LECTURE NOTE

ESTIMATION & COSTING ENGINEERING 3RD SEMESTER

Diploma (Civil Engineering)

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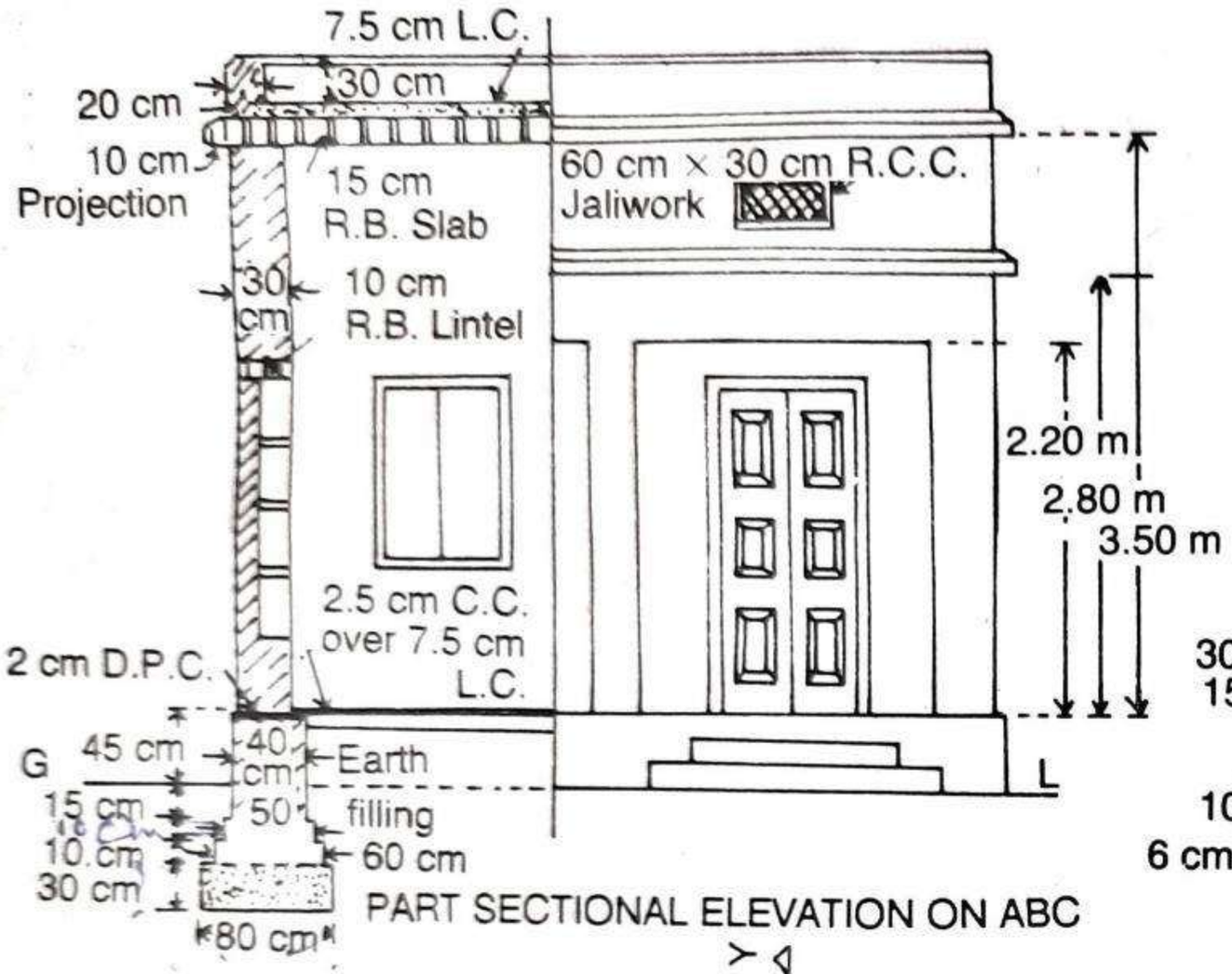
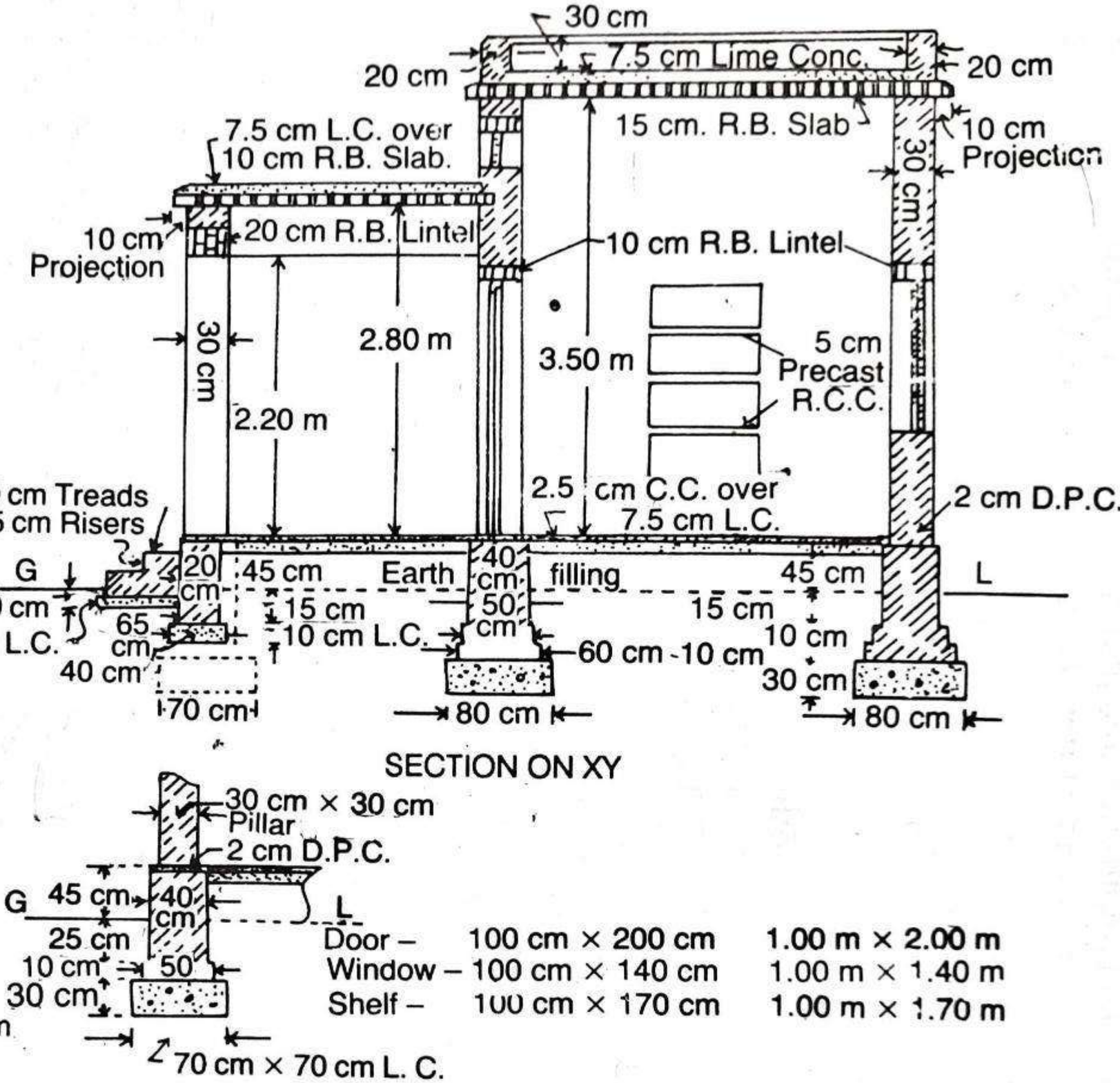


