	3.5m.	11.76	5.3+0.6= 5.60m.
	short wall	2	4.00m.	0.3	3.5m.	8.40	4.3-0.3 = 4.00m
					total	20.16 cum.	

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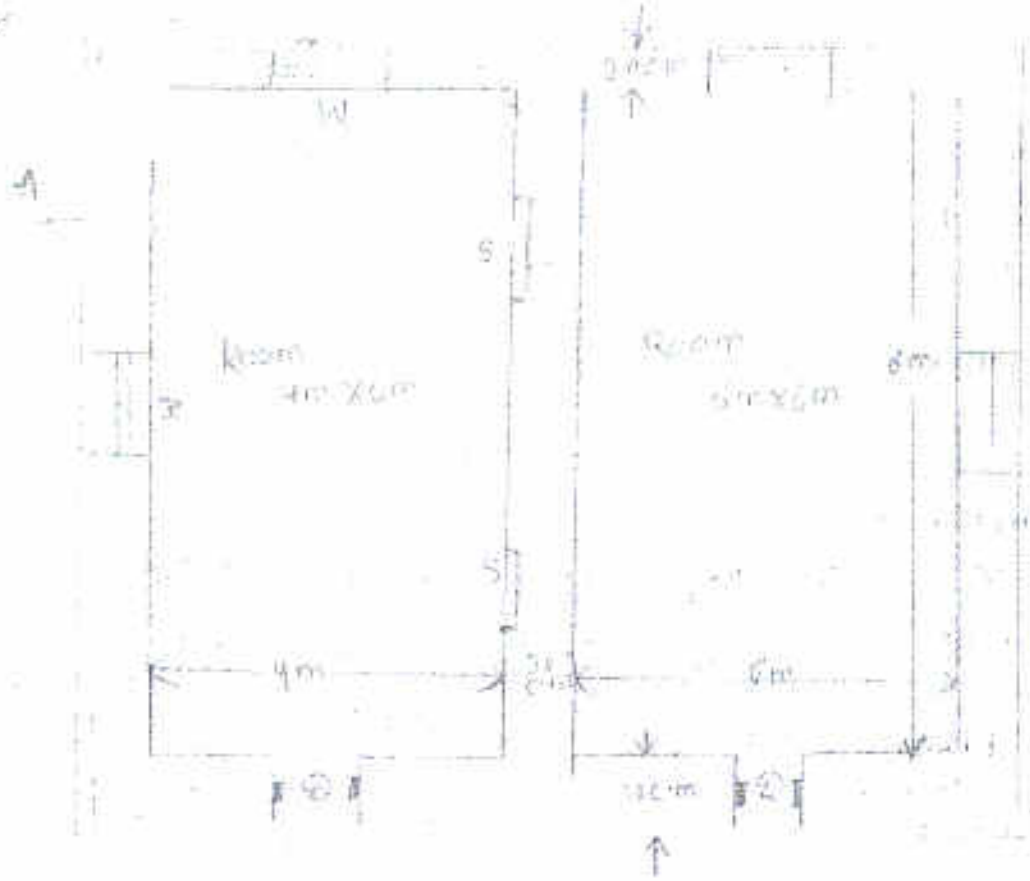
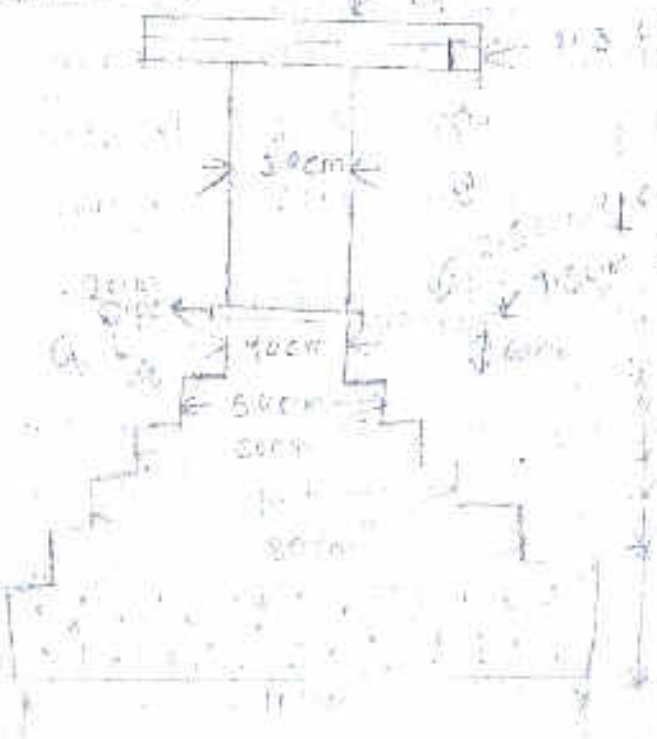
2nd Q



Lintels (over doors, windows and shoulders are 15cm thick R.B (Reinforced Brick) PLAN



Cross-section of wall on A-A

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(1)	Earth work in excavation					
	Long wall	2	11.70	1.10	1.00m	25.74cm
	Short wall	3	5.2	1.10	1.00m	17.16Cm
					Total	= 42.90Cm
(2)	Leme Concreate in foundation					
	Long wall	2	11.70	1.10	0.30m	7.722
	Short wall	3	5.25	1.10	0.30m	5.15
					Total	
(3)	1st class Brick ~~foundation~~ work in foundation & plinth					
	Long wall					
	1st footing	2	10.60 + 0.88 = 11.40	0.80	0.20	3.658 m3
				0.80	0.10	1.608 m3
	2nd footing	2	11.30	0.70	0.10	1.582m3
	3rd footing	2	11.20	0.60	0.10	1.34 m3
	4th footing	2	11.00	0.50	0.10	1.11m3
	plinth wall above footing	2	11.00	0.40	0.80	7.04 m3
						16.51m3
	Short wall					
	1st footing	3	6.3-0.8 = 5.5	0.8	0.2	2.65 cum
	2nd footing	3	6.3-0.7 = 5.6	0.7	0.1	1.17 cum
	3rd footing	3	5.7	0.6	0.1	1.03 cum
	4th footing	3	5.8	0.5	0.1	2.87 cum
	plinth wall above footing	3	5.96	0.4	0.8	5.66 cum
					Total	11.38 cum + 16.15 cum
						= 26.10 cum

22 sept 2020

S/No	Particulars of item	No	Length	Breadth	Height	Quantity
(1)	1st class Brick in lime mortar in superstructure		10.60 + 0.30 =	0.3	4.2	27.47 cum
	Long wall	2	10.90m			
	Short wall	3	6.3 - 0.3 = 6.0m	0.3	4.2	22.68 cum
						50.15
	Deduct					
	Door opening	2	1.20	0.30	2.10	1.51 cum
	window opening	4	1.00	0.30	1.5m	1.80 cum
	Shelves	2	1.00	0.20m	1.5m	0.60 cum
	Lintels over Doors	2	1.50	0.3	0.15	0.13 cum
	Lintels over windows	4	1.30	0.3	0.15	0.23 cum
	Lintels over Shelves	2	1.30	0.3	0.15	0.12 cum
					Total deduction =	4.40 cum
					net quantity = 50.15 - 4.40 cum	
					= 45.75 cum	
(5)	Damp proof Course (m^2)		Same as Brick work in plinth			
	25 cm thick cement Concrete		11.00	0.40	-	8.80m^2
	Long wall	2	5.90	0.40	-	7.08m^3
	Short wall	3			Total s =	15.88m^3
	deduct Door Sill	2	1.20	0.45	Total =	0.96
					net quantity =	14.92m^2

Damp proof course :- (D.P.C)

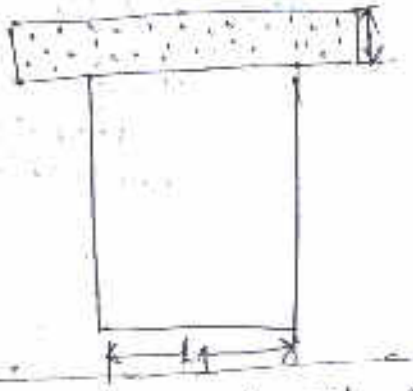
> D.P.C usually 2.5cm thick rich cement concrete 1:1,5:3 or 2cm thick rich cement mortar 1:2 mixed with standard water proofing material is provided at the plinth level to full width of plinth wall.

> The quantities of D.P.C is calculated in square metre (m^2) i.e (L×b)

> If dimension of bearing is not given then the bearing may be taken same as thickness of lintel with a minimum of 12 cm.

> Quantity of lintels = L×t×thickness of wall

deductions = L×t×thickness of wall



Length of lintel =

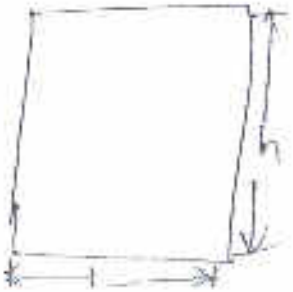
$L = l_1 + 2t$

> usually D.P.C is not provided at the sills of doors and ventilation openings for which deductions are made.

Deductions for openings ; bearings is masonary

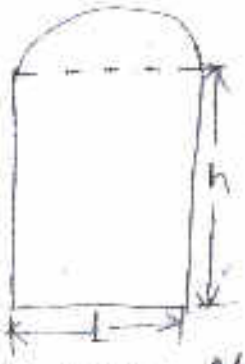
xox ——— xox

(1) Rectangular openings :-



deductions = l×h×thickness of wall

(2)



Doors and windows with small segmental arches deductions = L x h x thickness of wall.

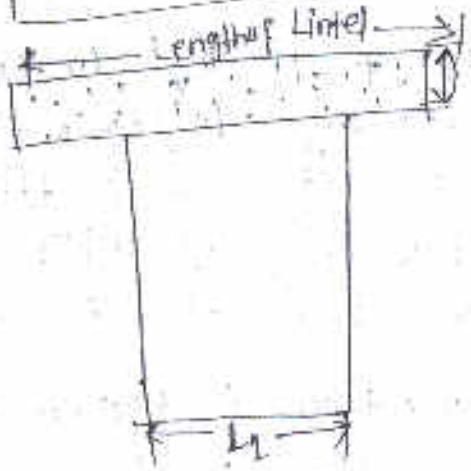
(3) Lintels over opening :- Lintels are either of R.C.C (Rain forced Cement Concreate) or of R.B (Reinforced brick) and the quantities are claculated in cum (m^3)

Length of lentels = span + 2x bearings

=> If dimension of bearing is not given then the bearing may be taken same as thickness of lentel with a minimum of 12 c.m

=> Quantity of lentals = L x t x thickness of wall

deductions = L x t x thickness of wall



Length of lentel = $l = l_1 + 2t$

23 sep 2020

R.C.C & R.B work :- R.C.C and R.B work may be in roof, or floor slab, in beams, lentels, columns, foundations etc and the quantities are calculated in cum, or m^3

→ Length, breadth, thickness are found correctly from the plan, elevation and section or from the detailed drawing.

→ Bearings are correctly added to clean span to get dimensions.

