6 Transition metal compounds have a range of applications as catalysts.

6 (a) State the general property of transition metals that allows the vanadium in vanadium(V) oxide to act as a catalyst in the Contact Process.

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(1 mark)

6 (b) Write **two** equations to show how vanadium(V) oxide acts as a catalyst in the Contact Process.

Equation 1

.....

Equation 2

.....

(2 marks)

6 (c) In the Contact Process, vanadium(V) oxide acts as a heterogeneous catalyst.

6 (c) (i) Give the meaning of the term *heterogeneous*.

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(1 mark)

6 (c) (ii) Give **one** reason why impurities in the reactants can cause problems in processes that use heterogeneous catalysts.

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(1 mark)

6 (d) The oxidation of $C_2O_4^{2-}$ ions by MnO_4^- ions in acidic solution is an example of a reaction that is autocatalysed.

6 (d) (i) Give the meaning of the term *autocatalysed*.

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(1 mark)

6 (d) (ii) Identify the autocatalyst in this reaction.

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(1 mark)

6 (d) (iii) Write **two** equations to show how the autocatalyst is involved in this oxidation of $C_2O_4^{2-}$ ions.

Equation 1

.....

Equation 2

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(2 marks)

9

Turn over for the next question