

HW3

p 351 MC 3, 4, 6

Concept 23

p 353 Problems 7, 23, 25

~~Online 1st law derived~~

~~- 1st law reviewed~~

~~- cylinder ideal gas w/ piston~~

p 351 - Multiple Choice

(1)

3) Basketball filled w/ gas - change  $V$  b/c  $m$  change

• pump more gas in it

4) air in bike tire  $\rightarrow$  do not change when pump

(3)

a) mass

b) volume

c) density

d) pressure

**e) particle mass**

f) particle concentration

~~Concept~~

23) ~~How many oranges if 2 moles oranges.~~

e) Balloons filled w/ helium ~~at pressure~~  
deflate over time?

• gas diffuses to atmosphere

- Concept

23) How many oranges if 2 moles oranges?

(1)

$$2 \text{ mol} (6.02 \times 10^{23}) = 1.20 \times 10^{24} \text{ oranges}$$

p 353 - Problems

7) mass water molecule in kg?

a) molar mass water = 18 g/mol

} where?  
H<sub>2</sub>O 1H  
+14  
+164

$$m = \frac{M}{N} = \frac{18 \times 10^{-3} \text{ kg}}{6.02 \times 10^{23}} = 3.0 \times 10^{-26} \text{ kg}$$

(1)

b) avg air molecule in kg?

21% O<sub>2</sub> 78% N<sub>2</sub> M = 29 g/mol

$$m = \frac{M}{N} = \frac{29 \times 10^{-3} \text{ kg}}{6.02 \times 10^{23}} = 4.8 \times 10^{-26} \text{ kg}$$

23) T = -19°C

ΔT to double avg K

$$\bar{K} = \frac{3}{2} kT$$

① double T to double K

(1)

$$T_0 = -19^\circ\text{C} = 254 \text{ K}$$

$$T_f = 508 \text{ K}$$

$$\textcircled{2} \Delta T = 508 \text{ K} - 254 \text{ K} = 254 \text{ K}$$

③

25)  $\bar{K}$  particle of air at STP

$$T = 273 \text{ K}$$
$$P = 1 \times 10^5 \text{ Pa}$$

$$K = \frac{3}{2} kT$$

$$= \frac{3}{2} (1.38 \times 10^{-23} \frac{\text{J}}{\text{K}}) (273 \text{ K})$$

$$= 5.65 \times 10^{-21} \text{ J}$$

(1)