Flooring & Roofing :-

(i) Ground Floor :-

→ The base lime concrete and floor finishing of cement (C.C) or stone or marble or mosaic etc. are taken as one item and the quantity is calculated in square metre (m^2) :- i.e (L x b)

→ The Length and breadth are measured as inside dimensions from wall to wall of superstructure.

Both the work of base or floor finishing are paid under one item.

(ii) 1st floor, 2nd floor etc :-

→ Supporting structure is separately in cu.m and the lime concrete terracing is computed in sq metre as R.C.C, RB etc. and the floor finishing is taken separetly in sq. metre as 25cm or 40mm C.C, or marble, mosaic etc.

(iii) Roof :-

Supporting structure is taken separatly in cu.m and the lime concrete terracing is computed in sq. metre with thickness specified under a separate item including surface rendering smooth.

→ The computed thickness of lime concrete terracing is 7.5 cm to 12 cm average

→ Lime concrete terracing may also be calculated in cu m with average thickness.

⇒ The bearing of roof or floor slab is given as the thickness of slab usually 10 c.m to 15 c.m.

Floor of door sills and sills of opening :-

It should be taken into account in case of ground floor sills should be taken separately as there is no lime concrete in sills.

24 sep 2020

Plastering :- plastering usually 12m.m. thick is calculated in square metre.

⇒ For walls the measurement are taken for the whole face of wall on both sides as solid and the deductions for openings are made in following ways:-

(i) No deductions is made for ends of beam, posts, rafters etc.

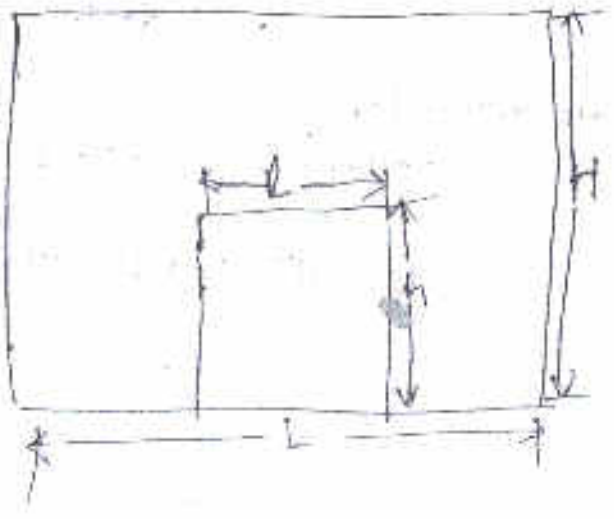
(ii) For small openings up to 0.5 sq metre no deduction is made.

(iii) For openings exceeding 0.5 sq metre but not exceeding 3 sq metre deductions is made for one face only

-> For openings above 3 sq metre, de ductions is made for both sides.

inside plastering = L x H

outside plastering (L x H) - l x h



⇒ The bearing of roof or floor slab is given as the thickness of slab, usually 10 c.m to 15 c.m.

Floor of door sills and sills of opening :-

It should be taken into account in case of ground floor sills should be taken seperately as there is no RMC concrete in sills.

24 sep 2020

Plastering :- plastering usually 12 m.m. thick is calculated in square metre.

⇒ For walls the measurement are taken for the whole face of wall on both sides as added and the deductions for openings are made in following ways :-

(i) No deductions is made for ends of beam, posts, rafters etc.

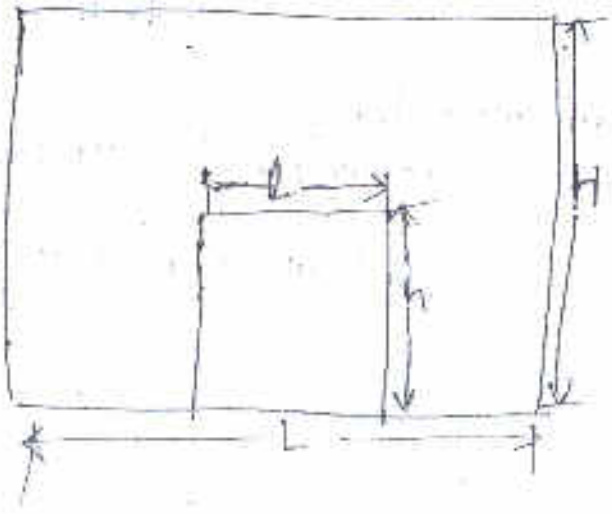
(ii) For small openings upto 0.5 sq metre no deduction is made.

(iii) For openings exceeding 0.5 sq metre but not exceeding 3 sq metre deductions is made for one face only.

⇒ For openings above 3 sq metre, de ductions is made for both sides.

inside plastering = L x H

outside plastering (L x H) = 0 x h



Pointing

pointing in walls is calculated in Square metre for whole surface and deductions is similar to plastering are made.

25 sep 2020

Q. Estimate the quantities of following items of a residential building.

(i) Earth work in excavation in foundation

(ii) ~~First class brick work~~ in ~~excavation in foundation~~ Lime concrete in foundation

(iii) First class brick work in 1:6 cement sand mortar in foundation & plinth.

(iv) 2.5 c.m damp

(v) 1st class brick work in Lime mortar in superstructure.

Soln Considering left hand side bed room Combined

c/c long wall $6 + 0.30 + \frac{0.30}{2} + \frac{0.30}{2}$

$= 10.60m$

Short wall

centre to centre length $= 6 + \frac{0.30}{2} + \frac{0.30}{2}$

$= 6.3m.$

Front Verandah

c/c length $= 5 + 4 + 2 \times 0.3 + \frac{0.3}{2} + \frac{0.2}{2} = 9.65m$

side wall c/c length $= 2 + \frac{0.3}{2} + \frac{0.3}{2}$

$= 2.25m.$

Back verandah including bathroom :-

c/c Long wall (rear wall including bath room) 9.65 m. as front verandah wall. etc.

c/c Length of side wall of bath room = $2.50 + \frac{0.30}{2} + \frac{0.2}{2}$

= 2.75 m.

Soln Drawing and left hand side bedroom Combined

c/c long walls = 6.00 + 4.00 + 0.30 + 0.15 + 0.15

= 10.60m.

c/c short walls = 5.00 + 2x0.15 = 5.30m.

Bed room right side (both combined)

c/c long walls = 5.00 + 4.00 + 0.30 + 0.15 + 0.15 = 9.60m.

c/c short walls = 4.50 + 2x0.15 = 4.80m.

Front verandah

c/c long wall = 0.15 + 5 + 0.3 + 4.00 + 0.15 + 0.05 = 9.65m.

side wall c/c = $2.00 + \frac{0.3}{2} + \frac{0.2}{2}$ = 2.25m.

Back verandah

c/c long wall = 9.65m.

c/c side wall of bath room = $2.50 + \frac{0.3}{2} + \frac{0.2}{2}$ = 2.75m.

(0.15 - 0.10) = 0.05

Details of measurement and calculation of Quantities

SL NO	Particulars items	Sl no	Length	Breath	Height of depth	Quantity	Explanatory note
(1)	Earthwork in excavation in foundation Drawing room and left bed room						
	Long walls	2	11.56	0.90	1.00m	$20.76m^3$	L = 10.60 + 0.9 = 11.50m.
	Short walls	3	4.40m	0.90	1.00	$11.88m^3$	L = 5.36 - 0.96 = 4.40m.
	Bed room right side (bath).						
	Long wall	2	9.60	0.90	1.00	17.28	$L = 9.60 - \frac{0.9}{2} + \frac{0.9}{2}$ = 9.66m
	Short wall	2	3.90	0.90	1.00	7.02	L = 4.80 - 0.9 = 3.9m.
	Front verandah						
	Front L.W	1	9.50	0.60	0.50	2.85	$L = 9.65 - \frac{0.9}{2} + \frac{0.9}{2}$ = 9.50m.
	Side S.W	1	1.50	0.60	0.50	0.45	$L = 2.25 - \frac{0.9}{2} - \frac{0.9}{2}$ = 1.50m
	Back verandah including bath room.						
	Long wall (Rear wall including bath room)	1	9.50	0.60	0.50	2.85	$L = 9.65 - \frac{0.9}{2} + \frac{0.9}{2}$ = 9.50
	(Remaining walls of bath room)	2	2.00 m	0.60m.	0.50m	1.20m	$L = 2.75 - \frac{0.9}{2} - \frac{0.9}{2}$ = 2.00m.
					Total =	64.23 Cum	
(2)	Lime Concrete in foundation Drawing and left bed room						Length same as earthwork in excavation
	Long wall	2	11.50	0.90	0.30	6.21	
	Short wall	3	4.40	0.90	0.30	3.56	

Bed room right side (both)						Length same as earth work in excavation.
Long wall	2	9.60	0.90	0.30	5.18	
Short wall	2	3.90	0.90	0.30	2.11	
front verandah						L = 9.65 - 0.5/2 + 0.6/2 = 9.70
front long wall	1	9.10 m.	0.60	0.20	1.16	L = 2.25 - 0.5/2 - 0.6/2 = 1.70m.
side short wall	1	1.10	0.60	0.20	0.20	
Back verandah including bath room & store- Long wall including bath room	1	9.70	0.60	0.20	1.16	L = 9.65 - 0.50/2 + 0.60/2 = 9.70
short wall (Remaining walls of bath room)	2	2.20	0.60	0.20	0.53	L = 2.75 - 0.50/2 - 0.60/2 = 2.20 m.
				Total =	20.11 Cum	
(5) 1st class brick work in foundation and plinth 1:6 cement mortar as per drawing & left bed room long walls						
1st footing	2	11.20	0.60	0.20	2.69	L = 10.60 + 0.60 = 11.20m.
2nd footing	2	11.10	0.50	0.20	2.22	10.60 + 0.50 = 11.10 m
Plinth wall above footing	2	11.0	0.40	0.90	7.92	L = 10.65 + 0.40 = 11.00
short wall						
1st footing	3	4.70	0.60	0.20	1.69	L = 5.30 - 0.60 = 4.70m.
2nd footing	3	4.80	0.50	0.20	1.44	L = 5.30 - 0.5 = 4.80 m.
plinth wall above footing	3	4.90	0.40	0.40	5.29	L = 5.30 - 0.4 = 4.90m.
Bed rooms right side (both) long walls						
			0.60	0.20	2.31	L = 9.60 - 0.6/2 + 0.6 = 9.60

2nd footing	3	9.50	0.50	0.20	1.92	L = 9.60 - 0.5 + 0.4 / 2 = 9.5m
plinth wall above footing	2	9.40	0.40	0.90	6.95	L = 9.6 - 0.4 + 0.4 / 2 = 9.5m
Short walls						
1st footing	2	4.20m	0.60m	0.20m	1.01	L = 4.80 - 0.60 = 4.20m
2nd footing	2	4.30	0.50	0.20	0.86	L = 4.20 + 2 x 0.05 = 4.30m
plinth wall above footing	2	4.40	0.40	0.90	3.17	L = 4.30 + 0.10 = 4.40m
Front verandah						
Front wall footing	1	9.65	0.40	0.20	0.77	L = 9.65 - 0.40/2 + 0.40/2 = 9.65m
plint wall above footing	1	9.60	0.30	0.70	2.02	L = 9.65 - 0.40/2 + 0.40/2 = 9.60m
Side short wall footing	1	1.85	0.40	0.20	0.15	L = 2.25 - 0.4/2 - 0.4/2 = 1.85m
plinth wall above footing	1	1.90	0.30	0.70	0.40	L = 2.25 - 0.4/2 - 0.4/2 = 1.90m.
Back verandah including bath room long wall footing	1	9.65	0.40	0.20	0.77	Length same as for front verandah Long wall
Plinth wall above footing	1	9.60	0.30	0.70	2.02	
Short walls (cross retaining walls of bath footing	2	3.35m	0.40m	0.20	0.38	L = 2.75 - 0.4/2 - 0.4/2 = 2.35m.
Plinth wall above footing	2	2.40m	0.30	0.70	1.01	L = 2.75 - 0.40/2 - 0.3/2 = 2.40m
				Total =	94.45 Cum	

