



# CALORIMETRY 3

- 1 In an experiment, 0.750 g of benzene ( $C_6H_6$ ) were completely burned in air. The heat evolved raised the temperature of 200 g of water by  $43.7^\circ C$ . Use this data to calculate the enthalpy of combustion of benzene (the specific heat capacity of water is  $4.18 J g^{-1} K^{-1}$ ).

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(4)

(BBoF 168)

- 2  $25.0 cm^3$  of  $2.00 mol dm^{-3}$  hydrochloric acid was added to  $25.0 cm^3$  of  $2.00 mol dm^{-3}$  ammonia solution. The temperature rose by  $12.4^\circ C$ . Calculate the enthalpy of neutralisation for this reaction. Assume that the density of the solution is  $1.00 g cm^{-3}$  and the specific heat capacity of the solution is  $4.18 J g^{-1} K^{-1}$ .

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- 3 When 0.500 g of powdered iron is added to  $100 cm^3$  of  $0.200 mol dm^{-3}$  copper sulphate solution in an insulated vessel, the temperature rises by  $3.3^\circ C$ .



- a) Why is the iron added as a powder? .....

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- b) Calculate the heat evolved in the reaction. The specific heat capacity of the solution can be taken as  $4.18 J g^{-1} K^{-1}$ , and the heat capacity of the iron can be ignored.

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- c) Calculate the number of moles of iron and copper sulphate, and so state which reagent is in excess?

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- d) Calculate the enthalpy change for the reaction. ....

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