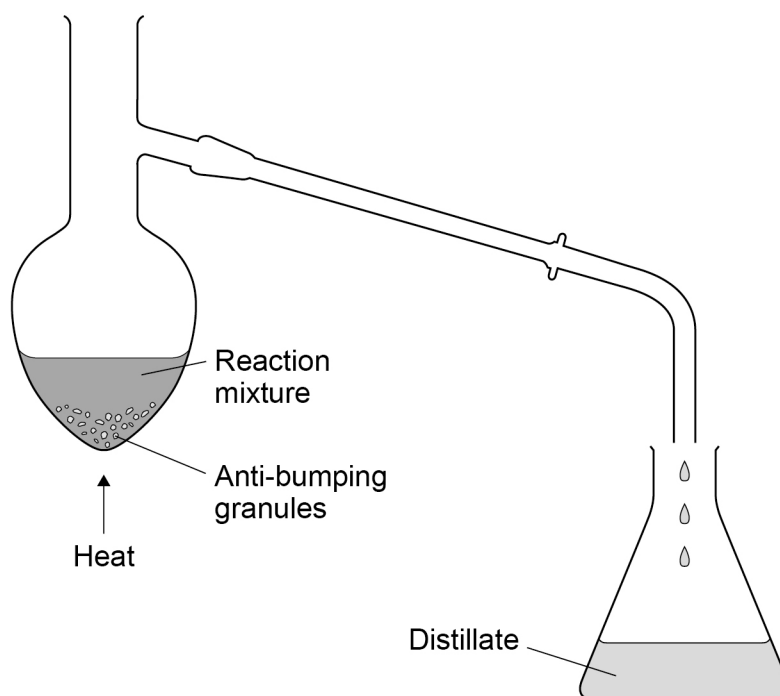**0 2** A student prepared cyclohexene by heating cyclohexanol with concentrated phosphoric acid. The cyclohexene produced was distilled off from the reaction mixture.

0 2 . 1 Complete the diagram of the apparatus used to distil the cyclohexene from the reaction mixture at 83 °C.

[2 marks]

Reaction mixture

Anti-bumping granules

Heat

Distillate

0 2 . 2 The distillate was shaken with saturated sodium chloride solution. The cyclohexene was separated from the aqueous solution using a separating funnel.

State why cyclohexene can be separated from the aqueous solution using the separating funnel.

[1 mark]

0 2 . 3 The cyclohexene separated in Question **02.2** was obtained as a cloudy liquid.
The student dried this cyclohexene by adding a few lumps of anhydrous calcium chloride and allowing the mixture to stand.

Give **one** observation that the student made to confirm that the cyclohexene was dry.

[1 mark]

0 2 . 4 In this preparation, the student added an excess of concentrated phosphoric acid to 14.4 g of cyclohexanol (M_r = 100.0).
The student obtained 4.15 cm^3 of cyclohexene (M_r = 82.0).
Density of cyclohexene = 0.810 g cm^{-3}

Calculate the percentage yield of cyclohexene obtained.
Give your answer to the appropriate number of significant figures.

[5 marks]

% yield _____
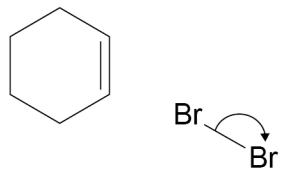
Question 2 continues on the next page

Turn over ▶

| 0 | 2 | . | 5 | Cyclohexene reacts with bromine.

Complete the mechanism for this reaction.

[3 marks]

12