



Physical Chemistry-Properties of Gases

65 / 1000 Sixty five
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No. 3

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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 (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)

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)

Q2. $\frac{40}{50}$

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

Answer: a) real b) noble c) perfect d) compressed (5/5)

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)

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 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 (0/5)

NO ANSWER (0/5)

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?

$$Q2/ P_1 = 115 \text{ kPa}, V_1 = 3.5 \text{ L}, P_2 = 625 \text{ torr}$$

$$V_2 = ?$$

$$P_1 V_1 = P_2 V_2$$

$$(115 \text{ kPa})(3.5 \text{ L}) = (625 \text{ torr}) V_2$$

$$V_2 = \frac{(115 \text{ kPa})(3.5 \text{ L})}{(625 \text{ torr})}$$

Q2 $\frac{5}{25}$

$$Q3/ V = 3 \text{ dm}^3 = 3 \text{ L}$$

$$T(\text{K}) = t(\text{C}) + 273$$

$$= 42\text{C} + 273 \Rightarrow T = 316 \text{ K}$$

$$n = 0.5 \text{ mol}$$

$$PV = nRT$$

$$P(\text{BooL}) = (0.5 \text{ mol})(0.082 \text{ atm}\cdot\text{L}/\text{mol}\cdot\text{K})(316 \text{ K})$$

$$P = \frac{(0.5 \text{ mol})(0.082 \text{ atm}\cdot\text{K}/\text{mol}\cdot\text{K})(316 \text{ K})}{3 \text{ L}}$$

Q3 $\frac{90}{25}$

$$P = 1.47 \text{ atm}$$