



Physical Chemistry_Chpt_One_Properties of Gases

Pe

60/100 Sixty only
23-11-2021
Abduljabbar I. R. Rusydi

Name of a student Ea'qeeh Ali Zaidin Signature [Signature] No. [Number]

University of Mustansiriyah

1st Semester-2021

Department of Chemistry

1st Exam-paper B

Q1: Circle the right answer for all of the following:

(50 points)

1: A vessel of 5000 mL capacity contains a certain amount of gas at 313 K and 2 bar pressure. The gas is transferred to another vessel of volume 10000 mL at 40 °C. What should be its pressure?

Answer: a) 1.0 atm b) 1.0 mmHg c) 75 cmHg d) 1.5 bar 5/5

2: If the particles of a gas are polar that means the difference between p_{ideal} and p_{real} is

Answer: a) low b) equal c) high 5/5

3: Calculate the temperature of 5000 mmol of a gas occupying 5.0 dm³ at 3.3×10^5 Pa?

Answer: a) 40.2 °C b) 40.2 K c) 44.2 °C d) 44.2 K 5/5

4: Calculate the weight of NH₃ (17 g.mol⁻¹) in a 4 L cylinder at 8 atm and 300 K.

Answer: a) 22.11 kg b) 22.11 g c) 23 K d) 23 °C 5/5

5: Calculate the p_c of a gas, if the p_r is 0.44 and p is 1 bar.

Answer: a) 2.27 K b) 2.27 atm c) 2.27 L d) 2.27 mol 5/5

6: If the attraction forces are calculated, that means the gas is?

Answer: a) real b) noble c) perfect d) compressed 5/5

7: According to the Dalton's law total mole fraction is equal to?

Answer: a) $\sum n$ b) $\sum p_i$ c) $\sum p_r$ d) $\sum x$ 5/5

8: What is the partial pressure of a gas in a mixture, if the X_i is 1, and the conditions are at STP?

Answer: a) 0.99 torr b) 0.89 bar c) 0.900 atm d) 1.01 bar 5/5

9: At high pressure the $Z > 1$ which means the dominated forces are?

Answer: a) Van der Waal's b) equal c) repulsions d) attractions 5/5

10: According to Avogadro's law the amount of a gas at STP is?

Answer: a) 1.00 mol b) 2.00 mol c) 1.00 mmol d) 2.00 mmol 5/5

Q2: The air inside a flexible 3.5 L container has a pressure of 115 kPa. What should the volume of the container be increased to in order to decrease the pressure to 625 torr? (25 points)

Q3: A 3 dm³ container holds 0.5 moles of N₂ gas at 42 °C. What is the pressure inside the container? (25 points)

$$Q2 / V_1 = 3.5 \text{ L}$$

$$P_1 = 115 \text{ kPa}$$

$$V_2 = ? \quad P_2 = 625 \text{ torr}$$

$$P_1 = 115 \text{ kPa} \Rightarrow \frac{115}{1.33}$$

$$P_1 = 86.5 \text{ torr}$$

$$86.466 \text{ torr}$$

$$\frac{V_1}{P_1} = \frac{V_2}{P_2}$$

$$V_2 = \frac{V_1 P_2}{P_1}$$

$$V_2 = \frac{3.5 \text{ L} \times 625 \text{ torr}}{86.5 \text{ torr}}$$

$$V_2 = \frac{2.1875 \text{ L}}{86.5} = 25.3 \text{ L}$$

$$Q2 \frac{10}{25}$$

$$Q3 / V = 3 \text{ cm}^3$$

$$n = 0.5 \text{ mole}$$

$$T = 42^\circ \text{C}$$

$$P = ?$$

$$T = 42^\circ \text{C} + 273 = 315 \text{ K}$$

$$V = 3 \text{ cm}^3 \Rightarrow 3 \times 10^{-3} \text{ m}^3 \Rightarrow 3 \times 10^{-3} \text{ L}$$

$$V = 3 \times 10^{-12} \text{ L}$$

$$PV = nRT$$

$$P = \frac{nRT}{V}$$

$$P = \frac{0.5 \text{ mole} \times 0.082 \frac{\text{L} \cdot \text{atm}}{\text{mole} \cdot \text{K}} \times 315 \text{ K}}{3 \times 10^{-12} \text{ L}}$$

$$P = \frac{12.915 \text{ atm}}{3 \times 10^{-12}} = 4.31 \times 10^{12} \text{ atm}$$

Because unit of R in L

$$Q3 \frac{15}{25}$$