**Physical Chemistry_Chpt_One_Properties of Gases**

Name of a student ----------------- ترتيب حسين علي Signature ----------------- No. 13

| 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

**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

**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) Σ$p_i$          c) Σ$p_T$          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)

09/11/2021          Best wishes          Dr Abduljabbar I. R. Rushdi

المعطيات

## Q2)

$V_1 = 3.5L$

$P_1 = 115 kPa$

$P_2 = 625$ torr

$V_2 = ?$

احول الضغط من torr الى atm $\dfrac{625}{670}$

$= 0.822 atm$

الحل :-

$P_1 V_1 = P_2 V_2 \Rightarrow 115 kPa \times 3.5 L = 0.822 atm \times V_2$

$402.5 kPa/L = 0.822 atm \times V_2 \Rightarrow V_2 = \dfrac{402.5 kPa/L}{0.822 atm}$

$V_2 = 489.6 L$ $\quad Q_2 \dfrac{15}{25}$

---

المعطيات

## Q3)

① احول درجة الحرارة من C الى K

$T = 42C + 273 \Rightarrow 315 K$

② احول V من dm أو mb الى m

$V = 3 dm^3$

$\dfrac{3 \times 10^{-3}}{1000} = 3L$

$n = 0.5$ moles

③ ثوابت R

$T = 42°C$

$0.082$

الحل :-

مطلوب $P = ?$ $\quad Q_3 \dfrac{15}{25}$

$PV = nRT$

$P \times 3 = 0.5 (0.082)(315)$

$P3 = 12.915 \Rightarrow P = \dfrac{12.915}{3} = 4.305 atm$