

Unit 9 Test Review

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

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Instructor: Jennifer Krug

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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? _____ ml

/1

Question 4

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

125 kPa is equivalent to _____ mm Hg

/1

Question 5

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

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

/1

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Question 6

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

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

- ☐ 22.4 L
- ☐ 44.8 L
- ☐ 33.6 L
- ☐ 11.2 L

/1

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
- ☐ 26.7 kPa
- ☐ 359 kPa
- ☐ 39.9 kPa

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Question 8

Use the graph below to answer the following questions:

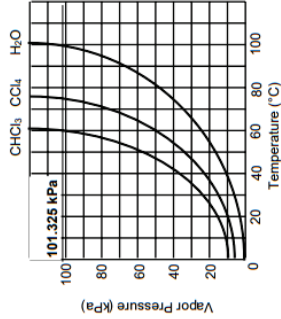


Figure 1

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

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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?

- ☐ 149 °C
- ☐ 124 °C
- ☐ -124 °C
- ☐ -149 °C

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?

- ☐ 12 grams
- ☐ 6 grams
- ☐ 48 grams
- ☐ 24 grams

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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 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

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

Question 13

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

653 mm Hg is equivalent to _____ atm

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?

- ☐ 0.67 kPa
- ☐ 67 kPa
- ☐ 120 kPa
- ☐ 17.6 kPa

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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)

- ☐ 760 kPa
☐ 101 kPa
☐ 871 kPa
☐ 116 kPa

/1

Question 17

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

/2

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? _____ ml

/1

Question 16

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

/1

Question 19

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

- ☐ is cut in half.
☐ also doubles.
☐ is squared.
☐ quadruples.

/1

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Question 20

Convert 353 Kelvin into degrees Celsius. _____ °C

/1

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.

- ☐ 1600 m/s
☐ 1200 m/s
☐ 680 m/s
☐ 840 m/s

/1

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Question 22

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

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

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

/1

Question 23

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

/1

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Question 24

Converting 25°C to Kelvin= _____ K

/1

Question 25

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.hellum gas | ☐ | F. |

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Question 26

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 |

/1

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)

- | | |
|--------------------------|--------|
| ☐ | 642 °C |
| ☐ | 760 °C |
| ☐ | 369 °C |
| ☐ | 101 °C |

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Question 28

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

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