

Chapter 5 Practise Test

1. An **open end** mercury manometer was constructed from a U-shaped tube. In a particular measurement, the level in the end connected to the gas manifold, on which the experiment was being conducted, measured 76.2 cm above the U-neck, while the level in the open end (to the atmosphere) was 23.8 cm above the U-neck. The outside air pressure in the laboratory was measured as 754 torr. What is the pressure in the gas manifold?
 - A) 230 torr
 - B) 236 torr
 - C) 241 torr
 - D) 246 torr
 - E) 1278 torr

2. A real gas behaves most nearly like an ideal gas under condition of
 - A) low temperature and high pressure
 - B) low temperature and low pressure
 - C) high temperature and low pressure
 - D) high temperature and high pressure
 - E) actually it will behave like an ideal gas regardless of the temperature or the pressure as long as it remains in the gaseous state

3. A sample of a gas in a cylindrical chamber with a movable piston occupied a volume of 4.626 liters when the pressure was 0.983 atm and the temperature was 27.2 °C. The pressure was readjusted to 1.388 atm by moving the piston. What was the volume occupied by the sample under the later conditions if the **temperature** remained **constant** throughout?
 - A) 0.303 liters
 - B) 3.30 liters
 - C) 4.68 liters
 - D) 6.35 liters
 - E) 6.49 liters

4. A sample of a gas in a cylindrical chamber with a movable piston occupied a volume of 11.60 liters when the pressure was 9.97×10^4 Pa and the temperature was 24.9 °C. The volume of the system was readjusted to 8.50 liters by moving the piston. What was the pressure exerted on the surface of the piston, in pascals, by the gas if the **temperature** of the system remained **constant**?
 - A) 1.011×10^3 Pa
 - B) 1.36×10^5 Pa
 - C) 7.31×10^4 Pa
 - D) 1.01×10^5 Pa
 - E) 9.83×10^4 Pa

5. A sample of a gas in a cylindrical chamber with a movable piston occupied a volume of 6.414 liters when the pressure was 850 torr and the temperature was 27.2 °C. The temperature was readjusted to 65.5 °C while the load on the piston was kept constant to keep the **pressure constant** in the system. What was the volume occupied by the sample at the new temperature?
- A) 2.66 liters
 - B) 5.689 liters
 - C) 7.21 liters
 - D) 7.232 liters
 - E) 15.4 liters
6. A sample of a gas in a cylindrical chamber with a movable piston occupied a volume of 0.00256 cubic meters when the pressure was 1.20×10^5 Pa and the temperature was 77.8 °C. The volume of the system was readjusted to 1.88 liters by changing the temperature while the load on the piston was kept constant to keep the **pressure constant** in the system. What was the temperature in the system at this point?
- A) -15.4 °C
 - B) +36.1 °C
 - C) +57.1 °C
 - D) +204.7 °C
 - E) +571 °C
7. A sample of an unknown gas was isolated in a gas containment bulb on a manifold used in this type work. The volume of the bulb was 1.425 liters. The temperature was 25.40 °C, and the manifold pressure was 583.0 torr. What volume, in liters, would this gas sample occupy at STP?
- A) 1.000 liters
 - B) 1.195 liters
 - C) 1.700 liters
 - D) 2.030 liters
 - E) 11.76 liters
8. A sample of a gas occupies a volume of 1.820 liters at STP. What pressure, in atmospheres, would it exert if transferred to a 1.425 liter vessel in which the temperature is maintained at 25.2 °C?
- A) 0.7168 atm
 - B) 0.8552 atm
 - C) 1.169 atm
 - D) 1.278 atm
 - E) 1.395 atm

