ALUMNO(A): GRISEYDA JOACHIN VELAZQUEZ

DOCENTE: ARQ. PEDRO ALBERTO GARCIA LOPEZ

MATERIA: ANALISIS DE ESTRUCTURAS

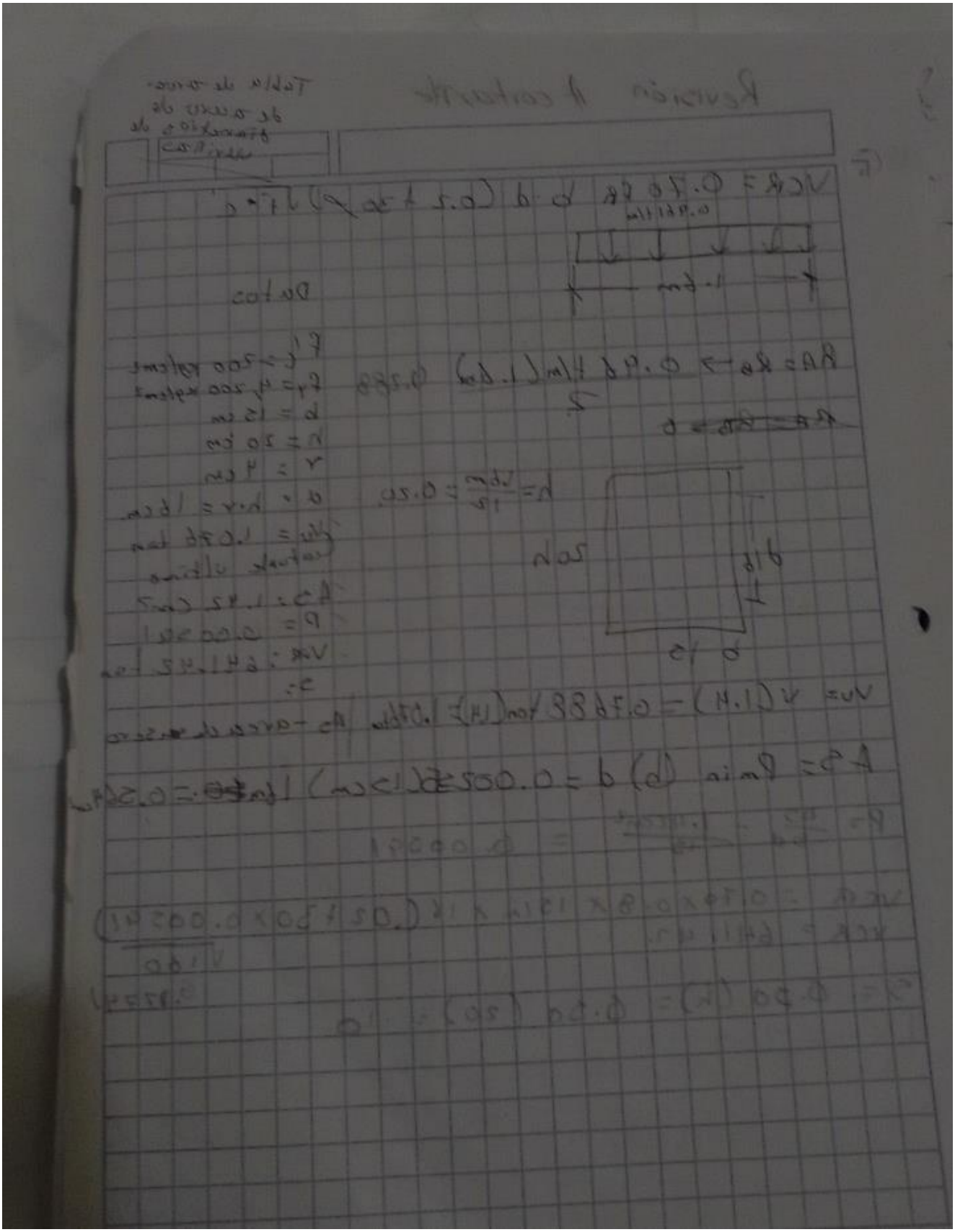
ACTIVIDAD: ACTIVIDADES

CUATRIMESTRE: 5° CUATRIMESTRE

GRUPO: A

LUGAR Y FECHA: 18/02/2023

Comitán de Domínguez Chiapas 2023



Columnas

$f'c = 200\ kg/cm^2$

$f''c = 0.8\ f'c \rightarrow 0.8\ 200\ kg/cm^2 = 160\ kg/cm^2$

$f'''c = 0.85\ f''c = 0.85 \cdot 160\ kg/cm^2 = 136\ kg/cm^2$

$\rho_{max} = \frac{0.75\ \rho_b}{f_y} \rightarrow \frac{0.75\sqrt{200\ kg/cm^2}}{4200\ kg/cm^2} = 0.00255$

$\rho_{max} = 0.75\ \rho_b = 0.75(0.0219) = 0.01643$

$\rho_b = \frac{f''c}{f_y} = \frac{4800}{f_y + 6000} \rightarrow \frac{136\ kg/cm^2}{4200\ kg/cm^2} \cdot \frac{4800}{4200 + 6000} = 0.0021$

$f'c = 250\ kg/cm^2$

$f''c = 0.85\ f'c \rightarrow 0.85\ 250\ kg/cm^2 = 212.5\ kg/cm^2$

$f'''c = 0.85 \cdot f''c = 0.85 \cdot 200\ kg/cm^2 = 170\ kg/cm^2$

$\rho_{max} = \frac{0.75\sqrt{f'c}}{f_y} = \frac{0.75\sqrt{250\ kg/cm^2}}{4200\ kg/cm^2} = 0.00268$

$\rho_{max} = 0.75\ \rho_b$

$\rho_b = \frac{f''c}{f_y} = \frac{4800}{f_y + 6000} = \frac{170\ kg/cm^2}{4200\ kg/cm^2} \cdot \frac{4800}{4200 + 6000} = 0.0164$

$\rho_{max} = 0.75\ \rho_b = 0.75(0.0164) = 0.0123$

6 Diseño

a)

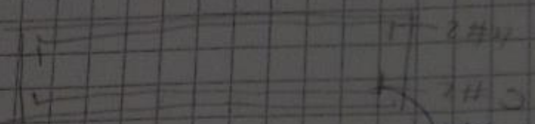
$\frac{3.24}{2} = 1.62$ $2\#5 = 1.99 \times 2 = 3.98$

