Problem 2 (20 points)

Two cantilever beams AB (fixed support at A) and CDE (fixed support at C) are connected with the help of a spring of constant \( k \) \((KN/m)\) as shown in Figure 2. The beam AB is subjected to a horizontal uniform distributed load \( w \) \((KN/m)\). Assume: lengths \( AB=CD=DE=L \), and bending rigidity \( EI \) for both beams.

Calculate:

i. The force in the spring \( F_{spring} \) (in terms of \( k, w, L, E, I \)).

ii. The reactions, shear force and bending moment diagrams for each of the beams (in terms of \( F_{spring} \) and \( L \)).

iii. The horizontal deflections at B, D and E (in terms of \( F_{spring} \) and \( L \)).