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Sec:- A

Subject:- Quantity Survey & Estimation

Instructor:- Engr. Imtiaz

Qno 1:-

Part (A)

Solution:-

Quantity of wet material = 100CFT

Dry Density of concrete = 1.54

Quantity of Dry material = $100 \times 1.54 = 154$ CFT

Ratio of concrete = 1:4:8

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

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

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

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

let $9.42 \simeq 10$ bags.

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

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

$$\text{Quantity of course agg} = \frac{\text{Ratio of course agg}}{\text{Sum of ratio}} \times \text{Dry material}$$

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

Cement bags = 10

Sand = 47.12 cft

Quantity of coarse aggs. = 94.24 cft

=> Brick work of 75 cft and Ratio for that is given 1:4

Volume of brick work = 75 cft

To find volume of morter:

Taking 25% of brickwork for mortars

$25/100 \times 75 = 18.75$ cft (wet volume)

For dry volume we have multiply factor 1.27 with wet volume

Dry volume = wet volume × 1.27

$= 18.75 \times 1.27 = 23.8$ cft

Dry volume = 23.81 cft

For a cement we have

$$\text{Quantity of cements} = \frac{\text{Ratio of cement} \times \text{Dry volume}}{\text{Sum of ratio}}$$

Ratio = 1:4

Sum of Ratio = 5 $\Rightarrow \frac{1}{5} \times 23.81$

Quantity of cement = 4.76 cft

1 bag = 1.25 $\Rightarrow \frac{4.76}{1.25} = 3.8$ bags = 4 bags

For A sand we have

Quantity of sand = $\frac{\text{Ratio of sand}}{\text{Sum of Ration}}$ × Dry volume

$= 4/5 \times 23.81 = 19.0 \text{ Ft}^3$

No. of bricks :-

We have vol = 75 Ft^3

Taking 25% of brick work for mortar

$\frac{25}{100} \times 75 = 18.75 \text{ Ft}^3$

Net brick work = Total brick work − vol. of mortar

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

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

Vol. of one brick = $\frac{9}{12} \times \frac{4.5}{12} + \frac{3}{12}$

$= 0.0703 \text{ Ft}^3$

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

let include 10% bricks wastage

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

Net no. of bricks = $800 + 80$

$= 880$ bricks.

Qno (1) Part (B)

Dry volumes

Volume of ingredient of concrete like sand, cement, & aggregate in mix dry condition before adding water.

Wet volumes

Volume of ingredient of concrete like sand, cement & aggregate in wet mix after adding water

Why we use 1.27 & 1.54

when we calculate the mortar quantity for any masonary work, we get the wet volume of mortar if we want to calculate the required volume of sand & cement, we need to convert that wet volume into dry volume, for estimation purpose dry volume can be 1.27 or 1.30

$$\text{Dry volume} = 1 + \left(\frac{27}{100} \times 1\right) = 1.27$$

1.5 is a factor help us to convert the wet volume of concrete into Dry volume.

"Purpose of Quantity & Estimation construction.

→ To justify the investment.

→ To know quantity of material used in Construction.

→ To know the amount of money required in Construction

→ Ensure that project remain profitable to the Contractor or not.

→ Asses to the required tool, plants & equipment to complete the work accordingly.

Qno 2)

Solution:-

C/C Lenght of long wall $= \left(\frac{0.30}{2}\right) + 10 + \left(\frac{0.30}{2}\right) = 10.3\,m$

C/C Lenght of short wall $= \left(\frac{0.30}{2}\right) + 8 + \left(\frac{0.30}{2}\right) = 8.3\,m$

Sr.no	Item Description	No	Length	Breadth	Height	Quantity	Note.
①	Excavation in Foundation						
	Long wall	2	11.2m	0.90	0.90	18.14	Length = 10.3 + 0.90 = 11.2m
	Short wall	2	7.40m	0.90	0.90	11.98	Breadth = 8.3 - 0.90 = 7.40m
					Total	30.12	
②	Concrete in Foundation						
	Long wall	2	11.2m	0.90	0.30	6.04	Length = 10.3 + 0.9 = 11.2m
		2	7.40m	0.90	0.30	3.99	Breadth = 8.3 - 0.90 = 7.40m
					Total	10.03	
③	Brickwork in Foundation & plinth						
	Long walls						
	1st Footing	2	10.9m	0.60m	0.30m	3.92	Length = 10.3 + 0.6 = 10.9m
	2nd Footing	2	10.8m	0.50m	0.30m	3.24	Length = 10.3 + 0.5 = 10.8m
	plinth walls	2	10.7m	0.40m	0.60m	5.13	Length = 10.3 + 0.4 = 10.7m

	Short walls						
	=> 1st Footing	2	7.7om	0.6om	0.3om	2.77	Length = 8.3 - 0.6 = 7.7om
	=> 2nd Footing	2	7.8om	0.5om	0.3om	2.34	Length = 8.3 - 0.5 = 7.8om
	Plinth work	2	7.9om	0.4om	0.6om	3.79	Length = 8.3 - 0.4 = 7.9om
					Total	8.90.	
9	Brick work in super-structure						
	Long walls	2	10.6m	0.3om	3.5om	22.26	Length = 10.3+0.3 = 10.6m
	short walls	2	8.02m	0.3om	3.50	16.8	Length = 8.3 - 0.3 = 8.0m
					Total	39.06	

Qno 3:-

Solution:-

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

$S(H) = 0.15 + 3 \times 0.3 + 2 + 0.15 = 5.6m$

No of walls = 2

So $5.6 \times 2 = 11.2m$

$S(V) = 0.15 + 4 + 0.15 = 4.3m$

No of short walls = 3

So $4.3 \times 3 = 12.9m$

$\Rightarrow C.L = 11.2 + 12.9 = 24.1m$

① Excavation or Earth work:-

$B = 0.9m \qquad H = 1.3m$

$L = C.L - (\frac{1}{2} \times B) \times$ no of T junctions

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

$L = 23.2m$

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

$= 23.2 \times 0.9 \times 1.3$

$Q = 27.144$ Cu.m or m^3

② Concrete work in Foundation:-

$B = 0.9m$, $H = 0.1m$

$L = C.L - B/2 \times$ no of T Junction

$= 24.1 - 0.9/2 \times 2$

$L = 23.2m$

Quantity $= 23.2 \times 0.9 \times 0.1$

$Q = 2.088 m^3$

③ Brick work in Foundation:-

a) Step 1:-

$B = 0.6m$, $H = 0.2m$

$L = C.L - B/2 \times$ No. of T. junction

$= 24.1 - 0.6/2 \times 2$

$L = 23.5$

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

b) Step 2:-

$B = 0.5m$, $H = 0.2m$

$L = 24.1 - 0.5/2 \times 2 = 23.6m$

$Q = 23.6 \times 0.5 \times 0.2 = 2.36 m^3$

c) Step 3:-

$B = 0.4m$, $H = 0.2m$

$L = 24.1 - 0.4/2 \times 2$

$L = 23.7m$

$Q = 23.7 \times 0.4 \times 0.2$

$= 1.896 m^3$

d) Step 4:

$B = 0.3m$, $H = 0.6m$

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

$L = 23.8\ m$

$Q = L \times H \times B$

$Q = 23.8 \times 0.3 \times 0.6$

$Q = 4.284 m^3$

Total Quantity of Brick work

$= 2.82 + 2.36 + 1.896 + 4.284$

$Q = 11.36 m^3$