$A_s = 0.00235(20)(36)$

$\frac{3.98}{(20)(36)} = 0.0055$

$= \frac{1.692}{2} = 0.846$

$= 2\#4 = 2.54$



$3\#4 = 3.81 cm^2$

$\rho = 0.00529$

Estribos

Sep extremos $= \frac{4.80}{4} = 1.2 = S = \frac{1.2}{0.15} = 8$

Sep medio $= 0.5(40) = 0.2$

$= 20 cm$

Estribos 26 pzas $(1.04 = 27$

$+ 10\%$

$\overline{29.7}$ $/12$

$= 2.47$

$= 3$ pzas

15/27

6

$V_{CR} = R_A = R_B = 3(1.42) = 2.13$

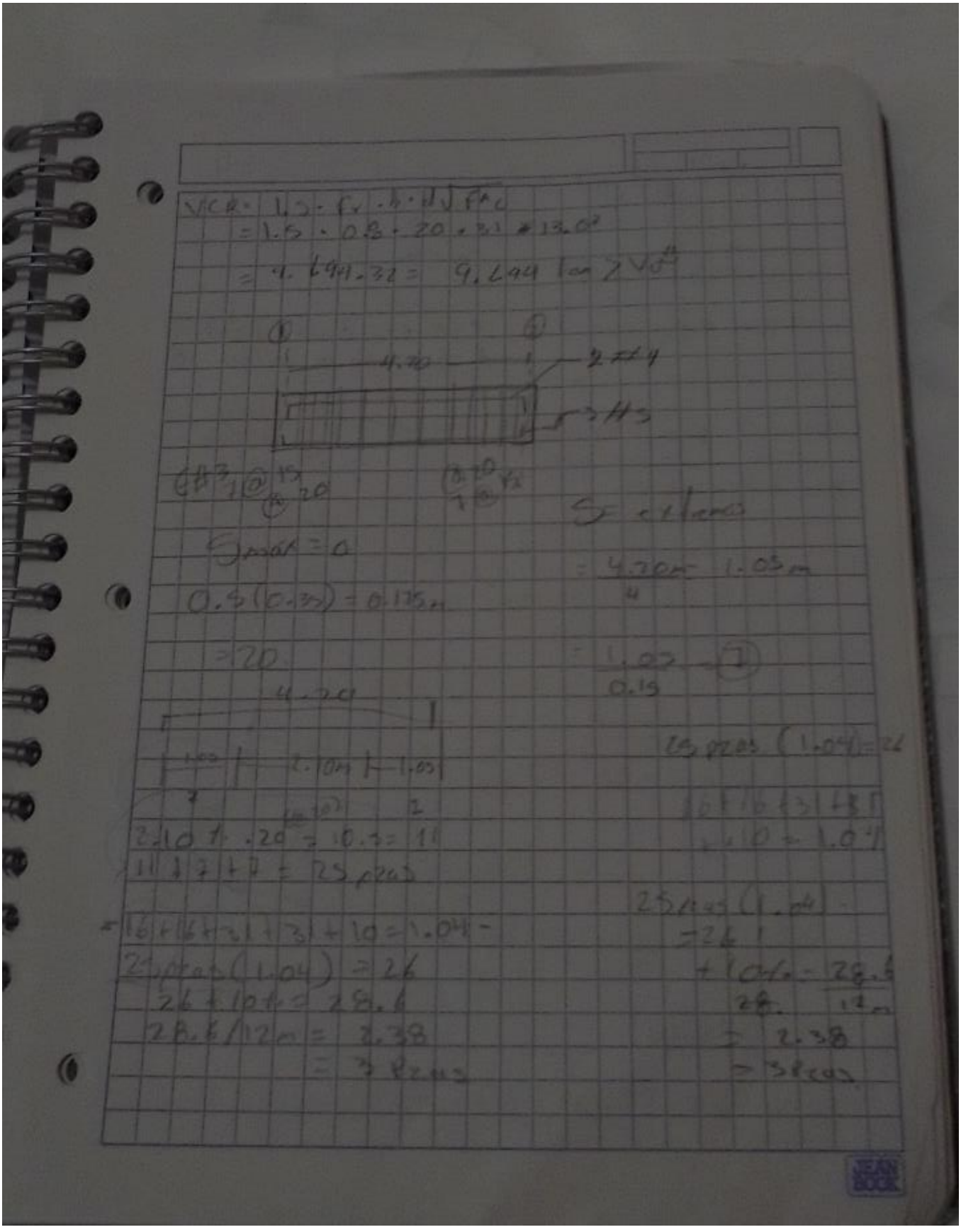
$= 2.13(1.4) = 2.982$

$= 0.70 + 0.80 \cdot 20 \cdot 36 \cdot (1.2 + 30(0.0047))$

$\sqrt{176}$

$= 1.706$

$V_{cs} = 1.5 \times (0.80) \times 20 \times 36 \sqrt{176} = 9.381$



Diseño

$A_s = 0.00926(20)(31) = 5.73\ cm^2$ $\rho = 0.00926$

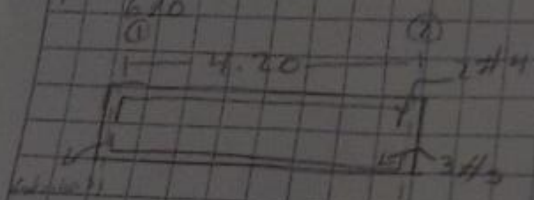
$5.73\ cm^2 / 2 = 2.86$ → $2\#6 = 5.74\ cm^2$

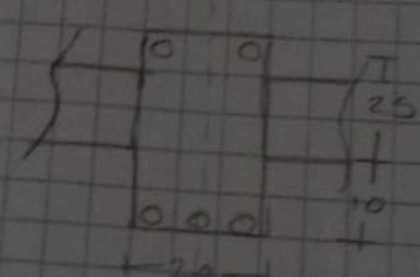
$5.73\ cm^2 / 3 = 1.91\ cm^2$ $3\#5 = 5.97\ cm^2$

