



Physical Chemistry-Properties of Gases

75/100 Seventy five
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Department of Chemistry 1st Exam-paper B

Q1: Circle the right answer for all of the following: O₂, H₂, He

1: Helium represents a.
Answer: a) real gas b) ideal gas c) noble gas d) heavy gas 5/5

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 5/5

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 5/5

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 5/5

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 5/5

6: According to Graham's law the heaviest gas is?
Answer: a) H₂ b) O₂ c) N₂ d) CO₂ 5/5

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 5/5

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 5/5

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 5/5

10: If V_m is bigger than V_{0m} then this means the behaviour of a gas is?
Answer: a) Real b) Ideal c) Real & ideal d) Z = 0 5/5

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?

35/50

Q2) m = 9.98 g →
V = 21.6 L

T = 75.46°C + 273 = 348.4 K

P = 641 Torr → 641 × 1/760 = 489.83 atm
% not
1 Torr = 760

PV = nRT

~~489.83~~ × 21.6 = ~~9.989~~ × 0.082 ~~atm·L~~ / ~~mol·K~~ × 348.4 K

10.56 = ~~9.989~~ / M × 28.56

M = ~~26.98~~ mol

Q2 15/25

Q3) m = 1.3 Ar

T = 27°C + 273 = 301 K

P = 725 Torr → 7.38 atm

273 + 27 =

300

PV = nRT

~~7.38~~ × V = 1.3 × 0.082 ~~atm·L~~ / ~~mol·K~~ × 301 K

V = 3208 / 7.38 = 4.346 L

Q3 15/25