Name: Joseph Specht Net-ID jspecht3

Quiz 1 (Total: 30 points) **Due back by Wed. 25 Jan. at 10 p.m., in Canvas**

- *This assignment pertains to Chapter 1 and parts of Chapter 2 from your textbook.*
- *Assignments will only be graded if the honor code statement on the last page is completed and signed.*
- *Save your entire assignment as one **PDF document** and upload it in the appropriate assignment folder on Canvas.*

a. For problems 1 - 10, match the appropriate definition in the right column with each term in the left column:

1.	I Boundary	**A.** The condition of a system as described by its properties.
2.	G Property	**B.** A region of space through which mass may flow.
3.	B Control volume	**C.** Whatever is studied, usually of fixed mass.
4.	E Extensive property	**D.** A transformation from one state to another.
5.	H Intensive property	**E.** A property whose value for an overall system is the sum of its values for the parts into which the system is divided.
6.	D Process	**F.** Everything external to the system.
7.	J Zeroth Law	**G.** A macroscopic characteristic of a system such as mass, volume, and temperature.
8.	A State	**H.** A property whose value is independent of the size or extent of a system and may vary from place to place within the system at any moment.
9.	F Surroundings	**I.** Distinguishes the system from its surroundings.
10.	C System	**J.** When two objects are in thermal equilibrium with a third object, they are in thermal equilibrium with each other.

b. A system is said to be in equilibrium [equilibrium; a dead state] if none of its properties change with time.

c. A *control volume* is a system that allows energy (heat) and mass transfer.

d. What do you call the energy transfer for which the sole effect on everything external to the system could have been the raising of a weight? work

e. What do you call the energy transfer which is induced only because of a temperature difference between a system and its surroundings? Energy (heat)

f. When a system undergoes a process, the terms *work* and *heat* do not refer to what is being transferred. Rather, energy is transferred when work and/or heat transfer occurs.

g. Calculate the *specific volume* of a system that comprises of a fluid with a mass of 1 kg inside a chamber with a fixed volume of 0.001 m^3. Can you determine the type of fluid from this value? [2]

v = ~~V~~ / m = .001 m^3 / 1kg = .001 m^3/kg. This is also equal to 1L/kg. This is the specific volume of water.

h. A metallic cylinder and piston arrangement contain 1 kg compressed gas at 20°C; the cylinder volume is 0.001 m^3. How much work does the piston do on the environment? Explain briefly. [2]

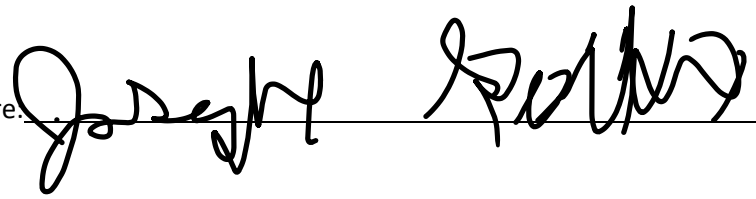
The piston does no work on the environment because there is no movement. Work is the integral of force with respect to x, since there is no change in x, there is no work being done at the current moment.

Being a student of high standards, I pledge to embody
the principles of *academic integrity*.

This quiz is my own work. I did not seek (or get) outside help or collaboration with any of the questions and their solutions. I did not post any of the questions on an electronic platform (like Chegg) nor did I solicit answers or solutions from any electronic platform (like Chegg). I also did not offer my solutions or answers to any other student.

I understand that this quiz is "open book" and "open notes" which means that I was permitted to use my prescribed textbook and lecture notes when addressing any of the questions. I have properly cited any other resources, with full cognizance of the regulations pertaining to plagiarism, copyright infringement, academic cheating, etc., as stipulated in the Student Code.

I acknowledge that academic violations will be dealt with according to the UIUC Student Code, Article 1, Part 4.

Student's signature: 

Student's Name: Joseph Specht

Net-ID: jspecht3

Date: 1/23/2023