25/100 Twenty Line

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Physical Chemistry-Properties of Gases

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University of Mustansiriyah

Department of Chemistry

1st Semester-2021

1st Exam-paper A

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

1: How many minutes are required to effuse H_2 gas if its molar mass is 2 g mol^{-1} in comparison with (32 g mol^{-1}, 3 min) O_2 gas?

Answer: a) 0.800 min b) 0.750 min c) 0.700 min d) 0.075 min

2: What is the right formula of the following equation?

Answer: a) $a = \frac{V_c}{3}$ b) $b = \frac{T_c}{5}$ c) $b = \frac{V_c}{3}$ d) $b = \frac{p_c}{3}$

3: Calculate the pressure of a gas occupying 3.0 dm^3 at 36.5 K?

Answer: a) 10 atm b) 1 bar c) 10 bar d) 765 mmHg

4: Calculate the mass of (44 g mol^{-1}) CO_2 occupied 2 L cylinder at 8 atm and 273 K.

Answer: a) 31.44 g b) 31.44 g^{-1} c) 33.44 g d) 31.44 mg

5: Calculate the density of (17 g mol^{-1}) ammonia gas under pressure of 760 mmHg and temperature 40 °C.

Answer: a) 0.66 g L b) 0.66 g L^{-1} c) 0.66 g mL^{-1} d) 0.66 L g^{-1}

6: It can know the gas is real or perfect from its?

Answer: a) volume b) pressure c) compression factor d) Gas constant

7: If you multiply mole fraction by total pressure then it can calculate?

Answer: a) no. of moles b) pressure of a gas c) temperature d) rate of flow

8: What is the partial pressure of a gas in a mixture if the X_i is 0.5, and the conditions are at STP?

Answer: a) 1.5 Pa b) 0.49 bar c) 0.5 atm d) 0.5 bar

9: The unit of R = 0.082 is?

Answer: a) K L mol^{-1} atm b) K^{-1} mol^{-1} atm L c) K L mol^{-1} J d) atm^{-1} L mol^{-1} K

10: You can know that the gas is heavy from its?

Answer: a) mass b) volume c) molar mass d) pressure

Q2: 8 moles of a gas are contained in a 40 dm^3 container at a pressure of a 9120 mmHg and a temperature of 220 K. a) Calculate the compression factor, Z. b) Determine if the gas is ideally-behaved or real. c) Determine if repulsions or attractions is predominated in the gas.

Q3: Calculate the pressure exerted by 0.400 mol of acetic acid in 3 L container at 50 °C using Van der Waals equation (a = 17.71 atm L^{-2} mol^2 and b = 0.0237 L mol^{-1}).?

09/02/2021

Best wishes

Dr Abduljabbar I. R. Rushdi

Q2

a) $M = 8$ moles $P = 40\ dm^3$ $P = 9120$ mmHg $T = 220$ K

$$P_{atm} = \frac{9120\ mmHg \times atm}{760\ mmHg} = 12\ atm$$

$$PV = nRT$$

$$n = \frac{PRT}{V}$$

$$n = \frac{40\ dm^3 * 0.082\ atm.L/mol.K * 220\ K}{12\ atm}$$

$$n = 0.133\ Z$$

b) real

c)

(Grader, in red:) $\circledast$ $PV = ZRT$ القانون الصحيح للتطبيق

المطلوب هو ايجاد قيمة Z وليس n

Q_2 $\frac{10}{25}$

Q3

$M = 0.400$ mol $P = 3$ L $T = 50$

$t = 50 + 273 = 323$ K

$$P = nRT$$

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

$$P = \frac{0.400\ mol * 0.082\ atm.L/mol.K * 323\ K}{3\ L}$$

$$P = 15.31\ atm$$

(Grader, in red:) هذه العلاقة خطأ، الحل خاطئ، المطلوب هو الضغط للغاز الحقيقي

Q_3 $\frac{5}{25}$