In Schroeder’s opinion, what is the most important type of work?

1. Compression
2. Electrical
3. Magnetic
4. Theoretical
5. Experimental

$\Delta U = Q + W$ is

1. The zeroeth law
2. The first law
3. The second law
4. The third law
5. Definition of internal energy

What option best describes adiabatic compression?

1. No temperature change
2. No heat flow
3. Must be quasi-static
4. Must be isentropic

Enthalpy is most useful for processes that occur at...

1. Constant temperature
2. Constant volume
3. Constant pressure
4. Constant entropy

Schroeder 1.26: A battery is connected in series to a resistor, which is immersed in water (to prepare a cup of tea). Would you classify the flow of energy from the battery to the resistor as “heat” or “work”?

1. Heat
2. Work
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1. Heat
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Schroeder 1.27:

Give an example of a process in which no heat is added to a system, but its temperature increases. Then give an example of the opposite: a process in which heat is added to a system but its temperature does not change.

Schroeder 1.28:

A 250mL cup of 25°C water is “heated” to boiling in a 600W microwave oven. Explain why no heat is involved in this process.

Schroeder 1.32: By applying a pressure of 200 atm, water can be compressed to 99% of its usual volume. Sketch this process on a PV diagram, and estimate the work required to compress a litre of water by this amount.

- 25% 1. 50 J
- 25% 2. 100 J
- 25% 3. 200 J
- 25% 4. 400 J

Schroeder 1.33:

An ideal gas is made to undergo the cyclic process shown in the figure. For each of the steps A, B, and C, determine whether each of the following is positive, negative, or zero: (a) the work done on the gas; (b) the change in the energy content of the gas; (c) the heat added to the gas. Then determine the sign of each of these quantities for the whole cycle.

Schroeder 1.38:

Two identical bubbles of gas form at the bottom of a lake, then rise to the surface. Because the pressure is much lower at the surface than at the bottom, both bubbles expand as they rise. However, bubble A rises very quickly, so that no heat is exchanged between it and the water. Meanwhile, bubble B rises slowly (stuck in weed), so it remains in thermal equilibrium with the water (which has the same temperature everywhere). Which of the two bubbles is larger by the time it reaches the surface?

- 46% 1. Bubble A
- 54% 2. Bubble B
Schroeder 1.37:

In a Diesel engine, atmospheric air is quickly compressed to about 1/20 of its original volume. Estimate the temperature of the air after compression.