

Name : Sarmad Mahmoed

ID - 7828

Sec - A

Subject : Quantity and Estimation

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to

①
Q#1 (a)

→ Solution

Quantity of wet material = 100 cft

Dry density of concrete = 1.54

• Quantity of dry material = 100×1.54
= 154 cft.

Ratio of concrete = 1:4:8

Sum of ratio = $1 + 4 + 8 = 13$.

Quantity of cement = $\frac{\text{Ratio of cement} \times \text{Dry}}{\text{Sum of ratio / material}}$

$$= \frac{1}{13} \times 154 = 11.78 \text{ CFT}$$

$$\text{No of bags} = \frac{11.78}{1.25} = 9.42$$

Let 9.42 \approx 10 bags.

• Quantity of sand = $\frac{\text{Ratio of sand} \times \text{Dry}}{\text{Sum of ratio material}}$

$$= \frac{4}{13} \times 154 = 47.12 \text{ CFT}$$

• Quantity of coarse agg = $\frac{\text{Ratio} \times \text{Dry}}{\text{Sum material}}$

$$= \frac{8}{13} \times 154 = 94.24 \text{ CFT}$$

②

→ Cement bags = 10
Sand = 47.12 CFT
Coarse Aggregate = 94.24 "
Brick work of 75 CFT and ratio
for that is given

Vol of Brickwork = 75 CFT

To find vol. of mortar
Taking 25% of brick work for
mortar

$$\frac{25}{100} \times 75 = 18.75 \text{ CFT (wet volume).}$$

For dry volume we multiply factor
1.27 with wet volume

$$\begin{aligned} \text{Dry} &= \text{wet} \times 1.27 \\ &= 18.75 \times 1.27 \end{aligned}$$

Dry Volume = 23.81 CFT.

For cement we have

$$= \frac{\text{Ratio of cement} \times \text{Dry Vol}}{\text{Sum of ratio}}$$

③

$$\text{Ratio} = 1:4$$

$$\text{Sum} = 5 = \frac{1}{5} \times 23.81$$

$$\text{Cement} = 4.76 \text{ CFT.}$$

$$1 \text{ bag} = 1.25 = \frac{4.76}{1.25}$$

$$= 3.8 \text{ bags.}$$

For Sand we have

$$\frac{\text{Ratio of sand} \times \text{Dry Vol}}{\text{Sum of ration}}$$

$$= \frac{4}{5} \times 23.81 = 19 \text{ CFT.}$$

No of bricks

$$\text{Vol} = 75 \text{ ft}^3$$

Taking 25%

$$\frac{25}{100} \times 75 = 18.75$$

Net brick work = Total Brickwork
-
Vol of mortar.

(4)

$$= 75 - 18.75$$
$$= 56.25 \text{ m}^3$$

$$\text{No. of bricks} = \frac{\text{Net brick work}}{\text{Vol of 1 brick}}$$

$$\text{Vol of 1 brick} = \frac{9}{12} \times \frac{4.5}{12} \times \frac{3}{12}$$

$$\text{No. of bricks} = \frac{56.25}{0.0703} = 800 \text{ bricks}$$

lets include 10% bricks wastage

$$\frac{10}{100} \times 800 = 80$$

$$\text{Net bricks} = 800 + 80 = 880 \text{ bricks}$$

(b)

→ Dry Vol : Vol of ingredients of concrete like sand, cement and aggregate in mix dry condition before adding water.

Wet Vol : Vol of ingredients of cement after adding water.

⑤

→ Using 1.27 and 1.54 :

When we calculate the masonry quantity for any masonry work we get the wet vol of masonry. If we want to calculate the required volume of sand and cement we need to convert the wet vol into dry vol. For estimation purpose dry vol can be 1.27 or 1.30.

$$\text{Dry Vol} = 1 + \frac{27}{100} \times 1 = 1.27.$$

1.54 is a factor that helps us convert wet vol of concrete into dry volume.

