Name of a student ----------- أنوار جبار سلطان ----------- Signature ---- Anwar ---------- No. ---- 36

University of Mustansiriyah

1st Semester-2021

Department of Chemistry

1st Exam-paper A

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

(50 degrees)

1: A vessel of 100 L capacity contains a certain amount of gas at 50 °C and 0.5 bar pressure. The gas is transferred to another vessel has a pressure of 5 bar at 50 °C. What should be the volume of the vessel?

Answer: **a) 10 bar**   b) 10 dm³   c) 0.1 dm³   d) 0.1 bar

2: What is the right formula of the Graham's law of effusion?

Answer: a) $\frac{r_1}{t_2} = (\frac{r_2}{M_1})^{\frac{1}{2}}$ **b) $\frac{r_1}{r_2} = (\frac{M_1}{M_2})^{\frac{1}{2}}$**   c) $\frac{d_1}{d_2} = (\frac{M_2}{M_1})^{\frac{1}{2}}$ d) $\frac{r_1}{r_2} = (\frac{d_2}{M_1})^{\frac{1}{2}}$

3: Calculate Z for a gas if T is 22 °C, V_m is 5 dm³ mol⁻¹ and p is 3 bar.

Answer: a) 0.62 °C   b) 6.2 K   **c) 0.62**   d) 6.2

4: Calculate the molar mass of O_2 (16 g.mol⁻¹) in a 4 L cylinder at 9 atm and 281 K.

Answer: a) 32 g.mol⁻¹   b) 32 g   c) 50 g.mol⁻¹   **d) 50 g**

5: Calculate the V^o_m of a gas, if p is 1 atm and temperature is 32 °C.

Answer: a) 25 K   b) 25 atm   **c) 25 L mol⁻¹**   d) 25 mol

$Q_1 \frac{20}{50}$

6: If the attraction forces are negligible, that means the gas is?

Answer: a) real   b) noble   c) perfect   **d) expands**

7: According to the Dalton's law the unit of the mole fraction is?

Answer: a) mol   b) dm³   c) psi   **d) free of units**

8: What is the partial pressure of a gas in a mixture if the X_i is 0.1, and under atmospheric pressure?

Answer: a) 760 mmHg   b) 10 bar   **c) 0.1 atm**   d) 1 bar

9: If the value of R is 0.082 then the unit of pressure is?

Answer: a) Pascal   b) mmHg   **c) Psi**   d) bar

10: What is the right equation of one of the following?

Answer: a) $p_r p_c = p$ b) $p_r p = p_c$ **c) $p_r / p_c = p$**   d) $p_r = p_c p$

Q2: Calculate the mass of 335 mL of sulfur dioxide (64 g mol⁻¹) measured at 37 °C and 745 mm Hg pressure.?

(25 degrees)

Q3: Calculate the volume of 0.25 g of oxygen at 25 °C and 742 mm Hg pressure.

(25 degrees)

Wed_20/01/2021   **Best wishes**   **Dr Abduljabbar I. R. Rushdi**

Q2/ m=g ?

$V = 335\ mL$

$M = 64\ g.mol^{-1}$

$T = 37\ c°$

$P = 745\ mmHg$

$V = \dfrac{335\ ?}{1000} = 0.335\ L$ — R. = Units

$T_c = 37\ ? + 273 = 310\ k$

$P = \dfrac{745\ ?}{760\ ?} = 0.98\ atm$

$PV = nRT$

$0.98\ atm * 0.335\ L = n * 0.082\ L.atm/mol.k * 310k$

$n = \dfrac{0.3283}{25.42} = 0.01\ mol$ (0.0129)

(Q₂ 20/25)

$n = \dfrac{m}{M} \Rightarrow 0.01 = \dfrac{m}{64} \Rightarrow m = 0.64\ g$

Q3/

$V = L\ ?$

$m = 0.25\ g$

$T = 25\ c°$

$P = 742\ mmHg$

$T_c° = 25 + 273 = 298\ k$

$P = \dfrac{742}{760} = 0.97\ atm$

$n = \dfrac{m}{M} = \dfrac{0.25\ ?}{32\ ?} = 0.007\ mol$

$PV = nRT$

$0.97\ atm * V = 0.007\ mol * 0.082\ L.atm/mol.k * 298\ k$

$V = \dfrac{0.1710}{0.97} = 0.176\ L$

(Q₃ 20/25)