9. A sample of a gas occupies a volume of 1.624 liters at STP. It was placed in a different vessel in which the pressure was measured as 797.3 torr when the temperature was 28.6 °C. What was the volume of this new vessel, in liters?
- A) 1.401 liters
 - B) 1.542 liters
 - C) 1.567 liters
 - D) 1.710 liters
 - E) 1.882 liters
10. A cylinder fitted with a movable piston and filled with a gas has a volume of 188.5 ml at 26.7 °C when the applied pressure is 755.2 torr. The temperature of the oil bath surrounding the cylinder was increased to 165.2 °C, and the load on the piston was changed. Careful measurement now gave a value of 210.5 ml for the volume. What was the final pressure in the system, in torr?
- A) 462.6 torr
 - B) 576.9 torr
 - C) 715.5 torr
 - D) 988.6 torr
 - E) 1233 torr
11. A gas sample containing 0.2820 moles of a compound is trapped in a vessel on a manifold at a temperature of 25.2 °C and a pressure of 642.0 torr. What is the volume of the vessel, in liters?
- A) 0.01075 liters
 - B) 0.6903 liters
 - C) 8.173 liters
 - D) 12.72 liters
 - E) 92.99 liters
12. A gas sample containing 0.3525 moles of a compound is trapped in a 2.641 liter vessel on a manifold at a temperature of 28.4 °C. What is the pressure in the vessel, in torr, if the gas behaves as an ideal gas?
- A) 334.6 torr
 - B) 2007 torr
 - C) 2510 torr
 - D) 2513 torr
 - E) 2694 torr
13. A gas sample weighing 3.78 grams occupies a volume of 2.28 liters at STP. What is the apparent molecular mass of the sample?
- A) 8.54 g mol⁻¹
 - B) 13.5 g mol⁻¹
 - C) 37.1 g mol⁻¹
 - D) 51.1 g mol⁻¹
 - E) 193 g mol⁻¹

14. What is the total pressure exerted by a gaseous mixture that consists of 1.00 g of hydrogen and 8.00 g of neon in a 2.80 liter container maintained at 44.10 °C?
- A) 1.15 atm
 - B) 3.77 atm
 - C) 3.95 atm
 - D) 8.30 atm
 - E) 12.9 atm
15. What is the mole fraction of hydrogen in a gaseous mixture that consists of 8.00 g of hydrogen and 12.00 g of neon in a 3.50 liter container maintained at 35.20°C?
- A) 0.150
 - B) 0.400
 - C) 0.660
 - D) 0.870
 - E) 0.930
16. A sample of oxygen gas was collected by downward displacement of water in a large gas collection apparatus. The total pressure in the collection vessel was 744.2 torr, the temperature was 26.0 °C, and the vessel contained 522 ml of the collected gas. How many moles of oxygen were collected? At 26.0 °C, the vapor pressure of water is 25.2 torr.
- A) 0.0201 moles
 - B) 0.0215 moles
 - C) 0.0842 moles
 - D) 0.151 moles
 - E) 0.231 moles
17. A sample of nitrogen gas was collected by downward displacement of water in a gas collection flask. The total pressure in the collection flask was measured as 754.2 torr, the temperature was 20.0 °C, and the measured volume of gas collected was 516 ml. How many grams should the nitrogen weigh? At 20.0 °C, the vapor pressure of water is 17.5 torr.
- A) 0.291 g
 - B) 0.305 g
 - C) 0.582 g
 - D) 0.596 g
 - E) 0.610 g

18. The reaction, $\text{MnO}_2(s) + 4 \text{HCl}(aq) \rightarrow \text{MnCl}_2(aq) + \text{Cl}_2(g) + \text{H}_2\text{O}(l)$ was being studied. 12.2 g of MnO_2 were reacted with 70.0 ml of 2.50 M HCl solution. The chlorine produced was collected in a vessel. The pressure measured 0.971 atm at a temperature of 78.2 °C. Determine the volume of chlorine produced if the theoretical yield was obtained.
- A) 0.289 l
 - B) 1.22 l
 - C) 1.30 l
 - D) 4.17 l
 - E) 5.20 l
19. A chemical reaction is shown: $2\text{NO}(g) + \text{O}_2(g) \rightarrow 2\text{NO}_2(g)$. How many liters of pure oxygen gas, measured at STP, are required for the complete reaction with 8.82 liters of $\text{NO}(g)$, also measured at STP?
- A) 4.41 liters
 - B) 8.82 liters
 - C) 11.2 liters
 - D) 17.6 liters
 - E) 22.4 liters
20. A gas sample has a volume of 1424 liters at STP. How many moles of gas are there in the sample? _____

Answer Key

1. A
2. C
3. B
4. B
5. D
6. A
7. A
8. E
9. D
10. D
11. C
12. C
13. C
14. D
15. D
16. A
17. C
18. C
19. A
20. 63.53 moles