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Name = Khalid Khan

ID = 7936

Section = B-

Paper = Estimation.

$$Q = 1!$$

$$\text{Part} = 9!.$$

100 cft concrete.
Ratio = (1:4:8).

Solution:-

Quantity of wet m = 100cft
Dry density of concrete = 1.54

Quantity of dry material =

$$100 \times 1.54 = 154 \text{ cft.}$$

Ratio of concrete = 1:4:8
Sum of ratio = 1+4+8 = 13

Quantity of cement = Ratio
of cement / Sum of ratios
Dry material

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

$$\frac{11.78}{1.25} = 9.42 \text{ bags}$$

Quantity of Sand = Ratio of Sand / Sum of ratios \times Dry material

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

Quantity of coarse agg = Ratio of coarse agg / Sum of ratios \times Dry material

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

also calculate a brick work of 75 cft.
Ratio = (1:4) -

Required:-

No. of bricks = ?

Dry volume = ?

Quantities of mortar = ?

Sol:-

Volume of bricks w = 75 cft

To find volume of mortar;

Taking 25% of brick work

$$\begin{aligned} \text{of mortar} &= 25/100 \times 75 \\ &= 18.75 \text{ cft (wet v)} \end{aligned}$$

for Dry Volume we have to multiply factor 1.27 with wet volume of mortar.

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

~~18.75~~

$$18.75 \times 1.27 = 23.81 \text{ cft}$$

Now cement = ?
 Sand = ?
 Bricks = ?

Cement:-

Quantity of cement = Ratio of cement / Sum of ratio \times Dry M.

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

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

$$\text{Dry Volume} = 23.81 \text{ cft}$$

$$= 1/5 \times 23.81 = 4.76 \text{ cft}$$

$$(1 \text{ bag} = 1.25 \text{ cft})$$

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$$4.76 / 1.25 = 3.8 \text{ bags.}$$

Sand :-

Quantity of Sand = Ratio of Sand / Sum of Ratio \times Dry m

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

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Bricks :-

Quantity of Bricks = Ratio of Sand / Sum of Ratio \times Dry m

$$\frac{1}{5} \times 23.81$$

$$= 4.762$$

$$= 4.676 \times 18.75$$

$$= 89.2$$

$$= 90 \text{ Brick}$$

B:-

Dry & wet Volume of Concrete:-

Dry Volume of concrete is the combined volume of cement, fine aggregates & 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

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

$$= 1 + 0.54$$

$$\text{Dry Volume} = 1.54$$

Dry & wet volume of Mortar:-

When water is added to the dry mix of Cement-Sand the volume of dry mix is reduced. It happens due to the presence of air voids in sand particles.

When we calculate the mortar quantity for any masonry work, we get the wet volume of mortar. If we want to calculate the required volume of sand and cement, we need to convert that wet volume into the dry volume.

For estimation purposes, dry volume of mortar can be taken 1.27 & 1.54 times of its wet volume.

