



Physical Chemistry-Properties of Gases



55/100 Fifty five
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Dr. Abduljabbar Rusydi

Name of a student خالد الدين رعد بالله Signature _____ No. 10

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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 5/5

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) $P = [nRT/(V-nb)] - a(n^2/V^2)$ 5/5

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 5/5

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

Q1: $\frac{30}{50}$

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 5/5

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 0/5

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 0/5

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?

Q-2-

$$V_1 = 3.5 \text{ L}, P_1 = 115 \text{ kPa}, P_2 = 625 \text{ torr}, V_2 = ?$$

$$P_1 = 115 \text{ kPa} \div 760 = 0.15 \text{ atm} \quad \text{How?}$$

$$P_2 = 625 \text{ torr} \div 760 = 0.82 \text{ atm}$$

? = Units

$$Q_2 \frac{10}{25}$$

$$P_1 V_1 = P_2 V_2$$

$$0.15 \text{ atm} * 3.5 \text{ L} = 0.82 \text{ atm} * V_2$$

$$V_2 = \frac{0.15 \text{ atm} * 3.5 \text{ L}}{0.82 \text{ atm}} = 0.64 \text{ L}$$

$$V_2 = 0.64 \text{ L} \quad \text{Is this right?}$$

Q-3-

$$V = 3 \text{ dcm}^3, n = 0.5 \text{ mole}, T = 42 + 273 \text{ K}, P = ?$$

$$PV = nRT$$

$$P = \frac{nRT}{V} = \frac{0.5 \text{ mole} * 0.082 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} * 315 \text{ K}}{3 \text{ dcm}^3 \equiv \text{L}}$$

$$P = 4.3 \text{ atm}$$

$$Q_3 \frac{15}{25}$$