



Physical Chemistry-Properties of Gases



Handwritten notes in red ink: "20-01-2021", "100", "Dr. Abduljabbar Rushdi Fawzi", "only", and "16".

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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:

(50 degree)

1: Carbon dioxide is classified as a .

Answer: a) toxic gas ~~b) ideal gas~~ c) real gas d) heavy gas e) 5

2: A 2 dm³ 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 dm³~~ c) 0.4 bar d) 4 bar e) 5

3: A gas occupies 400 dm³ at 130 °C and 76 cmHg pressure. What would be it is volume at STP?

Answer: a) 270 L b) 207 dm³ c) 207 m³ d) 204 cm³ e) 5/15

4: Calculate the weight of H₂ (2.00 g. mol⁻¹) in a 2 L cylinder at 2.5 atm and 27 °C

Answer: a) 0.40 mol⁻¹ ~~b) 0.40 g~~ c) 0.40 mol g⁻¹ d) 0.4 g mol⁻¹ e) 5/15

5: Calculate the number of moles for CO₂ in a 10 L cylinder at 8 bar and 27 °C.

Answer: a) 3.25 mmol ~~b) 3.00 mol~~ c) 3.00 L ~~d) 2.99 mol~~ e) 15/50

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

Answer: a) H₂ b) O₂ c) N₂ d) CO₂ e) 15/50

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~~ e) 15/50

8: If a gas has V_m ≠ V^o_m then this means one of the following?

Answer: a) real ~~b) noble~~ ~~c) ideal~~ d) heavy e) 5/15

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 e) 5/15

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~~ e) 15/50

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)

Q₂ $\frac{V_1 P_1}{T_1 n_1} = \frac{V_2 P_2}{T_2 n_2}$ CO₂ H₂

$\frac{V_1 P_1}{T_1 n_1} = \frac{V_2 P_2}{T_2 n_2}$

Q₂ $\frac{0}{25}$

Q₃ $P_m = dRT$

M = 44 g/mol
 T = 0 + 273 = 273 K
 R = 0.082 L.atm/mol.K
 P = 1 atm

$P_m = dRT$

$d = \frac{P_m}{RT} \Rightarrow d = \frac{1 \text{ atm} \cdot 44 \text{ g/mol}}{0.082 \text{ L.atm/mol.K} \cdot 273 \text{ K}}$

$d = \frac{44 \text{ g}}{0.082 \cdot 273 \text{ L}} \Rightarrow \frac{44 \text{ g}}{22.38 \text{ L}}$

$d = 1.966 \frac{\text{g}}{\text{L}}$

Q₃ $\frac{25}{25}$