50/100 Fifty only
12-01-2021
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Name of a student ---- آية رؤوف محمد ---- Signature ---- ame ---- No. **5**

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 it is pressure?
Answer: a) 1.0 atm b) 0.85 mmHg c) 0.9 cmHg d) 1 bar   *5/5*

$\frac{V_1}{T_1} = \frac{V_s}{T} = \infty$

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) $P = [nRT/(V-nb)] - a(n^2/V^2)$ *0/5*

3: Calculate the temperature of 4.0 mol of a gas occupying 5.0 dm^3 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 O_2 (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*

$Q_1 = \frac{25}{50}$ *1 atm*

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 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*

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 dm^3 container holds 0.5 moles of N_2 gas at 42 °C. What is the pressure inside the container?

12/01/2021   **Best wishes**   Dr Abduljabbar I. R. Rushdi

Q2

$V_1 = 3.5L$, $P_1 = 115 Kpa$

$V_2 = ?$, $P_2 = 625 torr$

→ Revise pages no. 2-3 to know how to convert torr to Pa or Pa to torr ← OR You can convert torr→atm & Pa→atm

$P = \dfrac{Kpa \times 625 torr}{101.325} = 0.006 Kpa$

$P_1 V_1 = P_2 V_2 \Rightarrow$ 3

$3.5L \times 1.15 Kpa = 0.006 Kpa \times V_2$

$V_2 = \dfrac{3.5L \times 1.15 Kpa}{0.006 Kpa} = \boxed{670.8 L}$ (crossed out)

Q2 $\frac{10}{25}$

Q3

$V = 3 dm^3$, $n = 0.5 mol$, $T = 42°C$

$T = 42°C + 273 = \boxed{3.15 K}$ ↑ That is your big mistake   315

$PV = nRT$

$P = \dfrac{nRT}{V} = \dfrac{0.5 mole \times 0.082\, atm\cdot L/mole\cdot k \times \boxed{3.15 K}}{3 dm^3}$ 315

$P = \boxed{0.043\, atm}$

4.3

Q3 $\frac{15}{25}$