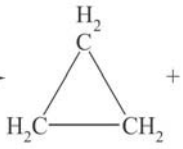
Worksheet 6.2

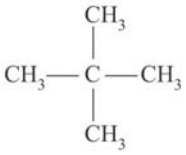
Calculating enthalpy changes of reaction using standard enthalpy changes of combustion

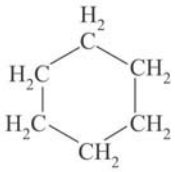
The table below gives the standard enthalpy change of combustion for some carbon compounds and for hydrogen.

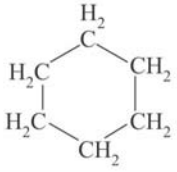
Name of substance	Formula	Standard enthalpy change of combustion ($\Delta H_c^{\ominus}$) / kJ mol^{-1}
propane	C_3H_8	–2220
cyclopropane	$(CH_2)_3$	–1966
hydrogen	H_2	–286
hexane	C_6H_{14}	–4195
pentane	C_5H_{12}	–3509
2,2-dimethylpropane	$CH_3C(CH_3)_2CH_3$	–3517
ethene	C_2H_4	–1411
ethane	C_2H_6	–1560
cyclohexane	C_6H_{12}	–3920
hexene	C_6H_{12}	–4128

Use the data in the table above to calculate the enthalpy change of reaction for each of the following reactions.

a $CH_3CH_2CH_3 \longrightarrow$  $+ H_2$ [2]

b $CH_3CH_2CH_2CH_2CH_3 \longrightarrow$  [2]

c $CH_3CH_2CH_2CH{=}CHCH_3 \longrightarrow$  [2]

d $CH_3CH_2CH_2CH_2CH_2CH_3 \longrightarrow$  $+ H_2$ [2]

e $CH_2{=}CH_2 + H_2 \longrightarrow C_2H_6$ [2]