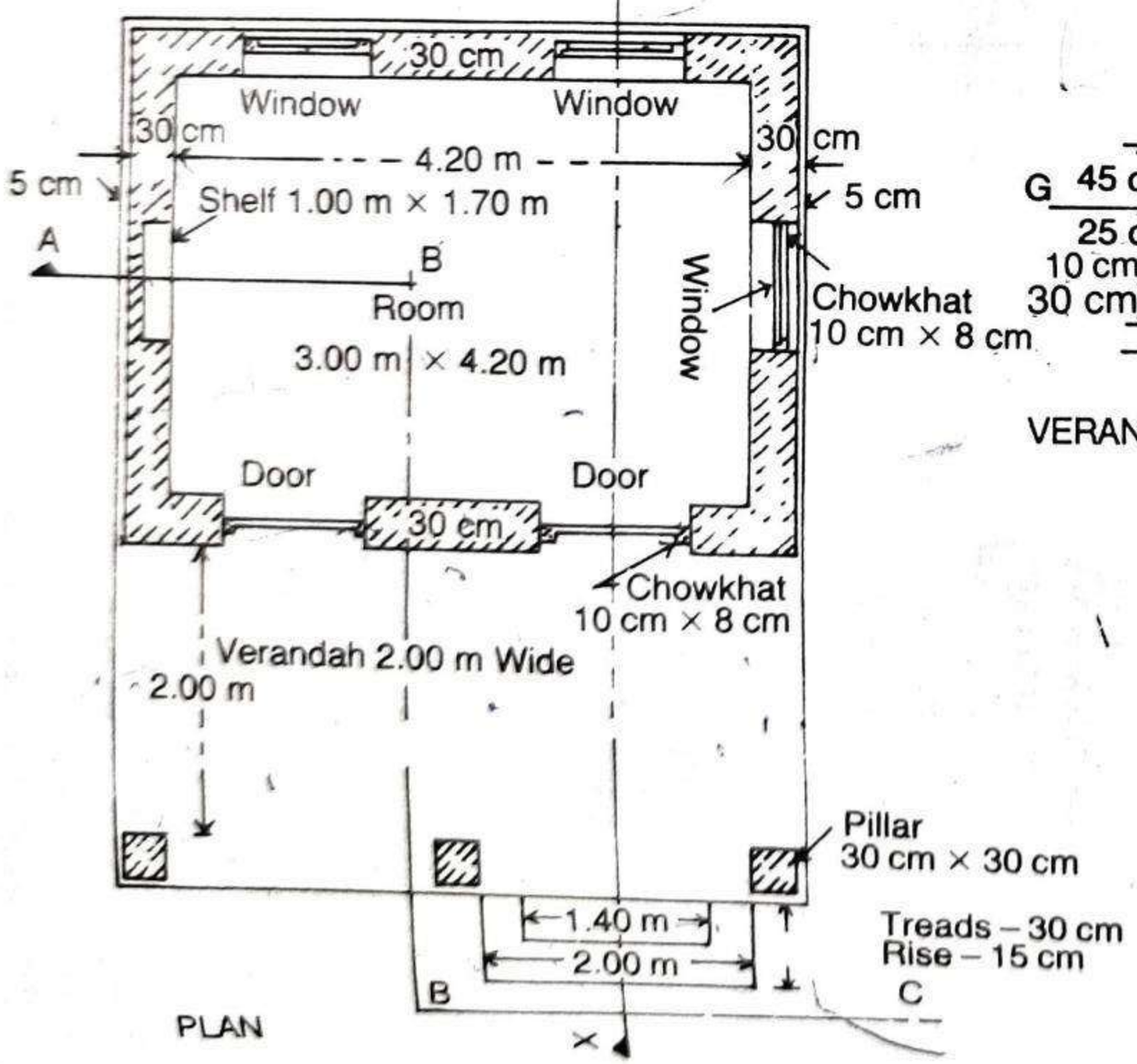
PART SECTIONAL ELEVATION ON ABC



SECTION ON XY

VERANDAH PILLAR FOUNDATION

Door –	100 cm × 200 cm	1.00 m × 2.00 m
Window –	100 cm × 140 cm	1.00 m × 1.40 m
Shelf –	100 cm × 170 cm	1.00 m × 1.70 m



