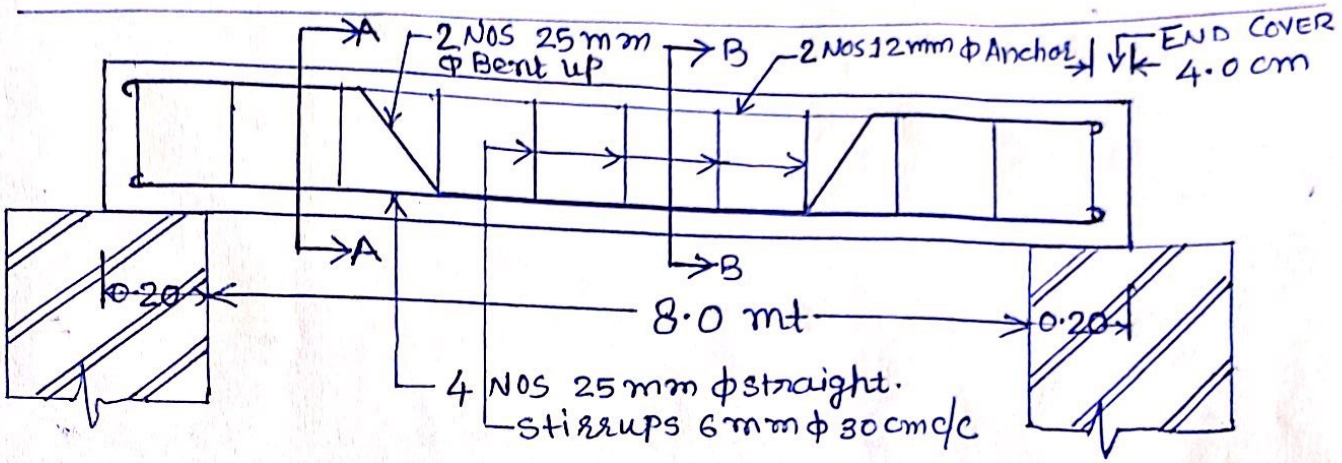
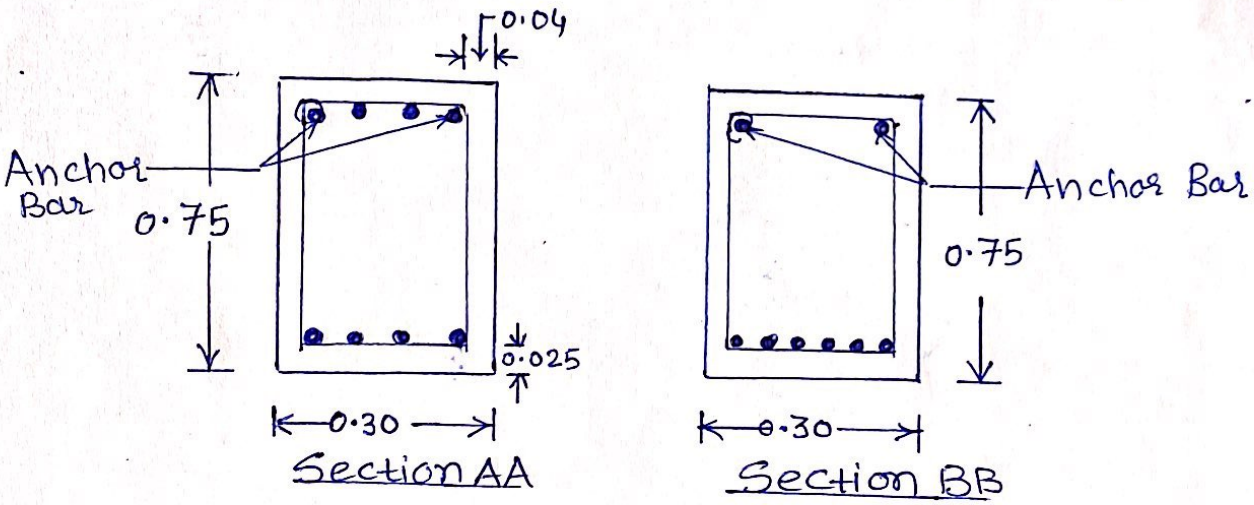
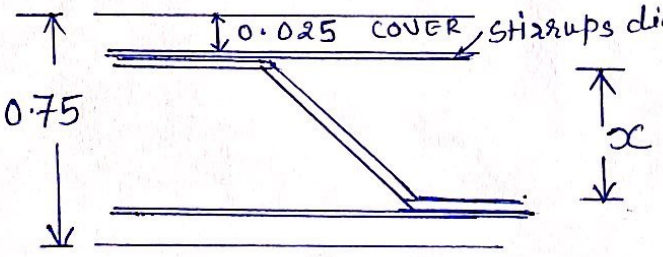
ESTIMATE OF R.C.C. BEAM

⟹ Prepare a detailed Estimate of a R.C.C. Beam of 8.0 mt clear span and 30×75 cm in Section. From the given drawing Calculate R.C.C. work, FORM work and steel in details. Also Prepare a schedule of Bar.





