

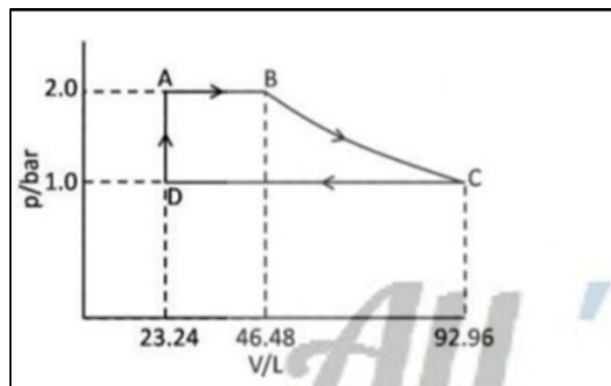
CH1201: 5 HOMEWORK PROBLEMS

Q.1) One dm^3 of an ideal gas at a pressure of 1.0133 MPa expands reversibly and isothermally from its volume to 10 dm^3 . How much of heat is absorbed and how much of work is done in expansion?

Q.2) 1.0 mol of a perfect monatomic gas is put through the cycle shown in the figure. The total work

(in J) done during the cycle is

(use 1 L-bar 100 J, $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1} = 0.083 \text{ L-bar K}^{-1} \text{ mol}^{-1}$, $\ln 2 = 0.7$).



Q.3) A monatomic perfect gas undergoes expansion from (p_1, V_1) to (p_2, V_2) under isothermal or adiabatic conditions. The pressure of the gas will fall more rapidly under adiabatic conditions. Explain mathematically.

Q.4) 20 g of N_2 at 300 K is compressed reversibly and adiabatically from 20 dm^3 to 10 dm^3 . Calculate the final temperature, q , w , ΔU and ΔH .

Q.5) 0.410 mol of a monoatomic gas fills a 1 dm^3 container to a pressure of 1.013 MPa. It is expanded reversibly and adiabatically until a pressure of 0.10133 MPa is reached. What are the final volume and temperature? What is the work done in the expansion?