PLAN

Fig. 3-4

Door and Windows. — Door and window chowkhats shall be of sal wood and shutters shall be 4 cm panelled of deodar wood, and painted two coats over one coat of priming.

Adopt suitable rates. Calculate also the plinth area rate of the building.

Solution—

Centre to centre length of walls —
Long wall c. to c. length = 4.20 + .30 = 4.50 m
Short wall c. to c. length = 3.00 + .30 = 3.30 m
Verandah front c. to c. length = 4.20 + .30 = 4.50 m
Verandah side c. to c. length = 2.00 + .30 = 2.30 m

DETAILS OF MEASUREMENT AND CALCULATION OF QUANTITIES (SINGLE ROOM BUILDING EX. 4)

Item No.	Particulars and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
1.	**Earthwork** in excavation in foundation—Room						
	Long walls ...	2	5.30	.80	.65	5.51	L = 4.50 + .80 = 5.30 m
	Short walls ...	2	2.50	.80	.65	2.60	L = 3.30 – .80 = 2.50 m
	Verandah —						
	Pillars ...	3	.70	.70	.65	0.96	
	Plinth dwarf wall front (sum total length) ...	1	3.10	.40	.25	0.31	L=4.50 – 2 × .70 = 3.10 m
	Plinth dwarf wall sides ...	2	1.55	.40	.25	0.31	L=2.30 – $\frac{.80}{2}$ – $\frac{.70}{2}$ = 1.55 m
	Step ...	1	2.10	.65	.10	0.14	
					Total	9.83 cu m	
2.	**Earthwork** in filling in Plinth—						
	Room ...	1	4.10	2.90	.375	4.46	
	Verandah ...	1	4.50	2.10	.375	3.54	L = 4.90 – .40 = 4.50 m B=2.35 – .20 – .05=2.10 m
					Total	8.00	
	Deduct —						
	Projection central pillar ...	1	.40	.20	.375	0.03	These deductions may be neglected being small.
	Projection side pillar ...	2	.20	.20	.375	0.03	
					Total	0.06	
				Net	Total	7.94 cu m	

Item No.	Particulars of Items and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
3.	**Lime concrete** in foundation—						
	Room —						
	Long walls ...	2	5.30	.80	.30	2.54	
	Short walls ...	2	2.50	.80	.30	1.20	
	Verandah						
	Pillars ...	3	.70	.70	.30	0.44	
	Dwarf wall front (sum total length) ...	1	3.70	.40	.10	0.15	L=4.50 – 2 × .40 = 3.70 m
	Dwarf wall sides ...	2	1.85	.40	.10	0.15	L=2.30 – $\frac{.50}{2}$ – $\frac{.40}{2}$ = 1.85
	Step ...	1	2.10	.65	.06	0.08	
					Total	4.56 cu m	
4.	**First class Brickwork in Foundation and Plinth in** lime mortar—						
	Room—						
	Long walls —						
	1st footing ...	2	5.10	.60	.10	0.61	L = 4.50 + .60 = 5.10 m
	2nd footing ...	2	5.00	.50	.10	0.50	L = 4.50 + .50 = 5.00 m
	Plinth wall above footing ...	2	4.90	.40	.60	2.35	L = 4.50 + .40 = 4.90 m
	Short walls —						
	1st footing ...	2	2.70	.60	.10	0.32	L = 3.30 – .60 = 2.70 m
	2nd footing ...	2	2.80	.50	.10	0.28	L = 3.30 – .50 = 2.80 m
	Plinth wall ...	2	2.90	.40	.60	1.39	L = 3.30 – .40 = 2.90 m
	Verandah —						
	Pillars footing ...	3	.50	.50	.10	0.075	
	Pillars Plinth	3	.40	.40	.70	0.336	
	Dwarf wall front (sum total length) ...	1	3.70	.20	.60	0.44	L=4.50 – 2 × .40 = 3.70 m
	Dwarf wall sides ...	2	1.90	.20	.60	0.46	L = 2.30 – .40 = 1.90 m
					C.O.	6.76	

