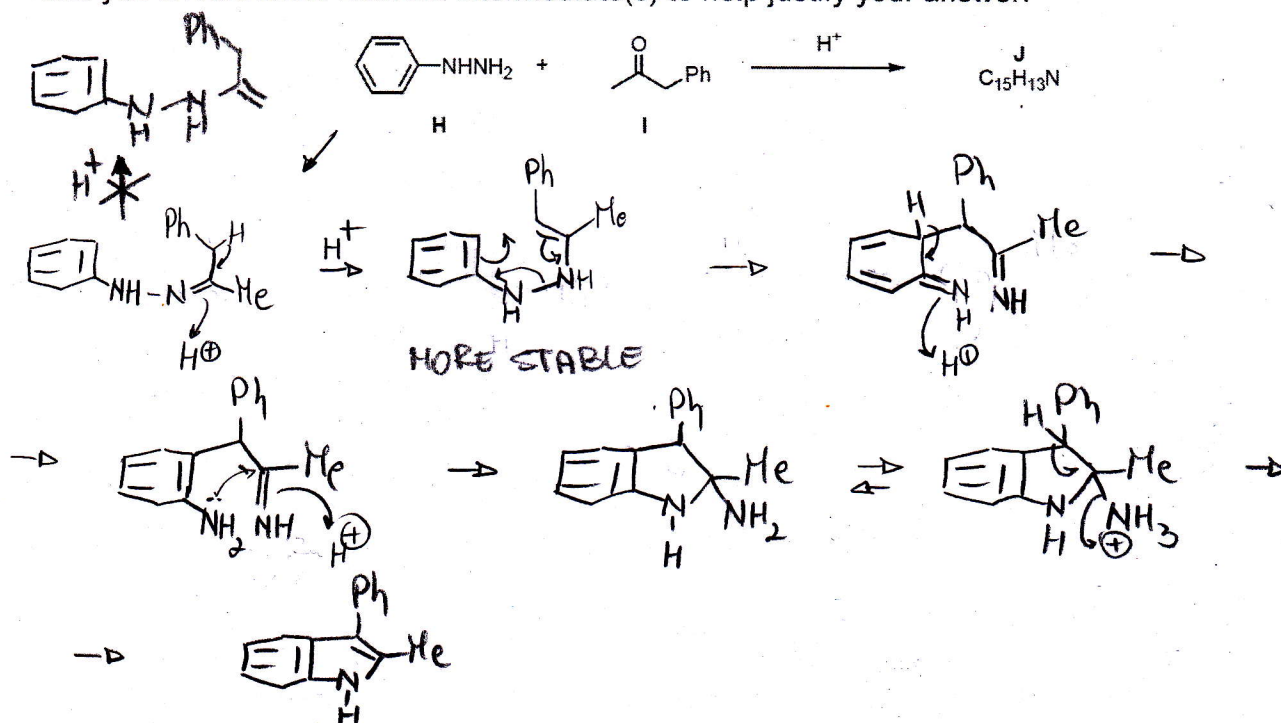


Last Name

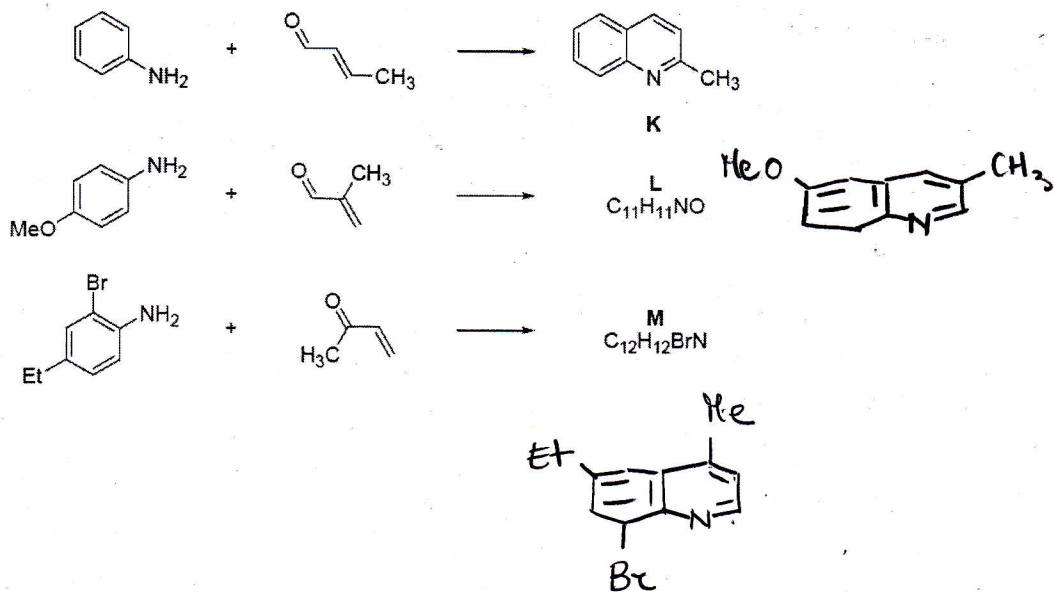
First Name

ID number

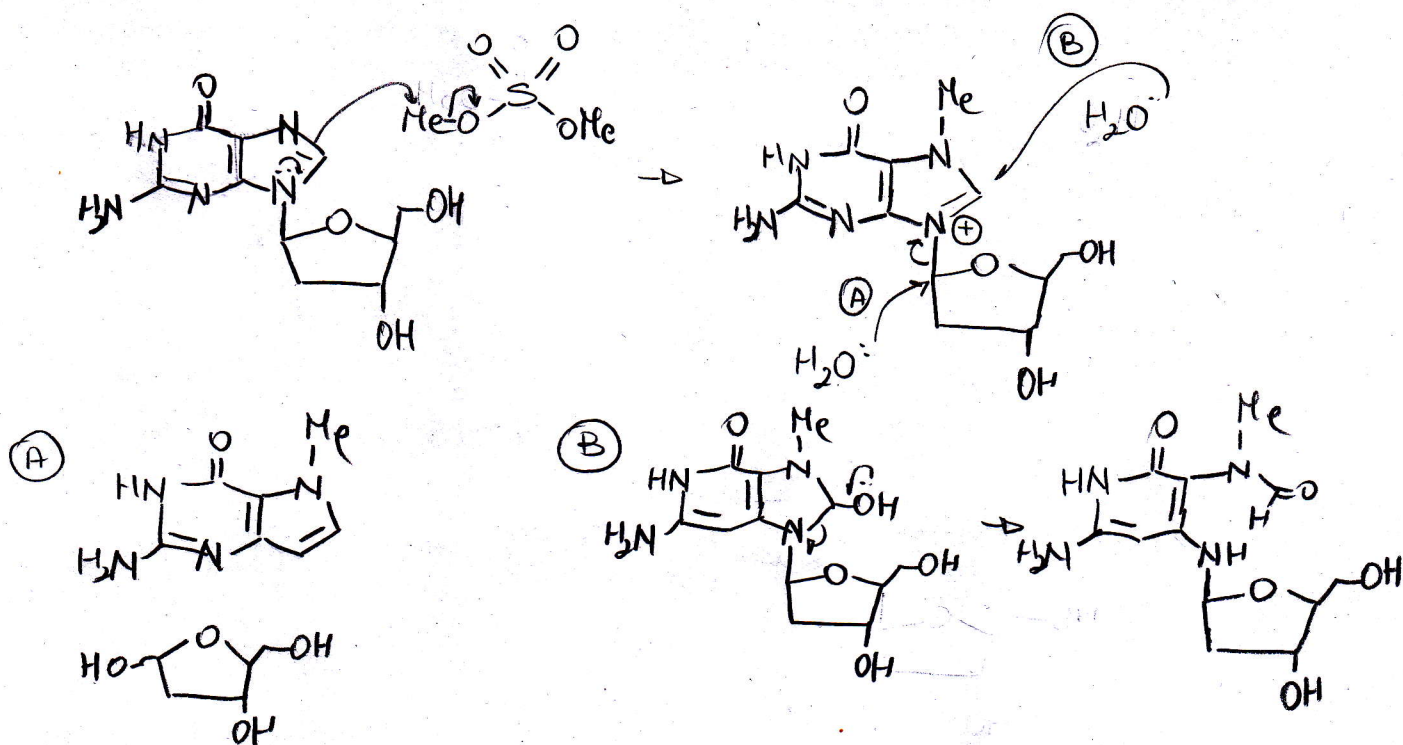
1. (9 points) Identify product J, which is obtained when phenylhydrazine (H) is reacted with ketone I, and explain why only one structural isomer is formed. A mechanism of the reaction is required, and you should show relevant intermediate(s) to help justify your answer.



2. (9 points) Given that in the Döbner-von Miller quinoline synthesis crotonaldehyde (*trans*-but-2-enal) and aniline react to give 2-methylquinoline (K), work out the structures of products L and M.



3. (9 points) Show the product(s) that are formed when deoxyguanosine (dG) reacts with dimethylsulfate.



4. (6 points) Provide the product of the following reaction and explain why you think is the right one i.e. chemo- and regioselectivity.

