



Physical Chemistry_Chpt_One_Properties of Gases

P4

Handwritten notes: 25 = n-21, 50/100, Lightly only, Abduljabbar I. R. Rushdi

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Department of Chemistry

1st Exam-paper E

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

(50 points)

1: If a gas has polar particles then the difference between the volume of this gas is:

Answer: a) V_{Real} > V_{Perfect} b) V_{Real} < V_{Perfect} c) V_{Real} = V_{Perfect} d) V_{Real} ≠ V_{Perfect}

2: A gas occupies 60 x 10³ mL at 150 °C and 760 mmHg pressure. What would be its volume at STP?

Answer: a) 38.7 mL b) 38.7 dm³ c) 38.7 L⁻¹ d) 38.7 dm³

3: Calculate the weight of H₂O gas (18 g.mol⁻¹) in a 5 L cylinder at 10 x 10² kPa and 373 K.

Answer: a) 29.40 g mol⁻¹ b) 29.40 g c) 29.40 mol d) 29.40 kg

4: Calculate the density of H₂O placed in a 22400 mL cylinder at 10⁵ Pa and 0 °C.

Answer: a) 0.804 kg L⁻¹ b) 0.804 g L⁻¹ c) 0.804 g d) 0.804 L⁻¹

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

Answer: a) H₂O b) CH₄ c) NH₃ d) Cl₂

6: A tank contains a certain amount of gas at 10⁵ Pa. The gas is transferred to another tank 40 dm³ with pressure of 200 x 10³ Pa. What should be its volume?

Answer: a) 80 L b) 80 Pa L c) 80 Pa dm³ d) 80 L⁻¹

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

Answer: a) p b) T c) R d) V e) n

8: The difference between real and ideal gas, that the real gas interested in?

Answer: a) V & p b) V & T c) p & n d) T & p

9: It can follow the direct proportional between temperature and pressure through the law of

Answer: a) Van der Waal b) Graham c) Charles d) Gay-Lussac

10: The behaviour of real gas is ideal when the value of Z is equal to

Answer: a) V_m < V_m⁰ b) V_m > V_m⁰ c) V_m = V_m⁰ d) V_m ≠ V_m⁰

Q2: The following data have been observed for 800 mg of nitrogen gas at 273 K. Calculate the best value of the

molar mass of N₂.

p/10 ⁵ Pa	0.750	0.500	0.200
V/dm ³	3.0	4.5	7.0

(25 points)

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm³. The p_r and V_f of the gas are 2 x 10² kPa and 2.14 dm³, respectively. Calculate the p_{original} of the gas in (i) bar, (ii) torr. (25 points)

Thur_11/11/2021

Best wishes

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Q 2/

① $mg \Rightarrow m$

$\div 1000$

$800 mg \Rightarrow 0.8 g$

But how?

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

$(0.75)(3) = \frac{0.8}{M} \times 0.082 \times 273$

$M = 7.9$

② $PV = \frac{m}{M} RT$

$(0.5)(4.5) = \frac{0.8}{M} \times 0.082 \times 273$

$2.25 = \frac{17.9}{M}$

$M = 7.9$

Q 2.25

③ $PV = \frac{m}{M} RT$

$(0.2)(7) = \frac{0.8}{M} (0.082)(273)$

$1.4 = \frac{17.9}{M}$

$M = 12.7$

Q 3/

$V_1 P_1 = V_2 P_2$

$1.8 \times 0.2 = 2.14 \times P_2$

$P_2 = 0.16$

Q 3 5/25