0 1   A student planned to investigate the effect of temperature and concentration on the rate of reaction.

The student predicted that the rate of reaction would increase as the temperature was increased.

0 1 . 1   Give **two** reasons why the student's prediction is correct.

[2 marks]

Tick **two** boxes:

☐   The particles are more concentrated.

☐   The particles have a greater mass.

☐   The particles have a larger surface area.

☐   The particles have more energy.

☐   The particles move faster.

From this investigation the student correctly concluded:

'As the concentration of sodium thiosulfate solution doubles, the rate of reaction doubles.'

0 1 . 2   Explain the student's conclusion in terms of particles.

[3 marks]

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0 2   The student then investigated how the surface area of marble chips affected the rate of reaction.

0 2 . 1   Which **two** variables should the student keep constant?

[2 marks]

Tick **two** boxes:

☐   Amount of water in the trough

☐   Concentration of acid

☐   Mass of marble chips

☐   Size of marble chips

☐   Volume of measuring cylinder

| 0 | 2 | . | 2 |

Explain, in terms of particles and collisions, the effect that increasing the surface area of the marble chips has on the rate of reaction.

[2 marks]

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| 0 | 3 |
| 0 | 3 | . | 1 |

Calcium carbonate is a catalyst for the industrial production of biodiesel.

Give **one** reason why using a catalyst reduces costs.

[1 mark]

………

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(Total 10 marks)

End