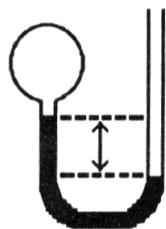


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

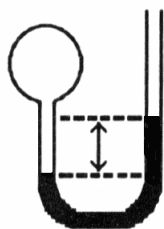
- 1) A gas at a pressure of 10.0 Pa exerts a force of _____ N on an area of 5.5 m². 1) _____
 A) 1.8 B) 0.55 C) 5.5 D) 55 E) 18
- 2) A gas at a pressure of 325 torr exerts a force of _____ N on an area of 5.5 m². 2) _____
 A) 0.018 B) 2.4 C) 2.4×10^5 D) 59 E) 1.8×10^3
- 3) A pressure of 1.00 atm is the same as a pressure of _____ of mmHg. 3) _____
 A) 193 B) 33.0 C) 29.92 D) 101 E) 760.0
- 4) The National Weather Service routinely supplies atmospheric pressure data to help pilots set their altimeters. The units the NWS uses for atmospheric pressure are inches of mercury. A barometric pressure of 30.51 inches of mercury corresponds to _____ kPa. 4) _____
 A) 16.01 B) 775 C) 103.3 D) 77.50 E) 1.020
- 5) A closed-end manometer was attached to a vessel containing argon. The difference in the mercury levels in the two arms of the manometer was 12.2 cm. Atmospheric pressure was 783 mmHg. The pressure of the argon in the container was _____ mmHg. 5) _____
 A) 795 B) 122 C) 882 D) 661 E) 771
- 6) A gas vessel is attached to an open-end manometer containing a nonvolatile liquid of density 0.791 g/mL as shown below. 6) _____



The difference in heights of the liquid in the two sides of the manometer is 43.4 cm when the atmospheric pressure is 755 mmHg. Given that the density of mercury is 13.6 g/mL, the pressure of the enclosed gas is _____ atm.

- A) 0.993 B) 1.03 C) 0.987 D) 0.960 E) 0.990

- 7) A gas vessel is attached to an open-end manometer filled with a nonvolatile liquid of density 0.993 g/mL as shown below. 7) _____



The difference in heights of the liquid in the two sides of the manometer is 32.3 cm when the atmospheric pressure is 765 mmHg. Given that the density of mercury is 13.6 g/mL, the pressure of the enclosed gas is _____ atm.

- A) 0.993 B) 1.04 C) 1.08 D) 1.01 E) 0.976
- 8) In a Torricelli barometer, a pressure of one atmosphere supports a 760 mm column of mercury. If the original tube containing the mercury is replaced with a tube having twice the diameter of the original, the height of the mercury column at one atmosphere pressure is _____ mm. 8) _____
- A) 4.78×10^3 B) 760 C) 121 D) 380 E) 1.52×10^3
- 9) A sample of gas (24.2 g) initially at 4.00 atm was compressed from 8.00 L to 2.00 L at constant temperature. After the compression, the gas pressure was _____ atm. 9) _____
- A) 1.00 B) 16.0 C) 2.00 D) 4.00 E) 8.00
- 10) A sample of a gas (5.0 mol) at 1.0 atm is expanded at constant temperature from 10 L to 15 L. The final pressure is _____ atm. 10) _____
- A) 7.5 B) 3.3 C) 15 D) 1.5 E) 0.67
- 11) A balloon originally had a volume of 4.39 L at 44 °C and a pressure of 729 torr. The balloon must be cooled to _____ °C to reduce its volume to 3.78 L (at constant pressure). 11) _____
- A) 38 B) 0 C) 273 D) 546 E) 72.9
- 12) If 3.21 mol of a gas occupies 56.2 L at 44 °C and 793 torr, 5.29 mol of this gas occupies _____ L under these conditions. 12) _____
- A) 30.9 B) 478 C) 61.7 D) 92.6 E) 14.7
- 13) A gas originally at 27 °C and 1.00 atm pressure in a 3.9 L flask is cooled at constant pressure until the temperature is 11 °C. The new volume of the gas is _____ L. 13) _____
- A) 3.7 B) 0.27 C) 3.9 D) 4.1 E) 0.24
- 14) If 50.75 g of a gas occupies 10.0 L at STP, 129.3 g of the gas will occupy _____ L at STP. 14) _____
- A) 50.8 B) 3.92 C) 5.08 D) 25.5 E) 12.9

