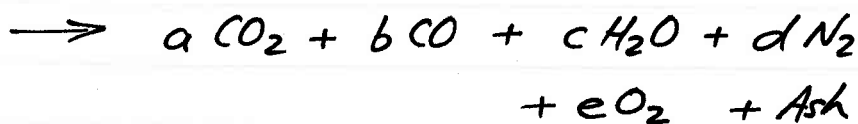
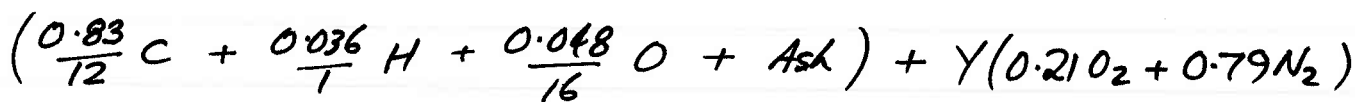


Qu. 10

COMBUSTION

1 kg fuel is  $(0.83C + 0.036H + 0.048O + 0.086 \text{ Ash})$

Convert to kmol & write combustion eqn. :-



NB: the same quantity of 'Ash' appears on both sides of the eqn because it is non-combustible.

Equating atoms gives :-

	LHS	RHS	
C	$0.83/12$	$a + b$	(i)
H	$0.036$	$2c$	$\therefore c = 0.018$
O	$0.048/16 + Y \cdot 21 \cdot 2$	$2a + b + c + 2e$	(ii)
N	$Y \cdot 79 \cdot 2$	$2d$	(iii)

From the gas analysis :-

$$CO_2 ; \frac{a}{a+b+d+e} = 0.109 \quad (v)$$

$$CO ; \frac{b}{a+b+d+e} = 0.010 \quad (vi)$$

$$O_2 ; \frac{e}{a+b+d+e} = 0.071 \quad (vii)$$

$$\& N_2 ; \frac{d}{a+b+d+e} = 0.810 \quad (viii)$$

(a) From (v) & (vi)  $\frac{a}{0.109} = \frac{b}{0.010}$  & also using (i)

$$a = 0.06335 \quad \& \quad b = 0.00581$$

Proportion of C burned to CO is given by  $\frac{b}{a+b}$

$$\text{i.e.} \quad \frac{0.00581}{\frac{0.83}{12}} \times 100\% = \underline{\underline{8.4\%}}$$