



Physical Chemistry-Properties of Gases

55/100
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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

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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 its pressure?

Answer: a) 0.60 atm b) 0.40 dm³ c) 0.4 atm d) 0.4 mmHg

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3: A gas occupies 299 dm³ at 127 °C and 760 mm pressure. What would be its volume at STP?

Answer: a) 199.8 L b) 199 dm³ c) 200 L d) 204 dm³

NO-ANSWER

4: Calculate the weight of CH₄ (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

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5: Calculate the number of moles for CH₄ 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

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6: According to Graham's law the heaviest gas is?

Answer: a) H₂ b) O₂ c) N₂ d) CO₂

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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

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8: The difference between real and ideal gas is one of the following?

Answer: a) p & V b) T & n d) attraction forces & volume of a gas

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9: It can know the molecular mass of an unknown 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

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10: If V_m is bigger than V_m⁰ then this means the behaviour of a gas is?

Answer: a) Real b) Ideal c) Real & ideal d) Z = 0

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NO ANSWER

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?

Q2 / $m = 9.98 \text{ g}$

$V = 21.6 \text{ L}$

$T = 75.46^\circ\text{C} \rightarrow T_K = 273 + 75.46^\circ\text{C}$

$T_K = 348.46 \text{ K}$

$P = 641 \text{ Torr} \rightarrow P_{\text{atm}} = \frac{1 \text{ atm} * 641 \text{ Torr}}{760 \text{ Torr}}$

$P_{\text{atm}} = 0.843 \text{ atm}$

Q2 $\frac{5}{25}$

Q3 /

Sol / $n = 1.3 \text{ mol}$

$T = 27^\circ\text{C}$

$T_K = 273 + 27^\circ\text{C}$

$* T_K = 300 \text{ K}$

$P = 725 \text{ Torr}$

$P_{\text{atm}} = \frac{1 \text{ atm} * 725}{760 \text{ Torr}}$

$* P = 0.953 \text{ atm}$

$PV = nRT$

$0.953 \text{ atm} * V = 1.3 \text{ mol} * 0.082 \text{ L} \cdot \text{atm} / \text{mol} \cdot \text{K} * 300 \text{ K}$

$V = \frac{1.3 \text{ mol} * 0.082 \text{ L} \cdot \text{atm} / \text{mol} \cdot \text{K} * 300 \text{ K}}{0.953 \text{ atm}} \approx \text{Unit}$

$V = \frac{10.92 \text{ L}}{0.953}$

$V = 11.458 \text{ L} \rightarrow \text{mL}$

$V = 0.0114 \text{ mL}$

Q3 $\frac{15}{25}$