(Ex. 4 Contd.)

Item No.	Particulars of Items and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
					B.F.	6.76	
	Step —						
	1st step ...	1	2.00	.60	.19	0.23	
	2nd step ...	1	1.40	.30	.15	0.06	
					Total	7.05 cu m	
5	**2 cm D. P. C.** of 1:2 cement mortar with water-proofing materials—						
	Long walls ...	2	4.90	.40	—	3.92	Length, breadth same as
	Short walls ...	2	2.90	.40	—	2.32	plinth wall.
	Verandah —						
	Pillars ...	3	.40	.40	—	0.48	
						6.72	
	Deduct door sills ...	2	1.00	.40	—	0.80	
					Total	5.92 sq m	
6.	**I-class Brickwork in superstructure** in lime mortar—						
	Room—						
	Long walls ...	2	4.80	.30	3.50	10.08	L = 4.50 + .30 = 4.80 m
	Short walls ...	2	3.00	.30	3.50	6.30	L = 3.30 – .30 = 3.00 m
	Verandah —						
	Pillars ...	3	.30	.30	2.20	0.59	
	Front above lintel ...	1	4.80	.30	.40	0.57	
	Sides above lintel ...	2	2.00	.30	.40	0.48	
	Parapet long walls ...	2	4.80	.20	.375	0.72	
	Parapet short walls ...	2	3.20	.20	.375	0.48	
					Total	19.22	
	Deduct —						
	Door openings ...	2	1.00	.30	2.00	1.20	
	Window openings ...	3	1.00	.30	1.40	1.26	
	Shelf ...	1	1.00	.20	1.70	0.34	
	Ventilators ...	2	.60	.30	.30	0.11	

Item No.	Particulars of Items and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
	Lintel over doors ...	2	1.20	.30	.10	0.07 (a)	10 cm bearing.
	Lintel over windows ...	3	1.20	.30	.10	0.11 (a)	
	Lintel over shelves ..	1	1.20	.30	.10	0.04 (a)	Total of (a) s = 0.24 cu m
	Lintel over ventilator ...	1	.80	.30	.10	0.02 (a)	
			Total	of deduction		3.15	
				Net	Total	16.07 cu m	
7.	**Reinforced Brick-work in** 1:3 cement mortar excluding steel and its bending but including centering and shuttering and binding steel						
	Roof of room ...	1	5.00	3.80	.15	2.850	
	Roof of verandah ...	1	5.00	2.55	.10	1.275	15 cm bearing.
	Lintel verandah front ...	1	4.80	.30	.20	0.288	Out to out.
	Lintel verandah sides ...	2	2.15	.30	.20	0.258	15 cm bearing
	Lintel over doors, windows, etc ...		Same marked	as for (a) in	items item 6	0.240	
					Total	4.911 cu m	
8.	**7.5 cm Lime concrete** in roof terracing complete with surface finishing—						
	Roof of room ...	1	4.40	3.20	—	14.08	
	Roof of verandah	1	5.00	2.40	—	12.00	
					Total	26.08 cu m	
9.	**Sal wood work** in chowkhat —						
	Doors (including 4 cm insertion into floor) ...	2	5.08	.10	.08	0.081	2 Vert. — 2.04 m each 1 Hor.—1.00 m each
	Windows ...	3	4.80	.10	.08	0.115	2 Vert.—1.40 m each 2 Hor.—1.00 m each
					Total	0.196 cu m	

(Ex. 4 Contd.)

