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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 dm³. What should be it is pressure?
Answer: a) 0.60 atm   b) 0.40 dm³   c) 0.4 atm   d) 0.4 mmHg

3: A gas occupies 299 dm³ at 127 °C and 760 mm pressure. What would be it is volume at STP?
Answer: a) 199.8 L   b) 199 dm³   c) 200 L   d) 204 dm³

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/ $d = \dfrac{m}{V} = \dfrac{9.98}{21.6} = 0.462$ (g/L)

$PM = dRT$

$M = \dfrac{dRT}{P} = \dfrac{0.462 \text{ g/L} \times 0.082 \text{ ?} \times 348.46K \text{ ?}}{0.8 \text{ ?}}$

$M = 16.465 \, M$

(circled in red) Q2 $\dfrac{15}{20}$

? = units

$P = 641 \text{ Torr}$
$V = 21.6 L$
$R = 0.082$
$T_{(K)} = t_{(c)} + 273$
$\quad = 75.46 + 273$
$\quad = 348.46$?
$P = \dfrac{641}{760} \text{ ?} = 0.8$?

Q3/

$PV = nRT$

(circled in red) Q3 $\dfrac{10}{25}$

$V = \dfrac{nRT}{P}$

$V = \dfrac{1.3 \, mole \times 0.082 \times 300K \text{ ?}}{1 \text{ ?}}$

$V = 32. L$

$V = 32 \times 1000 = 32000 \, mL$

$P = 725 \text{ Torr}$
$P = \dfrac{725 \text{ ?}}{760 \text{ ?}} = 0.95$?
$V = ?$
$n = 1.3 \, mole$
$T_{(K)} = t_{(c)} + 273$
$\quad = 27 + 273$
$\quad = 300 K$
$R = 0.082$?