

Deep Run High School

CHEMISTRY I HON: 2(A), 6(A)

Unit 9 Test Review

Due Date: April 25, 2019

Instructor: Jennifer Krug

Name: _____

Score: / 100

Instructions:

You will have **two attempts** to get your highest score.

Question 1

/1

A 6.35 L sample of carbon monoxide is collected at 55.0 °C and 0.892 atm. What volume will the gas occupy at 1.05 atm and 59.0 °C?

☐ 5.46 L

☐ 6.10 L

☐ 4.82 L

☐ 1.96 L

Question 2

/1

A 2 L balloon contains 0.10 moles of gas. What is the total volume of the balloon, once 0.90 more moles of gas are added? _____ L

Name: _____

Question 3

 /1

A chemist heats a 250 ml sample of gas from 20°C to 40°C. What is the final volume of the sample? _____ ml

Question 4

 /1

Pressure conversions: 1 atmosphere = 760 mm Hg = 760 torr = 101.325 kPa

125 kPa is equivalent to _____ mm Hg

Question 5

 /1

According to Charles' Law, when the temperature of a gas doubles, the volume

- ☐ reduces by one half
- ☐ also doubles
- ☐ quadruples
- ☐ stays constant

Name: _____

Question 6

/1

What is the volume of 2.0 moles of gas at STP?

($R = 0.0821 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}}$)

☐ 22.4 L

☐ 44.8 L

☐ 33.6 L

☐ 11.2 L

Question 7

/1

A sample of gas with a volume of 750 mL exerts a pressure of 98 kPa at 30 °C. What pressure will the sample exert when it is compressed to 250 mL and cooled to -25 °C?

☐ 241 kPa

☐ 26.7 kPa

☐ 359 kPa

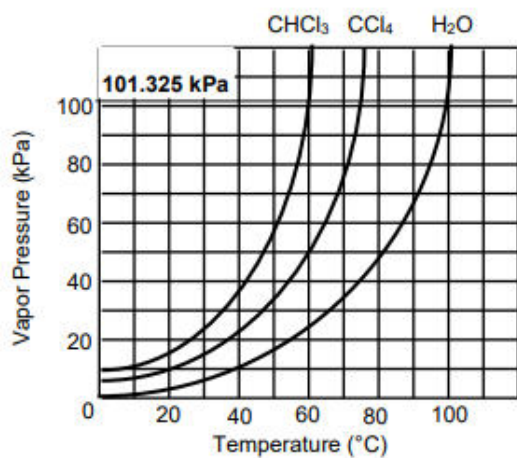
☐ 39.9 kPa

Name: _____

Question 8

/1

Use the graph below to answer the following questions:



1. What will the boiling point of CHCl_3 be when the atmospheric pressure exerted on its surface is 101.325 kPa?
_____ °C

2. What is the normal boiling point for CCl_4 ? _____ °C

3. What is the pressure when water boils at 70 °C? _____ kPa

4. Which liquid on the graph has molecules that exert the strongest attractive forces with each other?

5. Which liquid will evaporate first? _____

Name: _____

Question 9

/1

A sample of gas has a volume of 10.0 L at 25.0°C. What is the final temperature *in Celsius*, if the volume is decreased to 5.00 L?

☐ 149 °C

☐ 124 °C

☐ -124 °C

☐ -149 °C

Question 10

/1

A balloon currently contains 24 g of helium gas at a volume of 1.5 L. How many grams will it contain if you add helium until the balloon has a volume of 3.0 L?

☐ 12 grams

☐ 6 grams

☐ 48 grams

☐ 24 grams

Name: _____

Question 11

/1

Select **ALL THAT APPLY** to ideal gases.

- ☐ The volume of the gas molecules is insignificant.
- ☐ There are no attractive forces between the individual gas molecules.
- ☐ The pressure of the gas is always equal to one atmosphere.
- ☐ The kinetic energy of the gas molecules is proportional to the temperature in Kelvin.

Question 12

/1

The partial pressure of a mixture of gases are as follows: 20.0 kPa oxygen, 46.7 kPa nitrogen, and 26.3 kPa hydrogen. What is the total pressure of the mixture?

- ☐ 93.0 kPa
- ☐ 66.7 kPa
- ☐ 87.3 kPa
- ☐ 72.0 kPa

Name: _____

Question 13

/1

Pressure conversions: 1 atmosphere = 760 mm Hg = 760 torr = 101.325 kPa

653 mm Hg is equivalent to _____ atm

Question 14

/1

A 3.8 L sample of nitrogen at 25 °C and 88 kPa is allowed to expand to 5.0 L. The temperature remains constant. What is the final pressure?

