

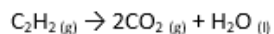
# CONTOH SOAL PERUBAHAN ENTALPI ESSAY

## A. Jawaban pertanyaan dibawah ini!

### 1. Soal Perubahan Entalpi (1)

Diketahui entalpi pembentukan  $H_2O_{(l)} = -258 \text{ kJ mol}^{-1}$ ,  $CO_{2(g)} = -393 \text{ kJ mol}^{-1}$  dan  $C_2H_{2(g)} = +227 \text{ kJ mol}^{-1}$ . Jumlah kalor yang dibebaskan pada pembakaran 0,52 g gas  $C_2H_2$  ( $M_r = 26$ ) adalah

Jawaban:



$$\Delta H = 2(-393) + (-258) - (227)$$

$$= -1271 \text{ kJ}$$

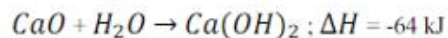
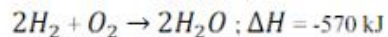
$$n_{C_2H_2} = \frac{0,52}{26} = 0,02 \text{ mol}$$

$$q = n \times \Delta H$$

$$= 0,02 (-1271 \text{ kJ})$$

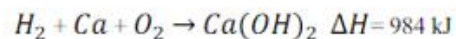
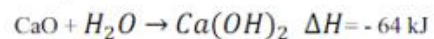
$$= -25,42 \text{ kJ}$$

### 2. Soal Perubahan Entalpi (2) – Pembentukan



Berapakah entalpi pembentukan  $Ca(OH)_2$ ?

Jawaban :



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### 3. Soal Perubahan Entalpi (3) – Energi Ikatan

Apabila diketahui data seperti di bawah ini

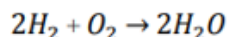
$$\text{O} - \text{H} = 464 \text{ kJ}$$

$$\text{O} = \text{O} = 500 \text{ kJ}$$

$$\text{H} - \text{H} = 436 \text{ kJ}$$

Berapakah perubahan entalpi penguraian  $\text{H}_2\text{O}$ ?

Jawaban :



$$\Delta H = \sum \Delta H_{\text{produk}} - \sum \Delta H_{\text{reaktan}}$$

$$= (2 \cdot 2 \cdot \text{H} - \text{O}) - (2 \cdot \text{H} - \text{H}) + (\text{O} = \text{O})$$

$$= (4 \cdot 464) - (2 \cdot 436) + (500)$$

$$= 1372 - 1856$$

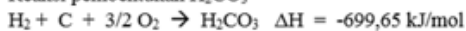
$$= 484 \text{ kJ mol}^{-1}$$

### 4. Soal Perubahan Entalpi (4) – Penguraian

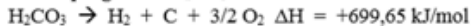
Apabila diketahui  $\Delta H_f \text{H}_2\text{CO}_3 (\text{aq}) = -699,65 \text{ kJ/mol}$  maka hitunglah perubahan entalpi pada penguraian 496 gram  $\text{H}_2\text{CO}_3$ !

Jawaban:

Reaksi pembentukan  $\text{H}_2\text{CO}_3$



Reaksi penguraian  $\text{H}_2\text{CO}_3$



**Maka  $\Delta H$  penguraian 496 gram  $\text{H}_2\text{CO}_3$**

$$\text{Mol H}_2\text{CO}_3 = \frac{\text{massa}}{\text{Mr}} = \frac{496}{62} = 8 \text{ mol}$$

$$\Delta H = 8 \cdot 699,65$$

$$= 5597,2 \text{ kJ/mol}$$

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### 5. Soal Perubahan Entalpi (5) – Pembakaran

Apabila diketahui data sebagai berikut.

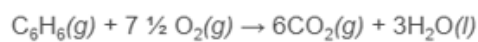
$$\Delta H_f \text{C}_6\text{H}_6(g) = 83 \text{ kJ/mol}$$

$$\Delta H_f \text{CO}_2(g) = 394 \text{ kJ/mol}$$

$$\Delta H_f \text{H}_2\text{O}(l) = 286 \text{ kJ/mol}$$

Berapakah perubahan entalpi pembakaran 1 mol  $\text{C}_6\text{H}_6$ ?

Jawaban :



$\Delta H$  pembakaran 1 mol  $\text{C}_6\text{H}_6$

$$\Delta H_{\text{Reaksi}} = \Delta H \text{ produk} - \Delta H \text{ reaktan}$$

$$\Delta H_{\text{Reaksi}} = [(6 \times \Delta H \text{CO}_2 + (3 \times \Delta H \text{H}_2\text{O})) - [(\Delta H \text{C}_6\text{H}_6) + (7 \frac{1}{2} \times \Delta H \text{O}_2)]$$

$$\Delta H_{\text{Reaksi}} = [(6 \times 394) + (3 \times 286)] - [83 + (7 \frac{1}{2} \times 0)]$$

$$\Delta H_{\text{Reaksi}} = 2364 + 858 - 83 = +3139 \text{ kJ/mol}$$