Purpose :

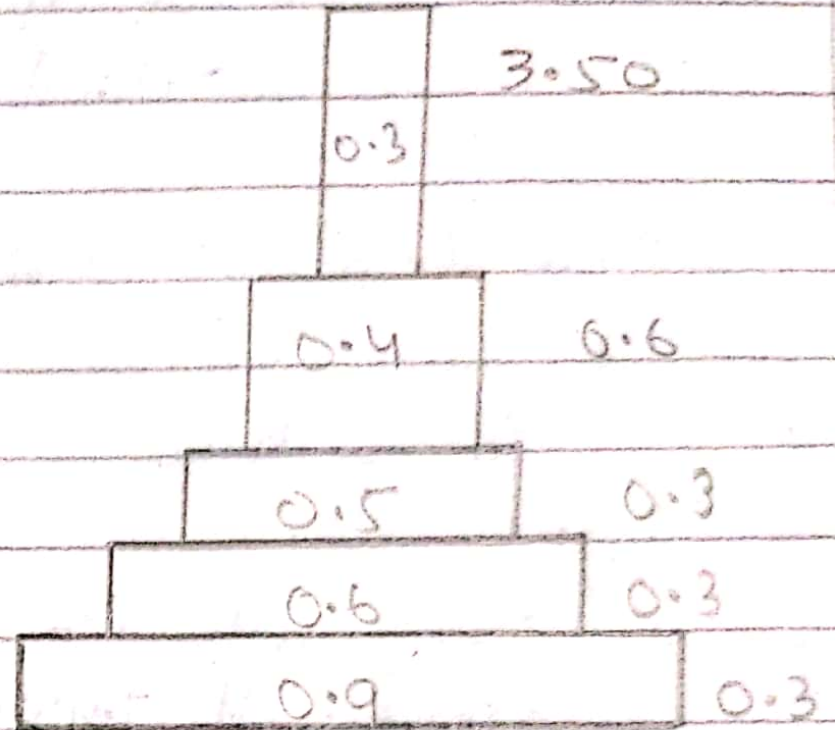
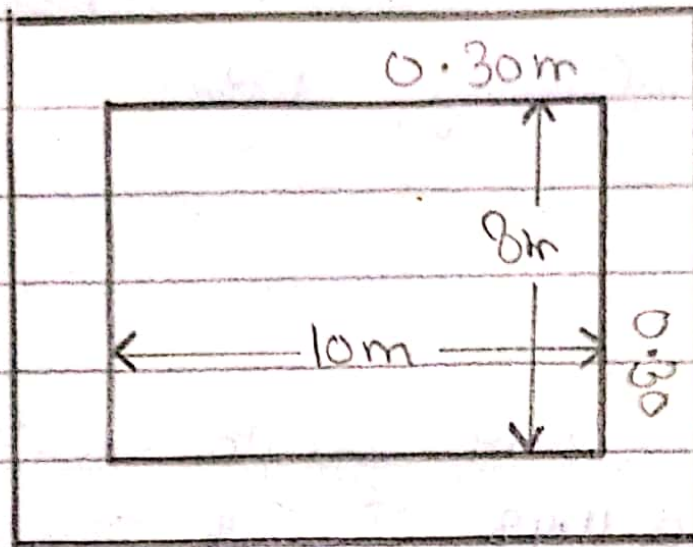
- To know the amount of money required.

- To know quantity of material used
- To justify the investment
- Assess the required tools plants and equipment to complete the work
- To ensure that project remains profitable.

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Q # 2

→ Solution :



$$\text{C/C length of long wall} = \frac{(0.30)}{2} + 10 + \frac{(0.30)}{2}$$

$$= 10.3 \text{ m}$$

$$\text{C/C length of short wall} = \frac{(0.30)}{2} + 8 + \frac{(0.30)}{2} = 8.3 \text{ m}$$

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→ Details of measurement and calculation of quantities.

