Dr. Alistair Boyer

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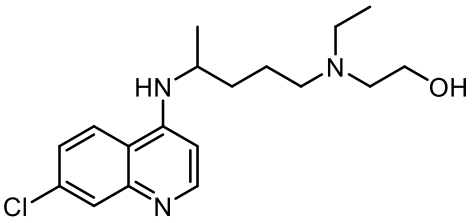
Sample Exam Question

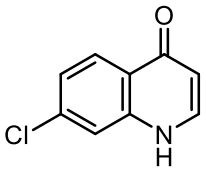
(a) Nomenclature and Synthesis

One of the molecules that rose to prominence during COVID-19 was hydroxychloroquine **A**. Originally an antimalarial, there has been some study to its effectiveness as a treatment for the disease.

Handout: P5, P36. DOI: 10.1039/jr9500003254; 10.3762/bjoc.14.45



A



B

(i) Name the heterocycle within hydroxychloroquine **A.**

[1]

(ii) Heterocycle **B** is a key building for the synthesis of **A**. Show how you could synthesise **B** from starting materials that do not contain any heterocycles. Your answer should include starting materials, suggested conditions and a mechanism.

[5]

(iii) Give reagents and conditions for conversion of **B** to **A**. The transformation should include two steps and your answer should include starting materials, suggested conditions and a mechanism.

[5]

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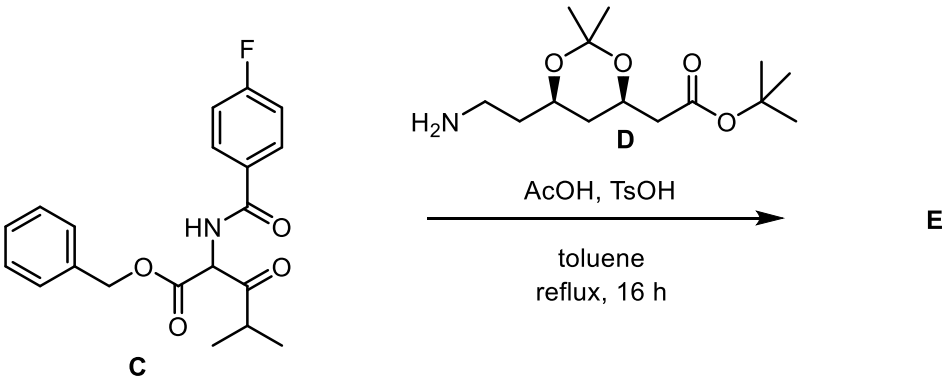
Sample Exam Question

(b) Synthesis

In 2008, this synthesis of an imidazole-containing compound was reported as part of a study in cholesterol-lowering drugs.

Handout: P31. DOI: 10.1021/op800092e

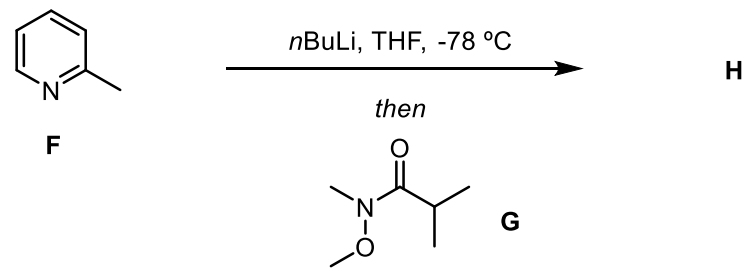


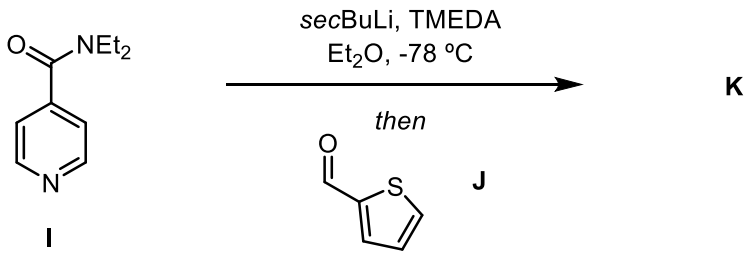
(i) Draw the product of this reaction **E** and a mechanism for its formation.

[5]

(c) Reactivity

Handout P13, P17. DOI: 10.1021/ja00524a059





(i) Draw the product **H** and explain the selectivity of the reaction shown.

[3]

(ii) Draw the product **K** and explain the selectivity of the reaction shown.

[3]