Answer on Question#49041 – Chemistry –Organic Chemistry

A sample of unknown liquid hydrocarbon was subjected to combustion in a limited supply of oxygen. The obtained gas composed of 4 L of carbon dioxide, 6 L of carbon monoxide and 10 L of water vapour. Find the empirical formula of the hydrocarbon.

Solution:

$C_xH_y + O_2 \rightarrow CO_2 + CO + H_2O$;

According to Avogadro's law:

$$\nu = \frac{V}{V_M};\ \nu(CO_2):\ \nu(CO):\ \nu(H_2O_{vapour}) = \frac{V(CO_2)}{V_M} : \frac{V(CO)}{V_M} : \frac{V(H_2O)}{V_M} = V(CO_2):V(CO):V(H_2O) =$$

$=4:6:10=2:3:5$;

$C_xH_y + O_2 \rightarrow 2CO_2 + 3CO + 5H_2O$;

5(C) atoms; 10 (H) atoms;

C_5H_{10}

$C_5H_{10} + 5O_2 \rightarrow 2CO_2 + 3CO + 5H_2O$;

Answer: C_5H_{10}