1. (30%) The beam shown has a constant flexural rigidity $EI$. Using moment-area theorems, determine
   (a) the reaction forces $A$, $B$, and $D$ at the three supports, (b) the slope $\theta_C$ and deflection $y_C$ at $C$.

2. (30%) Using conjugate beam method, solve Problem 1.

3. (20%) 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 $M_0 = 5wL^2 \bigotimes$. Circle on this test sheet the nearest item for each of the following:

   A. The reaction at $B$ of the beam is
      (a) $\frac{51wL}{8}$, (b) $\frac{57wL}{8}$, (c) $\frac{63wL}{8}$, (d) $\frac{69wL}{8}$, (e) $\frac{75wL}{8}$, (f) $\frac{81wL}{8}$, (g) $\frac{87wL}{8}$.

   B. The deflection at $A$ of the beam is
      (a) $\frac{125wL^3}{48EI}$, (b) $\frac{143wL^3}{48EI}$, (c) $\frac{61wL^3}{48EI}$, (d) $\frac{179wL^3}{48EI}$, (e) $\frac{197wL^3}{48EI}$, (f) $\frac{215wL^3}{48EI}$, (g) $\frac{233wL^3}{48EI}$.

   C. The slope at $A$ of the beam is
      (a) $\frac{419wL^3}{48EI}$, (b) $\frac{389wL^3}{48EI}$, (c) $\frac{359wL^3}{48EI}$, (d) $\frac{329wL^3}{48EI}$, (e) $\frac{299wL^3}{48EI}$, (f) $\frac{269wL^3}{48EI}$, (g) $\frac{239wL^3}{48EI}$.

   D. The slope at $B$ of the beam is
      (a) $\frac{77wL^3}{48EI}$, (b) $\frac{71wL^3}{48EI}$, (c) $\frac{65wL^3}{48EI}$, (d) $\frac{59wL^3}{48EI}$, (e) $\frac{53wL^3}{48EI}$, (f) $\frac{47wL^3}{48EI}$, (g) $\frac{41wL^3}{48EI}$.

4. (20%) Non-numerical problem.

   A. Let $C$ and $D$ be two points of a beam $AB$ having a length $L$ and a constant flexural rigidity $EI$, where $D$ is to the right of $C$. Assume that this beam is simply supported at $A$ and $B$ and a concentrated force $P$ acts at the midpoint of the beam. (a) Draw the deflected beam and $\theta_{DC}$, $t_{DC}$, and $t_{CD}$; (b) describe how to compute $\theta_{DC}$ and $t_{DC}$ according to the moment-area theorems.

   B. Describe the ten rules that guide one in using the conjugate beam method.