Quiz I: Gases

SCH3U_2016 - 2017_V2

NAME: _____

(Total Score: /10)

In all problems, please be certain to show the:
(a) original form of a formula, (b) any formula rearrangements
Please pay particular attention to units and significant figures.

1. In Ottawa a balloon with a volume of 7.50 L is filled with air at 102.3 kPa pressure. The balloon is take to the Gatineau hills where the atmospheric pressure is 91.0 kPa. If the temperature is the same in both places what will the new volume of the balloon be? 2

2. A chemist collected the following data regarding an unreactive gas: at 30.0 ^{O}C and 98.0 kPa, 2.00 L of the gas had a mass of 6.52 g. Determine the molar mass of the gas. 3

3. The most effective rocket fuels are lightweight liquids that react to produce many molecules of gaseous products. One of the best fuels is dimethylhydrazine, $(CH_3)_2N_2H_{2\,(l)}$. When mixed with dinitrogen tetroxide, $N_2O_{4(l)}$, it powered the Lunar Lander in the missions to the moon, according to the following equation:

$$(CH_3)_2N_2H_{2\,(l)} + 2\,N_2O_{4(g)} \longrightarrow 3N_{2(g)} + 4H_2O_{(g)} + 2CO_{2(g)}$$

How many grams of dimethylhydrazine, $(CH_3)_2N_2H_{2\,(l)}$, are contained in the Lunar Lander fuel tank if the nitrogen tetraoxide gas, $N_2O_{4(g)}$ is contained in a 250 L tank is at a pressure of 103.5 kPa and a temperature of 27.5 ^{O}C. 5