Problem 1

A rectangular concrete block (m = 150 kg) has a width of 1 m (dimension into the page.) The left side of the block supports a body of water (ρ = 1000 kg/m^3) while the right side is exposed to the atmosphere. When the water level is raised to a depth of 0.5 m, the block begins to slide.

(a) Draw a complete <u>linear momentum interaction diagram</u> for the concrete block.
(b) Perform conservation of linear momentum to determine the <u>coefficient of static friction</u> between the bottom of the block and the horizontal surface.

Concrete block and water
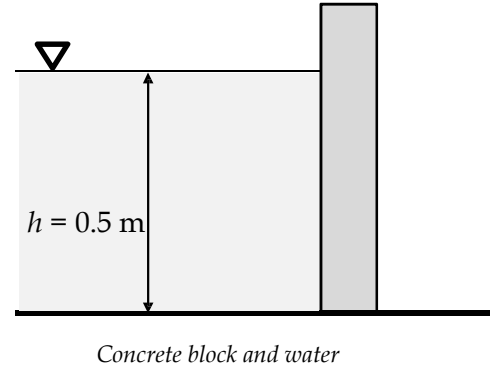
Problem 2

A 40-kg inclined rectangular gate, smoothly hinged at Point A, is 1 m wide (dimension into the page) and 2 m long. It is held in place by a horizontal cable as shown in the diagram below. The reservoir on the left is filled with water (ρ = 1000 kg/m^3). The right side of the gate is exposed to the atmosphere.

(a) Draw a complete <u>linear momentum interaction diagram</u> for the inclined gate.

(b) Determine only the <u>net pressure force</u> acting on the inclined gate.

Inclined gate