



Licenciatura en Arquitectura

Nombre del alumno:

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Materia:

Estática para la Arquitectura

Nombre del profesor:

Arq. Pedro Alberto García López

Cuatrimestre:

Tercero

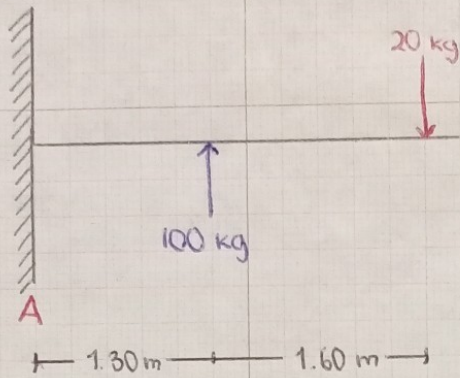
Nombre de la actividad:

Unidad III: Ejercicios

Fecha: 09 de julio de 2023

EJERCICIO 1:

A)



$$\sum M = 0$$

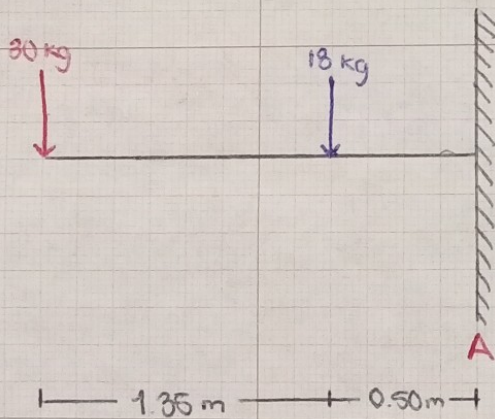
$$M_A + (100 \text{ kg} \cdot 1.30 \text{ m}) + (-20 \text{ kg} \cdot 2.90 \text{ m}) = 0$$

$$M_A + 130 \text{ kg} \cdot \text{m} - 58 \text{ kg} \cdot \text{m} = 0$$

$$M_A + 72 \text{ kg} \cdot \text{m} = 0$$

$$M_A = -72 \text{ kg} \cdot \text{m}$$

B)



$$\sum M = 0$$

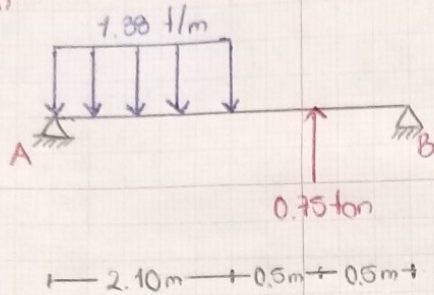
$$M_A = (18 \text{ kg} \cdot 0.50 \text{ m}) + (30 \text{ kg} \cdot 1.85 \text{ m}) = 0$$

$$M_A = 9 \text{ kg} \cdot \text{m} + 55.5 \text{ kg} \cdot \text{m} = 0$$

$$M_A = 64.5 \text{ kg} \cdot \text{m}$$

EJERCICIO 2:

A)



$$P = W \cdot L \rightarrow (1.38 \text{ t/m} \cdot 2.10 \text{ m}) = 2.898 \text{ ton}$$

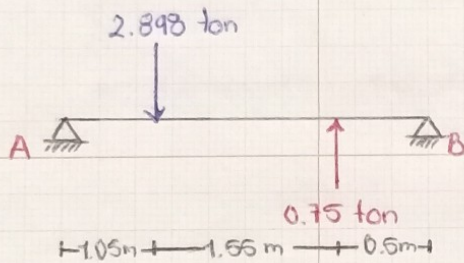
$$UP = \frac{L}{2} \rightarrow \frac{2.10 \text{ m}}{2} = 1.05 \text{ m}$$

$$EM = 0$$

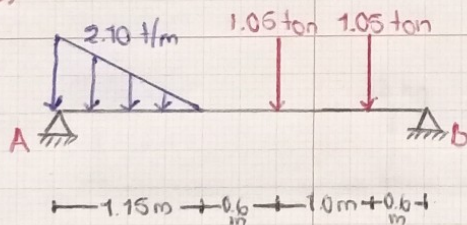
$$MA = (-2.898 \text{ ton} \cdot 1.05 \text{ m}) + (0.75 \text{ ton} \cdot 2.6 \text{ m})$$

