

**Note:** Dalton's Law of Partial Pressures:  $P_{\text{Total}} = P_A + P_B + P_C + \dots$

Refer to Table on back of this sheet for the vapor pressure of water at various temperatures.

Some of these questions were taken from the Holt Modern Chemistry text. (p329 and 359)

- 1) Air is primarily composed of three gases-- carbon dioxide ( $\text{CO}_2$ ), nitrogen ( $\text{N}_2$ ) and oxygen ( $\text{O}_2$ ). If a sample of air has a pressure of 760.0 mm Hg and the partial pressures of  $\text{CO}_2$  and  $\text{N}_2$  are given as  $P_{\text{CO}_2} = 0.285$  mm Hg and  $P_{\text{N}_2} = 593.5$  mm Hg, what is the partial pressure of  $\text{O}_2$ ?
- 2) What is the total pressure of a mixture of gases made up of  $\text{CO}_2$ ,  $\text{O}_2$  and  $\text{H}_2$  if the partial pressures are 22.3 kPa, 44.7 kPa and 112.0 kPa respectively?
- 3) Find the partial pressure of  $\text{SO}_2$  in a reaction mixture with  $\text{SO}_3$  and  $\text{O}_2$  if the total pressure is 30.4 kPa if the  $P_{\text{O}_2} = 16.5$  kPa and  $P_{\text{SO}_3} = 3.7$  kPa.
- 4) Suppose some oxygen gas is collected over water at  $20^\circ\text{C}$ . If the total pressure of the gases collected ( $\text{O}_2$  and  $\text{H}_2\text{O}$ ) is 730.0 mm Hg, what is the partial pressure of the  $\text{O}_2$  gas collected? (p329 #40)  
\*\*Use the table on the back to determine the partial pressure of the water vapor mixed in with the  $\text{O}_2$ .
- 5) A sample of oxygen gas is collected in a 175 mL container over water at  $15^\circ\text{C}$ . If the total pressure of the collected gases ( $\text{O}_2$  and  $\text{H}_2\text{O}$ ) is 752.0 mm Hg, what is the partial pressure of just the  $\text{O}_2$  gas, in atm?
- 6) A student collects  $\text{H}_2$  gas in a 50 mL eudiometer over water at  $23^\circ\text{C}$ . The total pressure is 104.3 kPa. What is the partial pressure of the  $\text{H}_2$ , in kPa?

APPENDIX A: HOLT MODERN CHEMISTRY

**TABLE A-8 WATER-VAPOR PRESSURE**

Temperature (°C)	Pressure (mm Hg)	Pressure (kPa)	Temperature (°C)	Pressure (mm Hg)	Pressure (kPa)
0.0	4.6	0.61	23.0	21.1	2.81
5.0	6.5	0.87	23.5	21.7	2.90
10.0	9.2	1.23	24.0	22.4	2.98
15.0	12.8	1.71	24.5	23.1	3.10
15.5	13.2	1.76	25.0	23.8	3.17
16.0	13.6	1.82	26.0	25.2	3.36
16.5	14.1	1.88	27.0	26.7	3.57
17.0	14.5	1.94	28.0	28.3	3.78
17.5	15.0	2.00	29.0	30.0	4.01
18.0	15.5	2.06	30.0	31.8	4.25
18.5	16.0	2.13	35.0	42.2	5.63
19.0	16.5	2.19	40.0	55.3	7.38
19.5	17.0	2.27	50.0	92.5	12.34
20.0	17.5	2.34	60.0	149.4	19.93
20.5	18.1	2.41	70.0	233.7	31.18
21.0	18.6	2.49	80.0	355.1	47.37
21.5	19.2	2.57	90.0	525.8	70.12
22.0	19.8	2.64	95.0	633.9	84.53
22.5	20.4	2.72	100.0	760.0	101.32