

**MEEG 3013**

**Name:** \_\_\_\_\_  
(Underline your last name.)

**Test III ( )**

**ID #:** \_\_\_\_\_

1. (30%) The beam  $AB$  of length  $L$  has a constant flexural rigidity  $EI$  and are loaded as shown. Using **singularity functions**, determine for this beam (a) the reaction  $A_y$  at  $A$ , (b) the slope  $y'_A$  at  $A$ , (c) the slope  $y'_C$  at  $C$ , (d) the deflection  $y_C$  at  $C$ .

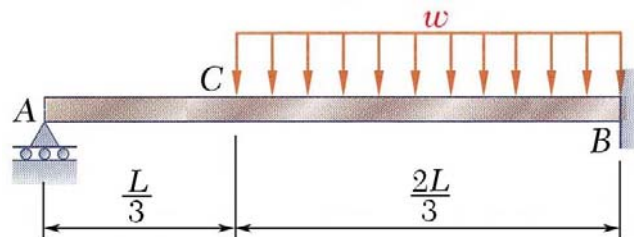


Fig. P1 & P2

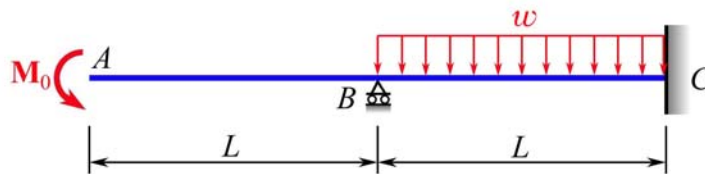


Fig. P3

2. (30%) Using **conjugate beam method**, solve Problem 1.
3. The beam  $ABC$  of length  $2L$  has a constant flexural rigidity  $EI$  and carries a moment  $M_0$  at  $A$  and a distributed load with intensity  $w$  in the segment  $BC$  as shown, where  $M_0 = 2wL^2 \text{ } \curvearrowleft$ . *Circle on this test sheet* the nearest item for each of the following:

A. (5%) The reaction at  $B$  of the beam is

(a)  $\frac{45wL}{8} \uparrow$ . (b)  $\frac{39wL}{8} \uparrow$ . (c)  $\frac{33wL}{8} \uparrow$ . (d)  $\frac{27wL}{8} \uparrow$ . (e)  $\frac{21wL}{8} \uparrow$ . (f)  $\frac{15wL}{8} \uparrow$ . (g)  $\frac{9wL}{8} \uparrow$ .

B. (5%) The deflection at  $A$  of the beam is

(a)  $-\frac{17wL^4}{48EI}$ . (b)  $-\frac{35wL^4}{48EI}$ . (c)  $-\frac{53wL^4}{48EI}$ . (d)  $-\frac{71wL^4}{48EI}$ . (e)  $-\frac{89wL^4}{48EI}$ . (f)  $-\frac{107wL^4}{48EI}$ . (g)  $-\frac{125wL^4}{48EI}$ .

C. (5%) The slope at  $A$  of the beam is

(a)  $\frac{179wL^3}{48EI}$ . (b)  $\frac{149wL^3}{48EI}$ . (c)  $\frac{119wL^3}{48EI}$ . (d)  $\frac{89wL^3}{48EI}$ . (e)  $\frac{59wL^3}{48EI}$ . (f)  $\frac{29wL^3}{48EI}$ . (g)  $-\frac{wL^3}{48wEI}$ .

D. (5%) The slope at  $B$  of the beam is

(a)  $-\frac{wL^3}{48EI}$ . (b)  $\frac{5wL^3}{48EI}$ . (c)  $\frac{11wL^3}{48EI}$ . (d)  $\frac{17wL^3}{48EI}$ . (e)  $\frac{23wL^3}{48EI}$ . (f)  $\frac{29wL^3}{48EI}$ . (g)  $\frac{35wL^3}{48EI}$ .

4. (20%) Non-numerical problem.