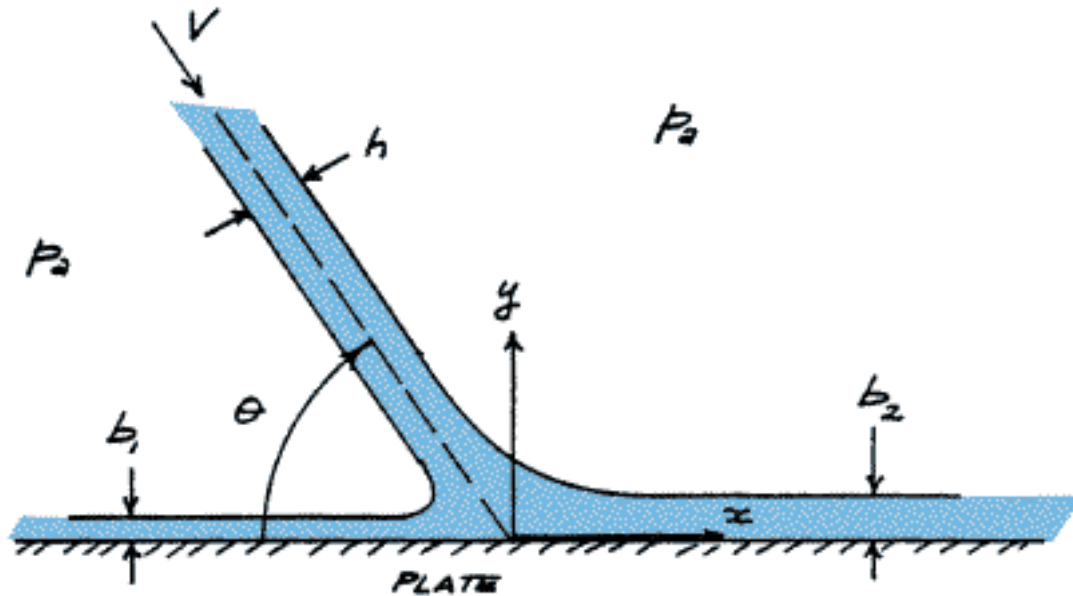


Problem 5.23

Two-dimensional split jet



A steady, two-dimensional liquid jet (density ρ) with width h and speed V impinges at an angle θ onto a smooth, flat plate, and divides into two streams as sketched. The ambient atmosphere is at constant pressure p_a . Assuming that the flow is incompressible and inviscid (i.e. shear forces exerted by the liquid can be neglected), write expressions for the x and y components of force, and the clockwise (z -direction) torque around the z -axis, exerted by the flow on the plate per unit length perpendicular to the sketch. Also, obtain expressions for the widths b_1 and b_2 of the two streams parallel to the plate. Neglect gravitational effects.

HINT

HINT 2

HINT 3

ANSWER