$$MA = -3.0429 \text{ ton} \cdot \text{m} + 1.95 \text{ ton} \cdot \text{m}$$

$$MA = -1.0929 \text{ ton} \cdot \text{m}$$



B)



$$P = \frac{W \cdot L}{2} \rightarrow \frac{(2.10 \text{ t/m} \cdot 1.15 \text{ m})}{2} = 1.2075 \text{ ton}$$

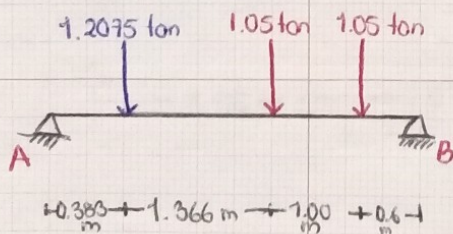
$$UP = \frac{L}{3} \rightarrow \frac{(1.15 \text{ m})}{3} = 0.383 \text{ m}$$

$$EM = 0$$

$$MA = (-1.2075 \text{ ton} \cdot 0.383 \text{ m}) + (-1.05 \text{ ton} \cdot 1.75 \text{ m}) + (-1.05 \text{ ton} \cdot 2.35 \text{ m})$$

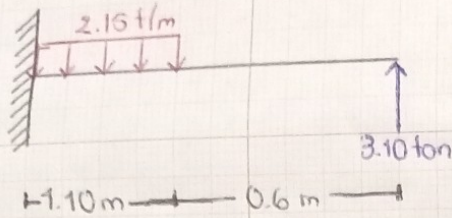
$$MA = (-0.4624 \text{ ton} \cdot \text{m}) + (-1.8375 \text{ ton} \cdot \text{m}) - 2.387 \text{ ton} \cdot \text{m}$$

$$MA = -5.186 \text{ ton} \cdot \text{m}$$



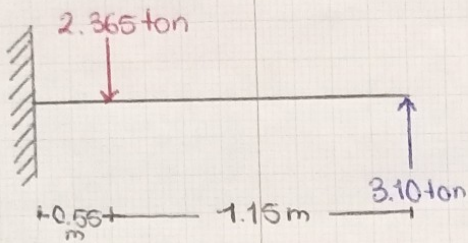
EJERCICIO 3:

A)



$$P = w \cdot L \rightarrow (2.15 \text{ t/m} \cdot 1.10 \text{ m}) = 2.365 \text{ ton}$$

$$UP = \frac{L}{2} \rightarrow \frac{1.10 \text{ m}}{2} = 0.55 \text{ m}$$



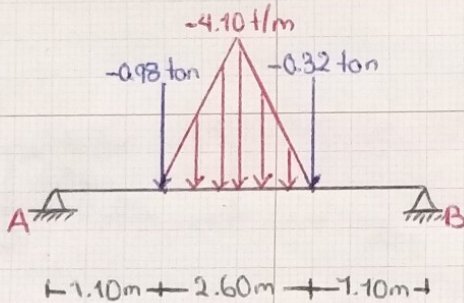
$$EM = 0$$

$$MA = (-2.365 \text{ ton} \cdot 0.55 \text{ m}) + (3.10 \text{ ton} \cdot 1.7 \text{ m})$$

$$MA = -1.30075 \text{ ton} \cdot \text{m} + 5.27 \text{ ton} \cdot \text{m}$$

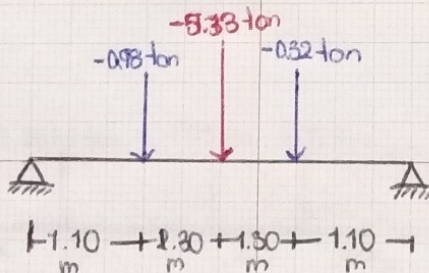
$$MA = \underline{\underline{3.96925 \text{ ton} \cdot \text{m}}}$$

