1. Gaseous Propane at 25ºC is burned with moist air at 400 K in a steady state, steady flow process. The combustion process is adiabatic, and the exiting temperature is measured to 1200 K. A sample of the products is tested and found to have a dew-point temperature of 70ºC. Determine the percentage of theoretical air used and the relative humidity of this air. Assume the combustion is complete and that the pressure is 100 KPa throughout the process.

2. A mixture of 80% ethane and 20% methane on a mole basis is throttled from10MPa, 65ºC, to 100 KPa and is fed to a combustion chamber where it undergoes complete combustion with air, which enters at 100 KPa , 600 K. The amount of air is such that the products of combustion exit at 100 KPa , 1200 K. Assuming that the combustion process is adiabatic and that all components behave as ideal gases except the fuel mixture, which behaves according to the generalized tables or charts, with pseudocritical constants, determine :
   a) the percentage of theoretical air used in the process
   b) the dew-point temperature of the products