3 Transition metal ions can act as homogeneous catalysts in redox reactions. For example, iron(II) ions catalyse the reaction between peroxodisulfate ($S_2O_8^{2-}$) ions and iodide ions.

3 (a) State the meaning of the term *homogeneous*.

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(1 mark)

3 (b) Suggest why ions from s block elements do **not** usually act as catalysts.

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(1 mark)

3 (c) Write an equation for the overall reaction that occurs, in aqueous solution, between $S_2O_8^{2-}$ ions and I^- ions.

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(1 mark)

3 (d) Give **one** reason why, in the absence of a catalyst, the activation energy for the reaction between $S_2O_8^{2-}$ ions and I^- ions is high.

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(1 mark)

3 (e) Write two equations to show how Fe^{2+} ions can catalyse the reaction between $S_2O_8^{2-}$ ions and I^- ions. Suggest **one** reason why the activation energy for each of these reactions is low.

Equation 1 .....

Equation 2 .....

Reason .....

.....

(3 marks)

3 (f) Explain why Fe^{3+} ions are as effective as Fe^{2+} ions in catalysing this reaction.

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(1 mark)

8

Turn over for the next question