

A horizontal rigid bar OH supports a body of weight W at end H. Bar OH, in turn, is supported by a three-member rod made up of members (1), (2) and (3), with the members having cross-sectional areas of A , $2A$ and A , and made up of a material with a Young's modulus of E . A support force P acts at connector D. The weights of the rod members and connectors can be considered to negligible. Assume small angles of rotation for bar OH.

- Draw a free body diagram of bar OH (FBD).
- Write down the equilibrium equations for the bar from your FBD.
- Write down the strain energy in the system.
- Use Castigliano's theorem to determine the displacement of pin K. Leave your answer in terms of, at most: E , A , P , W and a .