Deduct					
Doors openings					
D_1	6	1·20	0·30	2·10	4·54
D_2	2	1·00	0·30	2·00	1·20
D_3	1	0·15	0·20	1·80	0·27
Window opening					
W_1	11	1·00	0·30	1·50	4·95
W_2	1	2·00	0·30	1·50	0·90
W_3	2	0·75	0·20	1·20	0·36
Clerestory window					
C·W openings	18	0·75	0·30	0·60	2·43
Shelves openings	5	1·00	0·20	1·50	1·50 — Back of shelves to 1m thick wall.
Front verandah					
opening in between pillars	1	8·40	0·20	2·40	4·03 — 9·60 - 3x0·40 = 8·40m.
opening side	1	2·00	0·20	2·40	0·96
Back verandah openings	1	6·80	0·20	2·40	3·26 — L = 9·60 - 2·40 - 0·40 = 6·80m
Lintels					
Over Doors					
D_1	6	(1·2703) 1·50 (17 0·3)	0·30	0·15	0·405 — Bearing 150·m
D_2	2	1·30	0·30	0·15	0·117 — Bearing 150·m
D_3	1	0·95	0·20	0·15	0·029 — Bearing 150·m
over Windows					
W_1	11	1·30	0·30	0·15	0·644 — Bearing 150·m
W_2	1	2·30	0·30	0·15	0·103 — Bearing 150·m
W_3	2	0·95	0·20	0·15	0·056 — Bearing 150·m

Over clerestory window						
Over C.W	18	0.95	0.30	0.15	0.770	Bearing 10cm
Over Shelves	5	1.30	0.30	0.15	0.293	Bearing 15cm
Verandah Wall						
front	1	9.75	0.20	0.15	0.293	L = 9.60 + 0.15 = 9.75m
side	1	3.15	0.20	0.15	0.065	L = 3.00 + 0.15 = 3.15m
Back	1	7.50	0.20	0.15	0.225	L = 9.60 - 2.40 - 2×0.15 = 7.50
				Total =	27.401 Cum	
				Net Total =	66.59 Cum	
(5) 2.50m Damp proof course						
Drawing and Left bed rooms						
long walls	2	11.00	0.40	-	8.80	L same as plinth wall
short walls	3	4.90	0.40	-	5.88	L same as plinth wall
Bed rooms Innerside						
long walls	2	9.60	0.40	-	7.68	L same as plinth wall
Short walls	2	4.40	0.40	-	3.52	L same as plinth wall
verandah pillars	4	0.50m	0.30	-	0.60	Sum of several sides
Bath Room						
Rear wall	1	2.50m	0.30	-	0.75	L = 2.20 + 2×0.15 = 2.60m
Side and later walls	2	2.40m	0.30	-	1.44	
				Total =	28.67 Sum	

Deduct

Door sills	D_1	6	1.20	0.40	= 2.88
Door sills	D_2	2	1.00	0.40	= 0.80
Door sills	D_3	1	0.75	0.30	= 0.23

Total deduction = $3.91\ m^2$

net total = $24.76\ m^2$/sqm

5 oct 2021

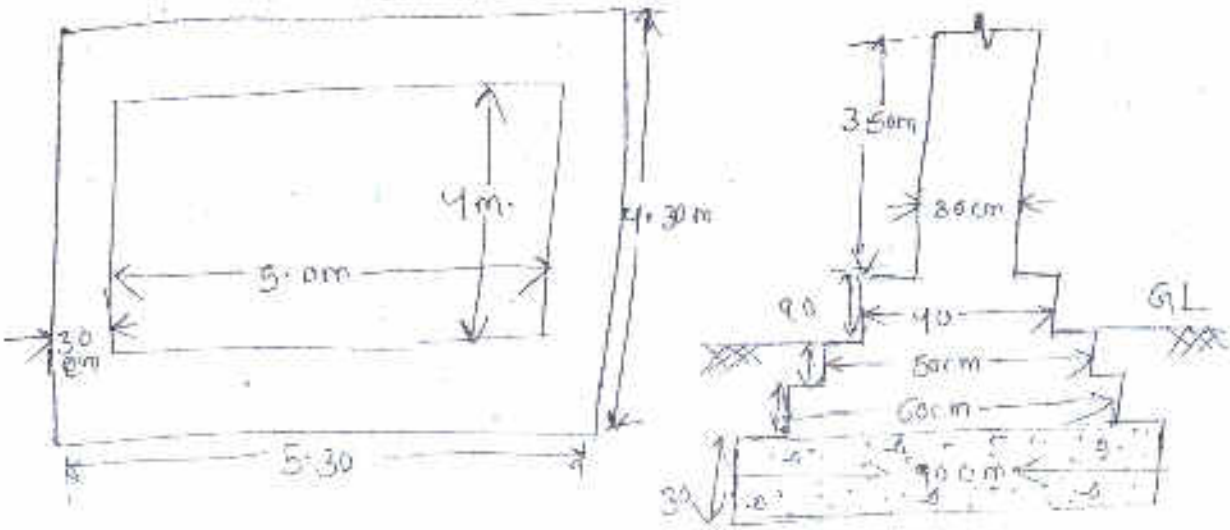
12 Estimate by centre line method the quantities of following item of a single room building

(i) Earth work in excavation in foundation

(ii) Concrete in foundation

(iii) Brickwork in foundation & plinth

(iv) Brick work in superstructure.



Soln Total Centre length of walls AB + BC + CD + DA

= 5.30 + 4.30 + 5.30 + 4.30

= 19.20m

Item NO	Particulars of item	nos	Length	breath	height	Quantity
(1)	Earth work in excavation in foundation	1	19.20	0.9	0.90m	15.55 cum
(2)	Concrete in foundation	1	19.20	0.9	0.3m	5.18 cum
(3)	Brick work in foundation & plinth					
	1st footing	1	19.20	0.6	0.3m	3.46 cum
	2nd footing	1	19.20	0.5	0.3m	2.88 cum
	plinth wall	1	19.20	0.4	0.6	4.61 cum
(4)	Brick work in superstructure	1	19.20	0.3	3.50	20.16 cum
					Total =	51.84 cum

NOTE — If door, window openings, lentels etc is given then that are calculated by depending from total quantity.

Q2 Estimate by the centre line method the quantities of following item of a single room building.

(1) Earth work in excavation in foundation

(2) Concrete in foundation

(3) Brick work in foundation & Plinth

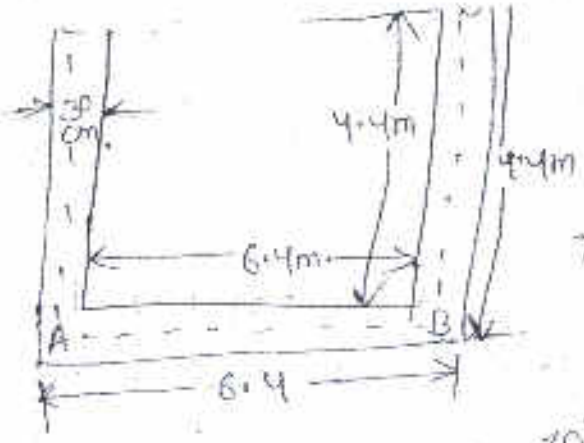
(4) Brick work in superstructure

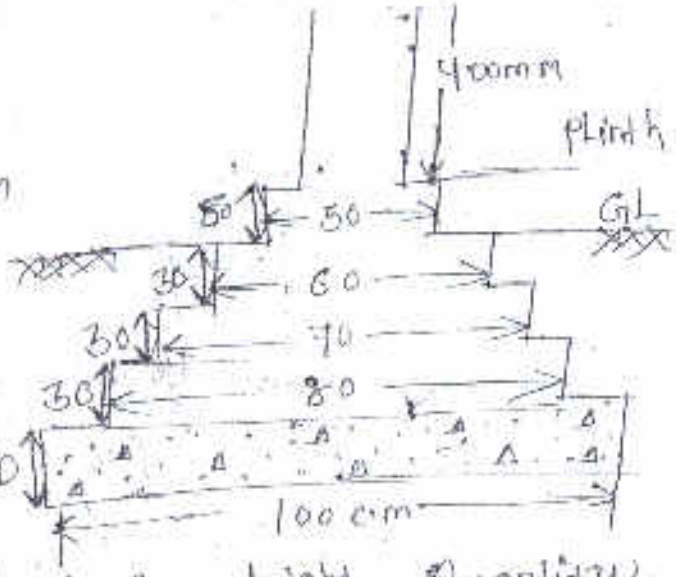
(b) Centre line method

Centre to Centre line method is one of method for preparing an estimate.

(i) In this method first calculate the Construction line length of the wall and then multiply with breadth and depth of wall to fixed the quantity.

(ii) Centre to Centre line method is suitable for rectangular, circular, (polygonal hexagonal, octagonal) building having no inter walls or cross walls. (The wall is an interior dividing wall of a building).





