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

University of Mustansiriyah

Department of Chemistry

1st Semester-2021

1st Exam-paper B

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

1: Helium represents a

Answer: a) real gas   b) ideal gas   c) noble gas   d) heavy gas

2: A 0.2 L container contains a certain amount of gas at 1.0 bar pressure. The gas is transferred to another vessel of volume 0.5 dm^3. What should be it is pressure?

Answer: a) 0.60 atm   b) 0.40 dm^3 c) 0.4 atm   d) 0.4 mmHg

3: A gas occupies 299 dm^3 at 127 ^oC and 760 mm pressure. What would be it is volume at STP?

Answer: a) 199.8 L   b) 199 dm^3 c) 200 L   d) 204 dm^3

4: Calculate the weight of CH$_4$ (16 g.mol^{-1}) in a 10 L cylinder at 15 atm and 34 ^oC.

Answer: a) 95.33 g mol^{-1} b) 95.33 g   c) 85.80 mol   d) 86.65 g

5: Calculate the number of moles for CH$_4$ in a 12 L cylinder at 14 bar and 28 ^oC.

Answer: a) 6.8 mol   b) 6.9 mol   c) 6.5 mol   d) 6.7 mol

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

Answer: a) H$_2$ b) O$_2$ c) N$_2$ d) CO$_2$

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

Answer: a) p   b) T   c) R   d) V

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

Answer: a) p & V   b) T & n   c)   d) attraction forces & volume of a gas

9: It can know the molecular mass of un known gas by applying one of the following?

Answer: a) Boyle's law   b) Graham's law   c) Charles's law   d) Gay-Lussac's law

10: If V$_m$ is bigger than V^o_m then this means the behaviour of a gas is?

Answer: a) Real   b) Ideal   c) Real & ideal   d) Z = 0

Q2: A gas sample has a mass of 9.98 g. Its volume is 21.6 L at a temperature of 75.46 ^oC and a pressure of 641 Torr. Calculate its molar mass.

Q3: A 1.3 mole of Ar gas is placed in a container at 27 ^oC at a pressure of 725 torr. What is the volume of the container in ml?

12/01/2021   **Best wishes**   Dr Abduljabbar I. R. Rushdi

Q2 - ⓐ = 9.98g -

V = 21.6 L

T = 75.46°C = 75.46 + 273 = 348.46 K

P = 641 Torr.

$$\boxed{PVM = dRT} \alpha$$

641 Torr × 21.6 L × M = 9.98g × 0.082 Torr.k/kg.L · 348.46 K

$$M = \frac{9.98g \times 0.082 \text{ Torr.k kg.L} \cdot 348.46 K}{641 \text{ Torr} \cdot 216 L}$$

ⓒ Q2 $\frac{5}{25}$

$$M = \frac{285.42 \text{ kg}}{13845.6}$$ M = 0.020 kg

Q-3 -   n = 1.3 Mole

T = 27°C + 273 = 300 K

P = 725 Torr

V = ?

$$PV = nRT$$

755 Torr × V = 1.3 Mole × 0.082 · 300 K   ? ≡ Units   ⓒ Q3 $\frac{5}{25}$

$$V = \frac{1.3 \text{ Mole} \times 0.082 \cdot 300 K}{755 \text{ torr}}$$

V = 31.98 L α