P3

50 Fifty only

23-11-2021 Tue

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Physical Chemistry_Chpt_One_Properties of Gases

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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 °C 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)

09/11/2021 **Best wishes** **Dr Abduljabbar I. R. Rushdi**

Q2/

$V_1 = 3.5\,L$

$P_1 = 115\,kPa$

$P_2 = 625\,torr$

$V_2 = ?$

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

$P_1V_1 = P_2V_2$

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

$\frac{3.5\,L}{115\,kPa} = \frac{V_2}{625\,torr}$

no matching between the two units

$V_2 = \frac{3.5\,L \times 625\,torr}{115\,kPa}$

$V_2 = 19\,L$

Q2 5/25

Q3/

$V = 3\,dm^3$

$n(mol) = 0.5$

$t°C = 42$

$T_K = t°C + 273$

$= 42 + 273$

$T_K = 315\,K$

$P = ?$

$PV = nRT$

$P \times (3 \times 10) = 0.5 \times 0.082 \times 315$

$P = \frac{0.5 \times 0.082 \times 315}{3 \times 10^{-3}}$

$P = 0.6 \times 10^{-3}$

Q3 15/25