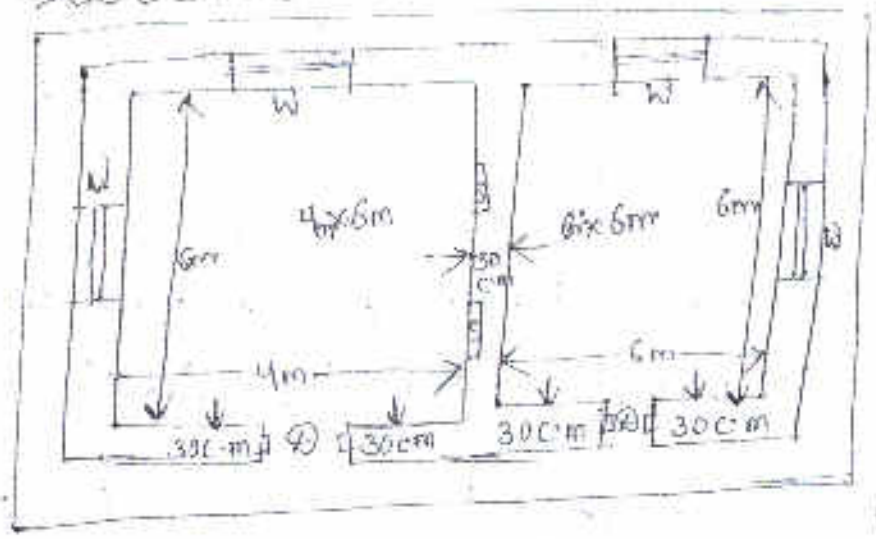
Item no	particulars of item	nos	Length	breath	height	Quantity
(i)	Earth work in excavation in foundation	1	21.60	1m	120cm =1.20m	25.92 m^3
(ii)	Concrete in foundation	1	21.60	1m	0.3	6.48 m^3
(iii)	Brick work in foundation and plinth 1st footing	1	21.60	0.8m	0.3	5.18 m^3
	2nd footing	1	23.00	0.7m	0.3	4.53 m^3

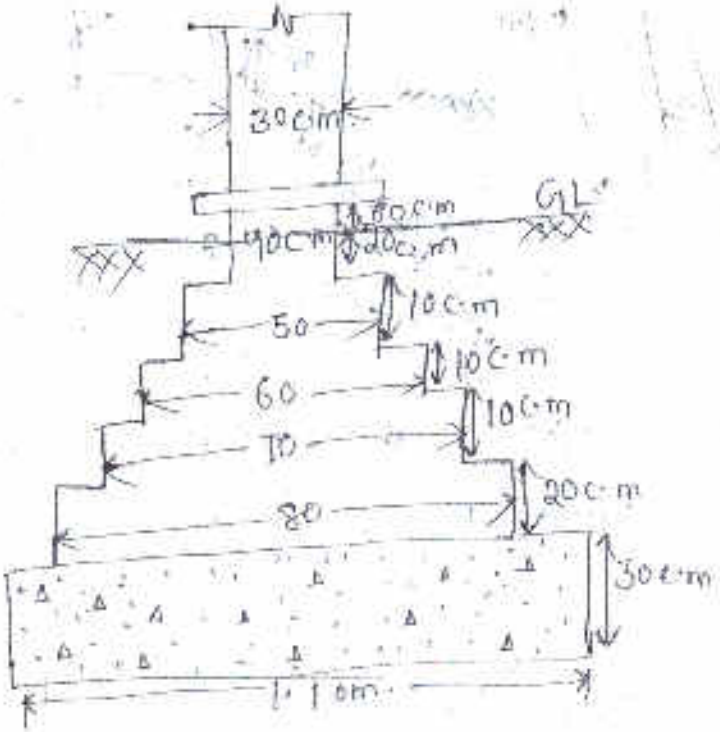
3rd floor plinth wall	1	21.60	0.6m	0.3m	3.88m³
	1	21.60	0.5m	0.5m	5.40m
					18.99m³
					34.56 cum

(4) Brick work in Superstructure

8 OCT 2020

Q2





Total center length of wall = ~~10.6m + 6.3 + 10.6 + 6.3~~

= ~~33.8 m~~

10.66 + 6.30 + 10.60 + 6.30 + 6.30

= 40.10m

(or)

= 2 x c/c of long wall + 3 x c/c of short wall

= 2 x 10.60 + 3 x 6.30 =

40.10 m

$40.10 - \left[2 \times \frac{1.10}{2}\right] = 39$

Sl no	Particulars items	Sl no	Length	breath	height	quantity
(1)	Earth work in excavation in foundation	1	39.00	1.10 m	1m	42.9 Cum
			39.00	1.10 m	0.3 m	12.87 Cum
(2)	Lime concrete in foundation	1	39.00	1.10 m		
(3)	1st class brick work in foundation & plinth		42.10 - 2 × 0.80/2 = 39.30			
	1st footing	1	39.30	0.80	0.20	6.29 Cum
	2nd footing	1	39.40	0.70	0.10	2.76 Cum
	3rd footing	1	39.50	0.60	0.10	2.37 Cum
	4th footing	1	39.60	0.50	0.10	1.98 Cum
	plinth wall in above footing	1	39.70	0.40	0.80	12.70 Cum
					Total =	26.10 Cum
		1	39.80	0.3	4.2	50.15 Cum
(4)	1st class brick work in Rcc in superstructure					
	Deduction					
	Door	2	1.20	0.3	2.10	1.52 Cum
	window	4	1.00	0.30	1.50	1.80 Cum
	Shelves	2	1.00	0.20	1.50	0.60 Cum
	Lintels over Shelves	2	1.50	0.3	0.15	0.14 Cum
	Lintels over Door	4	1.30	0.3	0.15	0.23 Cum
	Lintels over shelves	4	1.30	0.3	0.15	0.23 Cum

@Damp Proof:

Concrete (m^3)

25 cm thick

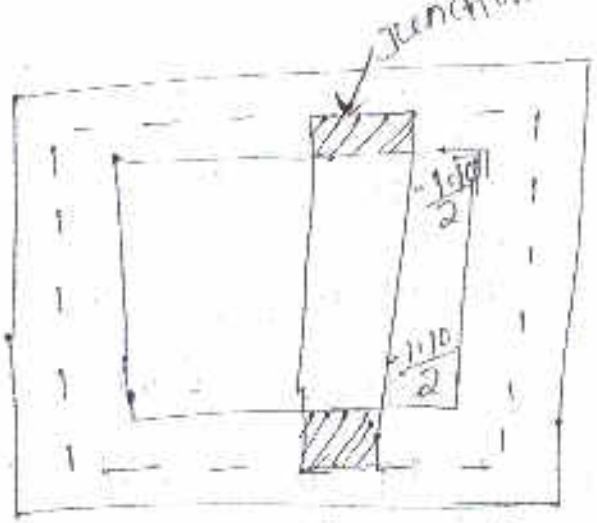
Cement Concrete

$40.10 - 2 \times \frac{0.4}{2}$

$= 40.10 - 0.4 = 39.70m$.

	1	39.70m.	0.4cm.	—	15.88 m^2
@reduct door sill	2	1.20	0.40	—	0.96 cum

Net quantity 14.92



$40.10 - \left[2 \times \frac{1.10}{2}\right] = 39.00$

c/c length method

Total centre length of all 30 cm wall =
total centre length of drawing & left side bed room + total center length of right side bed room.

Total centre length of left drawing & bed room

= [No of long wall + c/c length of long wall + no of short wall + c/c length of sidewall]

= ~~2+1+6+~~ $(2 \times 10.60 + 3 \times 5.30) = 37.10$

Total centre length of right side bedroom

= [no of long wall x c/c length of long wall + no of short wall + c/c length of short] ~~cancel~~.

$= (2 \times 9.60 + 2 \times 4.80)$

$= 28.80m$

$37.10 + 28.80 = 65.90m$.

Total centre length of all 20cm wall of front verandah, back verandah and bath room.

= (c/c length of front wall + c/c length of side wall)

+ (c/c length of back verandah long wall including bath room + No of short wall x c/c length of Cross walls of bath room)

$= (9.65 + 2.25) + (9.65 + 2 \times 2.75)$

$= 27.05m$.

~~No of~~ Number of Junction are '6' with main wall of 50 c.m sign (x)

number of Junction with wall 20 c.m as '5' junction (+) with main wall & 1 Junction with 20 c.m wall (-) (sign)

12-10-2020

item no	Particulars of item	no	Length	breadth	height of depth	Quantity
(1)	Earthwork in excavation in foundation					
	wall of main room (6 junction)	1	63.20m	0.90m	1mt	$56.88m^3$
	wall of verandah including bath room (5 Junction)	1	24.50	0.6mt	0.5m.	$7.35m^3$

(2)	Lime concrete in foundation				
	wall of main room (6 junction)	1	63.20m.	0.9m.	0.30m.	17.06m^2
	wall of verandah including bathroom	1	25.50m.	0.5m.	0.20m.	3.06m^3
(3)	1st class brick work in foundation and plinth 1:6 Cement mortar wall of main room (8) junction.				
	1st footing	1	64.10m.	0.6m.	0.20m.	7.69m^3
	2nd footing	1	64.40m	0.40m.	0.20m.	6.44m^3
	plinth wall above footing	1	64.70m	0.40m.	0.90m.	23.29m^3
	wall of verandah including bath room.				
	1st footing	1	25.85m.	0.4m	0.2m	2.07m^3
	plinth wall above footing	1	25.90m.	0.30m	0.70m	5.44m^3
(4)	2.5 c.m & p.c main wall verandah	1	64.70m.	0.40m.	—	25.88m^2
	pillars	4	0.6m.	0.3m.	—	0.72m^2
	Bath room	1	7.30m	0.3m.	—	2.19m^2
						28.60m^2
13-10-2020	Deductions					
	Door sill @1	6	1.20	0.4m.	—	2.88m^2
	Door sill @2	2	1.00	0.4m	—	0.80m^2

Door sill D_3	1	0.75	0.30	-	$0.23\ m^2$
				Total deduction =	$3.91\ m^2$
				Net total =	$24.69\ m^2$
(5) 1st class brick work in superstructure in lime mortar walls of main room	1	65.00 m.	0.3 m.	4.00 m.	$78.00\ m^3$
wall of verandah and bath room	1	26.20m.	0.2m.	4.00m.	$20.96\ m^3$
deduct opening and lintels over Door.					
D_1	6	1.50m.	0.30m.	0.15m.	$0.405m^3$
D_2	2	1.30m.	0.30m.	0.15m.	$0.117m^3$
D_3	1	0.95m.	0.20m.	0.15m.	$0.029m^3$
over windows					
W_1	11	1.30m.	0.3m.	0.15m.	$0.644m^3$
W_2	1	2.30m.	0.3m.	0.15m.	$0.103m^3$
W_3	2	0.95m.	0.2m.	0.15m.	$0.057m^3$
over three storey wall over C.W over sheaves	18	0.95m	0.30m	0.15m.	$0.770m^3$
	5	1.30m	0.30m	0.15m.	$0.293m^3$
verandah lintels front	1	9.15m.	0.20m.	0.15m	$0.293m^3$
side	1	2.15m	0.20m	0.15m.	$0.065m^3$

Back 1 7.50m · 0.30m · 0.15m · $0.225m^3$

Total = $27.40m^3$

Net total = $65.59 m^3$

Estimate the quantity by following questions:-

① Foundation & plinth first class brickwork in 1:6 cement mortar and local sand mortar over lime concrete.

② D.P.C = 25 cm thick with 1:2:4 cement concrete.

③ Superstructure masonary work first class brick work in 1:6 Cement mortar.

④ Roof, slab and lentels Reinforced brick work in roof and 1:2:4 R.C.C in lintels.

⑤ Flooring → 2.5 cm thick 1:2:4 cement Concrete over 15 cm thick lime Concrete.

⑥ Inside wall plastering - 15m. thick 1:6 cement sand plastering

⑦ ceiling plaster - 6mm thick 1:6 Cement Sand plastering

⑧ Outside plastering - 12mm thick 1:6 cement mortar plastering.

⑨ Doors and windows - softwood work in chaukats and Shisham wood 30mm thick panelled shutters.

⑩ Finishing Inside three coats white washing outside three coats white washing.