Sr.n	Item	L(m)	B(m)	H(m)	Quantity	Note
1	Excavation in foundation					
	• Long wall	11.2	0.90	0.90	18.14	Lengths = $10.3 + 0.90 = 11.2$
	• Short wall	7.40	0.90	0.90	11.98	Breadth = $8.3 - 0.90 = 7.4$
					Total = 30.12	
2	Concrete in foundation					
	• long wall	11.2	0.90	0.30	6.04	L = $10.3 + 0.9 = 11.2$
	• Short wall	7.40	0.90	0.30	3.99	B = $8.3 - 0.9 = 7.40$
					Total = 10.03	
3	Brickwork in foundation and plinth.					
	• long walls:					Lengths :-
	→ 1st footing	10.9	0.60	0.30	3.92	$10.3 + 0.6 = 10.9$
	→ 2nd u	10.8	0.50	0.30	3.24	$10.3 + 0.5 = 10.8$
	→ Plinth walls	10.7	0.40	0.60	5.13	$10.3 + 0.4 = 10.7$

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Sr.n	Item	L(m)	B(m)	H(m)	Quantity	Note
	• Short walls					Lengths
	→ 1st footing	7.70	0.60	0.30	2.77	$8.3 - 0.6 = 7.70$
	→ 2nd u	7.80	0.50	0.30	2.34	$8.3 - 0.5 = 7.80$
	→ plinth walls	7.90	0.40	0.60	3.79	$8.3 - 0.4 = 7.90$
				Total =	8.90	

4 Brickwork
in
Super Structure

						Lengths
	long wall	10.6	0.30	3.50	22.26	$10.3 + 0.3 = 10.6$
	short wall	8.0	0.30	3.50	16.8	$8.3 - 0.3 = 8.0$

All the items described in the list are in number = 2.

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Q # 3

→ Solution :-

$$C.L = S(H) + S(V)$$

$$S(H) = 0.15 + 3 + 0.3 + 2 + 0.15 = 5.6 \text{ m}$$

no. of walls = 2

$$5.6 \times 2 = 11.2 \text{ m}$$

$$S(V) = 0.15 + 4 + 0.15 = 4.3 \text{ m}$$

no. of short walls = 3

$$4.3 \times 3 = 12.9$$

$$\begin{aligned} \rightarrow C.L &= 11.2 + 12.9 \\ &= 24.1 \end{aligned}$$

① Excavation of earthwork

$$B = 0.9 \text{ m} \quad H = 1.3$$

$$\begin{aligned} L &= C.L - \left(\frac{1}{2} \times B\right) \times \text{no. T junctions} \\ &= 24.1 - \left(\frac{1}{2} \times 0.9\right) \times 2 \end{aligned}$$

$$L = 23.2 \text{ m}$$

$$\rightarrow Q = L \times B \times H$$

$$\begin{aligned} &= 23.2 \times 0.9 \times 1.3 = 27.144 \text{ cu. m} \\ &\text{or } m^3 \end{aligned}$$

(10)
① Concrete work in foundation :-

$$B = 0.9 \text{ m}, H = 0.1 \text{ m}$$

$$L = \text{C.L} - B/2 \times \text{no. of T junction}$$

$$= 24.1 - 0.9/2 \times 2$$

$$= 23.2 \text{ m}$$

$$\text{Quantity} = 23.2 \times 0.9 \times 0.1$$

$$= 2.088 \text{ m}^3$$

② Brickwork in foundation :-

a) $B = 0.6 \text{ m}$ $H = 0.2 \text{ m}$

$$L = \text{C.L} - B/2 \times \text{no. of T junction}$$

$$= 24.1 - 0.6/2 \times 2$$

$$= 23.5$$

$$Q = 23.5 \times 0.6 \times 0.2 = 2.82 \text{ m}^3$$

b) $B = 0.5 \text{ m}$ $H = 0.2 \text{ m}$

$$L = 24.1 - 0.5/2 \times 2 = 23.6 \text{ m}^3$$

c) $B = 0.4 \text{ m}$ $H = 0.2 \text{ m}$

$$L = 24.1 - \frac{0.4}{2} \times 2$$

$$= 23.7$$

$$Q = 23.7 \times 0.4 \times 0.2$$

$$= 1.896 \text{ m}^3$$

④

$$d) \quad B = 0.3$$

$$H = 0.6$$

$$L = 24.1 - 0.3/2 \times 2$$

$$= 23.8$$

$$Q = 23.8 \times 0.3 \times 0.6$$
$$= 4.284 \text{ m}^3$$

Total quantity of brick work

$$= 2.82 + 2.36 + 1.896 + 4.284$$

$$Q = 11.36 \text{ m}^3 - \text{Ans.}$$