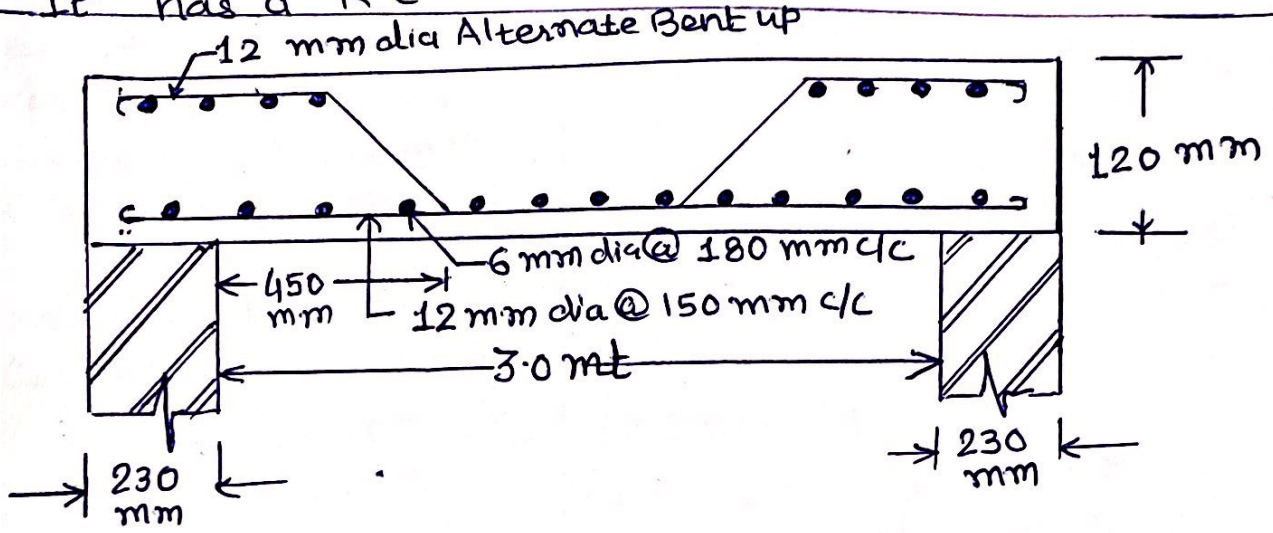
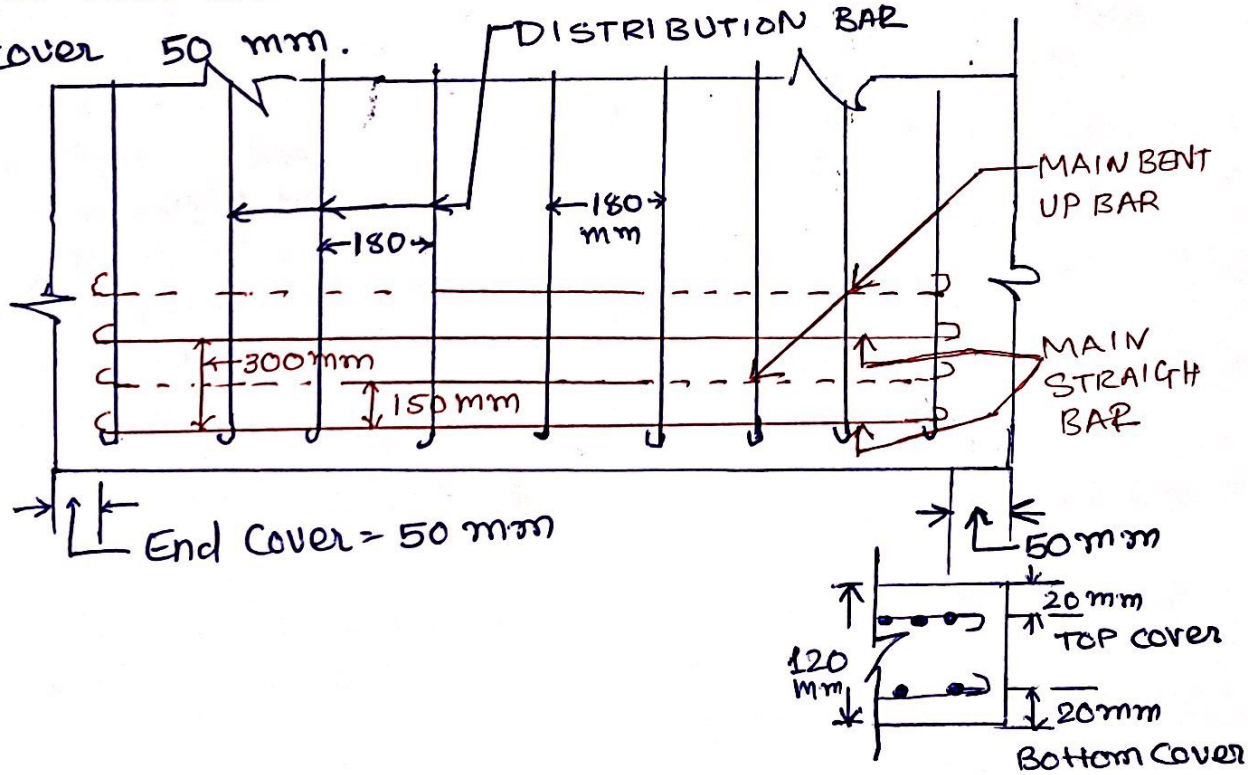
Estimate Of R.C.C. Slab