B)



$$P = \frac{w \cdot L}{2} \rightarrow \frac{(-4.10 \text{ t/m} \cdot 2.60 \text{ m})}{2} = -5.33 \text{ ton}$$

$$UP = \frac{L}{2} \rightarrow \frac{2.60 \text{ m}}{2} = 1.30 \text{ m}$$



$$EM = 0$$

$$MA = (-0.98 \text{ ton} \cdot 1.10 \text{ m}) + (-5.33 \text{ ton} \cdot 2.4 \text{ m}) + (-0.32 \text{ t} \cdot 3.7 \text{ m}) + RB \cdot 4.8 = 0$$

$$MA = -1.078 \text{ ton} \cdot \text{m} - 12.792 \text{ ton} \cdot \text{m} - 1.184 \text{ ton} \cdot \text{m} + RB \cdot 4.8 \text{ m}$$

$$MA = -15.054 \text{ ton} \cdot \text{m} + RB \cdot 4.8 \text{ m}$$

$$RB = \frac{15.054 \text{ ton} \cdot \text{m}}{4.8 \text{ m}}$$

$$RB = \underline{\underline{3.136 \text{ ton}}}$$

$$ETV = 0$$

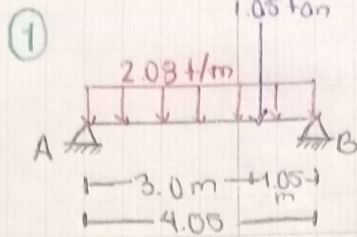
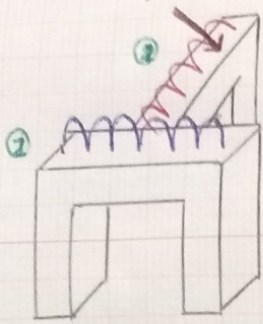
$$RA - 0.98 \text{ ton} - 5.33 \text{ ton} - 0.32 \text{ ton} + 3.136 \text{ ton} = 0$$

$$RA - 6.63 \text{ ton} + 3.136 \text{ ton} = 0$$

$$RA - 3.494 \text{ ton} = 0$$

$$RA = \underline{\underline{3.494 \text{ ton}}}$$

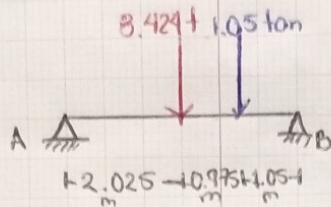
EJERCICIO 4 y 5:



$$P = W \cdot L \rightarrow (2.08 \text{ t/m} \cdot 4.05 \text{ m})$$

$$P = 8.424 \text{ ton}$$

$$UP = \frac{L}{2} \rightarrow \frac{4.05 \text{ m}}{2} = 2.025 \text{ m}$$



$$\sum M = 0$$

$$MA = (-8.424 \cdot 2.025 \text{ m}) + (-1.05 \cdot 4.05 \text{ m}) + RB \cdot 4.05 \text{ m}$$

$$MA = -17.058 \text{ t} \cdot \text{m} - 4.2525 \text{ t} \cdot \text{m} + RB \cdot 4.05 \text{ m}$$

$$MA = -21.3105 \text{ t} \cdot \text{m} + RB \cdot 4.05 \text{ m}$$

$$RB = \frac{21.3105 \text{ t} \cdot \text{m}}{4.05 \text{ m}}$$

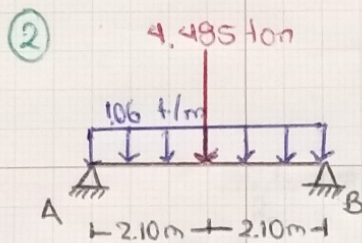
$$RB = 5.262 \text{ ton} \uparrow$$

$$\sum FV = 0$$

$$RA - 8.424 \text{ ton} - 1.05 \text{ ton} + 5.262 \text{ ton} = 0$$

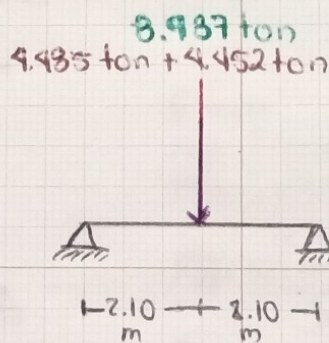
$$RA - 4.212 \text{ ton} = 0$$

$$RA = 4.212 \text{ ton} \downarrow$$



$$P = W \cdot L \rightarrow (1.06 \text{ t/m} \cdot 4.20 \text{ m}) = 4.452 \text{ ton}$$

