Problem 3.29: 1 mol of liquid ~~hexane~~ at 10 bar, 50 °C, is mixed with 2 mol of hexane vapor at 250 °C, 10 bar. The process takes place adiabatically in a closed system at constant pressure.
a) Determine the final temperature and if the system is a vapor-liquid mixture report the mass fraction in each phase.
Additional data:

T^{sat}(at 10 bar)	= 165.7	°C
$H^{\text{sat},L}$(at 10 bar)	= 22.645	kJ/mol
$H^{\text{sat},V}$(at 10 bar)	= 43.320	kJ/mol
C_P^L	= 263.64	J/mol K
C_P^V	= 226.34	J/mol K

Problem 3.30: 1 mol of liquid hexane at 10 bar, 25 °C, is mixed adiabatically and under constant pressure with hexane vapor at 180 °C. Determine the moles of the vapor that must be mixed with the liquid in order to produce a final state that consists of a vapor-liquid mixture with 75% (by mass) liquid. You may use the data given in problem 3.29.

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Problem 3.31: Methanol at 25 °C, 8 bar is heated under constant P in closed system.
a) Determine the amount of heat to produce 95% vapor
b) Determine the final state if $Q = 32000$ J/mol
c) Determine the final state if $Q = 52000$ J/mol
Additional data:

T^{sat}(8 bar)	=	128.09 °C
ΔH^{vap}	=	30135 J/mol
C_{PL}	=	112.40 J/mol/K
C_{PV}	=	~~191.75~~ 130.0 J/mol/K

Problem 3.32: 1 kg of liquid water, initially at 40 °C, 2 bar, is heated under constant pressure. If the amount of heat added is 1200 kJ, determine the final temperature and the phase of the system in the final state (if vapor-liquid mixture, report the mass fraction of each phase).

Problem 3.33: a) Obtain the heat of vaporization of steam at 30 bar.
b) Saturated liquid water at 30 bar is heated until the quality is 75%. What is the amount of heat?
c) Saturated liquid water at 30 bar is heated by adding 750 kJ/kg of heat at constant pressure. What is the final state?
d) What is the final state if the amount of heat that is added to the saturated liquid is 1950 kJ/kg?