



F9

24-11-21  
Wed  
K.A.B.  
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Physical Chemistry\_Chpt\_One\_Properties of Gases



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1<sup>st</sup> Exam-paper D

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

(50 points)

1: According to van der Waal's corrections if  $V_{Real} < V_{Perfect}$  of any gas that means the gas has:

Answer: a) non-polar particles b) polar particles c) small particles d) big particles

2: Calculate the weight of CO<sub>2</sub> gas (44 g.mol<sup>-1</sup>) in a 0.5 × 10<sup>4</sup> mL cylinder at 20 × 10<sup>2</sup> kPa and 25 °C.

Answer: a) 180 g mol<sup>-1</sup> b) 180 g c) 180 mol d) 180 kg

3: Calculate the density of CO<sub>2</sub> placed in a 22.4 × 10<sup>3</sup> mL cylinder at 20 × 10<sup>2</sup> kPa and 298 K.

Answer: a) 36.06 kg L<sup>-1</sup> b) 36.06 g L<sup>-1</sup> c) 36.06 g d) 36.06 L<sup>-1</sup>

4: According to Graham's law the heaviest gas has?

Answer: a) low rate b) high rate c) middle rate d) low density

NO ANSWER

5: A gas occupies 20 dm<sup>3</sup> at 90 °C and 760 torr pressure. What would be its volume at STP?

Answer: a) 15.04 mL b) 15.04 dm<sup>3</sup> c) 15.04 L<sup>-1</sup> d) 15.04 dm<sup>-3</sup>

6: A vessel contains a certain amount of gas at 80 × 10<sup>5</sup> Pa. The gas is transferred to another tank 20 dm<sup>3</sup> with pressure of 20 × 10<sup>3</sup> Pa. What should be its volume?

Answer: a) 0.5 L b) 0.5 Pa L c) 0.5 Pa dm<sup>3</sup> d) 0.5 L<sup>-1</sup>

7: According to Avogadro's law n is directly proportional with volume at constant?

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

8: Attractive and repulsive forces between particles are present in a?

Answer: a) perfect gas b) non-ideal gas c) ideal gas d) noble gas

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

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

10: The mol fraction of atmospheric pressure is equal to?

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

Q2: The following data have been observed for 10000 mg of CO<sub>2</sub> gas at 273 K. Calculate the best value of the

molar mass of CO<sub>2</sub>.

p/10 <sup>2</sup> kPa	1.00	2.00	3.00
V/L	4.00	7.50	11.75

(25 points)

Q3: A perfect gas undergoes isothermal expansion, which increases its volume by 2.48 dm<sup>3</sup>. The p<sub>i</sub> and V<sub>i</sub> of the gas are 2 × 10<sup>2</sup> kPa and 2.14 dm<sup>3</sup>, respectively. Calculate the p<sub>f</sub> of the gas in (i) bar, (ii) torr. (25 points)

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Best wishes

Dr Abduljabbar I. R. Rushdi

Q2 2<sup>a</sup>

~~$PV = nRT$~~

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

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

~~$= \frac{100 \times 0.082 \times 273}{4}$~~

Q2  $\frac{5}{25}$

$m = 10000 \text{ mg}$   
 $m = 10000 \times 10^{-2}$   
 $= 10^2$

Q3<sup>a</sup>

$V = 7.48 \text{ dm}^3$

$P_i = 2 \times 10^5 \text{ Pa}$

$V_i = 2014 \text{ dm}^3$

$\frac{P_i}{P} = \frac{V_i}{V}$

Q3  $\frac{0}{25}$