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Subject :- QUANTITY & ESTIMATION

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①

Q No 1:-¹⁾ Determine the quantities of various material to prepare 100 CFT concrete if ratio is (1:4:8)?

Also calculate a brick work of 75 CFT and ratio for that given (1:4). calculate No. of bricks, Dry volume & Quantities of mortar?

Sol:-

Quantity of wet material = 100 CFT
Dry Density of concrete = 1.54

Quantity of dry material = 100×1.54

Quantity of dry material = 154 CFT

Ratio of concrete = 1:4:8

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

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

Quantity of cement = $\frac{1}{13} \times 154 = 11.84 \text{ CFT}$

$\therefore 1 \text{ bag} = 1.25 \text{ cft}$

And $\frac{11.84}{1.25} \Rightarrow 9.47 \text{ bags} = 10 \text{ bags}$

(2)

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

$$\text{Quantity of sand} = \frac{4}{13} \times 154 = \boxed{47.38 \text{ CFT}}$$

$$\text{Quantity of }^{\text{coarse}} \text{ aggregate} = \frac{\text{Ratio of coarse Ag}}{\text{Sum of ratio}} \times \text{Dry material}$$

$$\text{Quantity of coarse Aggregate} = \frac{8}{13} \times 154$$

$$\text{Quantity of coarse aggregate} = \boxed{94.76 \text{ CFT}}$$

$$\text{Volume of brick work} = 75 \text{ CFT}$$

Taking 25% of brick ~~work~~ work for mortar.

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

For dry volume we have a multiply factor 1.27 with wet volume of mortar.

(3)

$$\text{Dry volume} = \text{wet volume} \times 1.27$$

$$\text{Dry volume} = 18.75 \times 1.27$$

$$\text{Dry volume} = 23.81 \text{ CFT}$$

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

$$\text{Sum of Ratio} = 1+4=5$$

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

$$\text{Quantity of cement} = \frac{1}{5} \times 23.81$$

$$\text{Quantity of cement} = \boxed{4.76 \text{ CFT}}$$

(4)

Part B:-

Dry & wet volume of concrete:-

* Dry volume of concrete is the combination of volume of cement, fine aggregate, coarse agg: in dry condition.

* After mixing the resultant wet volume turns out to be approximately 60-70% of the dry volume. For estimation purpose, dry volume of concrete can be taken as 1.54 of its wet volume.

* For concrete $1m^3 = 54\%$
Dry volume = wet volume + 54%
of wet volume

$$= 1 + \left(\frac{54}{100 \times 1} \right)$$

$$= 1.054$$

$$\text{Dry volume} = 1.54.$$

(5)

When water is added to dry mix of cement sand the volume of dry mix is reduced. It happens due to the presence of air voids on sand particles.

* When ^{we} ~~the~~ calculate the mortar Qty for any masonry work we get the wet volume of mortar. If we want to calculate the required volume of sand & cement we need to convert that the volume into dry volume.

* For estimation purpose dry volume of mortar can be taken 1.278 to 1.54 times of its wet volume.

For cement mortar $1m^3$

27% or 54%

Dry volume = wet volume + 27% of wet volume.

⑥

$$= 1 + \left(\frac{27+1}{100} \right)$$

$$= 1 + 0.27$$

Dry Volume = $\boxed{1.27}$

Q No 2:-

8
7

S.No	Items Description	No	L	B	H/D	Qty Quan	Note
1)	Excavation of Foundation.						
	Long walls	2	11.20m	0.90m	0.90m	18.14 m ³	$10.30 + 0.90 = 11.20m$
	Short walls	2	7.4m	0.90m	0.90m	11.98 m ³	$8.30 - 0.90 = 7.4m$
						30.12 m ³	
2)	Concrete in Foundation						
	Long wall	2	11.20m	0.90m	0.30m	6.04 m ³	
	Short wall	2	7.4m	0.90m	0.30m	3.99 m ³	
						10.03 m ³	
3)	Brick work in Foundation & plinths						
	Long wall						
	1st footing	2	10.90m	0.60m	0.30	3.92 m ³	$L = 10.30 + 0.60 = 10.9m$
	2nd footing	2	10.80m	0.50	0.30	3.24 m ³	$L = 10.30 + 0.50 = 10.8m$
	Plinth walls	2	10.70m	0.40	0.30	2.56 m ³	$L = 10.30 + 0.40 = 10.7m$
	Short walls						
	1st footing	2	7.70m	0.60	0.30	2.77 m ³	$L = 8.30 - 0.60 = 7.7m$
	2nd footing	2	7.80m	0.50	0.30	2.34 m ³	$L = 8.30 - 0.50 = 7.8m$
	Plinth walls	2	7.90m	0.4	0.30	1.89 m ³	$L = 8.30 - 0.40 = 7.90m$
						16.72	
4)	Brickwork in super structure						
	Long wall	2	10.60m	0.30m	3.50m	22.86 m ³	$10.30 + 0.30 = 10.60m$
	Short walls	2	8m	0.30m	3.50m	16.80 m ³	$8.30 - 0.30 = 8m$
						39.66 m ³	

QNO 3:-

Sol:-

Center line = SH + SV
First we find Horizontal

$$H = 0.15 + 3 + 0.30 + 2 + 0.15 = 5.6 \\ = 5.6 \times 2 = 11.2 \text{ m}$$

$$V = 0.15 + 4 + 0.15 = 4.3 \\ = 4.3 \times 3 = 12.9 \text{ m}$$

$$C.L = 11.2 + 12.9 = \boxed{24.8} \text{ m}$$

S.No	Description	No	L	W	H	Q
1)	Excavation in Foundation Length $= L - L - \frac{W}{2} \times \text{No. of Junction}$ $24.8 - \frac{0.9}{2} \times 2$ $= 23.9$	1	23.9	0.9	0.9 1.3	26.1 m ³
2)	P.C.C in Foundation. Length = $24.8 - \frac{0.9}{2} \times 2$ $= 23.9$	1	23.9	0.9	0.10	2.15 m ³

(9)

S No	Description	No	L	W	H	Q
3)	Brick masonry in Found. Step 1 = $24.8 - \frac{0.6}{2} \times 2$ = 24.2	1	24.2	0.6	0.2	2.904 m ³
	Step 2:- $L = 24.8 - \frac{0.5}{2} \times 2$ = 24.3	1	24.3	0.5	0.2	2.43 m ³
	Step 3:- $L = 24.8 - \frac{0.4}{2} \times 2$ = 24.4	1	24.4	0.4	0.2	1.952 m ³
	Step 4:- up to ground level Length = $24.8 - \frac{0.3}{2} \times 2$ = 24.5	1	24.5	0.3	0.6	4.4 m ³