A fisherman in a boat catches a huge fish with a rod and starts to pull it in. The fish struggles for a while and then becomes still when it is at a distance of 200m from the boat. During this operation,the boat(initially at rest)moves 25 m in the direction of the fish.If the mass of the boat is 5000kg, calculate the mass of the fish.Assume that water experts no friction.

Solution

The boat move 25m while the fish is being reeled in from 200m. It's a center of mass problem - if the water friction can be ignored then the center of mass of the boat/fish system lies 25m from the initial position of the boat.

$$m_1 x_1 = m_2 x_2$$

$$m_2 = \frac{x_1}{x_2} m_1 = \frac{25}{200} 5000 = 625 \text{ kg.}$$

Answer: 625 kg.