$$UP = \frac{L}{2} \rightarrow \frac{4.20}{2} = 2.10 \text{ m}$$



$$\sum M = 0$$

$$MA = (-4.452 \cdot 2.10 \text{ m}) + RB \cdot 4.20 \text{ m} = 0$$

$$MA = -9.3492 \text{ t} \cdot \text{m} + RB \cdot 4.20 \text{ m}$$

$$RB = \frac{9.3492 \text{ t} \cdot \text{m}}{4.20 \text{ m}}$$

$$RB = 2.226 \text{ ton} \uparrow$$

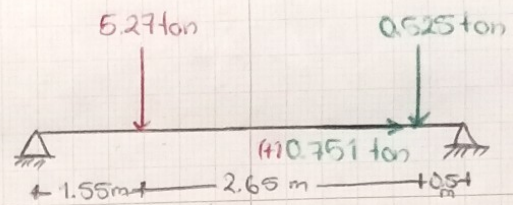
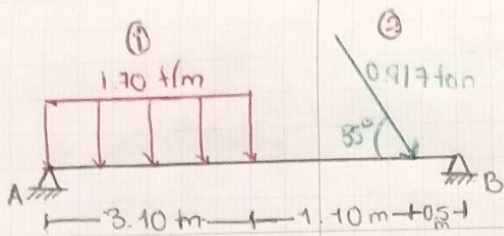
$$\sum FV = 0$$

$$RA - 4.452 \text{ ton} + 2.226 \text{ ton} = 0$$

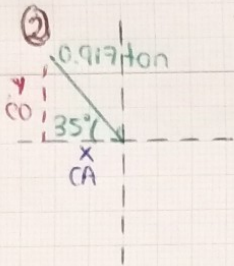
$$RA - 2.226 \text{ ton} = 0$$

$$RA = 2.226 \text{ ton} \downarrow$$

EJERCICIO 6:



① $P = W \cdot L \rightarrow (1.70 \text{ t/m} \cdot 3.10 \text{ m}) = 5.27 \text{ ton}$
 $W_P = \frac{L}{2} \rightarrow \frac{3.10 \text{ m}}{2} = 1.55 \text{ m}$



$\sin \theta = \frac{CO}{H} \rightarrow CO = \sin \theta (H) \rightarrow CO = \sin 35^\circ (0.917 \text{ ton}) = 0.525 \text{ ton (Y)}$
 $\cos \theta = \frac{CA}{H} \rightarrow CA = \cos \theta (H) \rightarrow CA = \cos 35^\circ (0.917 \text{ ton}) = 0.751 \text{ ton (X)}$

$\sum F_x = 0$
 0.751 ton

$\sum M = 0$
 $(-5.27 \text{ ton} \cdot 1.55 \text{ m}) + (-0.525 \text{ ton} \cdot 4.20 \text{ m}) + R_B \cdot 4.70 \text{ m} = 0$
 $-8.1685 \text{ ton} \cdot \text{m} - 2.205 \text{ ton} \cdot \text{m} + R_B \cdot 4.70 \text{ m} = 0$
 $-10.3735 \text{ ton} \cdot \text{m} + R_B \cdot 4.70 \text{ m} = 0$
 $R_B = \frac{10.3735 \text{ ton} \cdot \text{m}}{4.70 \text{ m}}$
 $R_B = 2.207 \text{ ton}$

$\sum F_y = 0$
 $R_A - 5.27 \text{ ton} - 0.525 \text{ ton} + 2.207 \text{ ton} = 0$
 $R_A - 3.588 \text{ ton} = 0$
 $R_A = 3.588 \text{ ton}$