→ A room has a clear dimentions 3.0m×4.0m It has a R.C.C. slab as shown in beloo.



TOP and Bottom Cover is 20 mm and end Cover 50 mm.



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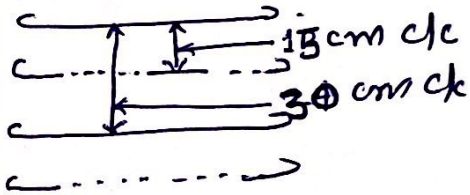
MEASUREMENT SHEET

Item No	Item Description	NO	L	B	H or D	Quantity.
(1)	R.C.C. work (1:1.5:3) excluding steel and its bending but including centering and shuttering and binding steel.	1	4.46	3.46	0.12	1.85 cu.m. L = 4+.23+.23 = 4.46 B = 3+.23+.23 = 3.46 D = 120 mm = 0.12 m
(2)	FORM work of slab centering and shuttering					
	Bottom	1	4.0	3.0	-	12.0 sq.m.
	Sides.	2	4.46	-	0.15	1.34 sq.m
		2	3.46	-	0.15	1.04 sq.m.
						14.38 sq.m.
(3)	Steel bars including bending (mild steel) in R.C.C. work 1. Main Bars → Straight bars → Bent up bars As Alternate bars are bent up spacing between Straight bars is 30 cm c/c. NO of Straight Bar = (Total span − 2 (side cover) / spacing) + 1 ∴ NO = (4.46 − 0.1)/0.3 + 1 = 15.53 ≈ (16)					Alternate Bar is bent up.  Total span = 4+.23+.23 = 4.46 2x side cove = 2x.05 = 0.1 Spacing = 30 cm = 0.3 mt L = 3.0+.23+.23+18D−2 x cov. = 3+.46+18(.012) − 2x(0.05) cover = 3.46+0.216−.1 = 3.576 ≈ 3.58 mt

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MEASURMENT SHEET.

