



Physical Chemistry_Chpt_One_Properties of Gases

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University of Mustansiriyah

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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

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

3: Calculate the temperature of 5000 mmol of a gas occupying 5.0 dm³ at 3.3x10⁵ Pa?

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

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: 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

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

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

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) $\sum x$

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

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

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

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/ $V_1 = 3.5L$ $P_1 = 115 \text{ kPa}$
 $V_2 = ?$ $P_2 = 625 \text{ torr}$

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

$$\frac{3.5L}{V_2} = \frac{1 \times 10^{-3} \text{ atm}}{0.82}$$

$$V_2 = 4.2L$$

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$$P_2 = \frac{625}{760} = 0.82 \text{ atm}$$

$$P_1 = 115 \text{ kPa} = 1 \times 10^{-3} \text{ atm}$$

$$115 \text{ kPa} = 1.15 \times 10^5 \text{ Pa} = 1.15 \text{ atm}$$

Q3/ $T = 42 + 273 \text{ K} = 315 \text{ K}$

$$P = \frac{nRT}{d} = \frac{0.5 \text{ mol} \times 0.082 \text{ L atm/mol.K} \times 315 \text{ K}}{3} \text{ ?} \equiv \text{unit}$$

$$P = 4.3 \text{ atm}$$

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