- 15) A sample of He gas (2.35 mol) occupies 57.9 L at 300.0 K and 1.00 atm. The volume of this sample is _____ L at 423 K and 1.00 atm. 15) _____
 A) 0.709 B) 81.6 C) 41.1 D) 57.9 E) 1.41
- 16) A sample of H₂ gas (12.28 g) occupies 100.0 L at 400.0 K and 2.00 atm. A sample weighing 9.49 g occupies _____ L at 353 K and 2.00 atm. 16) _____
 A) 109 B) 147 C) 68.2 D) 77.3 E) 54.7
- 17) A sample of an ideal gas (3.00 L) in a closed container at 25.0 °C and 76.0 torr is heated to 300 °C. The pressure of the gas at this temperature is _____ torr. 17) _____
 A) 76.5
 B) 39.5
 C) 2.53×10^{-2}
 D) 912
 E) 146
- 18) A sample of a gas (1.50 mol) is contained in a 15.0 L cylinder. The temperature is increased from 100 °C to 150 °C. The ratio of final pressure to initial pressure $\left[\frac{P_2}{P_1}\right]$ is _____. 18) _____
 A) 1.00 B) 1.50 C) 0.882 D) 1.13 E) 0.667
- 19) A sample of a gas originally at 25 °C and 1.00 atm pressure in a 2.5 L container is allowed to expand until the pressure is 0.85 atm and the temperature is 15 °C. The final volume of the gas is _____ L. 19) _____
 A) 2.8 B) 3.0 C) 2.6 D) 2.1 E) 0.38
- 20) The reaction of 50 mL of Cl₂ gas with 50 mL of CH₄ gas via the equation: 20) _____

$$\text{Cl}_2(\text{g}) + \text{CH}_4(\text{g}) \rightarrow \text{HCl}(\text{g}) + \text{CH}_3\text{Cl}(\text{g})$$
 will produce a total of _____ mL of products if pressure and temperature are kept constant.
 A) 250 B) 50 C) 200 D) 150 E) 100
- 21) The reaction of 50 mL of N₂ gas with 150 mL of H₂ gas to form ammonia via the equation: 21) _____

$$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$$
 will produce _____ mL of ammonia if pressure and temperature are kept constant.
 A) 100 B) 250 C) 150 D) 200 E) 50
- 22) The reaction of 50 mL of Cl₂ gas with 50 mL of CH₄ gas via the equation: 22) _____

$$\text{Cl}_2(\text{g}) + \text{C}_2\text{H}_4(\text{g}) \rightarrow \text{C}_2\text{H}_4\text{Cl}_2(\text{g})$$
 will produce a total of _____ mL of products if pressure and temperature are kept constant.
 A) 25 B) 50 C) 100 D) 150 E) 125

- 23) The amount of gas that occupies 60.82 L at 31 °C and 367 mmHg is _____ mol. 23) _____
A) 11.6 B) 1.18 C) 0.850 D) 894 E) 0.120
- 24) The pressure of a sample of CH₄ gas (6.022 g) in a 30.0 L vessel at 402 K is _____ atm. 24) _____
A) 12.4 B) 6.62 C) 2.42 D) 0.414 E) 22.4
- 25) At a temperature of _____ °C, 0.444 mol of CO gas occupies 11.8 L at 889 torr. 25) _____
A) 106 B) 379 C) 32 D) 73 E) 14
- 26) The volume of 0.25 mol of a gas at 72.7 kPa and 15 °C is _____ m³. 26) _____
A) 2.2×10^{-1} B) 8.1×10^{-5} C) 4.3×10^{-4} D) 1.2×10^{-4} E) 8.2×10^{-3}
- 27) The pressure exerted by 1.3 mol of gas in a 13 L flask at 22 °C is _____ kPa. 27) _____
A) 18 B) 560 C) 2.4 D) 1.0 E) 250
- 28) A 0.325 L flask filled with gas at 0.914 atm and 19 °C contains _____ mol of gas. 28) _____
A) 80.7
B) 12.4
C) 1.48×10^{-2}
D) 9.42
E) 1.24×10^{-2}
- 29) A gas in a 325 mL container has a pressure of 695 torr at 19 °C. There are _____ mol of gas in the flask. 29) _____
A) 12.4
B) 1.24×10^{-2}
C) 1.48×10^{-2}
D) 9.42
E) 80.6
- 30) A sample of gas (1.9 mol) is in a flask at 21 °C and 697 mmHg. The flask is opened and more gas is added to the flask. The new pressure is 795 mmHg and the temperature is now 26 °C. There are now _____ mol of gas in the flask. 30) _____
A) 0.28 B) 2.1 C) 1.6 D) 3.5 E) 2.9
- 31) A sample of gas (1.3 mol) occupies _____ L at 22 °C and 2.5 atm. 31) _____
A) 0.94 B) 3.2×10^{-2} C) 13 D) 31 E) 0.079

