Thank you 80/100 Eighty only 12-01-2021 Abd Jabb Dr. Abduljabbar Rushdi

Physical Chemistry-Properties of Gases

Name of a student ---------- Signature ---------- No. 7

University of Mustansiriyah — **1st Semester-2021**

Department of Chemistry — **1st Exam-paper A**

Q1: Circle the right answer for all of the following:

1: A vessel of 50 mL capacity contains a certain amount of gas at 40 °C and 2 bar pressure. The gas is transferred to another vessel of volume 100 mL at 40 °C. What should be it is pressure?

Answer: **a) 1.0 atm** **b) 0.85 mmHg** **c) 0.9 cmHg** **d) 1 bar** 5/5

2: What is the right formula of the Van der Waals equation?

Answer: **a) $p = [nRT/(V-nb)] - n(a^2/V^2)$** **b) $P = [nRT/(V-nb)] - V(n^2/a^2)$** **c) $p = [nRT/(b-nV)] - a(n^2/V^2)$** **d) $P = [nRT/(V-nb)] - a(n^2/V^2)$** 5/5

3: Calculate the temperature of 4.0 mol of a gas occupying 5.0 dm^3 at 3.3 bar?

Answer: **a) 50.3 °C** **b) 48 K** **c) 51 °C** **d) 50.3 K** 5/5

4: Calculate the weight of O_2 (32 $g.mol^{-1}$) in a 4 L cylinder at 9 atm and 281 K.

Answer: **a) 50 kg** **b) 50 g** **c) 50 K** **d) 50 °C** 5/5

5: Calculate the p_C of He gas, if the p_r and p is 0.44 and 1 atm respectively

Answer: **a) 2.26 K** **b) 2.26 atm** **c) 2.26 L** **d) 2.26 mol** 5/5

45/50 Q.

6: If the repulsion forces are negligible, that means the gas is?

Answer: **a) real** **b) noble** **c) perfect** **d) compressed** ok

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

Answer: **a) 0.10 mol** **b) 1.0 mol** **c) 0.10** **d) 1.0** 5/5

8: What is the partial pressure of a gas in a mixture if the X_i is 0.5, and the conditions are at STP?

Answer: **a) 1.5 Pa** **b) 0.49 bar** **c) 0.5 atm** **d) 0.5 bar** 5/5

9: If the value of R is 0.082 then the unit of temperature is?

Answer: **a) Kelvin** **b) Celsius** **c) Fahrenheit** **d) no one of these** 5/5

10: According to the Avogadro's law the amount of a gas at STP is?

Answer: **a) 1.00 mol** **b) 2.00 mol** **c) 1.00 L** **d) 2.00 mol** 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?

Q3: A 3 dm^3 container holds 0.5 moles of N_2 gas at 42 °C. What is the pressure inside the container?

12/01/2021 **Best wishes** **Dr Abduljabbar I. R. Rushdi**

Q2/ $P_1 = \frac{115\ \text{kPa} \times 1\ \text{aTm}}{101.325\ \text{kPa}}$

$P_1 = 113.4\ \text{aTm}$ 1.134 atm

$P_2 = \frac{625\ \text{torr} \times 1\ \text{aTm}}{760\ \text{torr}}$

$P_2 = 0.822\ \text{aTm}$

Q2 20/25

$P_1V_1 = P_2V_2$

$113.4\ \text{aTm} \times 3.5\ \text{L} = 0.822\ \text{aTm} \times V_2$

$V_2 = \frac{3.969 \times 10^{+2}\ \text{L}}{0.822}$

$V_2 = 4.82 \times 10^{+2}\ \text{L}$

Q3/ $pV = nRT$

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

$= \frac{0.5\ \text{mol} \times 0.082\ \text{L.atm/mol.K} \times 315\ \text{K}}{1\ \text{L}}$

$K = C + 273$

$= 42 + 273$

$= 315$?

$L = dm^3$

$3\ \text{L} = 3\ dm^3$

$p = \frac{12.91}{1}$

$p = 12.91\ \text{aTm}$

$\approx 4.3\ \text{atm}$

Q3 15/25