

Q1.

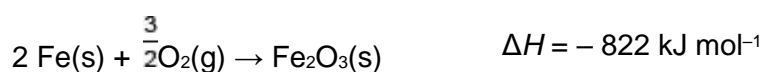
Which reaction has an enthalpy change equal to the standard enthalpy of formation of lithium fluoride?

- A $\text{Li(g)} + \frac{1}{2}\text{F}_2\text{(g)} \rightarrow \text{LiF(s)}$
- B $\text{Li}^+\text{(g)} + \text{F}^-\text{(g)} \rightarrow \text{LiF(s)}$
- C $\text{Li}^+\text{(aq)} + \text{F}^-\text{(aq)} \rightarrow \text{LiF(s)}$
- D $\text{Li(s)} + \frac{1}{2}\text{F}_2\text{(g)} \rightarrow \text{LiF(s)}$

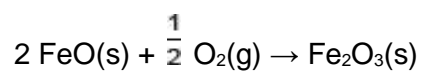
(Total 1 mark)

Q2.

Two reactions of iron with oxygen are shown.



What is the enthalpy change, in kJ mol^{-1} , for this reaction?

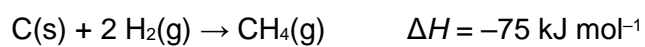
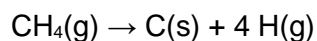


- A +550
- B -278
- C -1094
- D -1372

(Total 1 mark)

Q3.

Some enthalpy change data are shown.

What is the enthalpy change, in kJ mol^{-1} , for the following reaction?

A -947

B -361

C +361

D +947

(Total 1 mark)**Q4.**The temperature changed from $21.8 \text{ }^\circ\text{C}$ to $19.2 \text{ }^\circ\text{C}$ during a calorimetry experiment.The uncertainty of each reading of the thermometer is $\pm 0.1 \text{ }^\circ\text{C}$

What is the percentage uncertainty in the temperature change?

A 0.5%

B 1.0%

C 3.8%

D 7.7%

(Total 1 mark)

Q5.

An experiment is done to determine the enthalpy of combustion of a fuel using a calorimeter containing water.

b = mass of fuel burned / g

w = mass of water heated / g

ΔT = temperature rise of water / K

M_r = relative molecular mass of fuel

c = specific heat capacity of water / J K⁻¹ g⁻¹

Which expression gives the enthalpy of combustion (in J mol⁻¹), assuming there is no heat loss?

A $-\frac{c w \Delta T M_r}{b}$

B $-\frac{c b \Delta T M_r}{w}$

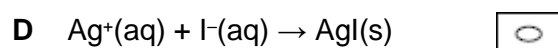
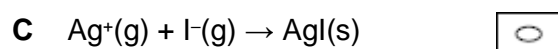
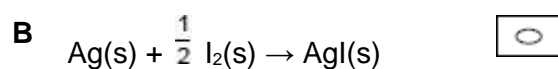
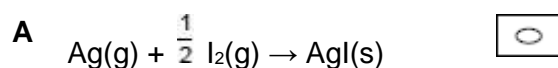
C $-\frac{c b w M_r}{\Delta T}$

D $-\frac{c b w \Delta T}{M_r}$

(Total 1 mark)

Q6.

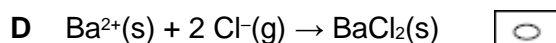
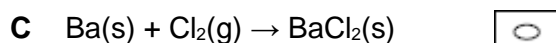
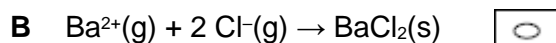
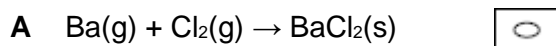
Which reaction has an enthalpy change equal to the standard enthalpy of formation of silver iodide?



(Total 1 mark)

Q7.

Which equation represents the reaction that has a standard enthalpy change equal to the standard enthalpy of formation for barium chloride?

**(Total 1 mark)****Q8.**

Some fuel in a spirit burner is burned, and the heat produced is used to heat a container of water.

In this experiment:

The mass of water heated = m g

The temperature rise = y °C

The specific heat capacity of water = c J K⁻¹ g⁻¹

What is the amount of heat energy absorbed by the water?

A mcy

B $mc(y + 273)$

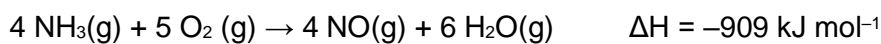
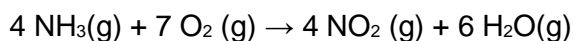
C y / mc

D $(y + 273) / mc$

(Total 1 mark)

Q9.

Nitrogen dioxide is produced from ammonia and air as shown in these equations

What is the enthalpy change (in kJ mol^{-1}) for the following reaction?

A -679

B -794

C -1024

D -1139

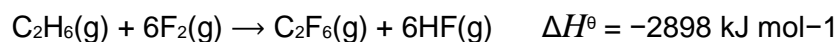
(Total 1 mark)**Q10.**What is the enthalpy of formation of buta-1,3-diene, $\text{C}_4\text{H}_6(\text{g})$?

Substance	Enthalpy of combustion / kJ mol^{-1}
$\text{C}_4\text{H}_6(\text{g})$	-2546
$\text{C}(\text{s})$	-394
$\text{H}_2(\text{g})$	-286

A +112 kJ mol^{-1} B -112 kJ mol^{-1} C +746 kJ mol^{-1} D -746 kJ mol^{-1} **(Total 1 mark)**

Q11.

The table shows the standard enthalpy of formation, $\Delta_f H^\ominus$, for some of the substances in the reaction



	$\text{C}_2\text{H}_6(\text{g})$	$\text{C}_2\text{F}_6(\text{g})$
$\Delta_f H^\ominus / \text{kJ mol}^{-1}$	-84	-1344

What is the standard enthalpy of formation, in kJ mol^{-1} , for $\text{HF}(\text{g})$?

- A -1638
- B -273
- C +273
- D +1638

(Total 1 mark)

Q12.

What is the temperature rise, in K, when 504 J of heat energy are absorbed by 0.110 kg of solid iron?

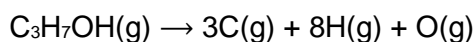
Specific heat capacity of iron = $0.448 \text{ J K}^{-1} \text{ g}^{-1}$

- A 9.78×10^{-2}
- B 1.02×10^1
- C 2.83×10^2
- D 1.02×10^4

(Total 1 mark)

Q13.

Calculate the enthalpy change, in kJ, for this dissociation of mole of propan-1-ol.



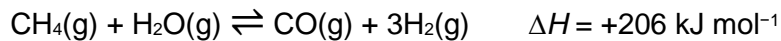
	C—H	C—C	C—O	O—H
Mean bond dissociation enthalpy / kJ mol ⁻¹	412	348	360	463

- A -4751
- B -4403
- C +4403
- D +4751

(Total 1 mark)

Q14.

Hydrogen is produced by the reaction of methane with steam. The reaction mixture reaches a state of dynamic equilibrium.



Some enthalpy data is given in the table.

Bond	C—H	O—H	H—H	C≡H
Bond enthalpy / kJ mol⁻¹	413	463	436	To be calculated

Use the information in the table and the stated enthalpy change to calculate the missing bond enthalpy.

- A 234
- B 1064
- C 1476
- D 1936

(Total 1 mark)