THERMAL AND STATISTICAL PHYSICS H.W №4

Salwa Al Saleh

A Carnot cycle is conducted using an ideal diatomic gas. Initially, the gas is at temperature $25^o C$., pressure of $100 KPa$ and volume of $0.01 m^3$. The system is then compressed isothermally to a volume $0.002 m^3$. From that point, the gas undergoes an adiabatic compression (with $\gamma = 1.4$), until the volume further reduces to $0.001 m^3$. After that, the system goes an isothermal expansion process to a point where the pressure of the system is $263.8 KPa$. Then the system continues the cycle with an adiabatic expansion.

PROBLEM (1)

What is the maximum pressure of gas in the cycle above ?

PROBLEM (2)

Calculate the maximum temperature in the above cycle.

PROBLEM (3)

Calculate the total work done in the cycle above

PROBLEM (4)

Calculate the total heat change in the cycle, then using the result from Problem -3- calculate the efficiency of the cycle.