Item NO	Particulares of item	nos	Length	breadth	height	Quantity
(1)	Earth work in excavation in foundation.					
	Long wall	2	8.8m.	0.7m.	0.76m.	$9.24m^3$
	Short wall	3	3.10m.	0.7m.	0.75m.	$4.88m^3$
(2)	Lime concrete in foundation.					
	Long wall	2	8.80m.	0.7m.	0.05m.	$1.85m^3$
	Short wall	3	3.16m.	0.7m.	0.05m.	$0.97m^3$
(3)	Brick work in Lime mortar 1:6 in foundation and plinth					
	1st footing					
	Long wall	2	8.6m.	0.5m.	0.05m.	$0.43m^3$
	short wall	3	3.3m.	0.5m.	0.05m.	$0.25m^3$
	2nd footing					
	Long wall	2	8.5m.	0.4m.	0.05m.	$0.34m^3$
	short wall	3	3.4m.	0.4m.	0.05m.	$0.20m^3$
	3rd footing with plinth					
	Long wall	2	8.40m.	0.3m.	0.85m.	$4.28m^3$
	short wall	3	3.50m.	0.3m.	0.85m.	$2.68m^3$
(4)	2.5cm thick D.P.C 1:2:4 C.C					
	Long wall	2	5.60m.	0.30m.	—	$3.36m^2$
	Short wall	3	3.50m.	0.30m.	—	$3.15m^2$
	in verandah	3	0.30m.	0.30m.	—	$1.27m^2$
	Column					
	Deduct					
		1	1.0m.	0.3m.	—	$0.36m^2$

(5) Brick work in the Superstructure.					
Long wall	2	8·4m	0·30m	3·5m	17·64 m³
Short wall	3	3·5m	0·30m	3·5m	11·03 m³
deduction					
door openings	1	1·20m	0·3m	2·00m	0·72 m³
Window openings	2	1·20m	0·3m	1·20m	0·864 m³
verandah side opening	2	2·50m	0·3m	2·30m	3·45 m³
Verandah front opening	1	1·60m	0·3m	2·30m	22·08 m³
Lintels					
Doors	1	1·50m	0·3m	0·15m	0·068 m³
window	2	1·50m	0·3m	0·15m	0·136 m³
Above front verandah opening	1	4·10m	0·30m	0·15m	0·18 m³
Above side verandah opening	2	2·65m	0·3m	0·15m	0·24 m³
In sun-shade of window	2	1·50m	0·50m	0·07m	0·11 m³
(6) Earth work in filling					
under room	1	5·0m	3·5m	0·2m	3·5 m³
under verandah	1	3·5m	2·5m	6·2m	1·75 m³
(7) Lime concrete in flooring					
in Room	1	5·0m	3·5m	0·075m	1·31 m³
In verandah	1	3·5m	2·5m	0·075m	0·66 m³
				Total =	1·97 m³

(8) 2.5 cm thick
Cement concrete
Flooring

in Room	1	5.0m.	3.5m.	–	17.50 Cum
in verandah	1	3.5m.	2.5m.	–	8.76 Cum
sill of door	1	1.2m.	0.3m.	–	0.36 Cum
sill of verandah	2	2.5m.	0.3m.	–	1.50 m^2
verandah opening	2	1.6m.	0.3m.	–	0.96 m^2

Total = 29.07 m^2

(9) 15 m.m thick 1:6
Cement Sand
Plastering inside
the walls.

walls of Room	1	17.00	–	3.5m.	59.50 m^2
walls of verandah	1	12.0	–	3.5m.	42.00 m^2
pillar sides	7	0.3	–	2.30m.	4.83 m^2

Total = 106.33 m^2

Deduct

Door opening	1	1.2	–	2.0	2.40 m^2
verandah opening (side)	2	2.5	–	2.30	11.50 m^2
verandah opening (front)	2	1.6	–	2.30	7.36 m^2

Total = 21.26 m^2

Net Total = 106.33 − 21.26
= 85.07 m^2

(10) 12 m.m thick 1:6
cement Sand plastering
outside.
Long wall

	2	8.4	–	3.8	63.84 m^2
	–	–	–	3.8	26.60 m^2

Total = 90.44 m²

Deduct

Window opening	2	1.2 m	—	1.20 m	3.88 m²
verandah opening (side)	2	2.5 m	—	2.30 m	11.50 m²
(Front)	2	1.6 m	—	1.60 m	5.12 m²

Total = 19.50 m²

Over head cost :- It include general office expen-ses rents, taxes, supervision and other costs which are indirect expenses and not productive expenses on the job.

The miscellaneous expenses on overheads are

① General overheads :-

(a) Establishment (office, staff)

(b) Stationary, printing, postages etc. (for paper)

(c) Travelling expenses

(d) Telephone

(e) Rent and taxes.

② Job overhead costs :-

(i) Supervision (salary engineers)

(ii) Handling of materials

(iii) Repairs, carriage etc.

(iv) Amenities of labour.

(v) Workmen's ~~expenses~~ (compensation, insurance etc

(vi) Interest of investment

(vii) Losses.

5 November 2020

The analysis of rate is usually worked out for the unit of payment of particular item of work under two heads.

- Materials
- Labours

M → MPa

$M_{7.5}$ → 7.5 Megapascal (MPa)

IS → Characteristic Strength of Concrete (or) Compressive strength

M_{10} → 10 MPa

M_{15} → 15 MPa

M_{20} → 20 MPa

M_{25} → 25 MPa

1 → Cement
4 → Fine aggregate
8 → Coarse aggregate

M-7.5
$M_{7.5}$ → 1:4:8

M_{10} → 1:3:6

M_{15} → 1:2:4

M_{20} → 1:1.5:3

M_{25} → 1:1:2

Concrete cub no size 15 c.m

Analysis of Rate — 6 Nov 2020

1) Lime concrete in foundation (1 part lime 2 part brick ballast) (1 cum)

(a) White lime (1:2:6)

Calculation of materials for 100 cu.m lime

Concrete = $\frac{100}{(1+2+6)}$ = 16.6 cum

Lime = 16.6 cum

Surkhi / sand = 2 × 16.6 = 99.6 cum

Particulars	Quantity	Rate	Cost
Materials			
Brick Ballast	$10m^3$	1000 Cum	10000
Surkhi / Sand	$3.3m^3$	8000 Cum	2640.00
Lime	$1.6m^3$	1000 Cum	1600
			Total = 14240.00

Labour	NOS	Rate	Cost
Head Mason	1 nos	450 / day	450.00
Mason	1 nos	400 / day	400.00
Mazdor (Bele dar)	16 NOS	250 / day	4000.00
Man / Woman Mulio	16 NOS.	230 / day	3680.00
Bhishti	2 NOS	280 / day	460.00
Sundries (T&P) petty things	Lums of money	150 / day	150.00
			Total = 9140

Total money = 19240 + 9140 = 23380 Rs.
(Total material & labour cost)

2 % water charges = 467.60

10 %. Contractor profit = Rs 2338

Grand total = 26185.60

10 cum = 26185.60

1 cum = $\frac{26185.60}{10}$

= 2618.560

= 2619 Rs

100 m3	= 99.6
1 m3	= $\frac{99.6}{100}$
10 m3	= $\frac{99.6}{100} \times 10$
	= 9.96

10 November 2020

(2) Lime concrete in foundation or floor with 40mm gauge stone ballast white Lime and sand.

Proportion → 1:2:4 (unit 1 cum)

Calculation of material for 100 cum

Lime (Concrete 1:2:4) = $\frac{152}{1+2+4}$ = 22 cum

Sand = 2 x 22 = 44 cum

Ballast = 4 x 22 = 88 cum

Take 10 cum

particulars	Quantity	Rate	Cost
Stone ballast (40mm)	8.8	2400.00	21120.00
Sand	4.4 cum	1500.00	6600.00
Lime (white)	2.2 cum	1000.00	2200.00

Total = 29920.00

Labour	Nos	Rate/day	Cost
Mistri (Head)	1	450	450.00
Mason	2	400	800.00
Mulia	12	250	3000.00
Boy / girl coolee	12	230	2760.00
Waterman (Bhisti)	2	230	460.00
Sundries (T&P) petty things	Lumps of Money	150	150.00

Total = 7620.00

Grand Total = 37540.00

Add 2% watercharges = 750.80

Add 10% contractor's profit = 3754.00

Total = 42044.80

For 10 cum = 42044.80

$$1 \text{ cum} = \frac{42044.80}{10} = 4204.480$$

= 4300.00

(3) Cement concrete (1:5:10) in foundation or floor with brick ballast 40mm, & unit → 1 [illegible]

Calculation materials for 10 cum

$$\text{Cement concrete} \rightarrow \frac{152}{1+5+10} = 9.5 \text{ cum}$$

(Cement 1 motto = 9.5 cum)

Sand = 5X 9.5 Cum = 47.5 Cum

Ballast = 10x 9.5 cum = 95 cum

Take 10 cum calculate :-

Materials

Particulars	Quantity	Rate	Cost
Brick Ballast (40 mm)	9.5 Cum	1000.00	9500.00
Sand	4.75 = 4.8	1500.00	7200.00
Cement	0.95	9700.00	9215.00
		Total =	25915.00

Labour	Nos	Rate/day	Cost
Mistri (Head)	1	450	450.00
Mason	2	400	800.00
Mulia	12	250	3000.00
Beldaroo	12	230	2760.00
Waterman (Bhisti)	02	230	460.00
Sundries (T&P) petty things	Lumes of money	150	150.00
			7620.00

Material

Grand total = 33535.00

Add 2% water charges = $\frac{33535 \times 2}{100}$ = Rs 670.70

Add 10% Contractor Profit = $\frac{33535 \times 10}{100}$ = Rs 3353.5

Total = Rs 37559.20

For 1 cum = $\frac{37559.20}{10}$

= 3755.90

= Rs 3756

11 Nov 2020

(4) Cement Concrete (1:2:4) → unit 1 cum

Materials

Particulars	Quantity	Rate/day	Cost
Stone Ballast 40m.m.	8.8 cum	2400.00	21120.00
Sand (coarse)	4.4 cum	1800.00	7920.00
Cement	2.2 cum	9700.00	21340.00
		Total =	Rs = 50380.00

Labour	Nos	Rate/day	Cost
Head mason	1	450	450.00

Mulia (Beldar)	12	250	3000.00
Boy & woman coolie	12	230	2760.00
Bhisti (water man)	2	230	460.00
Sundries (T&P) etc.	Lumes of money	150	150.00
		Total =	7620.00

Grand total = 7620.00 + 50380.00

= 58000.00

Add 2% water charges = $\frac{2}{100} \times 58000.00$

= 1160.00

Add 10% Contractor profit = $\frac{10}{100} \times 58000.00$

= 580000

For 1 cum = $\frac{5800.00}{100}$

= 58

(1) 2.2 cum = ——— bag of cement

1 bag = 50kg

Cement density = 1440 kg/m3

1 m3 = 1440 kg

$2.2m^3 = 1440 \times 2.2 = 3168$ kg

$\frac{3168}{50} = 63.36$ bag

$= 64$ bags

(2) $0.95m^3$ of Cement = ---- bag ---- kg ?

1 bag 50 kg

$1m^3 = 1440$ kg

$0.95m^3 = 1440 \times 0.95 = 1368$ kg

$\frac{1368}{50} = 21.36$ kg $\quad 28$ bag.

