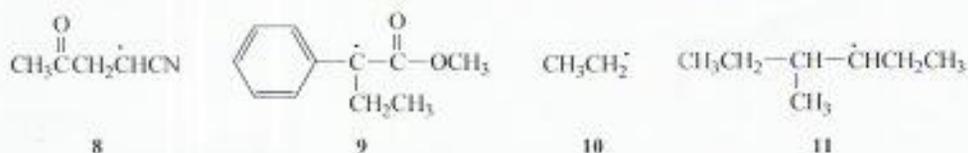


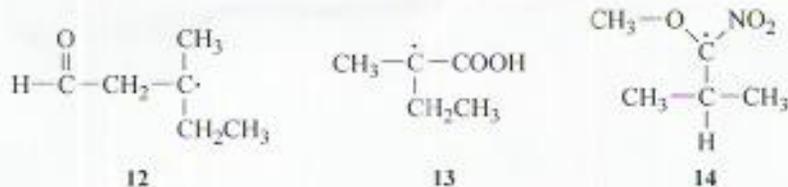
### Question 3

This question carries 15 per cent of the marks for this assignment, and tests Learning Outcomes 1, 4, 5 and 7 of Book 10 Part 3.

(a) (3 marks) Arrange the radicals 8–11 in order of stability, starting with the least stable.



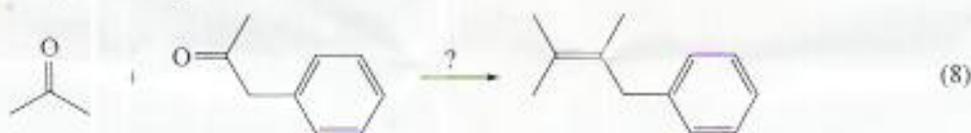
(b) (3 marks) Which of the radicals 12–14 is/are captodative? Identify the electron-withdrawing group and the electron-donating group in the radical(s) you have selected.



(c) (3 marks) What is the structure of the product of the pinacol coupling reaction? A mechanism is not required.



(d) (3 marks) What reagent is needed for Reaction 8?

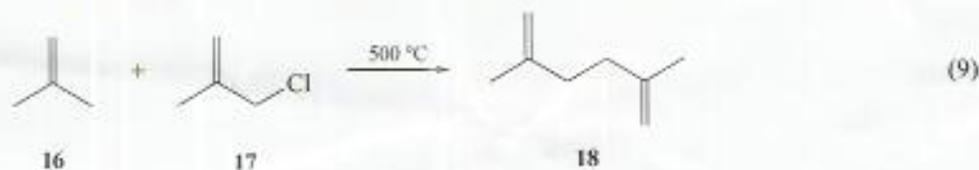


(e) (3 marks) In radical chain reactions, what is the role of the initiator? Give an example of an initiator.

### Question 4

This question carries 10 per cent of the marks for this assignment, and tests Learning Outcomes 5, 6 and 8 of Book 10 Part 3.

An ICI (now Astra Zeneca) process for the manufacture of the diene 18 (used to make pyrethroid insecticides) involves heating compounds 16 and 17 to 500 °C in a flow system:



Suggest a radical chain mechanism for the reaction. Explain the need for the high temperature in the reaction. Is the diene 18 the only product formed? Give a reason for your answer.