

54B #1 UNIT 5

(1)

1. KINETIC MOLECULAR THEORY

1. GASES HAVE SMALL PARTICLES, EACH WITH MASS
2. DISTANCE BETWEEN PARTICLES IS LARGE
3. GAS PARTICLES IN CONSTANT, RAPID, RANDOM MOTION
4. COLLISIONS BETWEEN PARTICLES ARE ELASTIC
5. KE OF PARTICLES DEPENDS ON TEMPERATURE
- INC TEMP = INC KE
6. GAS PARTICLES EXERT NO FORCE ON EACH OTHER
= ELASTIC COLLISIONS

2. KE MEASURED BY TEMP. KE THUS VARIED BY HEATING OR COOLING.

3. $KE = \frac{1}{2} m v^2$; mass & velocity; KE would INC.

4. DIFFUSION = MOVEMENT OF PARTICLES FROM AN AREA OF HIGHER CONC. TO AREA OF LOWER CONC.

COMPRESSION = DECREASING VOLUME WITH SAME # OF PARTICLES

5. SOLIDS NOT DENSE THAN LIQUIDS, THIER GASES (NOT DENSE)
- GASES SO MUCH LESS DENSE BECAUSE PARTICLES SO FAR APART

6. PRESSURE = FORCE A GAS EXERTS ON A SURFACE

DUE TO IT'S MOTION. VOLUME, TEMP & NUMBER OF MOLES AFFECT PRESSURE

B.K. a. CO_2 + CH_4

b. $CO_2 = 44.01 \text{ g/mol}$ $CH_4 = 16.05 \text{ g/mol}$

$KE = \frac{1}{2} m v^2$; IF KE SAME, LIGHTER GAS MUST HAVE GREATER VELOCITY

E.C. $\frac{1}{2} (44.01)(v_1^2) = \frac{1}{2} (16.05)(v_2^2)$

$$\frac{44.01(v_1^2)}{16.05} = v_2^2$$

$$\sqrt{11} v_1 = v_2$$

Q5 5/8#1 (cont.)

(2)

98. P - INC.; T - INC.; V - STAY THE SAME; n - STAY THE SAME
109. P - DEC.; T - SAME; V - SAME; n - DEC
110. ALL NO CHANGE
121. P - SAME; T - INC.; V - INC.; n - SAME
1312. P - SAME; T - SAME; V - DEC; n - DEC
1413. P - INC; T - SAME; V - DEC; n - SAME
1514. $H_2 = 2.02 \text{ g/mol}$ $CO_2 = 44.01 \text{ g/mol}$
 - SAME # OF MOLECULES IF $V, T \& P$ SAME
1615. $44.01 \text{ g/mol} / 2.02 \text{ g/mol} = \frac{44.01}{2.02}$
1716. BOTH HAVE SAME KE

BECAUSE HAVE SAME TEMP

$$\frac{1}{2} (44.01) v_1^2 = \frac{1}{2} (2.02) v_2^2$$

$$\frac{44.01 v_1^2}{2.02} = v_2^2$$

$$\frac{\sqrt{22}}{\sqrt{1}} v_1 = v_2 = \sqrt{22} v_1 = v_2$$

#7 MOLAR VOLUME = VOLUME OF ONE MOLE OF A GAS AT A PARTICULAR TEMP AND PRESSURE
 1 mol OF ANY GAS @ STP = 22.4 L