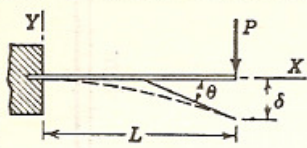
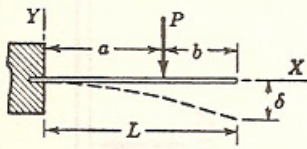
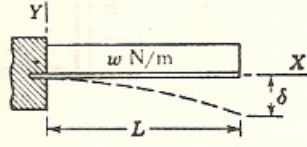
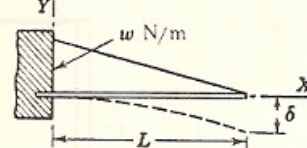
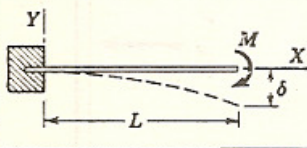
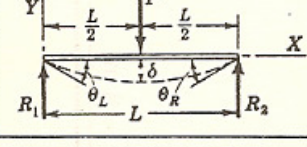
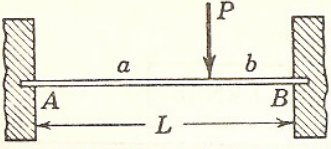
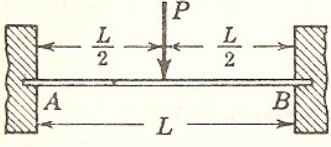
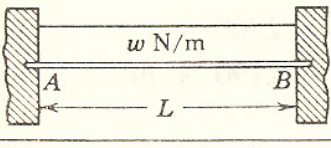
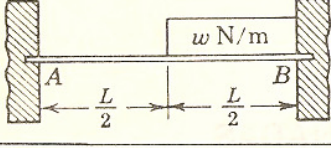
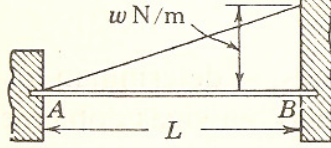
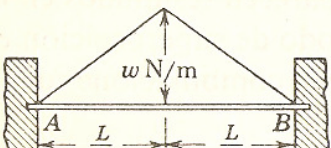
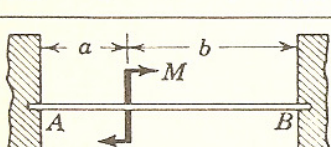


TABLA 6-2. Resumen de vigas cargadas

CASO No.	TIPO DE CARGA	MOMENTO MÁXIMO	PENDIENTE EN EL EXTREMO	ECUACIÓN DE LA ELÁSTICA (y es positiva hacia abajo)	DEFLEXIÓN MÁXIMA
1		$M = -PL$	$\theta = \frac{PL^2}{2EI}$	$EIy = \frac{Px^2}{6}(3L - x)$	$\delta = \frac{PL^3}{3EI}$
2		$M = -Pa$	$\theta = \frac{Pa^2}{2EI}$	$EIy = \frac{Px^2}{6}(3a - x)$ para $0 < x < a$ $EIy = \frac{Pa^2}{6}(3x - a)$ para $a < x < L$	$\delta = \frac{Pa^2}{6EI}(3L - a)$
3		$M = -\frac{wL^2}{2}$ $= -\frac{WL}{2}$	$\theta = \frac{wL^3}{6EI}$ $= \frac{WL^2}{6EI}$	$EIy = \frac{wx^2}{24}(6L^2 - 4Lx + x^2)$	$\delta = \frac{wL^4}{8EI} = \frac{WL^3}{8EI}$
4		$M = -\frac{wL^2}{6}$ $= -\frac{WL}{3}$	$\theta = \frac{wL^3}{24EI}$ $= \frac{WL^2}{12EI}$	$EIy = \frac{wx^2}{120L}(10L^3 - 10L^2x + 5Lx^2 - x^3)$	$\delta = \frac{wL^4}{30EI} = \frac{WL^3}{15EI}$
5		$M = -M$	$\theta = \frac{ML}{EI}$	$EIy = \frac{Mx^2}{2}$	$\delta = \frac{ML^2}{2EI}$
6		$M = \frac{PL}{4}$	$\theta_L = \theta_R = \frac{PL^2}{16EI}$	$EIy = \frac{Px}{12} \left( \frac{3}{4}L^2 - x^2 \right)$ para $0 < x < \frac{L}{2}$	$\delta = \frac{PL^3}{48EI}$

