1. (7 pts) A mass of 1 kg is accelerated from rest \( (V_1 = 0) \) by a force of 3 N for two seconds. Calculate the acceleration and the final kinetic energy \( (J) \).
2. (10 pts) The work transfer done by the system and the heat transfer into the system that occur in the process A from state 1 to state 2 are +20 kJ and +16 kJ, respectively. Another process between states 1 and 2 is process B, for which the heat transfer into the system is +9 kJ. Neglect potential and kinetic energies. Determine: a) the change in internal energy for process A; b) the change in internal energy for process B; and c) the work done by the system during process B.
3. (18 pts) Five pounds mass of ammonia, initially at $P_1 = 100$ lbf/in$^2$ and $T_1 = 360^\circ$F, undergoes a constant pressure process to a final state where the quality is 85%. Show the initial and final states as well as the process on a P-v diagram and a T-v diagram. Show the mixed phase region (“the dome”) on your diagrams. Show several isotherms on the P-v diagram and several isobars on the T-v diagram. Determine the work for the process, in Btu.