20-01-2021 Wed

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Physical Chemistry-Properties of Gases

Dr. Abdulljabbar Rushdi

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

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

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

Q1: Circle the right answer for all of the following: **(50 degree)**

1: Carbon dioxide is classified as a .

Answer: a) toxic gas **b) ideal gas** c) real gas d) heavy gas

2: A 2 dm^3 container contains a certain amount of gas at 0.5 atm pressure. The gas is transferred to another vessel of volume and the pressure is 0.25 bar. What should be it is Volume?

Answer: a) 0.40 atm b) 0.40 dm^3 c) 0.4 bar **d) 4 bar**

3: A gas occupies 400 dm^3 at 130 ºC and 76 cmHg pressure. What would be it is volume at STP?

Answer: a) 270 L **b) 207 dm^3** c) 207 m^3 d) 204 cm^3

4: Calculate the weight of H_2 (2.00 $g.mol^{-1}$) in a 2 L cylinder at 2.5 atm and 27 ºC.

Answer: a) 0.40 mol^{-1} b) 0.40 g **c) 0.40 mol g^{-1}** d) 0.4 g mol^{-1}

5: Calculate the number of moles for CO_2 in a 10 L cylinder at 8 bar and 27 ºC.

Answer: a) 3.25 mmol **b) 3.00 mol** c) 3.00 L d) 2.99 mol

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

Answer: a) H_2 b) O_2 c) N_2 **d) CO_2**

7: According to the Boyle's law the pressure of a gas is inversely proportional with?

Answer: a) mol b) T c) R **d) V**

8: If a gas has Vm ≠ V°m then this means one of the following?

Answer: **a) real** b) noble c) ideal d) heavy

9: If RT > pV this means the forces dominated are?

Answer: a) attraction b) repulsion c) Van der Waal's **d) no one of these**

10: According to Gay-Lussac's law the volume of the gas is?

Answer: **a) constant** b) variable c) equal to zero d) equal to 22.4 L

Q1 20/50

Q2: Under the same conditions of temperature and pressure, how many times faster will hydrogen effuse compare to carbon dioxide. **(25 degree)**

Q3: Calculate the density of carbon dioxide (44 g mol^{-1}) at STP. **(25 degree)**

$PV = nRT$

$PV = \frac{m}{M}$

Wed_20/01/2021 **Best wishes** **Dr Abdulljabbar I. R. Rushdi**

$M = \frac{dRT}{P}$ $d = \frac{PM}{RT}$

Q2/

This solution is far away from the problem that it's required

P = 1 atm

~~V = 22.4 L~~

t = 273

R = 0.082

n = 1

$PV = nRT$

$T = \frac{PV}{nR}$

$= \frac{1\,atm * 22.4\,L}{1 * 0.082\,L.atm/K.mol}$

$T_{Ac} = 273.17$

$PV = nRT$

$T = \frac{PV}{nR}$

$T = \frac{1\,atm \times 22.4\,L}{2 * 0.082\,L.atm/k.mol}$

$T = \frac{22.4}{0.164}$

$= 136.5$

Q2 1/25

Q3/

T = 273 K

P = 1 atm

R = 0.082 L.atm/k.mol

m = 44 g/mol

$d = \frac{Pm}{Rt}$

$d = \frac{1\,atm * 44\,g/mol}{0.082\,L.atm/mol.K \times 273\,K}$

d = 12.32 g/L

1.965

Q3 23/25