

1. Convert the following temperatures to K.

- a) 22°C
- b) -50°C

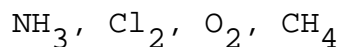
[1] _____

2. Convert the following temperatures to $^{\circ}\text{C}$.

- a) 157 K
- b) 447 K

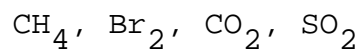
[2] _____

3. The following gases are in closed containers at 35.4°C . The molecules of which gas have the greatest average kinetic energy?



[3] _____

4. The following gases are in closed containers at 15.0°C . The molecules of which gas move with the greatest average velocity?



[4] _____

5. A closed manometer is used to measure the pressure of a sample of oxygen gas. The difference in height of the mercury in the two ends is 177 mm. Find the pressure of oxygen in kPa.
(1 kPa = 7.501 mm of Hg)

[5] _____

6. An open manometer is connected to a tank of helium gas. The level of the mercury in the atmospheric arm is 147 mm lower than the helium side. Find the pressure of the helium in the tank if the atmospheric pressure is 100.7 kPa.
(1 kPa = 7.501 mm of Hg)

[6] _____

7. A sample of helium gas has a volume of 169 cm^3 and a pressure of 87.9 kPa. What volume would the gas occupy at 61.9 kPa if the temperature remains constant?

[7] _____

8. 194 cm^3 of oxygen gas are collected over water at 10.0°C and 104.4 kPa. What volume will the dry gas occupy at standard pressure and 10.0°C ? The vapor pressure of water at 10.0°C is 1.2 kPa.

[8] _____

9. 7.96 dm³ of hydrogen gas is collected at 10.7°C. Find the volume the gas will occupy at -17.1°C if the pressure remains constant.

[9] _____

10. 852 cm³ of oxygen gas and 661 cm³ of nitrogen gas, both at 25.0°C and 100.3 kPa, are injected into an evacuated 427 cm³ flask. Find the total pressure in the flask, assuming the temperature remains constant.

[10] _____

11. A sample of gas has a volume of 375 cm³ at 16.0°C and 91.7 kPa. What volume will the gas occupy at STP?

[11] _____

12. 129 cm³ of hydrogen gas are collected over water at 22.0°C and 102.3 kPa. What volume would the dry gas occupy at STP? The water vapor pressure at 22.0°C is 2.6 kPa.

[12] _____

13. A chemist collected 62.3 cm^3 of gas in an open manometer when the temperature was 23.6°C and the pressure was 104.2 kPa . The next day the pressure had not changed, but the volume of the gas had decreased to 61.3 cm^3 . Find the temperature the next day.

[13] _____

14. At a certain temperature, molecules of ammonia gas, NH_3 , have an average velocity of 0.073 m/s . What is the average velocity of nitrogen molecules at this same temperature?

[14] _____

15. Find the relative rate of diffusion for the gases sulfur dioxide, SO_2 and ammonia, NH_3 .

[15] _____

Key Sheet

[1] a) 295 K
b) 223 K

[2] a) -116°C
b) 174°C

[3] They all have the same kinetic energy.

[4] CH_4

[5] 23.6 kPa

[6] 81.1 kPa

[7] 240 cm^3

Key Sheet

[8] 198 cm³

[9] 7.18 dm³

[10] 355 kPa

[11] 321 cm³

[12] 117 cm³

[13] 18.8°C

[14] 0.057 m/s

Key Sheet

[15] rate $\text{SO}_2:\text{NH}_3 = 0.515$