Energetics – Exam-Style Questions

1. 50 cm^3 of 1.0 mol dm^{-3} hydrochloric acid was added to 50 cm^3 of 1.0 mol dm^{-3} sodium hydroxide solution. The temperature rose by 6.8°C. Calculate the enthalpy of neutralisation for this reaction.

2. In an experiment, 0.60 g of propane (C_3H_8) was completely burned in air. The heat given off increased the temperature of 100 g of water by 65°C. Use this data to calculate the molar enthalpy change for the reaction.

3. Methane reacts with chlorine according to the following equation

Calculate the molar enthalpy change using the bond energy data given in the table

Bond	Bond energy kJ/mol	Bond	Bond energy kJ/mol
C-H	413	C-Cl	346
Cl-Cl	242	H-Cl	431

4. Draw an energy profile diagram for the following reaction.

$C_2H_5OH_{(l)} + 3O_{2(g)} \rightarrow 2CO_{2(g)} + 3H_2O_{(l)} \quad \Delta H = -1985kJ/mol$