Two Bars of 25 mm ϕ are Bent up



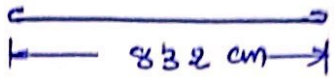
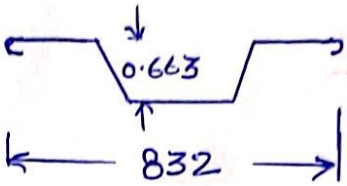
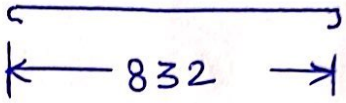
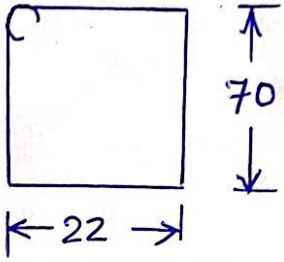
$$x = 0.75 - 2(0.025) - 2(0.006) - 2\times\frac{1}{2}(.025)$$

$$x = 0.663 \text{ mt.}$$

MEASURMENT SHEET

Item No	Item Discription	NO	L	B	H / D	Quantity.
1	R.C.C. Beam. R.C.C. work 1:2:4 excluding steel and its Bending but including Centering & shuttering.	1	8.4	0.3	0.75	1.189 m^3. (L = 8+.2+.2 = 8.4, B×D = .3×0.75) 1.89 m^3
2.	FORM WORK for Beam. Centering & Shuttering Bottom of beam sides of beam ends of beam	 1 2 2	 8.0 8.4 —	 0.3 — 0.3	 — 0.75 0.75	 2.4 m^2 12.6 m^2 0.45 m^2 15.45 m^2
3	Steel bars including Bending in R.C.C. work ⇒ Main Straight bar 25 mm ϕ	4	8.77 @ 3.86 kg/m			L = 8.4 − 2 side cover + 2 hooks = 8.4 − .08 + 18(.025) 135.41 kg ①
	⇒ Main Bent up bar L = Length of straight bar + 2 (bent up) L = 8.77 + 2 × (.45 × 0.663) = 9.37	2	9.37 @ 3.86 kg/m			72.34 kg ② $\frac{\phi^2}{162} = \frac{(25)^2}{162}$ = 3.86 kg/M ① + ② Total = 207.75 kg
	⇒ 12 mm ϕ Anchor Bar L = 8.4 − 2 cover + 2 hook = 8.4 − 2(.04) + 18(.012) ≈ 8.54 mt	2	8.54 @ 0.89 kg/m			$\frac{\phi^2}{162} = \frac{(12)^2}{162} = 0.89$ 15.20 kg
	⇒ Stirrups 6 mm ϕ 30 cm c/c. L = 8.4 − 2 cover = 8.4 − .08 ∴ L = 8.32 mt NO = $\frac{8.32}{0.3} + 1 = 29$	29	1.984 @ 0.22 kg/m			12.66 kg  Length = 2A + 2B + 24D A = 0.3 − 2×.04 = B = 0.75 − 2×.025 = ∴ L = 2(.22) + 2(.7) + 24 = 1.984

SCHEDULE OF BARS - R.C.C. BEAM.

DISCRIPTION OF BAR	SHAPE OF BENDING LENGTH IN CM	LENGTH	NO	TOTAL LENGTH	WEIGHT Kg.
Main Straight Bar 25 mm dia		8.77	4	35.08	135.41
Main Bent up Bar 25 mm dia		9.37	2	18.74	72.34
					207.75 Kg
Anchor Bar 12 mm dia.		8.54	2	17.08	15.20 Kg
Stirrups 6 mm dia 30 cm c/c.		1.984	29	57.54	12.66 Kg

Material Calculation R.C.C. Beam (1:2:4)

Cement + sand + Aggregate = 1 + 2 + 4 = 7

Qty of R.C.C. Beam = 1.89 m^3.

Req. Dry Volume of C.C = $1.52 \times 1.89 = 2.87\ M^3$.

Volume of Cement = $\frac{2.87}{7} = \underline{0.41\ m^3}$

No of Cement bags = $\frac{0.41}{.035} = \underline{12\ bags}$

∴ Vol. of Sand = $2 \times .41 = \underline{0.82\ m^3}$

Vol. of Aggregate = $4 \times .41 = \underline{1.64\ m^3}$

% Steel → Vol. of Steel = $\frac{\text{Total wt of Steel}}{\text{Density}} = \frac{207.75 + 15.20 + 12.66\ Kg}{7850\ Kg/m^3}$

$= 0.03\ m^3$

% of Steel = $\frac{0.03 \times 100}{1.89} = 1.58\ \%$. $\underline{1.58\ \%}$