(Fin)

30/100

Physical Chemistry_Chpt_One_Properties of Gases

Name of a student Kawther Mohammed Signature ------------------- No. ----

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

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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) Σχ

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)

14/11/2021   Best wishes   Dr Abduljabbar I. R. Rushdi

Q2/

$$P_1 V_1 = P_2 V_2 \quad \rightarrow Torr$$

$$115 * 3.5 = 625 * V_2$$

$$402.5 = 625 V_2$$

$$V_2 = \frac{402.5}{625}$$

$$V = 0.644 \, L$$

$$Q_2 \frac{10}{26}$$

Q3/ $T_{(K)} = t_{(C)} + 273$

$$= 42 + 273 = 315 \, K$$

$$PV = nRT \qquad \rightarrow P \text{ is unknown}$$

$$3 * 10^{-9} * V = 0.5 * 0.082 * 315$$

$$3 * 10^{-9} * V = 12.915$$

$$V = \frac{12.915}{3 * 10^{-9}}$$

$$V = 4.305 * 10^{9} \, L$$

$$Q_3 \frac{5}{25}$$