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Physical Chemistry_Chpt_One_Properties of Gases

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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**   0/5

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   0/5

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 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   5/5

$Q_1 \dfrac{40}{50}$

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) Σn b) Σp_i c) Σp_T **d) Σx**   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 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

$V_1 = 3.5 L$ $P_1 = 115 \, KPa \times 10^3 \Rightarrow 115000 \, tor$ 12.Q.

$V_2 = 2.2$ $P_2 = 625 \, tor$

$V_1 P_1 = V_2 P_2$

$V_2 = \dfrac{V_1 P_1}{P_2} \Rightarrow \dfrac{3.5L \times 115000 \, tor}{625 \, tor} = 644 \, L$

Q2 $\dfrac{15}{25}$

$V = 3 \, dm^3 \quad / \quad n = 0.5 \, mol$ Q3 $\dfrac{22}{25}$ 13.Q

$T = 42° \quad / \quad P = ??$

$T_{(K)} = 42 + 283 = 315 K$ Units are not correct

$P = \dfrac{nRT}{V} \Rightarrow \dfrac{0.5 \, mole \times 0.082 \, mole\cdot atm \, / \, atm\cdot K \times 315 K}{3 \, dm^3}$

$P = 4.305 \, atm$