

4. A fan has a bladed rotor of 0.3m outside diameter and 0.1m inside diameter and runs at 2000 rpm. The width of the rotor blades is 30mm from blade inlet to outlet. The flow rate is $0.20 \text{ m}^3/\text{s}$ and the absolute velocity of the air at blade inlet, V_1 , is purely radial. The blade discharge angle is 30° measured with respect to the tangential direction at the outside diameter of the rotor. A) What would be a reasonable blade inlet angle (measured with respect to the tangential direction at the inside diameter of the rotor) ? B) Find the power to run the fan, when the fluid is air with density of 1.23 kg/m^3 .

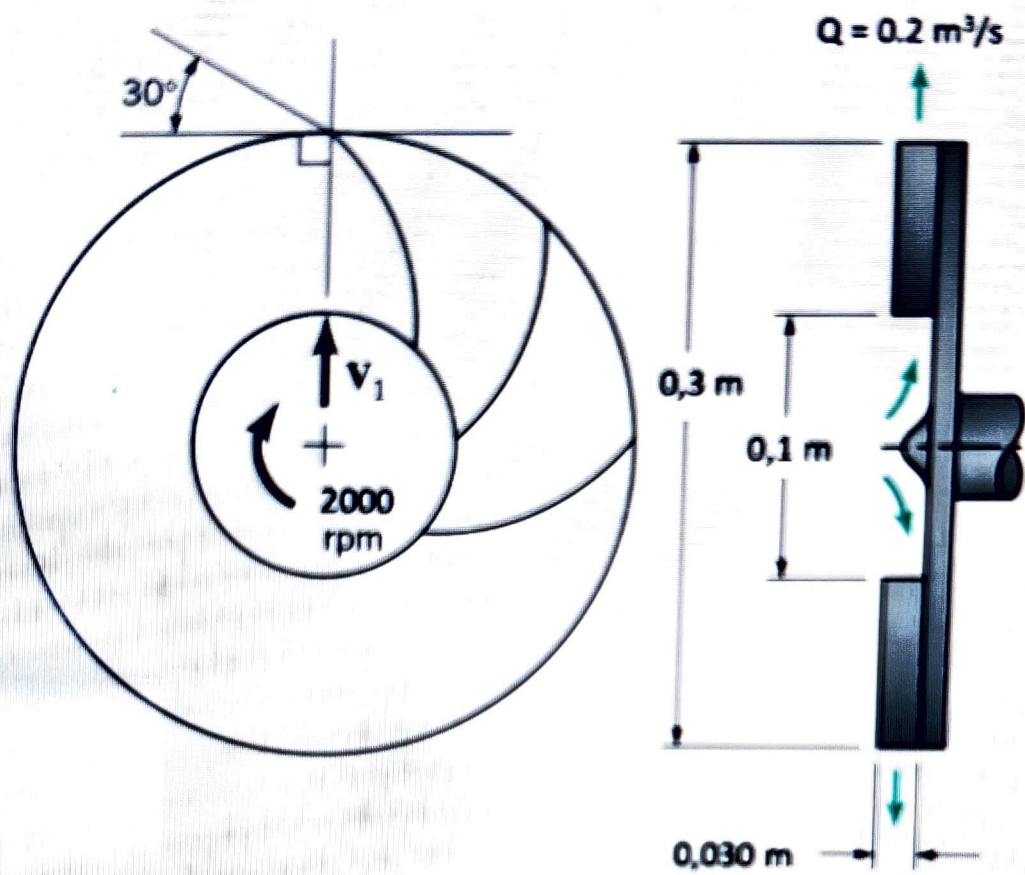


Figure 4. Problem 4.