



Physical Chemistry-Properties of Gases



1201-2021
40/100
Forty only
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No.

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University of Mustansiriyah

1st Semester-2021

Department of Chemistry

1st Exam-paper A

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

1: A vessel of 50 mL capacity contains a certain amount of gas at 40 °C and 2 bar pressure. The gas is transferred to another vessel of volume 100 mL at 40 °C. What should be its pressure?

Answer: a) 1.0 atm b) 0.85 mmHg c) 0.9 cmHg d) 1 bar

0.5

2: What is the right formula of the Van der Waals equation?

Answer: a) $p = [nRT/(V-nb)] - n(a^2/V^2)$ b) $P = [nRT/(V-nb)] - V(n^2/a^2)$ c) $p = [nRT/(b-nV)] - a(n^2/V^2)$ d) $P = [nRT/(V-nb)] - a(n^2/V^2)$

NO ANSWER 0.5

3: Calculate the temperature of 4.0 mol of a gas occupying 5.0 dm³ at 3.3 bar?

Answer: a) 50.3 °C b) 48 K c) 51 °C d) 50.3 K

NO ANSWER 0.5

4: Calculate the weight of O₂ (32 g.mol⁻¹) in a 4 L cylinder at 9 atm and 281 K.

Answer: a) 50 kg b) 50 g c) 50 K d) 50 °C

0.5

5: Calculate the p_c of He gas, if the p_r and p is 0.44 and 1 atm respectively

Answer: a) 2.26 K b) 2.26 atm c) 2.26 L d) 2.26 mol

NO ANSWER

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

Answer: a) real b) noble c) perfect d) compressed

0.5

7: According to the Dalton's law total mole fraction is equal to?

Answer: a) 0.10 mol b) 1.0 mol c) 0.10 d) 1.0

5/5

20/50

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

5/5

9: If the value of α is 0.082 then the unit of temperature is?

Answer: a) Kelvin b) Celsius c) Fahrenheit d) no one of these

5/5

10: According to the Avogadro's law the amount of a gas at STP is?

Answer: a) 1.00 mol b) 2.00 mol c) 1.00 L d) 2.00 mol

5/5

Q2: The air inside a flexible 3.5 L container has a pressure of 115 kPa. What should the volume of the container be increased to in order to decrease the pressure to 625 torr?

Q3: A 3 dm³ container holds 0.5 moles of N₂ gas at 42 °C. What is the pressure inside the container?

Q2/ $625 \stackrel{?}{=} 722 \stackrel{?}{=} 0.865 \text{ atm}$ }

~~$115 \times 722 = 0.15 \text{ atm}$~~

~~$\frac{P_1}{V_1} = \frac{P_2}{V_2}$~~

$\frac{0.15 \text{ atm}}{3.5 \text{ L}} = \frac{0.865 \text{ atm}}{V_2}$

$0.15 V_2 = 3.0275$

$V_2 = \frac{3.0275}{0.15}$

~~$V_2 = 20.1 \text{ L}$~~

Q2 $\frac{5}{25}$

Q3/

A/

~~$T = C + 273 \text{ K} \Rightarrow T = 42^\circ\text{C} + 273 \text{ K}$~~
 ~~$T = 315 \text{ K}$~~

$PV = nRT$

~~$P \cdot 3 \text{ dm}^3 = 0.5 \text{ Mol} \times 0.082 \frac{\text{Mol} \cdot \text{L}}{\text{atm} \cdot \text{K}} \times 315 \text{ K}$~~

$P = \frac{0.5 \text{ Mol} \times 0.082 \text{ Mol} \cdot \text{L} / \text{atm} \cdot \text{K} \times 315}{3 \text{ dm}^3} = \text{L}$

~~$P = 43 \text{ atm}$~~

Q3 $\frac{5}{25}$

0.06
 129.15
 3

12.915

3×10^{-6}