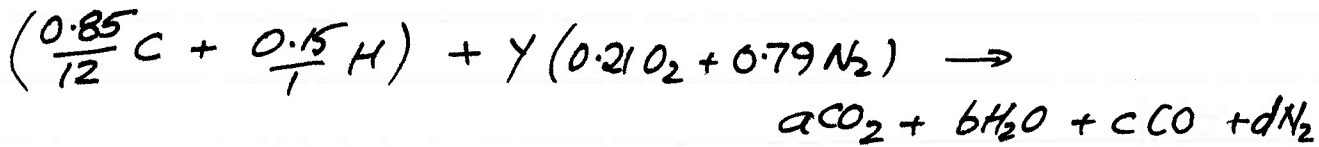


Qu 9.

By mass the fuel is $(0.85C + 0.15H)$ kg.
Convert to kmol. & write the combustion eqn.



(We assume from the question that CO is formed)

The AFR is 13:1 by mass \therefore 1 kg fuel : 13 kg air

The molar mass of air is 28.85 kg/kmol.

$$\therefore 13 \text{ kg is } \frac{13}{28.85} \text{ kmol} = 0.4506$$

$$\therefore Y = \underline{0.4506}$$

Equating atoms :-

	LHS	RHS	
C	$0.85/12$	$a + c$	(i)
H	0.15	$2b$	$\therefore b = 0.075$
O	$Y \times 0.21 \times 2$	$2a + b + c$	(iii)
N	$Y \times 0.79 \times 2$	$2d$	

Solving (i) & (iii) to find c. $a = \frac{0.85}{12} - c$

$$\therefore 0.4506 \times 0.21 \times 2 = 2\left(\frac{0.85}{12} - c\right) + 0.075 + c$$

$$\therefore \underline{c = 0.02741 \text{ (kmols)}}$$

Convert to kg. CO $0.02741 \text{ kmol CO} = 0.02741 \times 28 = 0.767 \text{ kg.}$

The total mass of the wet exhaust gases equals
" " " " " reactants i.e. $1 + 13 = 14 \text{ kg.}$

\therefore gravimetric proportion of CO is $\frac{0.767 \times 100\%}{14} = \underline{\underline{5.48\%}}$