Comprobación de ρ_{max}

$\rho = \frac{5.74}{(20)(31)} = \frac{5.74}{620} = 0.00926 < \rho_{max}$ $\rho = \frac{A_s}{(b)(d)}$

$\rho = \frac{5.97}{620} = 0.00962$





$A_s = \rho_{min}(d)b$

$\rho = 0.00235(20)(31) = 1.457\ cm^2$

$\frac{1.457\ cm^2}{2} = 0.7285 = 2\#4 = 2.54\ cm^2$

$V_u = V(1.4) = 4.578(1.4) = 6.41\ ton$

$V_{CR} > V_u$

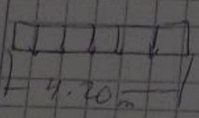
$V_{CR} = 0.7 \cdot F_R \cdot b \cdot d \cdot (0.2 + 30\rho)\sqrt{f^*c}$

$= 0.70(0.8)(20)(31)(0.2 + 30(0.00926))\sqrt{170}$

$= 347.20(0.477)13.03$

$= 2,157.45\ kg = 2.15745\ ton < V_u$ 0.8 cortante

$V = \frac{W(L)}{2} = \frac{2.18 \times 4.20}{2} = 4.578\ ton$



$f_y = 4200$ kg/cm²
$f'c = 200$ kg/cm²
$f^*c = 160$ kg/cm²
$f''c = 136$ kg/cm²
$\rho_{min} = 0.00265$
$\rho_{max} = 0.00493$

Momento $\frac{1}{8}(2.18\ t/m)(4.20\ m)^2$

$M = 4.807\ t/m$

Ton = 1000 kg

momento 480.70

$Mu = m(Fs)$] kg/cm

$Mu = m(1.2)^5$

$Mu = 4.801 \times 1.2^5 = 576{,}840.00$

$h = \frac{L}{12} = \frac{4.20}{12} = 0.35\ m$

b = 20 cm
h = 35 cm
r = 4 cm
d = h − r = 4 −

$q = \sqrt{\frac{-576{,}840\ kg/cm}{0.9 \times 20 \times 31^2 \times 136\ kg/cm}} (2) + 1$

$q = 0.7138$

$\rho = \frac{(q+1)(f''c)}{f_y} = \rho \frac{(-0.7138+1)(136\ kg/cm)}{4200\ kg/cm}$