For cement mortar $1m^3$
 $\approx 27\%$ or 54%

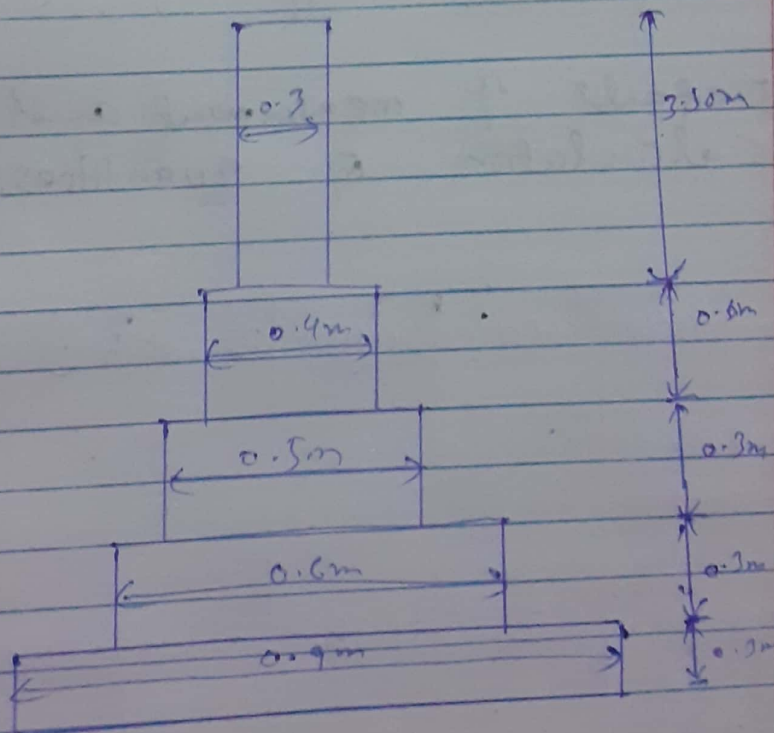
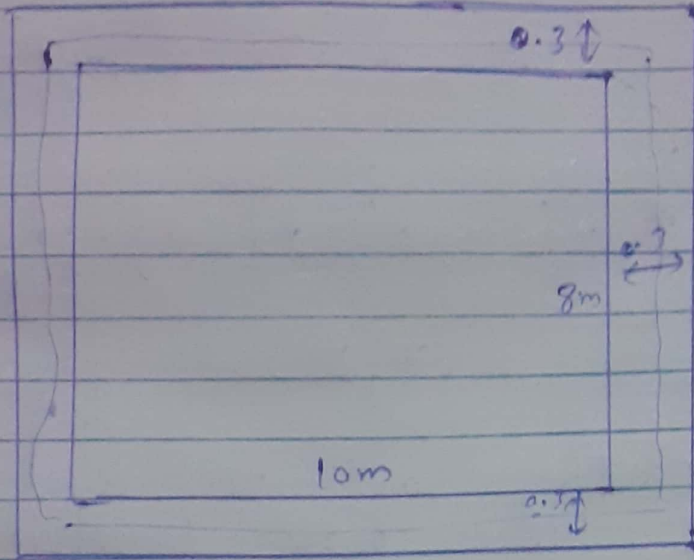
$$\text{Dry Volume} = \text{Wet Volume} + 27\% \text{ of Wet Volume}$$

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

$$= 1 + 0.27$$

$$\text{Dry Volume} = 1.27$$

Q = 2 :-



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$$\begin{aligned} \text{Centre to centre of long wall} \\ &= 10 + \left(\frac{1}{2} \times 0.30\right) + \\ &\quad \left(\frac{1}{2} \times 0.30\right) = 10.95\text{m} \end{aligned}$$

$$\begin{aligned} \text{Centre to centre of short wall} &= \\ &8 + \left(\frac{1}{2} \times 0.30\right) + \left(\frac{1}{2} \times 0.30\right) \\ &= 8.3\text{m} \end{aligned}$$

After finding out the length of the long wall & short wall, now find the quantity of the various item which are used in construction.

Details of measurement and calculation of quantities:-

Detail & measure

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S.No	Descr	No	L	B	h	Q
①	Excavate in foundation					
	Long wall	2	11.85m	0.90m	0.90m	19.197
	Short wall	2	7.4m	0.90m	0.90m	11.988
						<u>Total = 31.185 cum</u>

②	Concrete foundation					
	Long w	2	11.85m	0.90m	0.30m	6.399
	Short w	2	7.4m	0.90m	0.30m	3.996
						<u>Total = 10.395.</u>

③	Brick work in foundation & plinth.					
	Long wall					
	1st foot	2	11.55m	0.60m	0.30m	4.158
	2nd "	2	11.45m	0.50m	0.30m	3.435
	Plinth wall	2	11.35m	0.60m	0.60m	5.498

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Short wall					
1st fact	2	7.40m	0.60m	0.30m	2.664
2nd "	2	7.30m	0.50m	0.30m	2.19
Plinth w	2	7.30m	0.40m	0.60m	3.46
<u>Total =</u>					<u>21.351 cum</u>

(04)

Brick wall in Super Str					
Long wall	2	11.25m	0.30m	3.50m	23.625
Short "	2	8m	0.30m	2.50m	16.8
<u>Total =</u>					<u>40.425</u>

Q231

Sol

Center line calculation.

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

$$S(H) = (0.15 + 4 + 0.3 + 2 + 0.3)$$

$$= 6.75$$

$$6.75 \times 2$$

$$= \underline{13.5m}$$

$$V = (0.15 + 3 + 0.15)$$

$$= 3.3m$$

S₀

$$3.3 \times 3 = \underline{9.9m}$$

Center line calculation.

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

$$C.L = 13.5 + 9.9$$

$$= \underline{23.4}$$

	Des	L	B	H	Q
1	Excavation of foundat	22.5	0.9	1.3	26.32
2	PCC foundation	22.5	0.9	0.10	2.02
3	Brick in foundation.				
	Step#1	22.8	0.6	0.2	2.736
	Step#2	22.9	0.5	0.2	2.29
	Step#3	23	0.4	0.2	1.84
	Step#4	23.1	0.3	0.6	4.158

Total brick work quantity
= 11.004 m³.