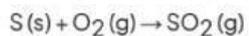1)
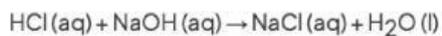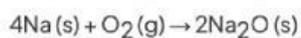
PCl$_5$ (g) dissociates as follows.

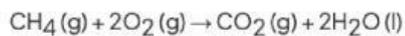$$PCl_5 (g) \rightarrow PCl_3 (g) + Cl_2 (g)$$

The yield of the products increases as the temperature is raised from 80°C to 110°C.

Which row correctly describes the formation of PCl$_3$ (g)?

	Shape of PCl$_3$ molecule	The reaction is
A	Pyramidal	Endothermic
B	Pyramidal	Exothermic
C	Trigonal	Endothermic
D	Trigonal	Exothermic

2)

Which equation below can represent both an enthalpy change of formation and combustion?

$CH_4 (g) + 2O_2 (g) \rightarrow CO_2 (g) + 2H_2O (l)$

$4Na (s) + O_2 (g) \rightarrow 2Na_2O (s)$

$HCl (aq) + NaOH (aq) \rightarrow NaCl (aq) + H_2O (l)$

$S (s) + O_2 (g) \rightarrow SO_2 (g)$

3)

The reaction pathway for a reversible reaction is shown below:
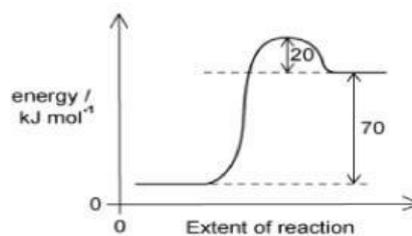
Which statement is correct?

The activation energy of the reverse reaction is $+90 \, kJ \, mol^{-1}$

The activation energy of the forward reaction is $+20 \, kJ \, mol^{-1}$

The activation of the reverse reaction is $+20 \, kJ \, mol^{-1}$

The enthalpy change of forwards reaction is $-70 \, kJ \, mol^{-1}$

4)

The reaction pathway for a reversible reaction is shown below.
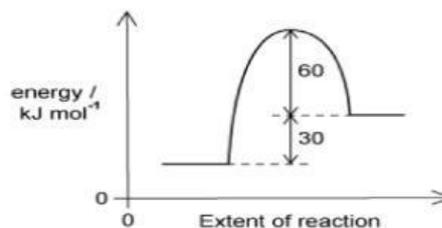

Which statements are correct?

1. The forward reaction is endothermic.
2. The enthalpy change for the backward reaction is $-30 \, kJ \, mol^{-1}$.
3. The activation energy for the forward reaction is $+90 \, kJ \, mol^{-1}$.

1 only

1 and 2

2 and 3

1, 2 and 3

5)

A student carried out an experiment to determine the enthalpy change for the combustion of ethanol.

The following results were obtained by the student. The specific heat capacity of water is $4.18\ J\,g^{-1}\,{}^{\circ}C^{-1}$.
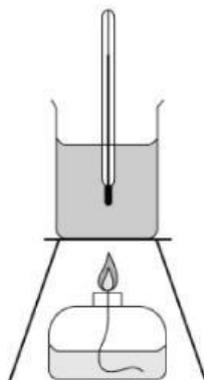
Start temperature of the water	21 °C
Final temperature of the water	54 °C
Mass of alcohol burner before burning	259.75 g
Mass of alcohol burner after burning	259.18 g
Mass of glass beaker plus water	150.00 g
Mass of glass beaker	50.0 g

How much of the heat energy produced by the burning of ethanol went into the water?

6897 J

20691 J

22572 J

13794 J