28×50 kg $= 1400$ kg

$0.95m^3$ Cement 28 bag 1400 kg.

Im.P Brick work with standard Bricks :-

For $1m^3$ of brick work = 500 nos of bricks are used.

$10m^3$ brick work = 5000 nos of bricks use.

Calculation of materials for brick work

Take a wall $1\frac{1}{2}$ brick, 30 c.m nominal thickness of 20 m.m length and 5 height.

Nominal volume = $30 \times 0.3 \times 3 = 36 m^3$

Mortar Joint will be less than 1cm.

Actual thickness of wall = 30 - 1 cm = 29 cm

no of standard brick $= \frac{29}{20 \times 0.10 \times 0.10} = 14500.00$

No of brick required for $1m^3$ $\frac{14500}{30}$

$= 484.$ NOS

Extra 5% required for any wastages, breakages so this is considered as 500 NOS.

$1m^3$ brick = 500 bricks use.

$10m^3$ brick = 5000 bricks use.

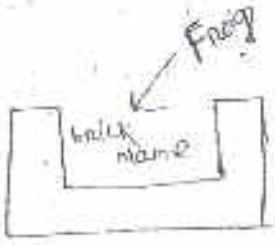
12 NOV 2020

Mortar Requirement = Total volume of brick work − Net volume of bricks

$= 29 - (0.19 \times 0.09 \times 0.09 \times 14500)$

$= 29 - 23.3155$

$= 6.6845$ cum



For frog filling, for use of cut bricks and for any wastage extra 15% of mortar is taken.

Total mortar Requirement $= 6.6845 + \frac{15}{100} \times 6.684$

$= 7.6871$ cum

For dry volume → increase $\frac{1}{4}$ of

~~7.6880 + $\frac{1}{4}$ × 7.688~~

⇒ 7.6871 + $\frac{1}{4}$ × 7.6871

⇒ 7.6871 + 1.922

= 9.609 = 9.61 cum

For 30 cum of brick work dry volume of mortar = 9.61 cum.

For 10 cum of brick work dry volume of mortar : $9.61 \times \frac{10}{30} = 3.2$ cum

Calculation of materials for mortar :-

Ex:- For brickwork in 1:6 cement mortar, cement

$= \frac{3}{1+6}$

= 0.428 cum

= 0.43 cum

Sand = 6 × 0.43 = 2.58 cum = 2.6 cum

Extra cement will required to fill up the voids in sand = 0.45 cum of cement and 2.7 cum of sand may be taken.

3 ——→ cement mortar

3.6 ——→ Lime mortar

For brick work in 1:6 ~~Cement~~ Lime mortar

~~Cement~~ / Lime = $\frac{3.5}{1+6}$ = 0.5 cum

Sand = 0.5 × 6 = 3 cum

1st class brickwork in foundation and plinth with (20×10×10) cm (nominal size) bricks with cement mortar → (unit 1 cum)

Take = 10 C.cum

Materials	NO	Rate	Cost
1st class Bricks	5000	8000.00 (for 100 nos)	40000.00
Cement	6.45 cum	9700.00 (per cum)	4365.00
Sand (local)	2.7 cum	1500.00 (per cum)	4050.00
		Total =	48415.00

8000 per 100 nos of bricks means →

100 → 8000

1 → $\frac{8000}{100}$

5000 → $\frac{8000}{100} \times 5000$

= 40,000

1 bag 50 kg $1m^3$ = 1440 kg

0.45 = 1440 × 0.45 = 64 g

$\frac{648}{50}$ = 12.96 kg = 13 bag.

Labour	nos	Rate / day	cost
Head Mason	1 nos	450 / day	450.00
Mason	10 nos	400	4000.00
Belder	7 nos	250	1750.00
Man & women Coolie	10 nos	230	2300.00
Bhisti	2 nos	230.00	460.00
Scaffolding	Lumesof money	350.00	350.00
T&P Sundries.	Lumes of money	1500.00	1500.00

Total = Rs. 10810

total meterials & labour cost = 48415 + 10810

= 59225.00

2% water charges : $\frac{2}{100} \times$ ~~Rs 810~~ 59225

= 1184.5

10% of contractor profit = $\frac{10}{100} \times 59225 = 5922.5$

Grand total = 66332.00

Rate per 10^3 = 66332

$$\therefore 1\ \text{cum} = \frac{66332}{10} = 6633.2$$

(2) 1st class brickwork in superstructure with (20x10x10) c.m brick with 1:6 Cement mortar. (1 unit 1 Cum).

Materials	NO	Rate/day	Cost
1st class brick	5000	8000.00 (For 100 nos)	40000.00
Cement	0.45 Cum	9700.00 (per Cum)	4365.00
Sand (Local)	2.7 Cum	1500.00 (per Cum)	4050.00
		total =	Rs = 48415.00

Labocor	NOS	Rate/day	Cost
Head Mason	1 nos	450 1day	450.00
Mason	7 NOS	400	2800.00
Belder	7 NOS	250	1750.00
Man & woman	10 NOS	230	2300.00

Bhisti	2 NOS	230.00	460 ~~230.00~~
Scaffolding	Lumes of money	350.00	350.00
T&P Sundries	Lumes of money	1500.00	1500.00

Total = Rs 9610

Total materials & labour cost =

$$48415 + 9610$$

$$= 58025.00$$

2% water charges $= \frac{2}{10} \times 58025$

$$= 1160.5$$

10% of contractor profit $= \frac{10}{100} \times 58025$

$$= 5802.5$$

Grand Total = 64988.00

Rate per 10 Cum =

$$1 \text{ Cum} = \frac{64988}{10} = 6498.8$$

$$= 6499$$

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(3) 1st class brickwork in superstructure

1:3 Lime, Surkhi mortar

unit → 1 cum

take → 10 Cum

$$\text{Lime} = \frac{3 \cdot 5}{1+3} = 0.875 \text{ Cum}$$

$$= 0.9 \text{ Cum}$$

Surkhi = $3 \times 0.9 = 2.7$ Cum

Particulars	Quantity	Rate Rs P.	Cost Rs P.
Materials			
1st Class bricks	5000 Nos	8000 per 1000 nos.	Rs40,000.00
Lime	0.9 Cum	1000 per Cum	Rs900.00
Surkhi	2.7 Cum	800 per Cum	Rs2160.00
		Total =	Rs43060.00
Labours			
Head Mason	1	450 / day	Rs450.00
Mason	2	400 / day	Rs800.00
Mulia (Belder)	7	250 / day	Rs1750.00
Man /woman coolie	10	230 / day	Rs2300.00
Bhishi	2	230 / day	Rs460.00
		350/ day	Rs350.00
	Lumsum		

Sundries (T&P)	Items of money	1500/day	Rs 1500.00

Total = Rs 7610.00

Total Material & Labour = 43060 + 7610

= Rs 50670.00

Add 2% water charges = $\frac{2}{100} \times 50670.00$

= 1013.400

Add 10% Contractor profit = $\frac{10}{100} \times 50670.00$

= 5067.00

Grand Total cost = Rs 56720.4

For 10 Cum = Rs 56720.4

1 Cum = Rs 5072.4

(4) 1st class Brickwork in wethes with 1:3 Cement Coarse Sand mortar unit 1 cum

---

Take = 1 cum

---

1 : 3

Cement = $\frac{3}{4}$ = 0.75 Cum

Coarse Sand = 3 × 0.75 = 2.25 Cum

Particulars	Quantity /nos	Rate Rs P	Cost Rs P
Materials			
1st class Bricks	5000 · 00 nos	8000 /1000 nos	40,000 · 00
Cement (22 bag)	0 · 75 cum	9700 / cum	7275 · 00
Coarse sand	2 · 25 cum	1800 / cum	4050 · 00
		total =	51325 · 00
Labour			
Head Mason	1 nos	450 / day	450 · 00
Mason	5 nos	400 / day	2000 · 00
Belder	12 nos	250 / day	3000 · 00
Woman/man Coolie	16 nos	230 / day	3680 · 00
Bhisti	4 nos	230 / day	920 · 00
Scaffolding	Lumes of money	350	350 · 00
T&P sundries	Lumes of money	1500	1500 · 00
		total =	11900 · 00

total materials and labours Rs 51325 · 00 + Rs 11900 · 00 .

= Rs 63225 · 00

Add 2% water charges = $\frac{2}{100}$ x Rs 63225.00
= Rs 1264.5

Add 10% Contractor's charges $\frac{10}{100}$ x Rs 63225.00
= Rs 6322.5

Grand Total = Rs 70812.00

For 10 cum = Rs 70812.00

1 cum = Rs $\frac{70812.00}{100}$

= Rs. 708 1.200

IS 1661 2000

Plastering

Calculation of quantity of mortar & materials

For uniform thickness
Quantity of mortar = Area x thickness
For filling up joints and to make up the un-uniform surface of wall 30% extra amount of mortars required.
To get the dry volume of materials we increased 25% the wet volume of materials.

Materials for 12 m.m thickness plastering in wall for 100 sq.m

For uniform layer, wet mortar = 1.2 cum

Rough

12 m.m × 100 sqm

$= 12 \times 10^{-3} m \times 100 m^2$

$= 12 \times 10^{-3} \times 100 m^3$ / cube. m cum

$= 0.012 \times 100$

$= 1.2 m^3$

For uneven surfaces extra 30% of mortar is required.

Then quantity of mortar $= 1.2 + \frac{0.3}{100} \times 1.2$

$= 1.2 + 0.36$

$= 1.56$ cum

17 NOV 2020

Then increasing 20%, Total dry volume

$= 1.56 + \frac{20}{100} \times 1.56 = 2.00$ cum

$\therefore$ 1.95 cum ≈ 2.00 cum

For 1:6 Cement mortar

Cement $= \frac{2}{1+6} = 0.30$ cum

Sand $= 0.30 \times 6 = 1.80$ cum

for 12 mm plastering 1:6 — 1 unit 1 cum

Time - 100 %

Particulars	Quantity or nos	Rate Rs P	Cost Rs P
Materials			
Cement (9 bags)	0.30 cum	9700 /cum	Rs 2910.00
Sand (Local)	1.80 cum	1500 /cum	Rs 2700.00
		Total =	Rs 5610.00
Labour			
Head mason	1 NOS	450.00	Rs 450.00
Mason	10 NOS	400.00	Rs 4000.00
Beldar	15 NOS	250.00	Rs 3750.00
Bhisthi	2 NOS	230.00	Rs 460.00
Scaffolding	Lumes of money	300.00	300.00
Sundries T&P etc	Lumes of money		
		Total =	8960.00

Total materials & labour cost = Rs 5610 + Rs 8960

= Rs 14570.00

2% of water charges = $\frac{2}{100} \times 14570.00$

= 291.400

10% Contractor profit = $\frac{10}{100} \times \frac{14570.00}{-Do\ 1457.00}$

Ground total = Rs 16318.4

Rate / Sq.m = $\frac{\text{Rs } 16318.4}{100}$

= Rs. 163.18

2) 1 cum cement plastering in 1:3 with

Course Sand ---> (unit 1 cum)

