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?

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

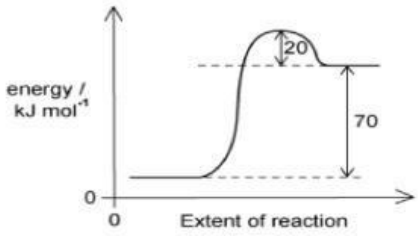
$4Na\,(s) + O_2\,(g) \rightarrow 2Na_2O\,(s)$

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

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

3)

The reaction pathway for a reversible reaction is shown below:

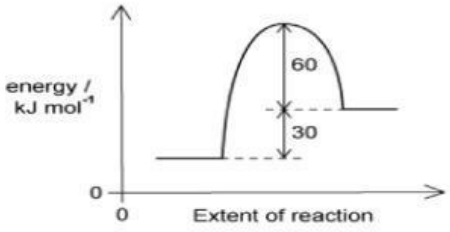


Which statement is correct?

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?

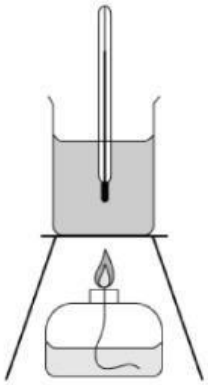
1. The forward reaction is endothermic.
2. The enthalpy change for the backward reaction is –30 kJ mol^{-1}.
3. The activation energy for the forward reaction is +90 kJ mol^{-1}.

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 $J\,g^{-1}\,°C^{-1}$.



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