

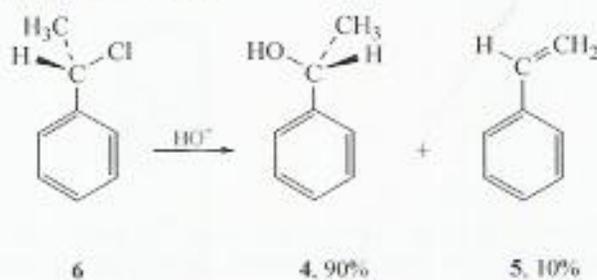
SECTION B

Long-answer questions

Attempt **ONE** of the following three questions, and **ONE** other question from this Section or from Sections C and D. All questions carry 15 per cent of the total marks for the examinable component. Section B tests the material in Book 5 (Parts 2 and 3), Book 7 and Book 10. You are advised to spend no more than **30 minutes** on each question. Write your answer(s) in a separate answer book from those used for Sections A, C and D.

Question 13

(a) (9 marks) Show by means of equations (including curly arrows) how each of the products **4** and **5** arises.



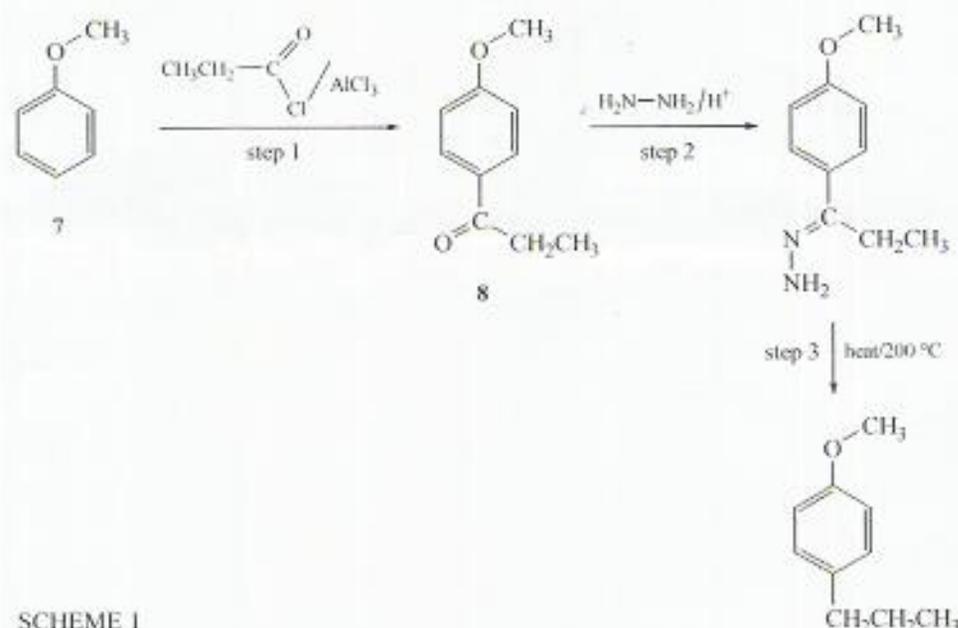
Discuss the mechanism of formation of each product. Your answer should include the most likely rate equations, details of any intermediates, reaction-coordinate diagrams, and a justification for the particular mechanism that you have chosen.

(b) (3 marks) Starting with the same chloro compound (**6**), what reagent would you use to ensure that only product **5** is obtained? Justify your choice of reagent.

(c) (3 marks) What would be the substitution product if Compound **6** were heated with water in the absence of hydroxide ion?

Question 14

Scheme 1 shows a synthetic sequence starting with methoxybenzene, **7**.



(a) (6 marks) Using curly arrows, draw out the mechanism of step 1 in Scheme 1. Account for the position of substitution observed in Compound **8**. What other isomer of **8** is most likely to be formed in step 1?

(b) (6 marks) Using curly arrows, draw out the mechanism of step 2 in Scheme 1.

(c) (3 marks) Why is the route in Scheme 1 preferred to the reaction of methoxybenzene, **7**, with $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}/\text{AlCl}_3$?