Cement = $\frac{2}{1+3}$ = 0.5 cum

Course Sand = 0.5 × 3 = 1.5 cum

1 m3 = 1440 bag

0.5 × 1440 = 720

= $\frac{720}{50}$ = 14.4 = 15 bag

Particulars	Quantity or Nos.	Rate Rs P.	Cost Rs P
Materials			
Cement (15 bag)	0.5 cum	9700 cum	Rs 4850.00
Course Sand	1.5 cum	1800 cum	Rs 2700.00
		Total =	Rs 7550
Labour			
Head mason	1 nos	450.00	Rs 450.00
Mason	10 nos	400.00	Rs 4000.00
Baldar	15 nos	250.00	Rs 3750.00
Bhisti	2 nos	230.00	Rs 460.00

Scaffolding	Lumes of money	300.00	Rs 300.00
Sundries T&P etc.			
		total =	Rs 8960.00

total materials & labour cost = Rs 7550.00 +
Rs 8960.00

= Rs 16510

Add 2% of water charges = $\frac{2}{100} \times 16510$

= Rs 330.2

10% of Contracters profits = $\frac{10}{100} \times 16510$

= 1651

Grand total = Rs 18491.2

1 cum = $\frac{\text{Rs } 18491.2}{100}$ = 184.912

19 NOV 2020

30 Ceiling plastering 12 m.m thick for 100 sqm.

For plastering on R.C.C ceiling the unevenness of surfaces will be less and 20% extra may be taken to get even surface.

unevenness → non-uniform

The quantity of wet mortar

$= 100 \times 0.012 + \frac{20}{100} \times 1.2$

$= 1.2 + 0.24$

$= 1.44$ cum

Increase by 25% the dry volume

$1.44 + 0.36 = 1.80$ cum

Take 100 sqm

Particulars	Quantity or NOS	Rate Rs P	Cost Rs P
Cement	0.45 cum	9700.00	Rs 4365
Sand (course)	1.35 cum	1800.00	Rs 2430
		Total =	Rs 6795
Labour			
Head mason	1 NOS	450.00	Rs 450.00
mason	10 NOS	400.00	Rs 4000.00
Beldar	15 NOS	250.00	Rs 3750.00
Bhisti	2 NOS	230.00	Rs 460.00
Scaffolding	Lumes of money	300.00	Rs 300.00
Sundries T&P etc		Total =	Rs 8960

pointing

* For pointing in brickwork the total dry volume of materials is taken as 0.60 m³ for 100 sq.m.

Materials required for pointing with different mortars for various proportions for 100 Sq.m.

Cement mortars (1:2) → 0.20 cum cement (6 bag)
0.40 cum Sand

Cement mortars (1:3) → 0.16 cum cement (5 bag)
0.48 cum Sand

White lime and 0.32 cum lime
Surkhi (1:1) 0.32 Surkhi

take 100 Sum Cement pointing (1:2) → units → 15 Sq.m

particular	quantity or nos	Rate Rs P	Cost Rs P
Materials			
Cement	0.20 cum	9700.00	Rs 1940
Local Sand	0.40 cum	1500.00	Rs 600
		total =	Rs 2540

Labour			
Head mason	1 nos	450	Rs 450.00
Mason	10 nos	400	Rs 4000.00
Beldar	10 nos	250	Rs 2500.00
Bhisti	2 nos	230	Rs 460.00
Scaf folding & sundries T & P	Lumes of money	150.00	Rs 150.00
		Total =	Rs = 7560

Total materials & Labour = 7550 + 2540
= Rs 10100.00

2% water charges = $\frac{2}{100} \times 10100$ = Rs 200.00

10% Contractor profit = $\frac{10}{100} \times 10100$
= Rs 101000

Grand total = Rs 11312

1 cum = $\frac{\text{Rs } 11312}{100}$ = Rs 113.12.00
= Rs 113.12 Ans

Total = Rs 7670.00

Total material & labours = Rs 15680.00 + Rs 7670.00

= Rs 23350.00

Add 2% Water charges $\frac{2}{100} \times 23350.00$

= Rs 467

Add 10% Contractor profit $\frac{10}{100} \times 23350.00$

= Rs 2335.00

Grand Total = Rs 26152.00

For 100 sq m. = Rs 26152.00

For 1 cum $\frac{26152}{100}$ = Rs 261.52

25 Nov 2020

① [2.5 c.m cement concrete Floor 1 : 1½ : 3 and → 1 cum] ie.

2.5×10^{-2} = 0.025 × 100 sq = 2.5 m^3

= 2.5 cum

2.5 + 0.25 = 2.75 cum wet Concrete.

Cement = $\frac{4.125}{1 + \frac{3}{2} + 3}$ = $\frac{4.125}{\frac{11}{2}}$ = 0.75 c.cum

= 1.13 cum

Sand = 0.75 × 1.5 = 1.125 cum

Aggregate = 3 × 0.75 = 2.25 cum

Cement for surface = 0.2 cum

Particulars	Quantity or nos	Rate Rs. P.	Cost Rs. P.
Materials			
Course sand	1.13	1800.00	2034.00
Cement	0.75	9100.00	1275.00
Stone ballast	2.25	2400.00	5400.00
cement for surface finising	0.2	9700.00	1940.00
		Total =	Rs16649.00
Labour			
Mistri	1	450	450
	10	400	4000
mason	5	250	1250
Beldar	2	200	400
Bhisti	Lump sum	300	300
scaffolding	Lumpsum	120	120
Sundries (T&P)		230	150
Man/woman Coolie	5	Total =	Rs.1670.00

total money = 16649.00 + 1670.00 = RS 24319.00

Add 2% water charge = $\frac{2}{100}$ × 24319 = RS 486.38

10% Contractor profit = $\frac{10}{100}$ × 24319 = RS 2431.90

Grand total = 24319.00 + 486.38 + 2431.90

= 27237.28

For 100 Cum = 27237.28

For 1 cum = $\frac{27237.28}{100}$ = 272.3728

Total = Rs 7670.00

Total material & labours = Rs 15680.00 + Rs 7670.00

= Rs 23350.00

Add 2% Water charges $\frac{2}{100} \times 23350.00$

= Rs 467

Add 10% Contractor Profit $\frac{10}{100} \times 23350.00$

= Rs 2335.00

Ground Total = Rs 26152.00

For 100 Sq m. = Rs 26152.00

For 1 Cum $\frac{26152}{100}$ = Rs 261.52

25 Nov 2020

① [2.5 cum cement Concrete Floor 1 : 1½ : 3

unit → 2.5 cum]

2.5×10^{-2} = 0.025 × 100 Sq = 2.5 m³

= 2.5 Cum

2.5 + 0.25 = 2.75 Cum wet Concrete.

Cement = $\frac{4.125}{4 \frac{3}{2} + 3}$ = $\frac{4.125}{11/2}$ = 0.75 Cum

= 1.13 Cum

Sand = 0.75 × 1.5 = 1.125 Cum

Aggregate = 3 × 0.75 = 2.25 Cum

Cement for surface = 0.2 cum

Particulars	Quantity or nos	Rate Rs P	cost Rs P.
Materials			
Course sand	1.13	1800.00	2034.00
Cement	0.75	9700.00	7275.00
Stone ballast	2.25	2400.00	5400.00
cement for surface finising	0.2	9700.00	1940.00
		TOTAL =	Rs16649.00
Labour			
Mistri	1	450	450
mason	10	400	4000
Beldar	5	250	1250
Bhisti	2	200	400
scaffolding	Lump sum	300	300
Sundries (T&P)	Lumpsum	120	120
		230	1150
man/woman Coolie	5	TOTAL =	Rs.7670.00

total money = 16649.00 + 7670.00 = RS 24319.00

Add 2% water charge = $\frac{2}{100}$ x 24319 = RS 486.38

10% Contractors profit = $\frac{10}{100}$ x 24319 = RS 2431.90

Grand total = 24319.00 + 486.38 + 2431.90

= 27237.28

For 100 Cum = 27237.28

For 1 cum = $\frac{27237.28}{100}$ = 272.3728

Brick floor 10c.m thick cement pointed
unit → 1sq.m (Take - 100sqm)

(a) Brick laid 1:6 mortar
Surface pointed (1:2) cement mortar

For pointing 0.6 cum Total dry volume of mortar is required.

For brick floor laid with 1:6 Cement mortar the quantity of materials are

Brick = 5000 NOS

Sand = 3 Cum

Cement = 0.5 Cum

Particular	Quantity or NOS	Rate Rs P	Cost Rs P
Materials for brick laying			
1st Brick	5000 · NOS	8000.00/day	Rs 40,000.00
Cement	0.50 Cum	9700.00/day	Rs 4850.00
Local sand	3.00 Cum	1500.00/day	Rs 4500.00
		Total =	Rs 49350.00
Labour			
Mistri Head Mason	1 NOS	450/day	450.00
Mason	10 NOS	400/day	4000.00
Beldar	7 NOS	250/day	1750.00
Man & Woman	10 NOS	230/day	2300.00

Bhisti	2 NOS	230/day	460.00
Scaffolding	Lumes of money	350/day	350.00
T&P Sundries	Lumes of money	1500/day	1500.00
		Total = Rs	1081.0

Labour + Material S = Rs 60160.00

Add 2% of water charges = $\frac{2}{100} \times 60160$ = Rs 1203.2

10% of Contractor profit = $\frac{10}{100} \times 60160$ = Rs 6016

Grand total Rs 67379.2

100 sqm = 67379.2

1 sq m. = $\frac{67379.2}{100}$ = Rs 673.792

Cement pointing

Material and labour. Same as cement pointing.

Materials	Quantity per nos.	Rate	Cost
Cement	0.2 cum	9700 /cum	Rs 1940.00
Sand (local)	0.40	1500 /cum	Rs 600.00
		Total = Rs	2540.00

Labour for pointing

Mistri (Head mason)	1 NOS	425.00	425.00
Mason	2 NOS	400.00	800.00
Mazdoor	6 NOS	250.00	1500.00
Bhisti	2 NOS	230.00	460.00
Scaffolding, Sundries T & P etc.	Lumes of money	150.00	150.00
		Total = Rs	3335.00

Rs 3335.00 + Rs 2540.00

= Rs 5875.00

Total materials and labour = Total material and labour of Brickwork + Total material and labour of painting.

Total material and labour = Rs 60160.00 + Rs 5875.00

Total material & labour = Rs 66035.00
Add 2% of water charges = Rs 1320.7
Add 10% of Contractor profit = Rs 6603.5

Grand Total = Rs 73959.2

100 sqm. = 73959.2
1 sqm. = $\frac{73959.2}{100}$ = 739.592

2 Dec 2020

Valuation

Actual price ku value Kanibaku.

* Valuation is the technique of estimating or determining the fair price or value of a property such as building a factory or other engineering structures of various types.
* By valuation, the present value of property is determined.
* The present value may be decided by its selling price or income or rent.
* The value of property depend upon its structure, life, maintenance, Location bank intrest, legal Control etc.

* The value also depends on the supply on demand and the purpose for which valuation is required.

Cost → original cost of construction of purchase.

value → present value (sale able value) It may be higher or lower than the cost.

Purpose of valuation :-

Main purposes of valuation

(i) Buying or selling property

when it is required to buy or to sell a property, valuation is required.