Item No.	Particulars of Items and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
10.	**4 cm thick Panelled shutters** of Deodar wood						
	Doors ...	2	0.87	1.935	—	3.367	15 cm rebate.
	Windows ...	3	0.87	1.27	—	3.315	
					Total	6.682 sq m	
11.	**Iron fittings including** screws and fixing for doors and windows ...	Same	as for	item	(10)	6.68 sq m	
12.	**Precast R. C. C. slab** shelve complete work including steel reinforcement and form work ...	3	1.08	0.20	0.05	0.032 cu m	4 cm bearing.
13.	**R. C. C. jali work 4 cm** thick in ventilators complete work including steel reinforcement and form work ...	2	.60	.30	—	0.36 sqm	
14.	**Mild steel in** Reinforcement bars including bending in R.B. work (at 0.7% of item 7) ...		$\frac{4.91 \times 7}{100}$	×	78.5 =	2.698 q	Density of mild steel = 78.5 q/cu m
	Hold fasts in doors and windows ...	24	@ 1 kg	each =	24 kg	= .24 q	6 nos. in each door and 4 nos in each window. *(Hold fasts may be taken under separate item).*
					Total	2.938 q	
15.	**2.5 cm c. c. 1:2:4 floor** over and including 7.5 cm lime concrete —						
	Room ...	1	4.20	3.00	—	12.60	L = Out to out — 2 dwarf walls. = (4.2 + 2 × .30 + 2 × .05) − 2 × .20 = 4.50 m
	Verandah ...	1	4.50	2.15	—	9.68	B = (2.0 + .30 + .05)−.20 = 2.15 m
					Total	22.28	

Item No.	Particulars of Items and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
	Deduct—Central pillars	1	.30	.15	—	0.045	
	Side pillars ...	2	.15	.15	—	0.045	
					Total	0.090	
				Net	Total	22.19 sq m	
16.	**2.5 cm c. c. 1:2:4: floor** (without lime concrete)—						
	Doors sills ...	2	1.00	.30	—	0.60	
	Sills of verandah opening—Front in between pillars...	1	3.90	.20	—	0.78	L = 4.80 – 3 × .30 = 3.90 m
	Sides ...	2	2.00	.20	—	0.80	
					Total	2.18 sq m	
17.	**12 mm Plastering in ceiling** with 1:3 cement and coarse sand mortar—						
	Room ...	1	4.20	3.00	—	12.60	
	Verandah ...	1	4.20	2.00	—	8.40	
					Total	21.00 sq m	
18.	**12 mm Plastering in walls** with 1:1:6 cement lime and local sand mortar **Inside**—						
	Room—						
	Long walls ...	2	4.20	—	3.50	29.40	
	Short walls ...	2	3.00	—	3.50	21.00	
	Jambs, sill and soffit of shelf	1	5.40	.20	—	1.08	L = 1.00 × 2 + 1.70 × 2 = 5.40 m
	Verandah—						
	Wall ...	1	4.20	—	2.80	11.76	
	Pillar inner face	7	.30	—	2.20	4.62	3 faces of central pillar and 2 faces of each end pillars.
					C.O.	67.86	

(Ex. 4 Contd.)

