MEEG 3013

Test III ( )

Name: _____

(Underline your **last name**.)

ID #: _____

1. (30%) The beam shown has a constant flexural rigidity EI. Using *singularity functions*, determine (a) the reaction $\mathbf{C}_y$ at C, (b) the slope y'_A at A, (c) the deflection y_A at A.
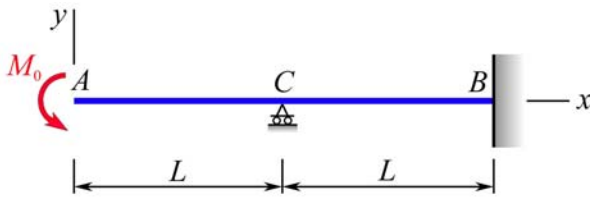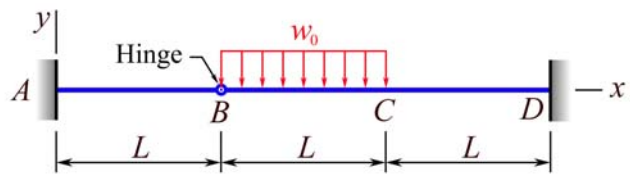

Fig. P1

Fig. P2

2. (30%) The segments AB and BCD of the beam have constant flexural rigidity EI and are joined by a hinge at B as shown. Using *conjugate beam method*, determine (a) the reaction force $\mathbf{A}_y$ and the reaction moment $\mathbf{M}_A$ at the fixed end A, (b) the deflection y_B of the hinge at B, (c) the deflection y_C and the slope θ_C of the beam at C.
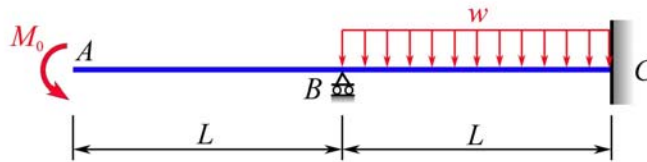

Fig. P3

3. The beam ABC of length $2L$ has a constant flexural rigidity EI and carries a moment $\mathbf{M}_0$ at A and a distributed load with intensity w in the segment BC as shown, where $\mathbf{M}_0 = 3wL^2$ ↻. *Circle on this test sheet* the nearest item for each of the following:

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

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

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

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

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

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

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

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

4. (20%) Non-numerical problem.