



Physical Chemistry-Properties of Gases



55/100 Fifty five

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1st Semester-2021

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1st Exam-paper B

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

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(50 degree)

1: Carbon dioxide is classified as a .

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

$V = 2 \text{ dm}^3$

$P = 0.5 \text{ atm}$

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

$V = 400 \text{ dm}^3 + 4877 \text{ } 76/760 \text{ atm}$

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

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

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) 3.0 mol c) 3.00 L d) 2.99 mol

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

Answer: a) H₂ b) O₂ c) N₂ d) CO₂

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 $V_m \neq V^o_m$ 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

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)

$d = \frac{wt}{V}$

Wed_20/01/2021

Best wishes

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② $V = 2 \text{ dm}^3$, $P = 0.5 \text{ atm}$, $P_2 = 0.25 \text{ bar} \rightarrow 0.25 \text{ atm}$

$P_1 V_1 = P_2 V_2 \rightarrow 0.5 \text{ atm} \times 2 \text{ dm}^3 = 0.25 \text{ atm} \times V_2 \rightarrow V_2 = \frac{0.5 \times 2 \text{ dm}^3}{0.25} = 4 \text{ dm}^3$

③ $V = 400 \text{ dm}^3$, $T = 130^\circ\text{C} + 273 = 403 \text{ K}$, $P = 76/760 = 0.1 \text{ atm}$

$PV = nRT \rightarrow 0.1 \text{ atm} \times 400 \text{ L} = n \times 0.082 \text{ (L.atm/mol.K)} \times 403 \text{ K}$

$n = \frac{0.1 \times 400}{0.082 \times 403} = 114 \text{ mol}$

$P = 1 \text{ atm}$
 $T = 25^\circ\text{C}$, $V = 22.4 \text{ L}$, $R = 0.082$

$PV_2 = nRT \rightarrow \frac{114 \text{ mol} \times 0.082 \text{ L.atm/mol.K} \times 298 \text{ K}}{1 \text{ atm}}$

$V_2 = 270 \text{ L}$

④ $M.wt = 2.00 \text{ gmol}^{-1}$, $V = 2 \text{ L}$, $P = 2.5 \text{ atm}$

$T = 27^\circ\text{C} + 273 = 300 \text{ K}$

$PV = nRT \rightarrow 2.5 \text{ atm} \times 2 \text{ L} = \frac{wt \times 0.082 \text{ (L.atm/mol.K)} \times 300 \text{ K}}{M.wt = 2.00 \text{ gmol}^{-1}}$

$5 = \frac{wt}{2.00} \times 246$

$wt = \frac{10}{246}$

Q - 2 - $T_H / T_{CO_2} = (M_{H_2} / M_{CO_2})^{12 + (16 \times 2)}$

$25/25 = (2/38)^{44/2}$

50.05 ?

$Q_2 \frac{5}{25}$

Q3 - $P = 1 \text{ atm}$, $V = 22.4 \text{ L}$, $T = 25^\circ\text{C}$, $R = 0.082$, $n = 1$

$PV = nRT \rightarrow PV = \frac{wt}{M} RT$

$PM = \frac{wt}{V} RT$

STP means $T = 0^\circ\text{C}$
 OR 273

$1 \text{ atm} \times 44 \text{ gmol}^{-1} = \frac{d}{V} \times 0.082 \text{ L.atm/mol.K} \times 298 \text{ K}$

$d = 1.8 \frac{\text{kg}}{\text{L}}$. $Q_3 \frac{15}{25}$