(ii) Taxation To assess the tax of a property its valuation is required Taxes may be municipal tax, wealth tax, property tax etc. and all the taxes are fixed on the valuation of property.

(iii) Rent Fixation :- In order to determine the rent of a property its valuation is required.

Rent is usually fixed on certain percentage of amount of valuation (6% to 10% of valuation)

(iv) Security of loans or Mortage → (ಅಡಮಾನ)

When the loans are taken against security of the property its valuation is required.

(v) Compulsory Acquisition :-

→ Whenever a property is acquired by Law compensation is paid to the owner. To determine the amount of compensation valuation of property is required.

→ Valuation of a property is also required for a Insurance, betterment charges, etc.

Income

This is 2 types

① Gross Income

It is the total income and includes all the receipts from various sources the outgoings and the operational and collection charges are not deducted.

② Net income This is the savings or the amounts left after deducting all outgoings : operational and collection expenses from the gross income.

Net income = Gross Income - Outgoings

Outgoings :- It is the expenses which are required to be incurred to maintain the revenue of the building. Various types of outgoings are as follows :-

Taxes :- These includes municipal Tax, property Tax, wealth Tax etc. which are to be paid by the owner of the property annually. These taxes are fixed on the basis of "Annual rental value" of the property after deduction for annual Repairs.

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Repairs :- The repairs are required to be carried out every years to maintain in property in fit condition.

→ The amount to be spent on repairs depends on the age construction nature of the building etc. and usually 10 - 15% of the gross income or gross rent or $\frac{1}{2}$ - 1 months rent is allowed for repairs.

⇒ For annual repairs 1 % - of 1½ % of the total cost of Construction may also be taken.

Management and Collection charges :-

⇒ These includes the expenses on rent collection (watch man) lift man, pump attendant, Sweeper etc.

⇒ About 5-10% of the gross rent may be taken on these account.

⇒ About for small building none of these may be required and there will be no outgoings on these account.

Sinking fund :-

⇒ A certain amount of gross rent is set aside annually as sinking fund to accumulate the total cost of construction when the life of the building is over.

⇒ The amount sinking fund is taken as outgoings.

Loss of rent :-

⇒ The property may not be kept fully occupied in such a case a suitable amount should be deducted from the

Miscellaneous :-

These include electric charges for running lift pumps for lightening common places and similar other charges which are to be borne by the owner.

Municipal Taxes :-

⇒ Municipality needs money inorder to under take and maintain public utility services and the same is collected by imposing items on the property

⇒ The main utility works are roads, drainages, water supply etc and the construction and maintenance.
⇒ The taxes are assessed on some percentages bases on the net income from the property and vaies from 10% - 25% of the net income.
⇒ Usually for small houses the taxes are less and for big hacses takes are high.

Scrap value :-

⇒ It is the value of dismantled material.
⇒ for a building when the life is over at the end of its utility period the dismantled material as steel, bricks, timber etc. will fetch a certain amount which is the scrap value of the building.
⇒ Case of machine, the scrap values of the value of metal the value of dismantled parts.
⇒ The scrap values for a building may be about 10% of its total cost of construction
⇒ The cost of dismantling and removal of the rubbish material is deducted from the total receipt from the sale of the useable parts to get the scrap value.

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Salvage value :- It is the value of the end of utility period without being dismantled.
⇒ A machine after the completion of it's usual span of life or when it become economic may be should and one may purchase the same for use for some other

Purpose, the sale value of the machine is salvage value.

⇒ It doesnot include the cost of removal, scale etc.

Note The scrap value or salvage value of a property got some positive value but it may also zero or nagative figure.

Marked value :-

⇒ The markes value of a property is the amount which can be obtained at any particular time from the open markes, It the property is but for sale.

⇒ Market value will differ from time to time according to demand and supply ..

⇒ Market value also changes from time to time for various miscellaneous reasons in industry changes on pashons, means of transport and labour etc.

Book value :-

Book value is the amount shown in the account book after allowing necessary depreciations.

⇒ The book value of a property at a particular year is the original cost minus the amount of depreciation upto the previous year.

⇒ The book value depends on the amount on depreciation allowed per year will be gradually reduced year to year.

Obsolescence

⇒ The value of property or structure become less by becoming out of due to in style, in structure in design etc. and this is turnned as 'obsolescene'.

⇒ An old dated building with massive calle ↓ in

Annuity :-

Annuity is the annual periodic payments for repayments of the capital amount invest by a party. reasons, ice of solescence.

⇒ ① ② ③

3 period → 12 months or 1 year

⇒ If the amount of annuity is paid at the begining of each period of year and payments continues for definite number of periods is known as Annuity Due.

⇒ Annuity means annual payment; the amount of annuity may be paid by twelve monthly instalment or quarterly or half yearly installments

Capital cost :- It is the total cost of construction including land or the original total amount required to possess a property.

⇒ It is the original cost doesn't which change.

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Capitalized value :-

The capitalized value of a property is the amount of money whose annual intrest at the highest prevailing rate of interest will be equal to the net income from the property.

⇒ To determine the capitalized value of a property, it is required to know the net income from the property and the

highest prevailing rate of interest.

Eg:
Capitalized value of a property fetching a net annual rent of Rs 1000.00 and the highest rate of interest prevalent bling 5% is →

For Rs 5.00 interest, capital = Rs 100.00
To get Rs 1000.00 interest Capital = $\frac{100}{5} \times 1000$
= Rs 20,000

> Capitalized value = Net annual income × Year's purchase.

eg: net income = Rs. 1000.00
Rate of interest = 8%
Capitalized value = $\frac{100}{8} \times 1000$
= Rs 125 00.00

Thus, higher the rate of interest, the Capitalized value of a property goes down.

Year's Purchase

→ It is defined as the capital sum required to be invested in order to receive an annuity of Rs. 1.00 at certain Rate of interest.

→ For 4% interest per annum to get Rs. 4.00 it requires Rs. 100.00 to be deposited in a bank.

→ To get Rs. 1.00 per year it will be required to deposit $\frac{1}{4}$ of Rs. 100.00 ie $\frac{100}{4}$ = Rs 25.00

Thus | Year's purchase $= \frac{100}{\text{Rate of interest}}$ $= \frac{1}{i}$ |

Where i = rate of interest in decimal

For 5% Rate of interest, Years purchase $= \frac{100}{5}$ = Rs. 20.00

For 6% Rate of interest, Years purchase $= \frac{100}{6}$ = Rs 16.67

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Sinking fund

The fund which is generally accumulated by way of periodic on annual deposit for the replacement of the building or structure at the end of it's useful life is termed as sinking fund.

Q ~~An old~~ ~~machine~~

> Sinking fund may also be required for payment of loan if a property is owned on constructed by taking loan a sinking fund may be created by setting a side of money annually to accumulate with compound interest in order to repay the debit at the end of term of loan.

| Annual installment Required (I) $= \frac{S \cdot i}{(1+i)^n - 1}$ |

where S = total amount of sinking fund to be accumulated.

n = number of years required to accumulate the sinking fund.

i = Rate of interest in decimal

I = Annual installment Required.

1. A pumping set with a motor has been installed in a building at a cost of Rs 25000.00 Assuming the life of the pump as 15 yrs findout the amount of annual instalment required to be deposited to accumulate the whole amount of 4% compound interest.

Sol^n Given that sinking Fund (S) = Rs. 2500.00

No of years (n) = 15 yrs

Rate of interest = (i) = $\frac{4}{100} = 0.04$

Annual enstallment required (I) = $\frac{Si}{(1+i)^n - 1}$

$= \frac{2500 \times 0.04}{(1+0.04)^{15} - 1}$

$= 124.8 = Rs\ 125.00$

The owner is to deposit Rs 125.00 annually in 4% compound interest carrying investment for 15 yrs to accumulate Rs. 2500.00

*2. An old building has been purchased by a person at a cost of Rs 30,000.00 excluding the cost of Land calculate the amount of annual sinking Fund at 4% interest assuming the future life of a building as 20 yrs and the scrap value of the building as 10% of the cost of purchase.

Given that :-

Rate of interest (i) = 4% = 0.04

No of years (n) = 20 years

Scrap value = 10% of cost of purchase

$= \frac{10}{100} \times 30,000$

= Rs 3000.00

Amount of sinking fund to be accumulated at the end of 20 yrs.

$S = \frac{90}{100} \times 30,000 = Rs\ 27000.00$

or S = C.P − Scrap value
(Cost of purchase)

= Rs. 30,000 − Rs. 3000.00

= Rs. 27000.00

Annual sinking fund Required (I) = $\frac{S.i}{(1+i)^n - 1}$

$I = \frac{Rs\ 27000 \times 0.04}{(1+0.04)^{20} - 1}$

= Rs. 970.20

Annual Installment Required for 20 yrs

= Rs. 997.20.

11 Dec 2020

Q3 An old machine has been purchased by a person at a cost 50,000 /- excluding the cost of land and Construction. Calculate the amount of annual installment required at 4% rate of interest required at 4% rate of interest life span of the machine is 15 yrs. and scrap value is 15% of cost of purchase.

Given data

Rate of intrest (I) = 4% = $\frac{4}{100}$ = 0.04

No of year (N) = 15 yrs

Scrap value = 15%

= $\frac{15}{100}$ × 50,000

= 7500.00

Amount of sinking fund to be accumulated at the end of 15 years.

S = 50000 - 7500

= 42500

Annual sinking fund Required (I)

$$= \frac{42500 \times 0.04}{(1+0.04)^{15}-1}$$

= Rs 2122.496

= Rs 2123.00

Hence Annual installment for sinking fund requires for 15 yrs = Rs. 2123.00

17 Dec 2020

Depreciation :-

* It is the gradual exhaustion of the usefulness of a property.
* This may be defined as the decrease or loss in the value of a property due to structural deterioration use, life, wear & tear, decay and obsolescense.

Methods of calculating depreciation :-

(i) Straight line method
(ii) Constant percentage method
(iii) Sinking fund method
(iv) Quantity survey method

(i) Straight line method :-

> In this method it is aggumed that the property loses its value by the same amount every year.
> A fixed amount of original cost is deducted every year. so that at the end of utility period only scrap value is left.

$$\text{Annual Depreciation } (D) = \frac{\text{original cost} - \text{scrap value}}{\text{Life in year}}$$

$$\boxed{D = \frac{C - S}{n}}$$

where C = original cost
S = Scrap value
n = life of the property in yrs.

(ii) Constant percentage method / Declining balance method

In this method, it is assumed that the property will lose it's value by a constant percentage of it's value at the beginning of every year.

$$\text{Annual Depreciation } (D) = 1 - \left(\frac{S}{C}\right)^{1/n}$$

where S = Scrap value
C = original Cost
n = Life of property in years
D = Annual Depreciation.

23 Dec 2020

1Q A property fetches a net annual income of Rs. 900.00 deducting all outgoings. find out the capitalised value of the property if the rate of interest is 6% per annum.

Ans Given data :- Net annual income = Rs. 900.00

Rate of intrest = 6%.

Years purchase $= \frac{100}{6} = 16.67$

Capitalized value = Net income × Years purchase

= Rs 900 × 16.67

= Rs 15003.00