Statistical Mechanics

q_{vib}

- Energy level diagram

- q_{vib}

Iclicker

- What is the probability of a CO molecule being in the ν=0 vibrational state at 300 K.
  - A – 0.0 – 0.19
  - B – 0.20 – 0.39
  - C – 0.40 – 0.59
  - D – 0.60 – 0.79
  - E – 0.80 – 1.00

$q_{rotational}$

- q_{trans}

- Replace sum with integral

Characteristic temperature

- Define a rotational temperature

- Define a vibrational temperature

Iclicker

- What fraction of CO molecules are in the ground rotational state? B = $5.79*10^{10}$ Hz
  - A – 0.0 – 0.19
  - B – 0.20 – 0.39
  - C – 0.40 – 0.59
  - D – 0.60 – 0.79
  - E – 0.80 – 1.00

Maximum J

- Rotational state, J, with maximum fractional population.

Q

- Total partition function

- ln Q

Q

- <E>

Q

- C_V

Q

- <P>