



F26

Physical Chemistry_Chpt_One_Properties of Gases

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Handwritten notes: 35 Thirty five / 100, 25-11-21, Dr 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) VReal > VPerfect b) VReal < VPerfect c) VReal = VPerfect d) VReal ≠ VPerfect

2: A gas occupies 60 x 10^3 mL at 150 °C and 760 mmHg pressure. What would be its volume at STP?

- Answer: a) 38.7 mL b) 38.7 dm^3 c) 38.7 L^1 d) 38.7 dm^3

3: Calculate the weight of H2O gas (18 g.mol^-1) in a 5 L cylinder at 10 x 10^2 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 10^5 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 10^5 Pa. The gas is transferred to another tank 40 dm^3 with pressure of 200 x 10^3 Pa. What should be its volume?

- Answer: a) 80 L b) 80 Pa L c) 80 Pa dm^3 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

NO ANSWER why? (5)

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) Vm < Vm^0 b) Vm > Vm^0 c) Vm = Vm^0 d) Vm ≠ Vm^0

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

Table with 3 rows: molar mass of N2, p/10^5 Pa, V/dm^3 and 3 columns of values.

(25 points)

Handwritten calculations: pV = nRT, 0.75 x 3.0 = n x 0.082 x 273, n = 0.75 x 3.0 / (0.082 x 273) = 1.0

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm^3. The p1 and V1 of

the gas are 2 x 10^2 kPa and 2.14 dm^3, respectively. Calculate the poriginal of the gas in (i) bar, (ii) torr. (25 points)

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Best wishes

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Handwritten calculations: P1/V1 = P2/V2, P1/1800 = 0.009/214, P1 = 1.62/214 = 0.007 at

Handwritten calculations: 1 at = 101325, 2 x 10^2 = 200000, 200000 / 101325 = 1.97

$$n = \frac{m}{M} = 0.10 = \frac{8}{M} \Rightarrow M = \frac{8}{0.10} = 80$$

~~$M = 80 \text{ g/mol}$~~

② $PV = nRT$

~~$0.5 \times 4.5 = n + 0.082 \times 273$~~ $n = \frac{0.5 \times 4.5}{0.082 \times 273} = \frac{2.25}{22.3} = 0.10?$

$n \equiv \text{units}$

③ ~~$PV = nRT$~~

~~$0.2 \times 7.0 = n \times 0.082 \times 273$~~

$n = \frac{0.2 \times 7.0}{0.082 \times 273} = \frac{1.4}{0.003} = \frac{10}{25}$

~~$0.10 = \frac{8}{M}$~~ ~~80 g/mol~~

$\frac{10}{25}$

NO ANSWER, why?