84/100 Eighty four (Thank you)

12-01-2021 Tue Jakob Dr. Abduljabbar Rushdi

Physical Chemistry-Properties of Gases

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

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

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

1: Helium represents a.

Answer: a) real gas b) ideal gas c) noble gas d) heavy gas — 0/5

2: A 0.2 L container contains a certain amount of gas at 1.0 bar pressure. The gas is transferred to another vessel of volume 0.5 dm^3. What should be it is pressure?

Answer: a) 0.60 atm b) 0.40 dm^3 c) 0.4 atm d) 0.4 mmHg — 5/5

3: A gas occupies 299 dm^3 at 127 °C and 760 mm pressure. What would be it is volume at STP?

Answer: a) 199.8 L b) 199 dm^3 c) 200 L d) 204 dm^3 — 0/5

4: Calculate the weight of CH_4 (16 $g.mol^{-1}$) in a 10 L cylinder at 15 atm and 34 °C.

Answer: a) 95.33 g mol^{-1} b) 95.33 g c) 85.80 mol d) 86.65 g — 5/5

5: Calculate the number of moles for CH_4 in a 12 L cylinder at 14 bar and 28 °C.

Answer: a) 6.8 mol b) 6.9 mol c) 6.5 mol d) 6.7 mol — 5/5

6: According to Graham's law the heaviest gas is?

Answer: a) H_2 b) O_2 c) N_2 d) CO_2 — 0/5

7: According to the Avogadro's law the amount of a substance is directly proportional with?

Answer: a) p b) T c) R d) V — 5/5

8: The difference between real and ideal gas is one of the following?

Answer: a) p & V b) T & n c) d) attraction forces & volume of a gas — 5/5

9: It can know the molecular mass of un known gas by applying one of the following?

Answer: a) Boyle's law b) Graham's law c) Charles's law d) Gay-Lussac's law — 5/5

10: If V_m is bigger than V^O_m then this means the behaviour of a gas is?

Answer: a) Real b) Ideal c) Real & ideal d) Z = 0 — 5/5

Q1 35/50

Q2: A gas sample has a mass of 9.98 g. Its volume is 21.6 L at a temperature of 75.46 °C and a pressure of 641 Torr. Calculate its molar mass.

Q3: A 1.3 mole of Ar gas is placed in a container at 27 °C at a pressure of 725 torr. What is the volume of the container in ml?

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

Q2 // m = 9.989 g V = 21.6 L T = 75.46 °C P = 641 torr

M = ?

T = 75.46 °C + 273 = 348.46 K // $P_{atm} = \frac{641 \text{ torr}}{760 \text{ torr}} \Rightarrow P = 0.843 \text{ atm}$

$PV = nRT \Rightarrow PV = \frac{m}{M}RT \Rightarrow PM = \frac{m}{V}RT$

$0.843 \text{ atm} * M = \frac{9.989}{21.6 \text{ L}} * 0.082 \text{ atm} \cdot \text{L/mol} \cdot \text{K} * 348.46 \text{ K}$

$0.843 \text{ atm} * M = 0.46 \text{ g} * 28.57 \text{ atm/mol}$

$0.843 \text{ atm} * M = 13.14 \text{ g} \cdot \text{atm/mol}$

$M = \frac{13.14 \text{ g} \cdot \text{atm/mol}}{0.843 \text{ atm}} \Rightarrow M = 15.587 \text{ g/mol}$

Q2 25/25

Q3 // n = 1.3 mol T = 27 °C P = 725 torr V = ?

T = 27 °C + 273 ⇒ T = 300 K

$P_{atm} = \frac{725 \text{ torr}}{760 \text{ torr}} \Rightarrow P = 0.95 \text{ atm}$

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

$V = \frac{1.3 \text{ mol} * 0.082 \text{ atm} \cdot \text{L/mol} \cdot \text{K} * 300 \text{ K}}{0.95 \text{ atm}}$

$V = \frac{31.98 \text{ L}}{0.95}$

V = 33.66 L

$V = \frac{33.66}{1000} \times 1000$

V = 0.03366 mL

Q3 24/25