7		$M = \frac{Pab}{L}$ <p>en <math>x = a</math></p>	$\theta_L = \frac{Pb(L^2 - b^2)}{6EIL}$ $\theta_R = \frac{Pa(L^2 - a^2)}{6EIL}$	$Ely = \frac{Pbx}{6L}(L^2 - x^2 - b^2) \text{ para } 0 < x < a$ $Ely = \frac{Pb}{6L} \left[ \frac{L}{b}(x-a)^3 + (L^2 - b^2)x - x^3 \right]$ <p>para <math>a &lt; x &lt; L</math></p>	$\delta = \frac{Pb(L^2 - b^2)^{3/2}}{9\sqrt{3} EIL} \text{ en } x = \sqrt{\frac{L^2 - b^2}{3}}$ <p>En el centro (no la max.)</p> $\delta = \frac{Pb}{48EI}(3L^2 - 4b^2)$ <p>cuando <math>a &gt; b</math></p>
8		$M = \frac{wL^2}{8}$ $= \frac{WL}{8}$	$\theta_L = \theta_R = \frac{wL^3}{24EI}$	$Ely = \frac{wx}{24}(L^3 - 2Lx^2 + x^3)$	$\delta = \frac{5wL^4}{384EI} = \frac{5WL^3}{384EI}$
9		$M = \frac{wL^2}{9\sqrt{3}}$ $= \frac{2WL}{9\sqrt{3}}$	$\theta_L = \frac{7wL^3}{360EI}$ $\theta_R = \frac{8wL^3}{360EI}$	$Ely = \frac{wx}{360L}(7L^4 - 10L^2x^2 + 3x^4)$	$\delta = \frac{2.5wL^4}{384EI} = \frac{5WL^3}{384EI}$ <p>en <math>x = 0.519L</math></p>
10		$M = \frac{wL^2}{12}$ $= \frac{WL}{6}$	$\theta_L = \theta_R = \frac{5wL^3}{192EI}$	$Ely = \frac{wx}{960L}(25L^4 - 40L^2x^2 + 16x^4)$ <p>para <math>0 &lt; x &lt; \frac{L}{2}</math></p>	$\delta = \frac{wL^4}{120EI} = \frac{WL^3}{60EI}$
11		$M = M$	$\theta_L = \frac{ML}{6EI}$ $\theta_R = \frac{ML}{3EI}$	$Ely = \frac{MLx}{6} \left( 1 - \frac{x^2}{L^2} \right)$	$\delta = \frac{ML^2}{9\sqrt{3} EI} \text{ en } x = \frac{L}{\sqrt{3}}$ <p>En el centro (no la max.)</p> $\delta = \frac{ML^2}{16EI}$
12		$M = M$	$\theta_L = \frac{ML}{3EI}$ $\theta_R = \frac{ML}{6EI}$	$Ely = \frac{Mx}{6L}(L-x)(2L-x)$	$\delta = \frac{ML^2}{9\sqrt{3} EI} \text{ en } x = \left( L - \frac{L}{\sqrt{3}} \right)$ <p>En el centro (no la max.)</p> $\delta = \frac{ML^2}{16EI}$

TABLA 7-2. Vigas doblemente empotradas con diversos tipos de carga

CASO No.	TIPO DE CARGA	MOMENTOS EN LOS EXTREMOS	VALOR DE $EIy$ (y es positiva hacia abajo)
1		$M_A = -\frac{Pab^2}{L^2}$ $M_B = -\frac{Pa^2b}{L^2}$	$EIy \text{ en el centro} = \frac{Pb^2}{48}(3L - 4b)$ Nota: sólo para $a > b$
2		$M_A = M_B = -\frac{PL}{8}$	$EIy \text{ máximo} = \frac{PL^3}{192}$
3		$M_A = M_B = -\frac{wL^2}{12} = -\frac{WL}{12}$	$EIy \text{ máximo} = \frac{wL^4}{384} = \frac{WL^3}{384}$
4		$M_A = -\frac{5}{192}wL^2 = -\frac{5}{96}WL$ $M_B = -\frac{11}{192}wL^2 = -\frac{11}{96}WL$	$EIy \text{ en el centro} = \frac{wL^4}{768} = \frac{WL^3}{384}$
5		$M_A = -\frac{wL^2}{30} = -\frac{WL}{15}$ $M_B = -\frac{wL^2}{20} = -\frac{WL}{10}$	$EIy \text{ en el centro} = \frac{wL^4}{768} = \frac{WL^3}{384}$
6		$M_A = M_B = -\frac{5wL^2}{96} = -\frac{5WL}{48}$	$EIy \text{ máximo} = \frac{7wL^4}{3840} = \frac{7WL^3}{1920}$
7		$M_A = \frac{Mb}{L} \left( \frac{3a}{L} - 1 \right)$ $M_B = -\frac{Ma}{L} \left( \frac{3b}{L} - 1 \right)$	