Problem 225B

The low pressure liquid oxygen pump in the Space Shuttle Main Engine is designed to deliver 887 lbs/s of liquid oxygen and a pressure rise of 310 psi at a rotating speed of 5000 rpm. What is the specific speed of this pump? Assume a liquid oxygen density of 55 lbs/ft^3. What type of pump is called for?

The pump has an inlet tip diameter of 11 $inches$. What should the angle of the blades be at the inlet tip ?

Use the simple one-dimensional performance analysis (neglecting frictional losses) to estimate the blade angle at discharge from the pump.