

Q1. (a) Define the term *standard molar enthalpy of formation*, ΔH_f^\ominus .

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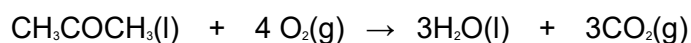
(3)

(b) State Hess's law.

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(1)

(c) Propanone, CH_3COCH_3 , burns in oxygen as shown by the equation



Use the data given below to calculate the standard enthalpy of combustion of propanone.

	$\text{CO}_2(\text{g})$	$\text{H}_2\text{O}(\text{l})$	$\text{CH}_3\text{COCH}_3(\text{l})$
$\Delta H_f^\ominus / \text{kJ mol}^{-1}$	-394	-286	-248

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(3)

(Total 7 marks)

Q2. Using the data below, which is the correct value for the standard enthalpy of formation for

TiCl₄(l)?



- A -1538 kJ mol⁻¹
- B -1094 kJ mol⁻¹
- C -750 kJ mol⁻¹
- D +286 kJ mol⁻¹

(Total 1 mark)

Q3.When ethanamide (CH₃CONH₂) burns in oxygen the carbon is converted into carbon dioxide, the hydrogen is converted into water and the nitrogen forms nitrogen gas.

Substance	ethanamide	carbon dioxide	water
Enthalpy of formation (ΔH_f^\ominus) / kJ mol ⁻¹	-320	-394	-286

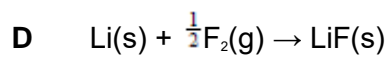
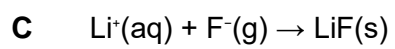
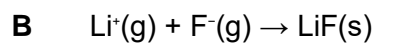
Using the data above, which one of the following is a correct value for the enthalpy of combustion of ethanamide?

- A -1823 kJ mol⁻¹
- B -1183 kJ mol⁻¹
- C -1000 kJ mol⁻¹
- D -360 kJ mol⁻¹

(Total 1 mark)

Q4.In which one of the following reactions is the standard enthalpy change equal to the standard enthalpy of formation of lithium fluoride?

- A Li(g) + F(g) → LiF(s)



(Total 1 mark)