Item No	Item Discription	NO	L	B	H or D	Quantity.
	→ STRAIGHT BAR as 12 mm dia so $\frac{D^2}{162} = \frac{(12)^2}{162} = 0.89$ kg/m	16	3.58	@	0.89 kg/m	∴ 50.98 kg.
	→ BENT UP BAR. NO = $\frac{4.46 - 0.1}{0.3} \cong 15$	15	3.64	@	0.89 kg/m	Length of Bent up Bar = ∴ 48.59 kg.
	Length = Length of Straight bar + 2 x bent up = 3.58 + 2(.45x.068) = 3.64 mt					1 bent up = .45x, 2 bent up = 0.9x. x = .12 − 2(cover) − 2(half dia) ∴ x = .12 − 2(.02) − 2(.006) x = .12 − .04 − .012 x = .068
			Total = 99.57 kg			
(4)	6 mm dia distribution steel bar @ 180 mm c/c. Bars at Bottom. No of Bars = $\frac{\text{Span} - 2 \text{ side cover}}{\text{Spacing}} + 1$ = $\frac{(3+.23+.23) - 2(.05)}{0.18} + 1$ = 19.66 ≅ 20 Nos.					Length of distribution bar L = 4 + .23 + .23 + 18D − 2 cover L = 4.46 + 18(.006) − 2(.05) L = 4.468 ≅ 4.47 mt

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MEASURMENT SHEET.

Item No	Item Discription	NO	L	B	H or D	Quantity
	Distribution bars at Bottom = 20 Nos.					Length of Distribation bar is 4.47 mt. Dia is 6mm
	Bars at top					$\frac{\phi^2}{162} = \frac{(6)^2}{162}$
	At top Left & Right side bars are provided.					$= 0.22 kg/m$
	∴ Width of slab at one side					
	$= 0.23 + 0.45 - 0.068 - .05$					
	$= 0.562$ m					
	spacing of distribution bar is 180 mm c/c	30	4.47	@ 0.22kg/m		29.50 kg.
	∴ No of bars at one side $= \frac{0.562}{0.18} + 1$					
	$= 4.122$					
	$\simeq$ 5 Nos.					
	so Both side					
	No of Bars = 5+5 = 10					
	∴ Total Nos = 20+10 = 30					

Material Calculation – Cement, Sand, Aggregate for slab

R.C.C. slab Praposion = 1 : 1.5 : 3

1 Part cement
1.5 Part Sand
3 Part Aggregate

Volume of Dry concrete = $1.52 \times 1.85 = 2.812 m^3$

(Dry. Vol. is 52% more than Vol.)

$1 + 1.5 + 3 = 5.5$

(1) ∴ Cement $= \frac{1}{5.5} \times 2.812 = 0.511 m^3$ ∴ No Bags $= \frac{0.511}{0.035} = 14.6$ beg $\simeq$ 15 beg.

(2) ∴ Sand $= \frac{1.5}{5.5} \times 2.812 = 0.766 m^3$.

(3) ∴ Aggregate $= \frac{3}{5.5} \times 2.812 = 1.53 m^3$

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PERCENTAGE OF STEEL IN SLAB

IN GIVEN SLAB TOTAL WEIGHT OF STEEL

= Weight of Main Steel bar + Weight of Distribution bar.

= 99.57 kg + 29.50 kg = 129.07 kg

Now Volume of Steel = $\frac{\text{mass}}{\text{density}} = \frac{\text{kg}}{\text{kg/m}^3} = \text{m}^3$.

$\therefore$ Vol. of Steel = $\frac{129.07\ \text{kg}}{7850\ \text{kg/m}^3} = .0164\ \text{m}^3$

Now Volume of Concrete from Q+4 sheet = 1.85 m³.

FOR FINDING % of Steel in Slab

$$\text{Percentage of Steel} = \frac{\text{Volume of Steel}}{\text{Volume of Concrete}} \times 100$$

$$= \frac{0.0164\ \text{m}^3}{1.85\ \text{m}^3} \times 100$$

$$= 0.889\ \%$$

$\therefore$ % of Steel in Slab = 0.889 %.

