

# Enthalpy Change

## Question Paper 5

Level	A Level
Subject	Chemistry
Exam Board	AQA
Module	3.1 Physical Chemistry
Topic	3.1.4 Energetics
Sub-Topic	3.1.4.1 Enthalpy Change
Booklet	Question Paper 5

**Time Allowed:** 10 minutes

**Score:** /10

**Percentage:** /100

### Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	70%	60%	55%	50%	<50%

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

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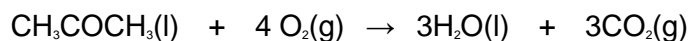
(3)

(b) State Hess's law.

.....  
.....

(1)

(c) Propanone,  $\text{CH}_3\text{COCH}_3$ , 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

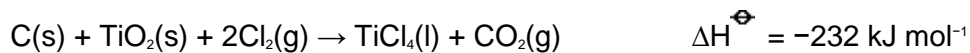
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(3)

(Total 7 marks)

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

TiCl<sub>4</sub>(l)?



- A -1538 kJ mol<sup>-1</sup>
- B -1094 kJ mol<sup>-1</sup>
- C -750 kJ mol<sup>-1</sup>
- D +286 kJ mol<sup>-1</sup>

(Total 1 mark)

**Q3.**When ethanamide (CH<sub>3</sub>CONH<sub>2</sub>) 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 ( $\Delta H_f^\ominus$ ) / kJ mol <sup>-1</sup>	-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<sup>-1</sup>
- B -1183 kJ mol<sup>-1</sup>
- C -1000 kJ mol<sup>-1</sup>
- D -360 kJ mol<sup>-1</sup>

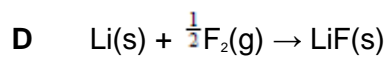
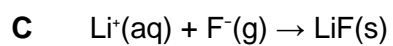
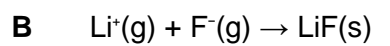
(Total 1 mark)

**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)

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**(Total 1 mark)**