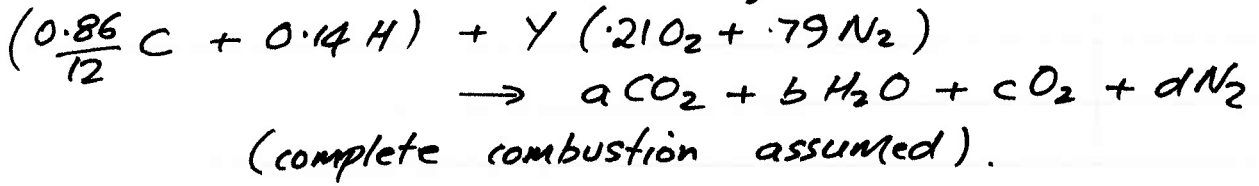


Que 11.

COMBUSTION

We can write the combustion equation :-



$$AFR = 80:1 \quad \therefore Y = \frac{80}{28.85} = 2.773 \text{ kmol.}$$

Equating atoms gives :-

	LHS	RHS	
C	$\frac{0.86}{12}$	a	$\therefore a = 0.0717$
H	0.14	2b	$\therefore b = 0.070$
O	$Y \times 21 \times 2$	$2a + b + 2c$	$\therefore c = 0.4757$
N	$Y \times 79 \times 2$	2d	$d = 2.191$

(a) For stoichiometric combustion $c = \phi$ & $Y_s = 0.5079$ (using $\frac{0}{0}$)

$$\therefore \% \text{ excess air} = \frac{2.773 - 0.5079}{0.5079} \times 100\% = \underline{\underline{446\%}}$$

(b) Gravimetric analysis : 81 kg total products

$$\text{Mass } CO_2 = 0.0717 \times 44 = 3.153 \text{ kg ; } \% \frac{3.153}{81} \times 100\% = \underline{\underline{3.9\%}}$$

$$\text{Mass } O_2 = 0.4757 \times 32 = 15.22 \text{ kg ; } \% \frac{15.22}{81} \times 100\% = \underline{\underline{18.8\%}}$$

$$\text{Mass } H_2O = 0.070 \times 18 = 1.26 \text{ kg ; } \% \frac{1.26}{81} \times 100\% = \underline{\underline{1.55\%}}$$

$$\text{Mass } N_2 = 2.191 \times 28 = 61.35 \text{ kg ; } \% \frac{61.35}{81} \times 100\% = \underline{\underline{75.75\%}}$$