70/100 Seventy only
23-11-21

Physical Chemistry_Chpt_One_Properties of Gases

Name of a student ---------- وسام محمد حسين ---------- Signature ---------- No. 16

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 °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 ✓/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 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** 0/5

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

20/50

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

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

Answer: a) real b) noble **c) perfect** ✗ d) compressed 0/5

7: According to the Dalton's law total mole fraction is equal to?

Answer: a) Σn b) $Σp_i$ **c) $Σp_T$** ✗ d) Σχ 0/5

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 0/5

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 0/5

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

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/

$$1 \text{ atm} = \frac{115 \text{ KPa}}{101325 \text{ KPa}} = 1.13 \text{ atm}$$

$$1 \text{ atm} = \frac{625 \text{ Torr}}{760 \text{ Torr}} = 0.82 \text{ atm}$$

$$P_1 V_1 = P_2 V_2$$

$$1.13 \text{ atm} \times 3.5 \text{ L} = 0.82 \text{ atm } V_2$$

$$V_2 = \frac{1.13 \times 3.5}{0.82} = 4.8 \text{ L}$$

Q₂ 25/25

Q3/

$$42c + 273 K = 315 K$$

$$3 \, dm^3 = 3 L$$

$$PV = nRT$$

$$P = \frac{nRT}{V}$$

$$P = \frac{0.5 \text{ moles} \times 0.082 \text{ L.atm/K.mol} \times 315 K}{3 L}$$

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

Q₃ 25/25