



Physical Chemistry\_Chpt\_One\_Properties of Gases

FR<sub>13</sub>

45/100 Fortyfive

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Department of Chemistry

1<sup>st</sup> Exam-Repeat\_1

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

(50 points)

1: Calculate the weight of C<sub>2</sub>H<sub>4</sub> gas (26 g mol<sup>-1</sup>) in a 10000 Cm<sup>3</sup> cylinder at 1520 mmHg and 90 °C.

Answer: a) 17.47 g<sup>-1</sup> mol<sup>-1</sup>    b) 17.47 g<sup>-1</sup>    c) 17.47 mol    d) 17.47 g    e) 17.47 mg

2: When V<sub>Real</sub> > V<sub>Perfect</sub>, this means that the gas is:

Answer: a) perfect    b) noble    c) real    d) heavy

3: The difference between real and ideal gas equation, that the ideal gas equation is not interested in?

Answer: a) p<sub>gas</sub> & n<sub>gas</sub>    b) V<sub>container</sub> & p<sub>attraction</sub>    c) V<sub>gas</sub> & p<sub>attraction</sub>    d) T<sub>gas</sub> & p<sub>gas</sub>

4: Calculate the density of C<sub>2</sub>H<sub>4</sub> is placed in a 50000 Cm<sup>3</sup> container at 760 torr and 273 K.

Answer: a) 1.16 g<sup>-1</sup> L<sup>-1</sup>    b) 1.16 g<sup>-1</sup> L    c) 1.16 g L<sup>-1</sup>    d) 1.16 mg L<sup>-1</sup>

5: Graham's law studies the ----- of the gas.

Answer: a) flow    b) collision    c) diffusion    d) effusion

6: The right formula of the Dalton's law is?

Answer: a) p<sub>i</sub> = χ<sub>i</sub> Σ p<sub>i</sub>    b) p<sub>i</sub> = χ<sub>i</sub> p<sub>T</sub>    c) p<sub>T</sub> = χ<sub>i</sub> Σ p<sub>i</sub>    d) p<sub>i</sub> = χ<sub>T</sub> p<sub>T</sub>

7: The law of Corresponding states is an evidence that the gas is?

Answer: a) real    b) ideal    c) expanded    d) compressed    e) heavy

8: The total mol fractions of atmospheric pressure of air is equal to?

Answer: a) zero    b) one    c) two    d) three

9: A gas occupies 30 × 10<sup>-3</sup> m<sup>3</sup> at 75 °C and 76 CmHg pressure. What would be its volume at STP?

Answer: a) 23.5 dm<sup>3</sup>    b) 23.5 m<sup>2</sup>    c) 23.5 L<sup>3</sup>    d) 23.5 m<sup>3</sup>

10: When the value of Z > 1 this means the dominated forces are:

Answer: a) attraction    b) van der Waal    c) repulsion    d) compression

Q2: The following data have been observed for 5000 mg of unknown gas at 0 °C. Calculate the best value of the molar mass of this gas, and what is it? (25 points)

p/10 <sup>5</sup> Pa	0.75	0.60	0.25
V/dm <sup>3</sup>	9.33	11.60	27.50

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm<sup>3</sup>. The p<sub>f</sub> and V<sub>f</sub> of the gas are 197 atm and 2.14 dm<sup>3</sup>, respectively. Calculate the p<sub>original</sub> of the gas in (a) bar, (b) torr. (25 points)

Sun\_28/11/2021

With best my wishes

Dr Abduljabbar I. R. Rusldi

$m = 5000 \text{ mg} \Rightarrow m = \frac{5000 \text{ mg}}{1000} = 5 \text{ g}$

$m = 5 \text{ g}$

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

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

$PV = \frac{mRT}{M}$

$M = \frac{mRT}{PV}$

$PV$  inverse the eq.

when,  $P = 0,75$ ,  $V = 9,33$  ? ? ? = units

$M = \frac{5 \times 0,082 \times 273}{0,75 \times 9,33} = 0,069 \text{ g/mol}$

$T = T_0 + 273$

$T_K = 273 \text{ K}$

$R = 0,082$

when,  $P = 0,6$ ,  $V = 11,6$  ?

$M = \frac{5 \times 0,082 \times 273}{0,6 \times 11,6} = 0,078 \text{ g/mol}$

$\frac{10}{25}$

when,  $P = 0,25$ ,  $V = 27,5$

$M = \frac{5 \times 0,082 \times 273}{0,25 \times 27,5} = 0,619$  ?

Q3

$\frac{10}{25}$  NO ANSWER, Why?

Q2: The following data have been observed for 5000 mg of unknown gas at 0 °C. Calculate the best value of the molar mass of this gas, and what is it?

$V/\text{dm}^3$	9,33	11,60	27,50
$P/10^5 \text{ Pa}$	0,75	0,60	0,25

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1,80 dm<sup>3</sup>. The  $P_1$  and  $V_1$  of the gas are 137 atm and 2,14 dm<sup>3</sup>, respectively. Calculate the pressure of the gas in (a) bar, (b) torr. (25 points)