Physical Chemistry_Chpt_One_Properties of Gases

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University of Mustansiriyah 1st Semester-2021

Department of Chemistry 1st Exam-paper

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 dm^3 at 3.3×10^5 Pa?

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

4: Calculate the weight of NH_3 (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) Σn b) Σp_i c) Σp_T **d) $\Sigma \chi$**

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 dm^3 container holds 0.5 moles of N_2 gas at 42 °C. What is the pressure inside the container? (25 points)

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06/11/2021 Best wishes Dr Abduljabbar I. R. Rushdi

Q2) $V_1 = 3.5\,L$, $P_1 = 115\ Kpa$, $P_2 = 625\ torr$

$V_2 = ?$

$P_2 = 625\ torr \rightarrow 625 * 760 = 475\ Kpa$

$\frac{625\ torr}{760\ torr * atm} \Rightarrow$

$\frac{P_1}{V_2} = \frac{P_2}{V_2} \rightarrow \frac{115\ Kpa}{3.5L} = \frac{475\ Kpa}{V_2}$

Q2 5/25

$V_2 = \frac{(475\ Kpa)(3.5L)}{115\ Kpa} = \frac{1662.5\ Kpa*L}{115\ Kpa} = 14.45\ L$

↓ It ~~send~~ clear tome

Q3) $V = 3\,dm^3 = 3\,L$, $n = 0.5\ moles$, $T = 42 + 273 = 315K$

$PV = nRT$

$P = \frac{nRT}{V} = \frac{(0.5\ moles)(0.082\ atm\,L/mol\,K)\ (315\,K)}{3L}$

$P = 4.305\ atm$

Q3 25/25