RECAP

- WHEN A SYSTEM IS IN THERMAL EQUILIBRIUM IT CAN BE CHARACTERISED BY A NUMBER OF MACROSCOPIC PARAMETERS

  - PRESSURE = p (Pa)
  - VOLUME = V (m^3)
  - AMOUNT = ν_i (mol)

    (No° OF MOLES OF CHEMICAL SPECIES i)

  - TEMP = T (K)

- AND WHEN IN EQUILIBRIUM THE SYSTEM IS SAID TO BE IN A MACROSTATE SPECIFIED BY THE GIVEN PARAMETERS.

- FOR A GIVEN MACROSTATE THERE ARE MANY POSSIBLE OR "ACCESSIBLE" MICROSCOPIC ARRANGEMENTS OF THE CONSTITUENT PARTICLES.

- A MICROSCOPIC ARRANGEMENT IS CALLED A MICROSTATE.

- A MACROSTATE CAN BE COMPLETELY CHARACTERISED BY JUST A FEW INDEPENDENT PARAMETERS – ALL OTHERS CAN BE DETERMINED BY EQUATIONS OF STATE

FOR SYSTEMS WITH NO MACROSCOPIC ELECTRIC OR MAGNETIC PROPERTIES,

ONE POSSIBLE CHOICE OF PARAMETERS WHICH COMPLETELY CHARACTERISE THE SYSTEM IS

$$E, \quad V, \quad \nu_i$$

EXAMPLES OF EQUATIONS OF STATE

IDEAL GASES

$$E = \alpha \nu R T = \alpha N k_B T \quad \text{—(1)}$$

$$pV = \nu R T = N k_B T \quad \text{—(2)}$$

WITH

$$\alpha = \begin{cases} \frac{3}{2} & \text{MONATOMIC GAS} \\ \frac{5}{2} & \text{DIATOMIC GAS} \\ \frac{6}{2} & \text{POLYATOMIC GAS} \end{cases}$$