- 32) The volume of 0.65 mol of an ideal gas at 365 torr and 97 °C is _____ L. 32) _____
A) 0.054 B) 9.5 C) 2.4×10^{-2} D) 11 E) 41
- 33) The volume occupied by 1.5 mol of gas at 35 °C and 2.0 atm pressure is _____ L. 33) _____
A) 2.2 B) 38 C) 0.026 D) 0.053 E) 19
- 34) The mass of nitrogen dioxide contained in a 4.32 L vessel at 48 °C and 141600 Pa is _____ g. 34) _____
A) 5.35×10^4
B) 9.46×10^{-2}
C) 10.5
D) 70.5
E) 53.5
- 35) The density of ammonia gas in a 4.32 L container at 837 torr and 45.0 °C is _____ g/L. 35) _____
A) 3.86
B) 4.22×10^{-2}
C) 0.717
D) 0.432
E) 0.194
- 36) The density of N₂O at 1.53 atm and 45.2 °C is _____ g/L. 36) _____
A) 0.388 B) 2.58 C) 9.99 D) 1.76 E) 18.2
- 37) The molecular weight of a gas is _____ g/mol if 3.5 g of the gas occupies 2.1 L at STP. 37) _____
A) 4.6×10^2 B) 5.5×10^3 C) 41 D) 2.7×10^{-2} E) 37
- 38) The molecular weight of a gas that has a density of 6.70 g/L at STP is _____ g/mol. 38) _____
A) 150 B) 3.35 C) 73.0 D) 496 E) 0.298
- 39) The molecular weight of a gas that has a density of 7.10 g/L at 25.0 °C and 1.00 atm pressure is _____ g/mol. 39) _____
A) 28.0
B) 5.75×10^{-3}
C) 14.6
D) 6.85×10^{-2}
E) 174

- 40) The molecular weight of a gas that has a density of 5.75 g/L at STP is _____ g/mol. 40) _____
- A) 578
B) 3.90
C) 141
D) 1.73×10^{-3}
E) 129
- 41) The density of chlorine (Cl_2) gas at 25 °C and 60. kPa is _____ g/L. 41) _____
- A) 0.86 B) 1.7 C) 4.9 D) 20 E) 0.58
- 42) The volume of hydrogen gas at 38.0 °C and 763 torr that can be produced by the reaction of 4.33 g of zinc with excess sulfuric acid is _____ L. 42) _____
- A) 2.71×10^{-4}
B) 0.592
C) 2.84
D) 1.69
E) 3.69×10^4
- 43) The volume of HCl gas required to react with excess magnesium metal to produce 6.82 L of hydrogen gas at 2.19 atm and 35.0 °C is _____ L. 43) _____
- A) 3.41 B) 6.82 C) 2.19 D) 4.38 E) 13.6
- 44) The volume of fluorine gas required to react with 2.67 g of calcium bromide to form calcium fluoride and bromine at 41.0 °C and 4.31 atm is _____ mL. 44) _____
- A) 79.9 B) 210 C) 104 D) 10.4 E) 420
- 45) What volume (mL) of sulfur dioxide can be produced by the complete reaction of 3.82 g of calcium sulfite with excess HCl (aq), when the final SO_2 pressure is 827 torr at 44.0 °C? 45) _____
- A) 1.39×10^{-4}
B) 578
C) 1.00×10^{-3}
D) 0.106
E) 761

- 46) Automobile air bags use the decomposition of sodium azide as their source of gas for rapid inflation: 46) _____



What mass (g) of NaN_3 is required to provide 40.0 L of N_2 at 25.0 °C and 763 torr?

- A) 1.09 B) 160 C) 1.64 D) 107 E) 71.1

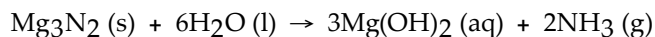
- 47) The Mond process produces pure nickel metal via the thermal decomposition of nickel tetracarbonyl: 47) _____



What volume (L) of CO is formed from the complete decomposition of 444 g of $\text{Ni}(\text{CO})_4$ at 752 torr and 22.0 °C?

