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SEMESTER :: SUMMER (MIDTERM)

SECTION :: A

SUBMITTED TO :: SIR IMTIAZ

DEPARTMENT :: CIVIL ENGINEERING

Q No 1

PART A

Solutions-

Given that

Quantity of wet material
 $= 10 \text{ CFT}$

Dry density of concrete $= 1.54$

\Rightarrow Quantity of dry material
 $= 10 \times 1.54$
 $= 15.4 \text{ CFT}$

Ratio of concrete $= 1:4:8$
(Given)

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

Quantity of cement

$\frac{\text{Ratio of cement}}{\text{sum of ratio}} \times \text{Dry materials}$

(2)

Putting values in above equation
 $= \frac{1}{13} \times 154 = 11.784 \text{ ft}$
OR

* Quantity of sand :- $\frac{\text{Ratio of Sand}}{\text{Sum of ratio}} \times \text{dry materials}$
 $= \frac{4}{13} \times 154 = 47.124 \text{ ft}$

* Quantity of coarse aggregate :-

$= \frac{\text{Ratio of coarse aggregate}}{\text{Sum of ratio}} \times \text{Dry materials}$

$= \frac{8}{13} \times 154 = 92.24 \text{ cft}$

Brick portion

Size of brick
 $= 9'' \times 4.5'' \times 3''$

Volume of brick = 121.5 Inch^3

Volume of brick wall = 75 ft^3

No of bricks without mortar

$$= \frac{75}{\left(\frac{121.5}{(12)^3}\right)}$$

$$\left(\frac{121.5}{(12)^3}\right)$$

$$\therefore \frac{121.5 \text{ Inch}^3 \text{ to}}{(12)^3 \text{ feet}}$$

$$= \frac{75}{0.070^3}$$

No of Bricks = 1066.85

OR

1067

Q No 1 PART B

Dry and wet

Volume of concrete :-

(4)

Solution:- Dry volume of concrete is the combined volume of cement, fine aggregates and coarse agg in dry condition.

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

for concrete $1\text{m}^3 = 54\%$.

Dry volume = wet volume + 54%
of wet volume

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

$$= 1 + 0.54$$

$$\text{Dry volume:- } 1.54$$

S

Dry and 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 presence of air voids in sand particles. When we calculate the another quantity 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 wet volume into the dry volume.

(6)

For estimation Purpose
dry volume of mortar
can be taken 1.27 and
1.54 times of its wet
volume.

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

Dry Volume = wet volume + 27%
or wet volume

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

$$= 1 + 0.27$$

Volume 1.27 Ans

→ α — α — α

Q No 2

S No
(1)

Item Description
Excavation in foundation
Long wall
Short wall

No
2
2

length (7)
11.20m
7.4m

Breadth
0.90m
0.90m

Height
0.90m
0.90m

Quantity
18.14
11.98
30.12 Cement

Note
 $10.3 + 0.90 = 11.2m$
 $8.3 - 0.90 = 7.4m$

(2)

Concrete & found
long wall Short wall

2
2

11.20m
7.4m

0.90m
0.90m

0.30m
0.30m

6.04
3.99
10.03 Cement

(3)

Brickwork in foundation and
path 1st footing
2nd footing
Plinth wall
Short wall
1st footing
2nd footing
Plinth wall

2
2
2
2
2
2
2

10.9m
10.80m
10.70m
7.70
7.80
7.90

0.60
0.56
0.40
0.60
0.56
0.40

0.30
0.30
0.30
0.30
0.30
0.30

3.92
3.24
2.56
2.77
2.34
1.89
16.72
CMT

$L = 10.3 + 0.6 = 10.9m$
 $L = 10.3 + 0.50 = 10.8m$
 $L = 10.3 + 0.40 = 10.7m$
 $8.30 - 0.60 = 7.7m$
 $8.30 - 0.50 = 7.8m$
 $8.30 - 0.40 = 7.2m$

(4)

Brickwork
In Super Structure
long wall
Short wall

2
2

10.6m
8m

0.30m
0.30m

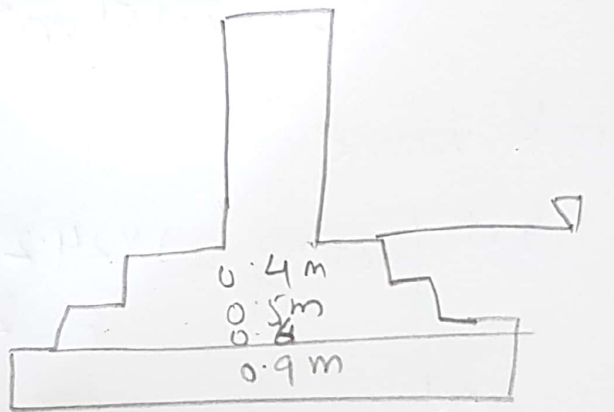
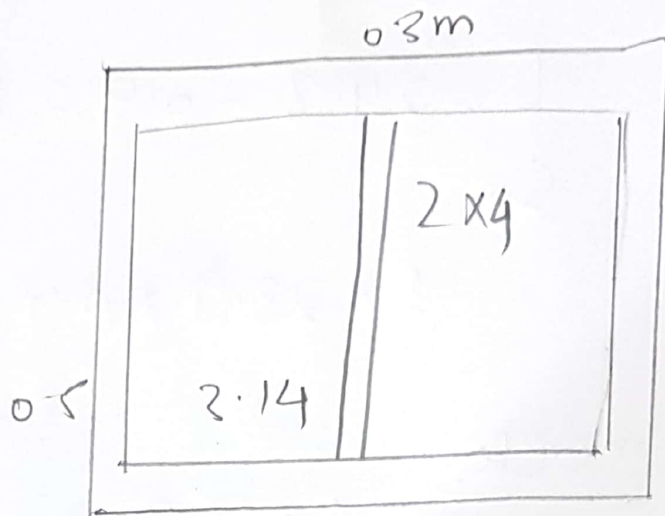
3.50m
3.50m

22.26
16.80
39.06
CMT

$10.30 + 0.30 = 10.6m$
 $8.30 - 0.30 = 8m$

(8)

Q No 3



Concrete

$$V = 0.15 + 4 + 0.15 = 4.3$$

$$EV = 3 \times 4.3 = 12.9$$

~~$$H = 3 \times 4.3 = 12.9$$~~

$$H = 0.15 + 3 + 0.3 + 2 + 0.15 = 5.6$$

$$EN_2 = 2 \times 5.6 = 11.2$$

Centre line length

~~$$= 11.2 + 12.9$$~~

$$= 24.8$$

(9)

Excavation:-

$$L = 24.8 - 0.9 = 23.9$$

So

$$1 \times 23.9 \times 0.9 \times 0.5 = 10.755 \text{ m}^3$$

Concrete:-

$$1 \times 23.9 \times 0.9 \times 0.1 \\ = 2.151 \text{ m}^3$$

Brick work

$$1^{\text{st}} \text{ footing} = 1 \times 24.2 \times 0.6 \times 0.2 \\ = 2.904 \text{ m}^3$$

$$2^{\text{nd}} \text{ footing} = 1 \times 24.3 \times 0.5 \times 0.2 \\ = 2.43 \text{ m}^3$$

$$3^{\text{rd}} \text{ footing} = 1 \times 24.4 \times 0.4 \times 0.2 \\ = 1.952 \text{ m}^3$$

$$\text{Brick wall} = 1 \times 24.5 \times 0.3 \\ \times 0.6 = 4.41 \text{ m}^3$$

— α — α —

End