Thank you

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12-01-2021 Tue-Jabb

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Physical Chemistry-Properties of Gases

Name of a student ---------- Signature ---------- No. 15

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

Department of Chemistry — **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 °C 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 °C.

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 °C.

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 °C 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 °C 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 / $PV = nRT$

$0.843\,atm * 21.6\,L = n * 0.082\,L.atm/mol.K * 348.46\,K$

$18.2088 = n * 28.57372\,mol$

$n = \frac{18.2088}{28.57372\,mol}$

$n = 0.6372\,mol$

$T = Tc + 273\,k$

$= 75.46c^\circ + 273\,k$

$= 348.46\,k$

$P = \frac{641\,Torr}{760} = 0.843\,atm$

$n = \frac{w}{M.wt} \rightarrow M.wt = \frac{w}{n} \rightarrow M.wt = \frac{9.98\,g}{0.6372\,mol}$

$M.wt = 15.6627244\,g/mol$

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Q3 $PV = nRT$

$0.953\,atm * V = 1.3\,mol * 0.082\,L.atm/mol.K * 300\,K$

$0.953\,atm * V = 31.98\,L.atm$

$V = \frac{31.98\,L}{0.953}$

$V = 33.55\,L$

$V\,(mL) = 33.55 * 100$

$V = 3355\,mL$

$P = \frac{725\,torr}{760} = 0.953\,atm$

$T = Tc + 273\,K$

$= 27c + 273\,K$

$= 300\,k$

$n = 1.3\,mol$

Q3 20/25

You should organize your ANSWER