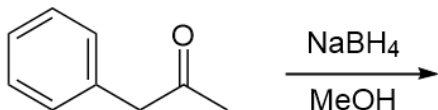


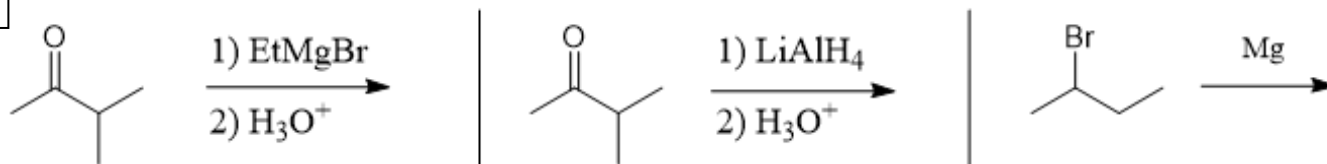


Predict the major product for the following reactions (or write N/R for No Reaction):

**1**  
& draw  
mechanism

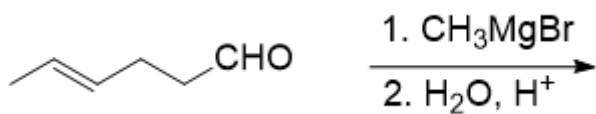


**2**



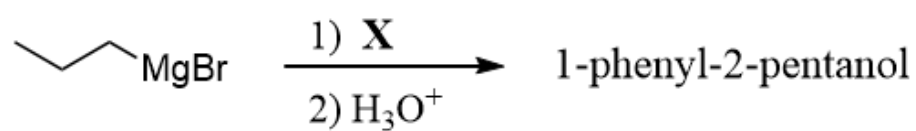
**3**

& draw  
mechanism



4

Identify compound **X**, to complete the following synthesis.



5

Which reagents would be best to achieve the following synthesis?

