



PROBLEM 1

1.1. The figure shows a mechanical assembly consisting of a horizontal beam of length L and weight W , supported by a vertical rod of length h and weight w . The rod is attached to the beam at a distance a from the left end. The beam is supported by a hinge at the left end and a roller at the right end. The rod is supported by a hinge at the top and a roller at the bottom. The angle between the beam and the horizontal is θ . The weight of the beam acts at its center of mass, which is at a distance $L/2$ from the left end. The weight of the rod acts at its center of mass, which is at a distance $h/2$ from the top hinge. The reaction forces at the hinge and roller are R_1 and R_2 , respectively. The reaction forces at the top and bottom hinges are H_1 and H_2 , respectively. The reaction forces at the top and bottom hinges are H_1 and H_2 , respectively.

PROBLEM 2



PROBLEM 3

3.1. The figure shows a mechanical assembly consisting of a horizontal beam of length L and weight W , supported by a vertical rod of length h and weight w . The rod is attached to the beam at a distance a from the left end. The beam is supported by a hinge at the left end and a roller at the right end. The rod is supported by a hinge at the top and a roller at the bottom. The angle between the beam and the horizontal is θ . The weight of the beam acts at its center of mass, which is at a distance $L/2$ from the left end. The weight of the rod acts at its center of mass, which is at a distance $h/2$ from the top hinge. The reaction forces at the hinge and roller are R_1 and R_2 , respectively. The reaction forces at the top and bottom hinges are H_1 and H_2 , respectively. The reaction forces at the top and bottom hinges are H_1 and H_2 , respectively.

PROBLEM 4

4.1. The figure shows a mechanical assembly consisting of a horizontal beam of length L and weight W , supported by a vertical rod of length h and weight w . The rod is attached to the beam at a distance a from the left end. The beam is supported by a hinge at the left end and a roller at the right end. The rod is supported by a hinge at the top and a roller at the bottom. The angle between the beam and the horizontal is θ . The weight of the beam acts at its center of mass, which is at a distance $L/2$ from the left end. The weight of the rod acts at its center of mass, which is at a distance $h/2$ from the top hinge. The reaction forces at the hinge and roller are R_1 and R_2 , respectively. The reaction forces at the top and bottom hinges are H_1 and H_2 , respectively. The reaction forces at the top and bottom hinges are H_1 and H_2 , respectively.