$\rho = 0.00926$

$As = \rho(b)(d)$

$As = 0.00926\ (20\ cm)(31\ cm) = 5.741\ cm^2$

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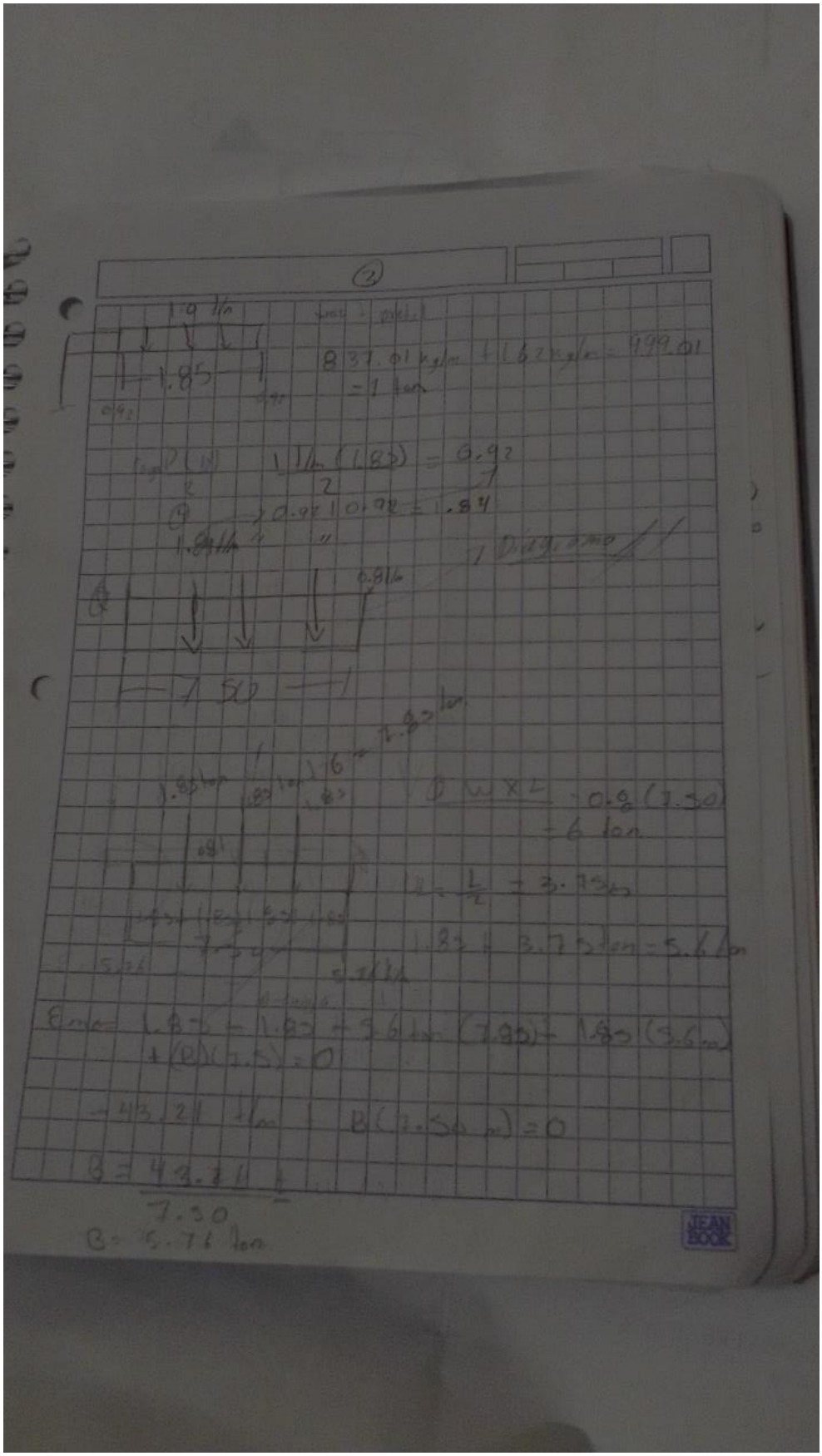
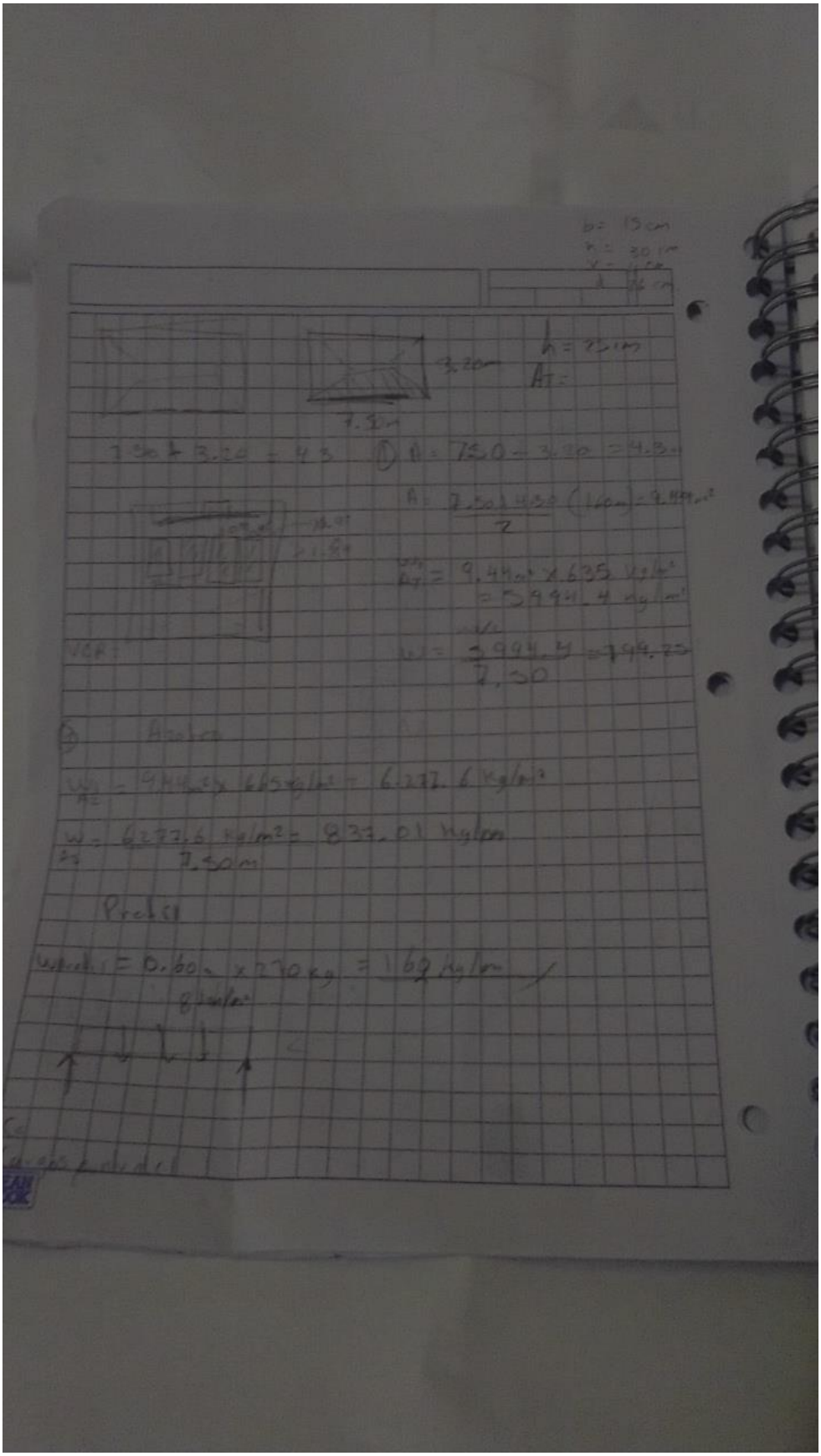
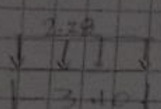