Item No.	Particulars of Items and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
					B.F.	67.86	
	Verandah above pillars (inner face)						
	front ...	1	4.20	—	.60	2.52	
	—Do— Sides ...	2	2.00	—	.60	2.40	
	Soffits of verandah lintels front ...	1	3.90	.30	—	1.17	L = 4.80 – 3 × .30 = 3.90 m
	Soffits of verandah lintel sides ...	2	2.00	.30	—	1.20	
	Vertical faces of inner wall below lintel ...	2	—	.30	2.20	1.32	
				Total	...	76.47	
	Deduct door openings ...	2	1.00	—	2.00	4.00	One surface to each.
				Net	Total	72.47 sq m	Total of inside plastering.
	Outside—						
	Room —						
	Back wall ...	1	4.80	—	3.50	16.80	
	Side walls ...	2	3.60	—	3.50	25.20	
	Plinth including 10 cm below G. L. and 5 cm offset back ...	1	4.90	—	.60	2.94	Ht. = .45 + .05 +.10 = .60 m
	— Do — Sides ...	2	3.65	—	.60	4.38	
	Front wall above verandah roof ...	1	4.80	—	.525	2.52	Ht. = 3.50 – 2.975 = .525 m
	Roof projections front and back ...	2	5.00	—	.25	2.50	Ht. = .15 + .10 = .25 m
	—Do— Sides ...	2	3.60	—	.25	1.80	
	Verandah pillar outer faces ...	5	0.30	—	2.20	3.30	One face of central pillar and two faces each of end pillars.
					C.O.	59.44	

Item No.	Particulars of Items and details of work	No.	Dimensions			Quantity or Content	Explanatory notes
			Length m	Breadth m	Height or Depth m		
	Verandah above pillars (outer face)				B.F.	59.44	
	front ...	1	4.80	—	.60	2.88	
	—Do— Sides ...	2	2.30	—	.60	2.76	
	Verandah Plinth wall front ...	1	4.90	—	.55	2.70	Step to be deducted.
	—Do— Sides ...	2	2.35	—	.55	2.59	
	Parapet walls (all four walls) ...	1	16.00	—	.875	14.00	Total centre length = 2 × 4.60 + 2 × 3.40 = 16.00 m Ht. = .30 + .20 + .375 = .875 m
					Total	84.37	
	Deduct—						
	Window openings ...	3	1.00	—	1.40	4.20	One face of each.
	Ventilators ...	—	—	—	—	—	No deduction.
	Step ...	1	2.00	—	.55	1.10	
					Total	5.30	
				Net	Total	79.07 sq m	Total of outside plastering.
		Grand and	total outside	of inside	plastering =	72.47 +	79.07 = 151.54 sq m
19.	**20 mm cement plaster 1:3** in steps finished with neat cement —						
	1st step —						
	Tread ...	1	2.60	.30	—	0.78	
	Rise ...	1	3.20	—	.15	0.48	
	2nd step—						
	Tread ...	1	1.40	.30	—	0.42	
	Rise ...	1	2.00	—	.15	0.30	
	Plinth wall ...	1	1.40	—	.15	0.21	
		2	0.30	—	.30	0.18	
					Total	2.37 sq m	

(Ex. 4 Contd.)

Item No.	Particulars of Items and details of work	No.	Dimensions: Length m	Dimensions: Breadth m	Dimensions: Height or Depth m	Quantity or Content	Explanatory notes
20.	**White washing 3 coats—**						
	Inside wall ...	Same	as inside plaster in item	(18)	..	72.47	
	Ceiling ...	Same	as ceiling plaster in item	(17)	..	21.00	
					Total	93.47 sq m	
21.	**Colour washing one coat** over two coats of white washing ...	Same	as out in item	side (18)	plaster ..	79.07	L = outer perimeter minus step. = (4.90 × 2 + 6.00 × 2) – 2.00 = 19.80 m
	Deduct portion below G.L. ...	1	19.80	—	.10	1.98	
					Total	77.09 sq m	
22	**Painting of doors and windows two** coats over one coat of priming—						
	Doors ...	2×2¼	1.00	—	2.00	9.00	1⅛ for one face.
	Windows ...	3×2¼	1.00	—	1.40	9.45	1⅛ for one face.
					Total	18.45 sq m	
23.	**Coal tarring two coats in** back of Chowkhats —						
	Doors ...	2	5.08	.10	—	1.02	Length same as chowkhats in item 9.
	Windows ...	3	4.80	.10	—	1.44	
						2.46 sq m	