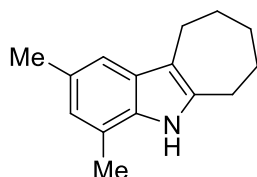


1. Provide a synthesis (with a detailed mechanism) for the formation of the shown indole. As organic starting materials you are allowed to use 2,4-dimethylphenyl hydrazine and cycloheptanone. What is the name and mechanism of this reaction?



2. A Knorr-Pyrazole synthesis is performed using 4-methylphenyl hydrazine and acetylacetone (pentane-2,4-dione). Provide the mechanism (relevant intermediates) of the reaction and draw the formed product.

3. How can you get the shown thiazole from a Robinson-Gabriel synthesis? Indicate the required starting material and the reaction in a forward sense.

