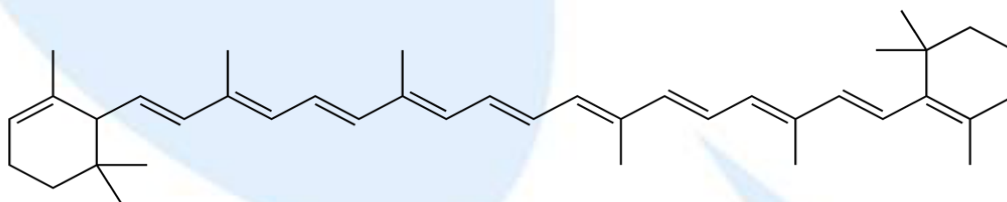


SL & HL Index of hydrogen deficiency questions

- Alkanes have the general formula C_nH_{2n+2} and alkenes have the general formula C_nH_{2n} . Explain why a compound with the formula C_6H_{12} can be classed either as an alkene or as a type of alkane.
- Calculate the index of hydrogen deficiency for a compound with the molecular formula C_6H_6O .
- Explain why 1,2-dichlorethane and ethane both have a hydrogen deficiency of zero.
- Deduce the index of hydrogen deficiency of ethylamine, $C_2H_5NH_2$.
- Deduce the index of hydrogen deficiency of α -carotene.



skeletal structure of α -carotene

(you may prefer to use the structure given in Section 35 of the data booklet which shows most of the carbon and hydrogen atoms)

- Draw two possible structural isomers for compounds with the molecular formula C_2H_6O .
 - Discuss whether the index of hydrogen deficiency is of any use in distinguishing between the two structural isomers.
- Calculate the index of hydrogen deficiency (IHD) of morphine from its molecular formula, $C_{17}H_{19}NO_3$.
 - Show how the IHD can be explained by the of rings and the number of double bonds in its structure.