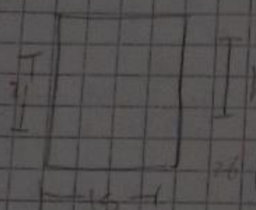


$V_{CR} = 0.70\ F_R\ b\ d\ (0.2 + 30\ \rho)\ \sqrt{f^{*}c}$



$R_{A} = R_{B} = \frac{2.28\ t/m\ (3.10\ m)}{2} = 3.534$

$\frac{3.10}{12} = 0.25$



$f'c = 250\ kg/cm^2$
$f_y = 4200\ kg/cm^2$
$b = 15$
$h = 0.25$
$r = 4\ cm$
$d = h - r = 21\ cm$
$V_u = 4.9476$
$A_s = 0.74\ cm^2$
$\rho = 0.0120$
$V_{CR} = 1,7149.52\ t/m$
$S = 12.50$

01/07 (2)

$V_U = V(1.4) = 3.534\ (1.4) = 4.9476$

$A_S = \rho_{min}\ (b)\ d = 0.00235\ (15)(21\ cm) = 0.74$

$\rho = \frac{A_s}{bd}\ \frac{3.91}{15(21)} = 0.0120$

0.071

$V_{CR} = 0.70 \times 0.8 \times 15 \times 21\ (0.2 + 30 \times 0.0120)$
$\sqrt{160}\ kg/cm^2$
$V_{CR} = 1,7148.52\ ton < V_u \leq V_u$

$S = 0.50\ (h) = 0.50\ (25) = 12.50$

12.64

01/07 (3)

$V_{CR} = 1.5\ (0.80)(15)\ (\sqrt{160}\ kg/cm^2)\ (26)$
$= 4\ 781.26\ kg/cm > V_U$

$V_{CR} = 1.5\ (0.80)(15)\ \sqrt{160}\ kg\ (26) = 3914.78$

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