- A) 63.7 B) 11.0 C) 255 D) 0.356 E) 20.2

- 48) What volume (L) of NH_3 gas at STP is produced by the complete reaction of 7.5 g of H_2O according to the following reaction? 48) _____



- A) 3.1 B) 9.3 C) 0.32 D) 28 E) 19

- 49) Ammonium nitrite undergoes thermal decomposition to produce only gases: 49) _____



What volume (L) of gas is produced by the decomposition of 35.0 g of NH_4NO_2 (s) at 525 °C and 1.5 atm?

- A) 15 B) 72 C) 160 D) 24 E) 47

- 50) The thermal decomposition of potassium chlorate can be used to produce oxygen in the laboratory. 50) _____



What volume (L) of O_2 gas at 25 °C and 1.00 atm pressure is produced by the decomposition of 7.5 g of KClO_3 (s)?

- A) 11 B) 7.5 C) 4.5 D) 2.2 E) 3.7

- 51) Since air is a mixture, it does not have a "molar mass." However, for calculation purposes, it is possible to speak of its "effective molar mass." (An effective molar mass is a weighted average of the molar masses of a mixture's components.) If air at STP has a density of 1.285 g/L, its effective molar mass is _____ g/mol. 51) _____
A) 31.4 B) 26.9 C) 30.0 D) 28.8 E) 34.4
- 52) A vessel contained N₂, Ar, He, and Ne. The total pressure in the vessel was 987 torr. The partial pressures of nitrogen, argon, and helium were 44.0, 486, and 218 torr, respectively. The partial pressure of neon in the vessel was _____ torr. 52) _____
A) 521 B) 42.4 C) 19.4 D) 760 E) 239
- 53) The pressure in a 12.2 L vessel that contains 2.34 g of carbon dioxide, 1.73 g of sulfur dioxide, and 3.33 g of argon, all at 42 °C is _____ mmHg. 53) _____
A) 395 B) 263 C) 0.347 D) 134 E) 116
- 54) A sample of He gas (3.0 L) at 5.6 atm and 25 °C was combined with 4.5 L of Ne gas at 3.6 atm and 25 °C at constant temperature in a 9.0 L flask. The total pressure in the flask was _____ atm. Assume the initial pressure in the flask was 0.00 atm. 54) _____
A) 9.2 B) 1.0 C) 24 D) 2.6 E) 3.7
- 55) A sample of H₂ gas (2.0 L) at 3.5 atm was combined with 1.5 L of N₂ gas at 2.6 atm pressure at a constant temperature of 25 °C into a 7.0 L flask. The total pressure in the flask is _____ atm. Assume the initial pressure in the flask was 0.00 atm. 55) _____
A) 2.8 B) 1.0 C) 1.6 D) 0.56 E) 24
- 56) In a gas mixture of He, Ne, and Ar with a total pressure of 8.40 atm, the mole fraction of Ar is _____ if the partial pressures of He and Ne are 1.50 and 2.00 atm, respectively. 56) _____
A) 0.357 B) 0.417 C) 0.583 D) 0.238 E) 0.179
- 57) A gas mixture of Ne and Ar has a total pressure of 4.00 atm and contains 16.0 mol of gas. If the partial pressure of Ne is 2.75 atm, how many moles of Ar are in the mixture? 57) _____
A) 5.00 B) 6.75 C) 12.0 D) 9.25 E) 11.0
- 58) A mixture of He and Ne at a total pressure of 0.95 atm is found to contain 0.32 mol of He and 0.56 mol of Ne. The partial pressure of Ne is _____ atm. 58) _____
A) 1.0 B) 1.7 C) 0.60 D) 0.35 E) 1.5
- 59) A flask contains a mixture of He and Ne at a total pressure of 2.6 atm. There are 2.0 mol of He and 5.0 mol of Ne in the flask. The partial pressure of He is _____ atm. 59) _____
A) 1.86 B) 1.04 C) 0.74 D) 6.5 E) 9.1

