

NAME:

STUDENT ID:

Problem

Steam enters an adiabatic turbine at 6 MPa, 600°C, and 140 m/s and leaves at 50 kPa, 100°C and 80 m/s. If the power output of the turbine is 5 MW. Assuming the surroundings to be at 25°C, determine:

- (a) The mass flow rate of the steam in kg/s,
- (b) The entropy generation in kW/K,
- (c) The reversible output power of the turbine in kW,
- (d) The exergy destroyed within the turbine in kW,
- (e) The second law efficiency of the turbine, and
- (f) Draw the T-S and P-v diagrams of the process showing the inlet and exit states with respect to saturation lines.