☐ 0.67 kPa

☐ 67 kPa

☐ 120 kPa

☐ 17.6 kPa

Name: _____

Question 15

/1

A compressed gas at STP is heated to 40.0 °C. Find its final pressure in kPa if the volume remains constant.

(STP = 273 Kelvin and 101.325 kPa)

☐ 760 kPa

☐ 101 kPa

☐ 871 kPa

☐ 116 kPa

Question 16

/1

What is the volume of 44 grams CO₂ at 22 °C and 750 mm Hg?

($R = 8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}}$)

☐ 24.5 L

☐ 32.8 L

☐ 10.7 L

☐ 17.9 L

Name: _____

Question 17

/2

What is the boiling point of pure water in degrees Celsius?

_____ °C

Question 18

/1

A 25.0 ml sample of hydrogen gas increased in pressure from 575 mm Hg to 875 mm Hg. What is the final volume? _____ ml

Question 19

/1

According to Avogadro's Law, when the number of moles doubles, the volume

☐

is cut in half.

☐

also doubles.

☐

is squared.

☐

quadruples.

Name: _____

Question 20

/1

Convert 353 Kelvin into degrees Celsius. _____ °C

Question 21

/1

A chemist calculated the speed of carbon dioxide molecules to be 410 m/s. Use this information to predict the speed of methane molecules.

☐ 1600 m/s

☐ 1200 m/s

☐ 680 m/s

☐ 840 m/s

Name: _____

Question 22

/1

Calculate the pressure exerted by 7.53 L of NO₂ containing 0.916 mol at 270 K.

($R = 8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}}$)

- ☐ 0.212 kPa
- ☐ 249 kPa
- ☐ 273 kPa
- ☐ 224 kPa

Question 23

/1

According to Boyle's Law, when the pressure of a gas doubles, the volume

- ☐ also doubles.
- ☐ is reduced by one half.
- ☐ increases by a factor of four.
- ☐ decreases by a factor of four

Name: _____

Question 24

/1

Converting 25°C to Kelvin= _____ K

Question 25

/6

Indicate whether the following gases are diatomic or monatomic in nature.

☐

1. hydrogen gas

A. diatomic

☐

2. nitrogen gas

B. monatomic

☐

3. neon gas

C.

☐

4. argon gas

D.

☐

5. oxygen gas

E.

☐

6. helium gas

F.

Name: _____

Question 26

/1

What is the mole fraction of carbon dioxide for the following mixture of gases: 2 moles oxygen, 6 moles carbon dioxide, 8 moles water vapor?

☐ 3/4

☐ 3/8

☐ 1/4

☐ 1/8

Question 27

/1

A compressed gas at STP is compressed to 2.35 atm. Find the final temperature *in Celsius*, if the volume remains constant.

(STP = 273 Kelvin and 1 atm)

☐ 642 °C

☐ 760 °C

☐ 369 °C

☐ 101 °C

Name: _____

Question 28

/1

Which of the following gases will escape the fastest: carbon dioxide gas, oxygen gas, chlorine gas, or argon gas?

☐ carbon dioxide gas

☐ chlorine gas

☐ oxygen gas

☐ argon gas

Instructions for grading: Grade each question and tally the score to obtain the total test points. If the factor does not equal 1, multiply the total points by the factor to obtain the student's final score.

Question 1

A 6.35 L sample of carbon monoxide is collected at 55.0 °C and 0.892 atm. What volume will the gas occupy at 1.05 atm and 59.0 °C?

5.46 L

1 possible pts.

Question 2

A 2 L balloon contains 0.10 moles of gas. What is the total volume of the balloon, once 0.90 more moles of gas are added? 20 L

1 possible pts.

Question 3

A chemist heats a 250 ml sample of gas from 20°C to 40°C. What is the final volume of the sample? 267 ml

1 possible pts.

Question 4

Pressure conversions: 1 atmosphere = 760 mm Hg = 760 torr = 101.325 kPa

125 kPa is equivalent to 938 mm Hg

1 possible pts.

Question 5

According to Charles' Law, when the temperture of a gas doubles, the volume ☐ also doubles

1 possible pts.

Question 6

What is the volume of 2.0 moles of gas at STP?

$$(R = 0.0821 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}})$$

44.8 L

1 possible pts.

Question 7

A sample of gas with a volume of 750 mL exerts a pressure of 98 kPa at 30 °C. What pressure will the sample exert when it is compressed to 250 mL and cooled to -25 °C?

241 kPa

1 possible pts.

