



F10

Physical Chemistry\_Chpt\_One\_Properties of Gases

30/100 Thirty only  
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1<sup>st</sup> Exam-paper C

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)  $V_{Real} \neq V_{Perfect}$

2: A gas occupies  $60 \times 10^3$  mL at  $150^\circ\text{C}$  and  $760$  mmHg pressure. What would be its volume at STP?

Answer: a)  $38.7$  mL b)  $38.7$  dm<sup>3</sup> c)  $38.7$  L<sup>-1</sup> d)  $38.7$  dm<sup>-3</sup>

3: Calculate the weight of H<sub>2</sub>O gas ( $18 \text{ g.mol}^{-1}$ ) in a  $5$  L cylinder at  $10 \times 10^2$  kPa and  $373$  K.

Answer: a)  $29.40 \text{ g mol}^{-1}$  b)  $29.40 \text{ g}$  c)  $29.40 \text{ mol}$  d)  $29.40 \text{ kg}$

4: Calculate the density of H<sub>2</sub>O placed in a  $22400$  mL cylinder at  $10^5$  Pa and  $0^\circ\text{C}$ .

Answer: a)  $0.804 \text{ kg L}^{-1}$  b)  $0.804 \text{ g L}^{-1}$  c)  $0.804 \text{ g}$  d)  $0.804 \text{ L}^{-1}$

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

Answer: a) H<sub>2</sub>O b) CH<sub>4</sub> c) NH<sub>3</sub> d) Cl<sub>2</sub>

6: A tank contains a certain amount of gas at  $10^5$  Pa. The gas is transferred to another tank  $40 \text{ dm}^3$  with pressure of  $200 \times 10^3$  Pa. What should be its volume?

Answer: a)  $80 \text{ L}$  b)  $80 \text{ Pa.L}$  c)  $80 \text{ Pa dm}^3$  d)  $80 \text{ L}^{-1}$

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)  $V_m < V_m^0$  b)  $V_m > V_m^0$  c)  $V_m = V_m^0$  d)  $V_m \neq V_m^0$

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

molar mass of N <sub>2</sub> .	$p/10^5 \text{ Pa}$	0.750	0.500	0.200	(25 points)
	$V/\text{dm}^3$	3.0	4.5	7.0	

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by  $1.80 \text{ dm}^3$ . The  $p_f$  and  $V_f$  of the gas are  $2 \times 10^2 \text{ kPa}$  and  $2.14 \text{ dm}^3$ , respectively. Calculate the  $p_{\text{original}}$  of the gas in (i) bar, (ii) torr. (25 points)

Q2)

$$PV = nRT$$

$$0.75$$

$$1.3 \text{ Pa}$$

Q2  $\frac{0}{25}$

Why?

Q3)  $V_2 = 1.80 \text{ dm}^3$

$$V_1 = 2.14$$

$$P_2 = 2 \times 10^2$$

$$P_1 = ?$$

Q3  $\frac{5}{25}$

$$P_1 \cdot V_1 = P_2 \cdot V_2$$

$$P_1 \times 2.14 = 2 \times 10^2 \times 1.80$$

$$P_1 = \frac{360}{2.14}$$

$$= 168.2 \text{ kPa}$$