

Brett Robbins Academic Consulting

Chemistry 20 Practice Test

Unit B: Forms of Matter · Gases

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

A temperature of 25°C is equivalent to

- A) 248 K
- B) 273 K
- C) 298 K
- D) 323 K

Question 2

A gas pressure of 303.9 kPa is equivalent to

Use $1.00\text{ atm} = 101.325\text{ kPa}$.

- A) 0.333 atm
- B) 3.00 atm
- C) 30.0 atm
- D) 0.0300 atm

Question 3

A sample of gas in a cylinder with a movable piston is compressed from 4.0 L to 2.0 L at constant temperature.

- A) The pressure doubles
- B) The pressure is halved
- C) The pressure does not change
- D) The pressure increases by a factor of four

Question 4

Which statement is consistent with the kinetic molecular theory of gases?

- A) Gas particles occupy most of the volume of their container
- B) Gas particles attract each other with strong forces
- C) Gas particles are in constant random motion and collide elastically
- D) Gas particles stop moving at 0°C

Question 5

A gas sample is cooled to a temperature of -23°C .

Its temperature, in kelvin, is ____

Question 6

A sample of gas occupies 2.4 L at a pressure of 120 kPa.

At constant temperature, the gas is compressed to a volume of 0.80 L.

The new pressure of the gas, in kilopascals, is ____

Question 7

A balloon has a volume of 3.0 L at 27°C .

At constant pressure, the balloon is heated to 127°C .

The new volume of the balloon is

- | | |
|----------|----------|
| A) 2.3 L | B) 4.0 L |
| C) 14 L | D) 1.3 L |

Question 8

An automobile tire has a gas pressure of 210 kPa at 20° C.

After driving, the temperature of the air in the tire rises to 50° C

while the volume stays constant. The new pressure in the tire is

- | | |
|------------|------------|
| A) 232 kPa | B) 191 kPa |
| C) 525 kPa | D) 210 kPa |

Question 9

At STP, the molar volume of any gas is 22.4 L/mol.

The volume occupied by 0.50 mol of a gas at STP, in litres, is ____

Question 10

A mixture of three gases in a container has a total pressure of 150 kPa.

The partial pressure of nitrogen is 90 kPa and the partial pressure

of oxygen is 40 kPa. The partial pressure of the third gas is

- | | |
|------------|------------|
| A) 60 kPa | B) 100 kPa |
| C) 130 kPa | D) 20 kPa |

Question 11

A sample of gas occupies 3.0 L at a pressure of 150 kPa

and a temperature of 27° C. Use $R = 8.314 \text{ L} \cdot \text{kPa}/(\text{mol} \cdot \text{K})$.

The amount of gas, to the nearest thousandth of a mole, is ____

Question 12

A gas sample has a volume of 5.0 L at 100 kPa and 27 °C.

The sample is changed to STP (0 °C and 101.325 kPa).

The new volume of the gas is

- | | |
|----------|----------|
| A) 4.5 L | B) 4.9 L |
| C) 5.1 L | D) 5.5 L |

Question 13

What pressure is exerted by 2.00 mol of a gas in a 10.0 L

container at 27 °C? Use $R = 8.314 \text{ L} \cdot \text{kPa}/(\text{mol} \cdot \text{K})$.

- | | |
|------------|-------------|
| A) 250 kPa | B) 4.99 kPa |
| C) 499 kPa | D) 998 kPa |

Question 14

A sample of gas occupies 600 mL at 20 °C.

The gas is heated at constant pressure to 80 °C.

The new volume of the gas, to the nearest millilitre, is ____

Question 15

A real gas behaves least like an ideal gas under conditions of

- A) Low pressure and high temperature
- B) Low pressure and low temperature
- C) High pressure and high temperature
- D) High pressure and low temperature

Question 16

A 0.960 g sample of a pure gas occupies 0.500 L at 100 kPa and 27 °C. Use $R = 8.314 \text{ L} \cdot \text{kPa}/(\text{mol} \cdot \text{K})$.

The molar mass of the gas, to the nearest tenth of a gram per mole, is ____

Question 17

A gas is collected over water at 25 °C. The total pressure of the collected gas is 101.3 kPa, and the vapour pressure of water at 25 °C is 3.17 kPa. The pressure of the dry gas is

- | | |
|--------------|--------------|
| A) 3.17 kPa | B) 98.1 kPa |
| C) 101.3 kPa | D) 104.5 kPa |

Question 18

For a fixed amount of gas at constant pressure, which graph gives a straight line that passes through the origin?

- A) Volume versus temperature in kelvin
- B) Volume versus temperature in degrees Celsius
- C) Pressure versus volume
- D) Volume versus pressure

Question 19

A gas has a molar mass of 44.0 g/mol. At STP, its molar volume is 22.4 L/mol. The density of the gas at STP is

- A) 0.509 g/L
- B) 2.20 g/L
- C) 44.0 g/L
- D) 1.96 g/L

Question 20

A 2.00 L sample of gas at 95.0 kPa and 25°C is compressed to a volume of 1.20 L and heated to 75°C. The final pressure is

- A) 158 kPa
- B) 475 kPa
- C) 185 kPa
- D) 66.6 kPa

Question 21

When the value $R = 8.314 \text{ L} \cdot \text{kPa}/(\text{mol} \cdot \text{K})$ is used in the ideal gas law, the temperature must be in ____ and the pressure in ____.

- A) Degrees Celsius and kilopascals
- B) Kelvin and kilopascals
- C) Kelvin and atmospheres
- D) Degrees Celsius and atmospheres

Question 22

The molar volume of a gas at STP is 22.4 L/mol.

The amount of gas, in moles, in a 5.60 L sample at STP is

- | | |
|--------------|--------------|
| A) 0.125 mol | B) 0.500 mol |
| C) 0.250 mol | D) 4.00 mol |

Question 23

A 3.0 L sample of nitrogen gas contains 0.13 mol.

At the same temperature and pressure, the amount of gas in
a 6.0 L sample is

- | | |
|--------------|-------------|
| A) 0.065 mol | B) 0.13 mol |
| C) 0.39 mol | D) 0.26 mol |

Question 24

A sealed spray can is left in a hot vehicle, and its internal pressure increases.

According to the kinetic molecular theory, this happens because the gas particles

- A) Collide with the walls more often and with greater force
- B) Expand so that each particle takes up more space
- C) Are attracted to each other more strongly
- D) Increase in number as the temperature rises

Question 25

A 1.00 mol sample of an ideal gas occupies 24.8 L at a pressure of 100 kPa. Use $R = 8.314 \text{ L} \cdot \text{kPa}/(\text{mol} \cdot \text{K})$.

The temperature of the gas, to the nearest kelvin, is ____

Answer Key

- | | | |
|---------|-----------|---------|
| 1. C | 10. D | 19. D |
| 2. B | 11. 0.180 | 20. C |
| 3. A | 12. A | 21. B |
| 4. C | 13. C | 22. C |
| 5. 250 | 14. 723 | 23. D |
| 6. 360 | 15. D | 24. A |
| 7. B | 16. 47.9 | 25. 298 |
| 8. A | 17. B | |
| 9. 11.2 | 18. A | |

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