Name:
Score: 0 / 18 points (0%) [3 open-ended questions not graded]

Chapter 10 Practice

Multiple Choice
Identify the choice that best completes the statement or answers the question.

___ 1. 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.
a. 4.00
b. 2.00
c. 1.00
d. 8.00
e. 16.0

ANSWER: E
POINTS: 0 / 1

___ 2. 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).
a. 38
b. 0
c. 72.9
d. 273
e. 546

ANSWER: B
POINTS: 0 / 1

___ 3. 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.
a. 14.7
b. 61.7
c. 30.9
d. 92.6
e. 478

ANSWER: D
POINTS: 0 / 1

___ 4. 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 [ ] is _____.

a. 1.50
b. 0.667
c. 0.882
d. 1.13
e. 1.00

ANSWER: D
POINTS: 0 / 1

___ 5. 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.
a. 3.0
b. 2.8
c. 2.6
d. 2.1
e. 0.38

ANSWER: B
POINTS: 0 / 1

___ 6. The reaction of 50 mL of N_2 gas with 150 mL of H_2 gas to form ammonia via the equation:

will produce _____ mL of ammonia if pressure and temperature are kept constant.
a. 250
b. 50
c. 200
d. 150
e. 100

ANSWER: E
POINTS: 0 / 1

___ 7. At a temperature of _____ °C, 0.444 mol of CO gas occupies 11.8 L at 889 torr.
a. 379
b. 73
c. 14
d. 32
e. 106

ANSWER: E
POINTS: 0 / 1

___ 8. The molecular weight of a gas that has a density of 6.70 g/L at STP is _____ g/mol.
a. 4.96×10^2
b. 1.50×10^2
c. 7.30×10^1
d. 3.35

e. 2.98×10^{-1}

ANSWER: B
POINTS: 0 / 1

___ 9. 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?
a. 11.0
b. 5.00
c. 6.75
d. 9.25
e. 12.0

ANSWER: B
POINTS: 0 / 1

___ 10. A sample of O_2 gas (2.0 mmol) effused through a pinhole in 5.0 s. It will take _____ s for the same amount of CO_2 to effuse under the same conditions.
a. 4.3
b. 0.23
c. 3.6
d. 5.9
e. 6.9

ANSWER: D
POINTS: 0 / 1

___ 11. One significant difference between gases and liquids is that _____.
a. a gas is made up of molecules
b. a gas assumes the volume of its container
c. a gas may consist of both elements and compounds
d. gases are always mixtures
e. All of the above answers are correct.

ANSWER: B
POINTS: 0 / 1

___ 12. A 255 mL round-bottom flask is weighed and found to have a mass of 114.85 g. A few milliliters of an easily vaporized liquid are added to the flask and the flask is immersed in a boiling water bath. All of the liquid vaporizes at the boiling temperature of water, filling the flask with vapor. When all of the liquid has vaporized, the flask is removed from the bath, cooled, dried, and reweighed. The new mass of the flask and the condensed vapor is 115.23 g. Which of the following compounds could the liquid be? (Assume the ambient pressure is 1 atm.)
a. C_4H_{10}
b. C_3H_7OH
c. C_2H_6

d. C_2H_5OH
e. C_4H_9OH

ANSWER: D
POINTS: 0 / 1

___ 13. The average kinetic energy of the particles of a gas is directly proportional to _____.
a. the rms speed
b. the square of the rms speed
c. the square root of the rms speed
d. the square of the particle mass
e. the particle mass

ANSWER: B
POINTS: 0 / 1

___ 14. The kinetic-molecular theory predicts that pressure rises as the temperature of a gas increases because _____.
a. the average kinetic energy of the gas molecules decreases
b. the gas molecules collide more frequently with the wall
c. the gas molecules collide less frequently with the wall
d. the gas molecules collide more energetically with the wall
e. both the gas molecules collide more frequently with the wall and the gas molecules collide more energetically with the wall

ANSWER: E
POINTS: 0 / 1

___ 15. According to kinetic-molecular theory, if the temperature of a gas is raised from 100°C to 200°C, the average kinetic energy of the gas will _____.
a. double
b. increase by a factor of 1.27
c. increase by a factor of 100
d. decrease by half
e. decrease by a factor of 100

ANSWER: B
POINTS: 0 / 1

___ 16. Of the following gases, _____ will have the greatest rate of effusion at a given temperature.
a. NH_3
b. CH_4
c. Ar
d. HBr
e. HCl

ANSWER: B

POINTS: 0 / 1

___ 17. The root-mean-square speed of H_2S at 26.0°C is _____ m/sec.

a. 334
b. 62.4
c. 468
d. 751
e. 214

ANSWER: C
POINTS: 0 / 1

___ 18. Arrange the following gases in order of increasing average molecular speed at 25°C.

He, O_2, CO_2, N_2

a. $He < N_2 < O_2 < CO_2$
b. $He < O_2 < N_2 < CO_2$
c. $CO_2 < O_2 < N_2 < He$
d. $CO_2 < N_2 < O_2 < He$
e. $CO_2 < He < N_2 < O_2$

ANSWER: C
POINTS: 0 / 1

Free Response

19. Equal masses (0.500 g each) of hydrogen and oxygen gases are placed in an evacuated 4.00-L flask at 298 K. The mixture is allowed to react to completion, and the flask is returned to 298 K. The vapor pressure of water at 298 K is 23.76 torr.

a. Write and balance the equation for the reaction.

b. What is the total pressure inside the flask before the reaction begins?

c. What is the mass of water vapor in the flask upon completion?

d. How many grams of which reactant remain?

e. What is the total pressure in the flask upon completion?

f. After the reaction, is there any liquid water present? If so, how many grams. If not, why?

RESPONSE:
ANSWER: a. duh
b. 1.62 atm
c. 0.0920 g water vapor

d. 0.438 g hydrogen gas
e. 1.37 atm
f. 0.470 g water liquid

POINTS: -- / 1

20. Samples of $CO(g)$ and $CO_2(g)$ are placed in 1-L containers. The CO gas is at 298 K and 2 atm, while the CO_2 gas is at 298 K and 1 atm.

a. Indicate whether the average kinetic energy of the CO_2 molecules is greater than, equal to, or less then the average kinetic energy of the CO molecules. Justify your answer.

b. Indicate whether the root-mean-square velocity of the CO_2 molecules is is greater than, equal to, or less then the root-mean-square velocity of the CO molecules. Justify your answer.

c. Indicate whether the number of CO_2 molecules is is greater than, equal to, or less then the number of CO molecules. Justify your answer.

RESPONSE:
ANSWER: a. same
b. less than
c. less than

POINTS: -- / 1

21. All of the air in a rigid, 2.0-L flask is pumped out. Then some liquid ethanol is injected into the sealed flask, which is held at 308 K. The amount of liquid ethanol initially decreases, but after five minutes the amount of liquid ethanol in the flask remains constant. Ethanol has a boiling point of 351.5 K and an equilibrium vapor pressure of 100 torr at 351.5 K.

a. When the amount of liquid ethanol in the flask is constant, is the pressure in the flask greater than, less than, or equal to 100 torr. Justify your answer.

b. The flask is then heated to 318 K, and the pressure in the flask increases. In terms of kinetic molecular theory, provide TWO reasons for the pressure's increase in the flask at 318 K as compared to 308 K.

RESPONSE:
ANSWER: a. less than
b. think about it

POINTS: -- / 1

Retake Test