Question 8

Use the graph below to answer the following questions:

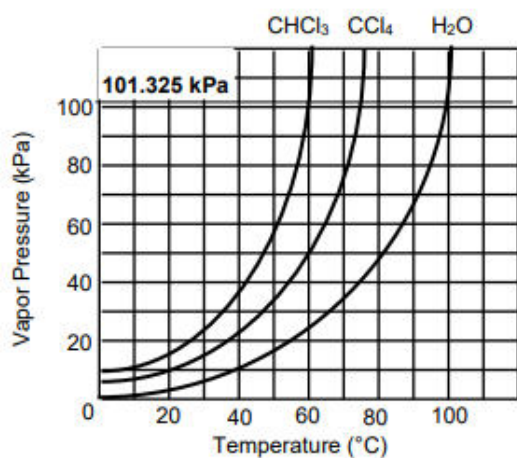


Figure 1

1. What will the boiling point of CHCl_3 be when the atmospheric pressure exerted on its surface is 101.325 kPa? **60 °C**

2. What is the normal boiling point for CCl_4 ? **73 - 76** °C

3. What is the pressure when water boils at 70 °C? **33 - 37** kPa

4. Which liquid on the graph has molecules that exert the strongest attractive forces with each other? **water, H_2O , H_2O , H_2O**

5. Which liquid will evaporate first? **trichloromethane, trichloromethane, CHCl_3**

Question 9

A sample of gas has a volume of 10.0 L at 25.0°C. What is the final temperature *in Celsius*, if the volume is decreased to 5.00 L?

-124 °C

1 possible pts.

Question 10

A balloon currently contains 24 g of helium gas at a volume of 1.5 L. How many grams will it contain if you add helium until the balloon has a volume of 3.0 L?

48 grams

1 possible pts.

Question 11

Select **ALL THAT APPLY** to ideal gases.

☐

The volume of the gas molecules is insignificant.

☐

There are no attractive forces between the individual gas molecules.

☐

The kinetic energy of the gas molecules is proportional to the temperature in Kelvin.

1 possible pts. / partial credit

Question 12

The partial pressure of a mixture of gases are as follows: 20.0 kPa oxygen, 46.7 kPa nitrogen, and 26.3 kPa hydrogen. What is the total pressure of the mixture?

93.0 kPa

1 possible pts.

Question 13

Pressure conversions: 1 atmosphere = 760 mm Hg = 760 torr = 101.325 kPa

653 mm Hg is equivalent to 0.859 atm

1 possible pts.

Question 14

A 3.8 L sample of nitrogen at 25 °C and 88 kPa is allowed to expand to 5.0 L. The temperature remains constant. What is the final pressure?

67 kPa

1 possible pts.

Question 15

A compressed gas at STP is heated to 40.0 °C. Find its final pressure in kPa if the volume remains constant.

(STP = 273 Kelvin and 101.325 kPa)

116 kPa

1 possible pts.

Question 16

What is the volume of 44 grams CO₂ at 22 °C and 750 mm Hg?

$$(R = 8.314 \frac{kPa \cdot L}{mol \cdot K})$$

24.5 L

1 possible pts.

Question 17

What is the boiling point of pure water in degrees Celsius? 100 °C

2 possible pts. / partial credit

Question 18

A 25.0 ml sample of hydrogen gas increased in pressure from 575 mm Hg to 875 mm Hg. What is the final volume? 16.4 ml

1 possible pts.

Question 19

According to Avogadro's Law, when the number of moles doubles, the volume

also doubles.

1 possible pts.

Question 20

Convert 353 Kelvin into degrees Celsius. 80, 80.0 °C

1 possible pts.

Question 21

A chemist calculated the speed of carbon dioxide molecules to be 410 m/s.
Use this information to predict the speed of methane molecules.

680 m/s

1 possible pts.

Question 22

Calculate the pressure exerted by 7.53 L of NO₂ containing 0.916 mol at 270 K.

$$(R = 8.314 \frac{kPa \cdot L}{mol \cdot K})$$

273 kPa

1 possible pts.

Question 23

According to Boyle's Law, when the pressure of a gas doubles, the volume

is reduced by one half.

1 possible pts.

Question 24

Converting 25°C to Kelvin= 298 K

1 possible pts.

Question 25

Indicate whether the following gases are diatomic or monatomic in nature.

1. hydrogen gas H_2 Diatomic

2. nitrogen gas N_2 Diatomic

3. neon gas Ne Mono

4. argon gas Ar Mono

5. oxygen gas O_2 Diatomic

6. helium gas He Mono

What is the mole fraction of carbon dioxide for the following mixture of gases: 2 moles oxygen, 6 moles carbon dioxide, 8 moles water vapor?

3/8

1 possible pts.

Question 27

A compressed gas at STP is compressed to 2.35 atm. Find the final temperature *in Celsius*, if the volume remains constant.

(STP = 273 Kelvin and 1 atm)

369 °C

1 possible pts.

Question 28

Which of the following gases will escape the fastest: carbon dioxide gas, oxygen gas, chlorine gas, or argon gas?

oxygen gas

1 possible pts.