Problem 1.
For the structure below, determine the member load vectors and the total structure load vector with respect to the shown degrees of freedom (DOF) due to the following:

1. The given loads.
2. A uniform rise of temperature of 20°C of member #2 only.
3. A nonuniform (linear) rise of temperature of member #3 (width = 0.5m) only (40°C outside and no change inside).
4. A settlement of 2cm at joint #4.

Given
\[ E = 200\, \text{t/cm}^2; \quad I = 0.01\, \text{m}^4; \quad A = 0.25\, \text{m}^2; \quad \alpha = 1 \times 10^{-5}/\degree\text{C}. \]