Science Virtual Learning

MPI Physics 240

Thermodynamics 20: P-V Diagrams

May 19, 2020

Lesson: MPI Thermodynamics 20
P-V Diagrams
May 19, 2020

Objective: To understand how p-V diagrams are used to illustrate thermodynamic changes in a system

This video introduces p-V diagrams, which are used to illustrate changes in thermodynamic systems, and help to calculate Work

https://youtu.be/WcvvMRoKnLI

Video: P-V Diagrams

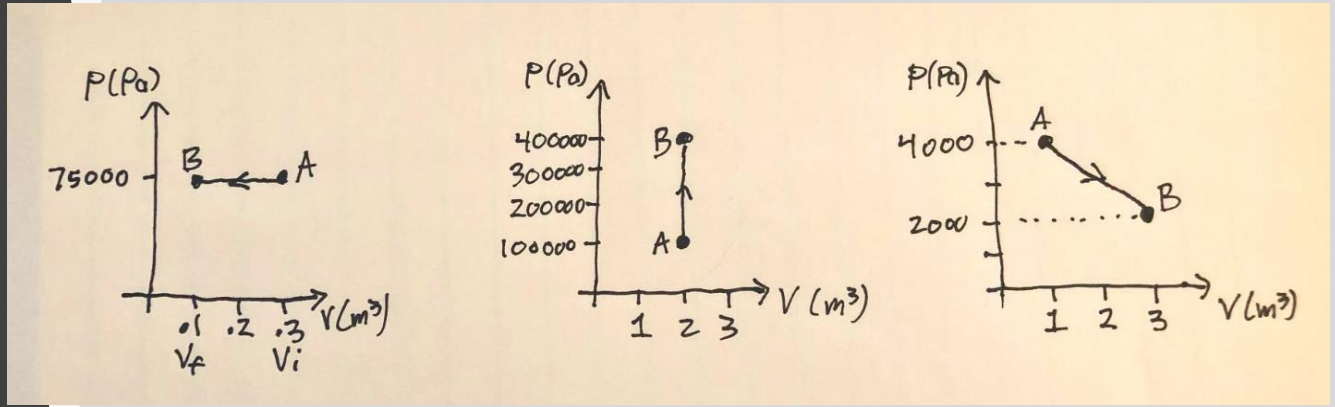
1.00 L of a diatomic gas is at 1.00 atm of pressure, and an initial temperature of 300 K. The gas undergoes a process that causes it to expand to 2.00 L. Draw an accurate p-V diagram for the process if it is:

a) isobaric b) isothermal c) adiabatic

Video: https://youtu.be/lPMWdsfgW0I

Example Video

Homework 1



Calculate the amount of Work done in each of the diagrams. Remember, Work = area under the curve. If the gas contracts, the work is negative.

- Try to solve the problem yourself, then watch the solution video:
- https://youtu.be/g0K7UvCGP7Y

Homework 2

- Try to solve the problem yourself, then watch the solution video:
- https://youtu.be/qlUk6G48iaE

2. Draw P-V diagrams for the following:

a) an adiabatic compression from p_i = 5.00 atm and V_i = 20.0 L to p_f = 47.6 atm and V_f = 4.00 L.

b) an isobaric expansion from p_i = 5000 Pa and V_i = 0.100 m^3 to V_f = 0.300 m^3.

c) An isovolumetric change in pressure from 10.0 atm to 4.00 atm at a volume of 6.00 m^3.

That’s it!