

## Homework-1 Solutions

### Q 1-19C

This system is a region of space or open system in that mass such as air and food can cross its control boundary. The system can also interact with the surroundings by exchanging heat and work across its control boundary. By tracking these interactions, we can determine the energy conversion characteristics of this system.

### Q 1-24 C

If we were to divide this system in half, both the volume and the number of moles contained in each half would be one-half that of the original system. The molar specific volume of the original system is

$$\bar{V} = V / N$$

and the molar specific volume of one of the smaller systems is

$$\bar{V} = \frac{V/2}{N/2} = \frac{V}{N}$$

which is the same as that of the original system. The molar specific volume is then an *intensive property*.

### Q 1-27 C

A process during which the temperature remains constant is called isothermal; a process during which the pressure remains constant is called isobaric; and a process during which the volume remains constant is called isochoric.

### Q 1-35 C

Probably, but not necessarily. The operation of these two thermometers is based on the thermal expansion of a fluid. If the thermal expansion coefficients of both fluids vary linearly with temperature, then both fluids will expand at the same rate with temperature, and both thermometers will always give identical readings. Otherwise, the two readings may deviate.