F12

35/100 Thirty seven

Name of a student ---------------------------------Signature ------------------------- No. 7 ------

University of Mustansiriyah   **1st Semester-2021**

Department of Chemistry   **1st Exam-paper A**

Q1: Circle the right answer for all of the following: **(50 points)**

1: If a gas has a non-polar particle then the difference between the volume of this gas is:

<u>Answer:</u>   a) $V_{Real} > V_{Perfect}$ b) $V_{Real} \gtrless V_{Perfect}$ c) $V_{Real} = V_{Perfect}$ d) $V_{Real} \neq V_{Perfect}$ 0/5

2: A gas occupies 300000 mL at 130 °C and 760 mmHg pressure. What would be its volume at STP?

<u>Answer:</u>   a) 203.22 mL   b) 203.22 dm³   c) 204 L   d) 204 dm³   0/5

3: Calculate the weight of CH_4 (16 g.mol⁻¹) in a 10 L cylinder at 15×10^5 Pa and 307 K.

<u>Answer:</u>   a) 95.33 g mol⁻¹   b) 95.33 g   c) 95.33 mol   d) 95.33 kg

4: Calculate the number of moles for CH_4 in a 10000 mL cylinder at 10^6 Pa and 32 °C.

<u>Answer:</u>   a) 4.5 mol   b) 4.0 mol   c) 4.0 mmol   d) 4.5 mmol   Q₁ 20/50

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

<u>Answer:</u>   a) H_2O b) CH_4 c) NH_3 d) CO   5/5

6: A 20 L tank contains a certain amount of gas at 10^5 Pa. The gas is transferred to another tank 40 dm³. What should be its pressure?

<u>Answer:</u>   a) 0.50 atm   b) 50 dm³   c) 50 atm   d) 0.50 mmHg   0/5

7: According to the Avogadro's law the amount of a substance is directly proportional with?

<u>Answer:</u>   a) p   b) T   c) R   d) V   e) n   0/5

8: The difference between real and ideal gas is one of the following?

<u>Answer:</u>   a) law p & high T   b) high p & law T   c) high p & high T   d) law p & law T   0/5

9: It can know the density of a gas by applying one of the following?

<u>Answer:</u>   a) Van der Waal's law   b) Graham's law   c) Charles's law   d) Gay-Lussac's law   5/5

10: If V_m is bigger than V^O_m then this means the behaviour of a gas is?

<u>Answer:</u>   a) Real   b) Ideal   c) Real & ideal   d) Z < 1   5/5

Q2: A (28 mol) gas sample has a mass of 10000 mg. The volume of a container is 22 dm³ at a temperature of 76 °C and a pressure of 641 Torr. What is the density of the gas?   **(25 points)**

Q3: An Ar gas is placed in a container at 30 °C at a pressure of 730 torr. What is the volume of the container in ml?   **(25 points)**

09/11/2021   **Best wishes**   **Dr Abduljabbar I. R. Rushdi**

Q2/

$1 \text{ mol } 85 = 28 \text{ mol}$ / انتبه دائماً

$\text{M MW} = 1000 \text{ mg}$

gm

$PM = d \cancel{n} RT$? ✗

$M = 0.022 g$

$d = \dfrac{\cancel{n} RT}{PM}$? ? → This comes from no. of moles. Be Careful!

$T = T_c + 273 =$

$T = 78 + 273 = 349 K$

$d = \dfrac{0.082 \, atm.L/mol.\cancel{K} \times 349\cancel{K} \times 1\text{mol } 85}{6.41 \, atm \times 0.022 \, g.L}$

$P = 6.41 \, torr$

$d = ?$

$d = \dfrac{861.3}{14.182} = 56.82 \, g/L$ ✗ $\dfrac{10}{25}$ Q2

$PV = nRT \Rightarrow$

$6.41 \, atm * 0.022 \, L = 28 \times 0.082 \, atm.L/mol.K$

Q3/ $PV = nRT$

$T = 30 + 273 K$

$T = 303 K$

$730 \times V = 1 \, mol \times 0.082 \, atm.L/mol.K \times 303 \, K$

$P = 730$

$V = ?$

$V = \dfrac{\cancel{mol} \times 0.082 \, atm.L \times 303}{730 \, atm \, \cancel{mol}}$

$V = \dfrac{248.4 \, L}{730 \, atm} = 0.34 \Rightarrow V = 0.34$

$\boxed{Q_3 \ \dfrac{5}{10}}$