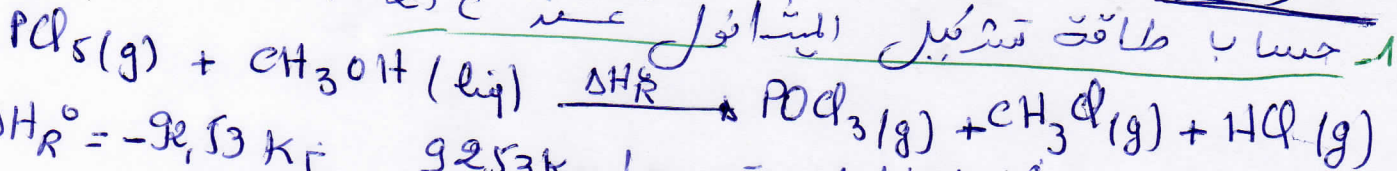


1- حساب طاقة تشكيل الميثانول عند 25°C



$$\Delta H_R^\circ = -92,53 \text{ kJ}$$

هذا التفاعل قد رعاها $92,53 \text{ kJ}$ حير

$$\Delta H_R^\circ = \sum \Delta H_f^\circ(\text{products}) - \sum \Delta H_f^\circ(\text{reactants})$$

$$\Delta H_R^\circ = \Delta H_f^\circ(\text{POCl}_3) + \Delta H_f^\circ(\text{CH}_3\text{Cl}) + \Delta H_f^\circ(\text{HCl}) - \Delta H_f^\circ(\text{PCl}_5) - \Delta H_f^\circ(\text{CH}_3\text{OH})$$

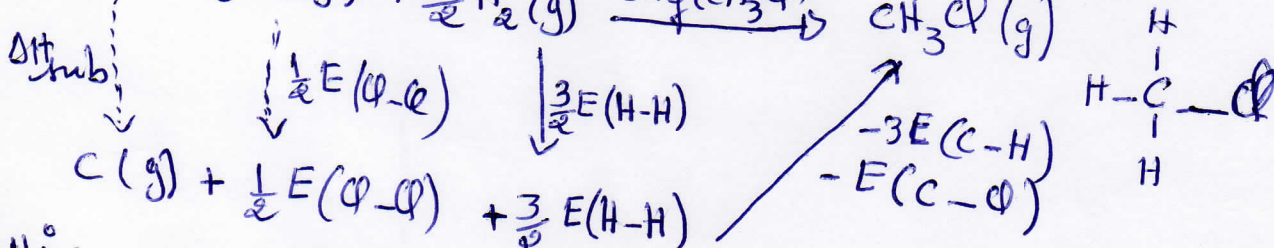
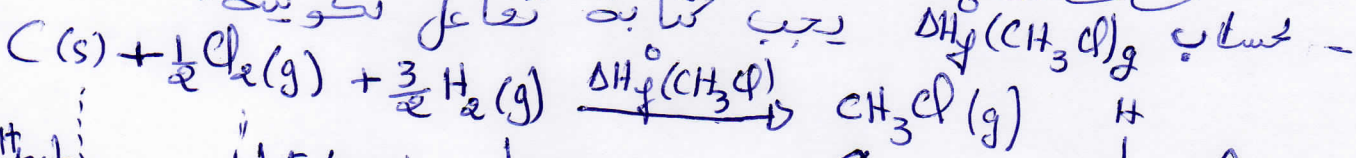
$$\Delta H_f^\circ(\text{CH}_3\text{OH}) = \Delta H_f^\circ(\text{POCl}_3) + \Delta H_f^\circ(\text{CH}_3\text{Cl}) + \Delta H_f^\circ(\text{HCl}) - \Delta H_f^\circ(\text{PCl}_5) - \Delta H_R^\circ$$



- حساب $\Delta H_f^\circ(\text{HCl})$

$$\Delta H_f^\circ(\text{HCl})(\text{g}) = \frac{1}{2} E(\text{H-H}) + \frac{1}{2} E(\text{Cl-Cl}) - E(\text{H-Cl}) = -91,7 \text{ kJ/mol}$$

يجب كتابة تفاعل تكوينه



$$\Delta H_f^\circ(\text{CH}_3\text{Cl}) = \Delta H_1^\circ + \Delta H_2^\circ$$

$$\Delta H_1^\circ = \Delta H_{\text{sub}}(\text{C}) + \frac{1}{2} E(\text{Cl-Cl}) + \frac{3}{2} E(\text{H-H})$$

$$\Delta H_2^\circ = -3E(\text{C-H}) - E(\text{C-Cl})$$

$$\Delta H_f^\circ(\text{CH}_3\text{Cl}) = -610,6 \text{ kJ/mol}$$

بالقورين في العلاقة (*) نحصل على:

$$\Delta H_f^\circ(\text{CH}_3\text{OH}) = -558,70 - 610,6 - 91,7 + 399,04 + 92,53$$

$$\Delta H_f^\circ = -769,43 \text{ kJ/mol}$$