



$w_1 = \text{---} \frac{\text{kg}}{\text{h}} \text{CH}_3\text{CH}_2\text{OH}$; $w_2 = \text{---} \frac{\text{kg}}{\text{h}} \text{aire}$

C

$w_3 = \text{---} \frac{\text{kg}}{\text{h}} \text{agua}$

D

$w_4 = \text{---} \begin{cases} \text{CH}_3\text{COOH} \\ \text{H}_2\text{O} \rightarrow ? \end{cases}$ $w_5 = \text{---} ?$

a)

E

$E + G = S + D$

F

$E =$

$$2 \frac{\text{kg acetico}}{\text{h}} \cdot \frac{1 \text{ kmol acetico}}{60 \text{ kg acetico}} \cdot \frac{1 \text{ kmol etanol}}{1 \text{ kmol acetico}} \cdot \frac{46 \text{ kg etanol}}{1 \text{ kmol etanol}}$$

$$= 1.53 \frac{\text{kg etanol}}{\text{h}}$$

$G = \phi$;

$S = \phi$; $D = E$ G

$$b) \boxed{IV} \quad E + G = D + S$$

$$E = ?$$

$$G = 1'53 \frac{\text{kg etanol}}{\text{b}} \cdot \boxed{I} \text{ Hoy las operaciones} = 0'6 \frac{\text{kg agua}}{\text{b}}$$

$$\boxed{J} \quad \frac{2}{2 + 0'6 + x} < 0'12$$

$$x > 14'067 \frac{\text{kg}}{\text{b}}$$

$$\boxed{K} \quad E + G = S + D \quad (1)$$

$$E = 200 \frac{\text{mol}}{\text{b}} \cdot 0'21 \cdot \frac{1 \text{ mol}}{1000 \text{ mol}} \cdot \frac{32 \text{ kg } O_2}{1 \text{ mol } O_2} = 1'344 \frac{\text{kg } O_2}{\text{b}}$$

$$G = 0; \quad S = ?$$

$$D = 1'53 \frac{\text{kg etanol}}{\text{b}} \times \frac{1 \text{ mol etanol}}{46 \text{ kg etanol}} \cdot \frac{1 \text{ mol } O_2}{1 \text{ mol etanol}} \cdot \frac{32 \text{ kg } O_2}{1 \text{ mol } O_2} = 1'06 \frac{\text{kg } O_2}{\text{b}}$$

$$\text{Audiendo a (1)} \quad 1'344 + 0 = S + 1'06$$

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$$1'344 - 1'06 = 0'284 \frac{\text{kg O}_2}{\text{h}}$$

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$$200 \frac{\text{mol air}}{\text{h}} \times 0'79 \times \frac{1 \text{ kmol N}_2}{1000 \text{ mol N}_2} \cdot \frac{28 \text{ kg N}_2}{1 \text{ kmol N}_2} = 4'42 \frac{\text{kg N}_2}{\text{h}}$$

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$$w_4 = \begin{cases} \text{CH}_3\text{COOH} : 2 \text{ kg/h} \\ \text{H}_2\text{O} : 14'66 \text{ kg/h} \end{cases} \quad \boxed{15}$$

$$w_5 = \begin{cases} \text{O}_2 : 0'284 \text{ kg/h} \\ \text{N}_2 : 4'42 \text{ kg/h} \end{cases}$$

$$w_4 = 16'66 \text{ kg/h} ; w_5 = 4'704 \text{ kg/h}$$

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$$x_{4 \text{ acetic}} = 0'12 \quad // \quad x_{5 \text{ O}_2} = 0'06$$

$$x_{4 \text{ H}_2\text{O}} = 0'88 \quad // \quad x_{5 \text{ N}_2} = 0'94$$