

Today

- I. First take home exam due Friday by midnight
 - II. Our Stamina Breaks for the Semester: We will take Friday Oct 23rd off, Wed Nov 25th, and Fri Nov 27th.
 - III. Last Time
 - IV. Josh's Guest Lecture on Efficiency of Engines
 - V. Midterm feedback for the Course
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- I. On Monday we discussed the chemical potential again. In particular, we considered a gas confined to two containers connected by a small tube and in a gravitational field at different heights. This illustrated that the chemical potential receives contributions from various forms of potential energy, in this case gravitational potential energy.

I. We also began discussing heat engines. We defined

$$e = \frac{W}{Q_h} = \frac{Q_h - Q_c}{Q_h} = 1 - \frac{Q_c}{Q_h} \leq 1 - \frac{T_c}{T_h}.$$

There is no engine whose net effect is to purely convert heat into work. Why? Well, it would mean that we were increasing the number of accessible states in the engine, while keeping its energy fixed and that's impossible.

Notice that in the study of engines, the usual sign conventions about heat are frequently changed. Here we are taking both heats to be positive.

