40/100 Fourty only

12-01-2021 Tues Jabb Abd Dr. Abduljabbar Rushdi

Physical Chemistry-Properties of Gases

Name of a student ---------- Signature ---------- No. 1

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? NO ANSWER 0/5

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) $P = [nRT/(V-nb)] - a(n^2/V^2)$**

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** 0/5

25 / 9.50

6: If the repulsion forces are negligible, 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) 0.10 mol** **b) 1.0 mol** **c) 0.10** **d) 1.0** 0/5

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** 0/5

9: If the value of 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** 0/5

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 //

$V_1 = 3.5\ L$

$V_2 = ?$

$P_1 = 115\ kPa$

$P_2 = 625\ Toor$

$P_2 = \frac{625}{1000} = 0.625\ PKa$

$P_1V_1 = P_2V_2$

$\frac{V_1}{P_1} = \frac{P_2}{V_2} \Rightarrow \frac{3.5\ L}{115\ kPa} = \frac{0.625\ kPa}{V_2}$

$V_2 \times 3.5\ L = 115\ kPa \times 0.625\ kPa$

$V_2 = \frac{71.875}{3.5\ L} \Rightarrow V_2 = 20.536\ L$

Q2 5/5

Q3 // Soll $V = 3\ dm^3$ $n = 0.5\ mol$

$T = 42\ C^\circ$

$V = \frac{3}{1000} = 0.003\ L$

$PV = nRT$

$T = 42 + 273 = 315$

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

$P = \frac{0.5\ mol \times 0.082\ L\ atm\ mol^{-1}\ K^{-1} \times 315\ K}{0.003\ L}$

$P = 4305\ atm$

Q3 10/25