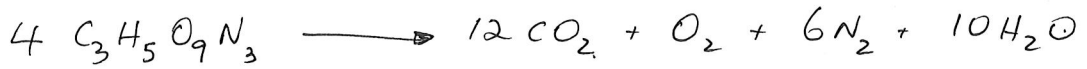


Q60

Nitro density = 1.59 g/mL

Temp = $0^{\circ}\text{C} = \underline{273\text{K}}$

Vol = $1\text{mL} = \underline{0.001\text{L}}$



density = 1.59 g/mL

vol = 1 mL

∴ m = 1.59 g

$$n = \frac{m}{MM}$$
$$= \frac{1.59}{227}$$
$$= 0.007$$

$n_{\text{C}_3\text{H}_5\text{O}_9\text{N}_3}$
= 0.007 moles

0.007 moles

4:12
1:3

n_{CO_2}
= 0.007×3
= 0.021 moles

4:1
1:0.25

n_{O_2}
= $0.007 \times \frac{1}{4}$
= 0.00175 moles

4:6
1:1.5

n_{N_2}
= 0.007×1.5
= 0.0105 moles

4:10
1:2.5

$n_{\text{H}_2\text{O}}$
= 0.007×2.5
= 0.0175 moles

$$n_{\text{TOTAL}} = n_{\text{CO}_2} + n_{\text{O}_2} + n_{\text{N}_2} + n_{\text{H}_2\text{O}}$$

$$= 0.021 + 0.00175 + 0.0105 + 0.0175$$

$$= \underline{0.051 \text{ moles}}$$

$$PV = nRT$$

$$P = \frac{nRT}{V}$$

$$= \frac{0.051 \times 8.31 \times 273}{0.001}$$

$$= \underline{\underline{115,700 \text{ kPa}}}$$

Q61

$$V = 40L$$

$$T = 120^\circ C = 393K$$

} const

- a) Partial Pressure of NO?
b) Total Press?

$$PV = nRT$$

and

$$P_T = P_A + P_B + \dots$$

$4 NH_3(g) + 5 O_2(g) \rightarrow 4 NO(g) + 6 H_2O(g)$

$m = 34g$ $m = 96g$

$n = \frac{m}{MM} = \frac{34}{17} = 2$ moles $n = \frac{m}{MM} = \frac{96}{32} = 3$ moles

$n_{NH_3} = 2$ moles $n_{O_2} = 3$ moles

RV Ratio: 4:5
 excess O_2
 limiting reagent = NH_3

$n_{NH_3} = 2$ moles 4:4 $n_{NO} = 2$ moles
 1:1
 2:2

$M_{NO} = 60g$
 $M = n \times MM = 2 \times 30g = 60g$
 use to calculate its pressure

$$P_{NO_2} : PV = nRT$$

$$= \frac{nRT}{V}$$

$$= \frac{2 \times 8.31 \times 393K}{40L}$$

$$= 163.3 \text{ kPa}$$

(b) $P_{TOTAL} = P_{NO} + P_{H_2O} + P_{O_2} + P_{NH_3}$

$= \begin{matrix} \uparrow & \uparrow & \uparrow & \uparrow \\ 2 & 3 & 0.5 & 0 \\ \text{moles} & \text{moles} & \text{moles} & \text{moles} \\ \text{produced} & \text{produced} & \text{left over} & \text{left over} \end{matrix}$

Total n. moles = 5.5 moles

(gases present are NO, H₂O which are produced and O₂ which remain left over)

$$P_{TOTAL} = 449 \text{ kPa}$$