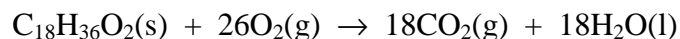


**Marks**  
**5**

- Stearic acid,  $C_{18}H_{36}O_2$ , is a fatty acid common in animal fats and vegetable oils and is a valuable energy source for mammals. The net reaction for its metabolism in humans is:



Calculate  $\Delta H^\circ$  for this reaction given the following heats of formation.

$$\Delta H_f^\circ (C_{18}H_{36}O_2(s)) = -948 \text{ kJ mol}^{-1}, \quad \Delta H_f^\circ (CO_2(g)) = -393 \text{ kJ mol}^{-1} \text{ and}$$

$$\Delta H_f^\circ (H_2O(l)) = -285 \text{ kJ mol}^{-1}$$

Answer:

If the combustion of stearic acid is carried out in air, water is produced as a vapour. Calculate the  $\Delta H^\circ$  for the combustion of stearic acid in air given that



Answer:

Will  $\Delta S$  be different for the two oxidation reactions? If so, how will it differ and why?

Calculate the mass of carbon dioxide produced by the complete oxidation of 1.00 g of stearic acid.

Answer: