

SCH3U Practice Test -Gases & Atmospheric Chemistry

K/U _____ /11 marks	T/I _____ / 11 marks	C _____ / 8 marks	A _____ / 11
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** Be sure that your final answers for your calculations contain the correct # of sig figs and units **

1. Complete the table below by putting a **check mark** (✓) to indicate the characteristics that apply to each state of matter. *Note: you can put more than one check mark for each characteristic, if applicable.* [K/U, 4 marks]

Characteristic	SOLID	LIQUID	GAS
<i>will take the shape of the container it is in</i>			
<i>will fill the volume of the container it is in</i>			
<i>atoms/molecules are in close contact with each other</i>			
<i>atoms/molecules can move freely (switch positions)</i>			

True or False: [K/U, 3 marks]

2. _____ For any substance, the melting point and freezing point occur at the same temperature.
3. _____ Gases are compressible because particles are far apart from each other .
4. _____ Absolute zero, the theoretical temperature at which all molecular motion stops, is at -273 Kelvin.

Multiple Choice: [K/U, 4 marks]

5. Which scientist studied the relationship between volume and pressure of a confined gas when temperature and amount of substance are kept constant?

- a) Charles b) Gay-Lussac c) Boyle d) Avogadro e) Dalton

6. If you had 1 mole of each of the following gases at STP, which would occupy the largest volume?

- a) He b) N₂ c) O₂ d) SO₂ e) they would all occupy the same volume

7. If the number of moles in a gas sample is increased, at constant temperature and pressure, the volume of the gas will... a) increase b) decrease c) stay the same

8. If a fixed amount of gas at a constant temperature is subjected to an increase in pressure, the volume of the gas will... a) increase b) decrease c) stay the same

9. Explain (using kinetic molecular theory) why pressure of a gas increases when the temperature is increased. [C, 4 marks]

10. Briefly describe two characteristics of **ideal gases** that make them different from real gases. [C, 4 marks]

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11. Determine the **pressure** in a 25.0-L canister containing 11.4 moles of air if it is heated to a temperature of 36°C. **Use 3 Sig. figs while in Kelvin* [T/I, 2 marks]

12. If 116.7mL of propane gas is released from a gas tank at 23°C, what **temperature**, in °C, would be required to decrease the volume to 95.0mL, if the pressure remains constant? Final answer in °C. [T/I, 2 marks]

13. How many moles of gas occupy 98 L at a pressure of 2.8 atmospheres and a temperature of 292 K? [2 marks]

14. A sample of methane gas occupies a volume of 645mL at SATP. If the pressure is increased to 970.0 torr and the temperature is decreased to -18.0°C, what would the new **volume** be? [T/I, 1 marks]

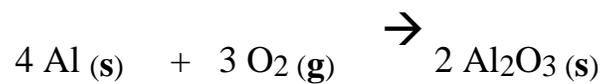
15. A flask contains a mixture of helium, neon and argon gases. The partial pressure of helium is 1.23 atm, the partial pressure of neon is 0.68 atm, and the partial pressure of argon is 2.48 atm. What is the **total gas pressure** in the flask? [T/I, 1 mark]

16. A canister holds a mixture of fluorine, chlorine and bromine gases. If the partial pressure of fluorine is 4.37 atm, the partial pressure of bromine is 3.22 atm, and the total gas pressure in the flask is 10.45 atm, determine the **partial pressure of chlorine**. [T/I, 1 mark]

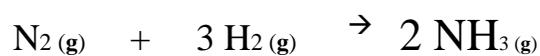
17. How many **moles** of carbon dioxide gas will occupy a volume of 51.7L at SATP? [A, 1 mark]

18. What **volume** would be occupied by 0.065 moles of butane gas at STP? [A, 1 mark]

19. What **mass (in kg)** of aluminum oxide is produced when 5.00 kL of oxygen gas is reacted with excess aluminum metal at a temperature of 84.0°C and a pressure of 456 kPa? [A, 5 marks]



20. Determine the **limiting reagent** in the reaction between 16.2L of nitrogen and 49.8L of hydrogen at STP. [A, 4 marks]



Bonus [+ 1]: Determine the **density** (in **g/L**) of carbon monoxide at 21.0°C and 96.7 kPa.