- 60) Sodium hydride reacts with excess water to produce aqueous sodium hydroxide and hydrogen gas: 60) _____
- $$\text{NaH (s)} + \text{H}_2\text{O (l)} \rightarrow \text{NaOH (aq)} + \text{H}_2 \text{ (g)}$$
- A sample of NaH weighing _____ g will produce 982 mL of gas at 28.0 °C and 765 torr, when the hydrogen is collected over water. The vapor pressure of water at this temperature is 28 torr.
- A) 2.93 B) 0.0388 C) 0.960 D) 925 E) 0.925
- 61) SO₂ (5.00 g) and CO₂ (5.00 g) were placed in a 750.0 mL container at 50.0 °C. The total pressure in the container was _____ atm. 61) _____
- A) 1.60 B) 0.192 C) 4.02 D) 2.76 E) 6.78
- 62) SO₂ (5.00 g) and CO₂ (5.00 g) are placed in a 750.0 mL container at 50.0 °C. The partial pressure of SO₂ in the container was _____ atm. 62) _____
- A) 0.192 B) 6.78 C) 4.02 D) 1.60 E) 2.76
- 63) SO₂ (5.00 g) and CO₂ (5.00 g) were placed in a 750.0 mL container at 50.0 °C. The partial pressure of CO₂ in the container was _____ atm. 63) _____
- A) 1.60 B) 2.76 C) 4.02 D) 0.192 E) 6.78
- 64) CO (5.00 g) and CO₂ (5.00 g) were placed in a 750.0 mL container at 50.0 °C. The total pressure in the container was _____ atm. 64) _____
- A) 1.60 B) 4.02 C) 0.292 D) 10.3 E) 6.31
- 65) CO (5.00 g) and CO₂ (5.00 g) were placed in a 750.0 mL container at 50.0 °C. The partial pressure of CO in the container was _____ atm. 65) _____
- A) 4.02 B) 10.3 C) 0.292 D) 6.31 E) 1.60
- 66) CO (5.00 g) and CO₂ (5.00 g) were placed in a 750.0 mL container at 50.0 °C. The partial pressure of CO₂ in the container was _____ atm. 66) _____
- A) 4.01 B) 1.60 C) 10.3 D) 6.31 E) 0.292
- 67) The root-mean-square speed of CO at 113 °C is _____ m/s. 67) _____
- A) 31.5 B) 317 C) 586 D) 993 E) 58.3
- 68) A sample of N₂ gas (2.0 mmol) effused through a pinhole in 5.5 s. It will take _____ s for the same amount of CH₄ to effuse under the same conditions. 68) _____
- A) 7.3 B) 5.5 C) 3.1 D) 9.6 E) 4.2

- 69) A sample of O₂ gas (2.0 mmol) effused through a pinhole in 5.0 s. It will take _____ s for the same amount of CO₂ to effuse under the same conditions. 69) _____
- A) 0.23 B) 3.6 C) 5.9 D) 6.9 E) 4.3
- 70) A sample of He gas (2.0 mmol) effused through a pinhole in 53 s. The same amount of an unknown gas, under the same conditions, effused through the pinhole in 248 s. The molecular mass of the unknown gas is _____ g/mol. 70) _____
- A) 19 B) 350 C) 5.5 D) 88 E) 0.19
- 71) Using the van der Waals equation, the pressure in a 22.4 L vessel containing 1.00 mol of neon gas at 100 °C is _____ atm. ($a = 0.211 \text{ L}^2\text{-atm/mol}^2$, $b = 0.0171 \text{ L/mol}$) 71) _____
- A) 0.367 B) 1.00 C) 1.37 D) 1.21 E) 0.730
- 72) Using the van der Waals equation, the pressure in a 22.4 L vessel containing 1.50 mol of chlorine gas at 0.00 °C is _____ atm. ($a = 6.49 \text{ L}^2\text{-atm/mol}^2$, $b = 0.0562 \text{ L/mol}$) 72) _____
- A) 1.50 B) 1.48 C) 0.993 D) 1.91 E) 0.676

Answer Key

Testname: CHAPTER 10 PRACTIS QUESTIONS

- 1) D
- 2) C
- 3) E
- 4) C
- 5) B
- 6) D
- 7) B
- 8) B
- 9) B
- 10) E
- 11) B
- 12) D
- 13) A
- 14) D
- 15) B
- 16) C
- 17) E
- 18) D
- 19) A
- 20) E
- 21) A
- 22) B
- 23) B
- 24) D
- 25) A
- 26) E
- 27) E
- 28) E
- 29) B
- 30) B
- 31) C
- 32) E
- 33) E
- 34) C
- 35) C
- 36) B
- 37) E
- 38) A
- 39) E
- 40) E
- 41) B
- 42) D
- 43) E
- 44) A
- 45) E
- 46) E
- 47) C
- 48) A
- 49) B
- 50) D

Answer Key

Testname: CHAPTER 10 PRACTIS QUESTIONS

- 51) D
- 52) E
- 53) B
- 54) E
- 55) C
- 56) C
- 57) A
- 58) C
- 59) C
- 60) E
- 61) E
- 62) E
- 63) C
- 64) D
- 65) D
- 66) A
- 67) C
- 68) E
- 69) C
- 70) D
- 71) C
- 72) B