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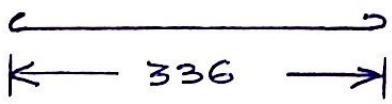
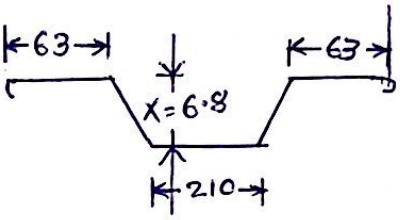
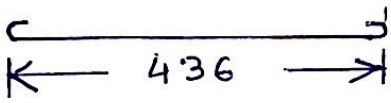
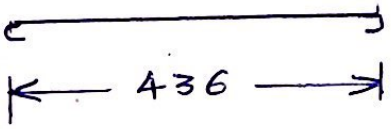
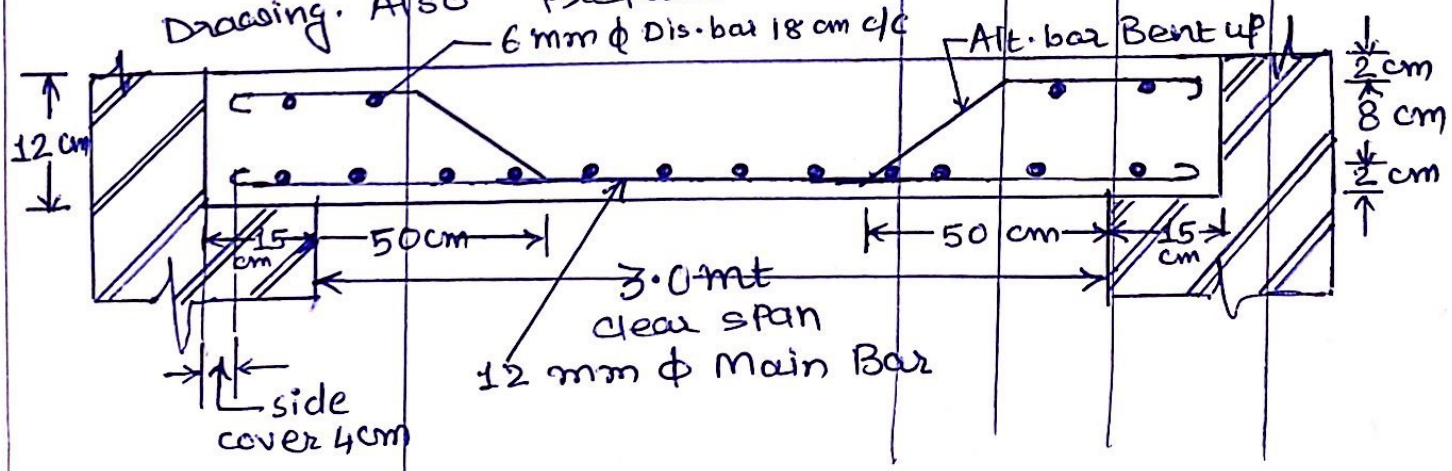
BAR BENDING SCHEDULE

SCHEDULE OF BARS – R.C.C. SLAB

DISCRIPTION OF BAR	SHAPE OF BENDING LENGTH IN cm	LENGTH	NO	TOTAL LENGTH	WEIGHT kg.
Main Straight bars 12 mm dia. @ 0.89 kg/m		3.58	16	57.28	50.98
Main Bent-up bar 12 mm dia @ 0.89 kg/m		3.64	15	54.60	48.59
Bottom Distribution bar 6 mm dia @ 0.22 kg/m		4.47	20	89.40	19.67
Top Distribution bar 6 mm dia @ 0.22 kg/m		4.47	10	44.70	9.83

EXERCISE

→ Prepare a Detailed estimate of R.C.C. Roof slab of 3 mt clear span and 6 mt long from given Drawing. Also prepare schedule of bar.



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