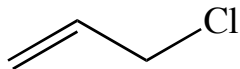


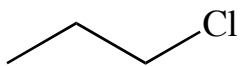
Ex 44 - Carbocation Stability

Question One

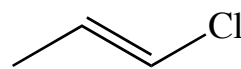
Rank the following groups of molecules in decreasing order of the carbocations that they will form. You should also be able to explain your reasons.



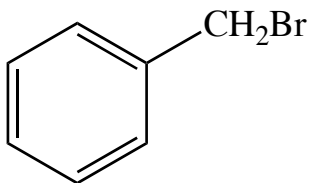
Good. Forms allylic carbocation stabilized by resonance.



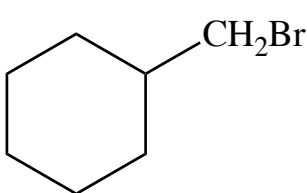
Bad. 1° carbocation.



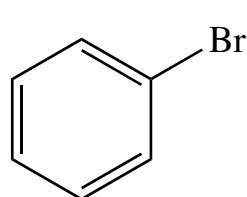
Worse. Vinyl carbocation.



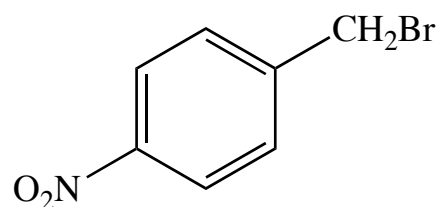
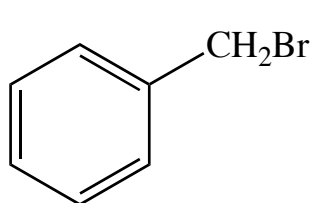
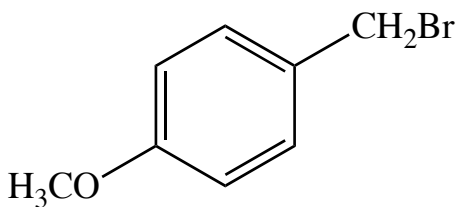
Good. Forms benzylic carbocation stabilized by resonance.



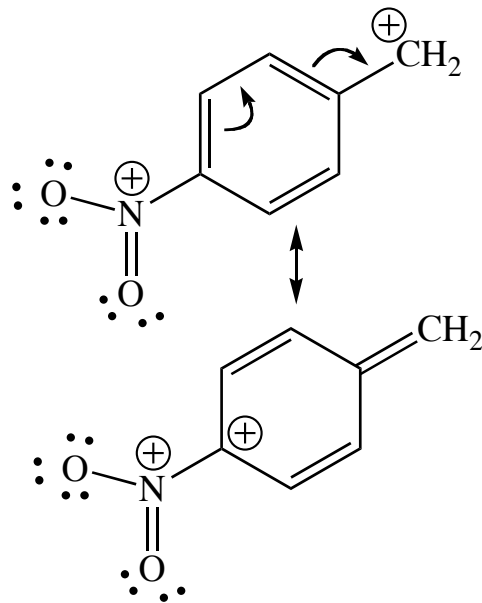
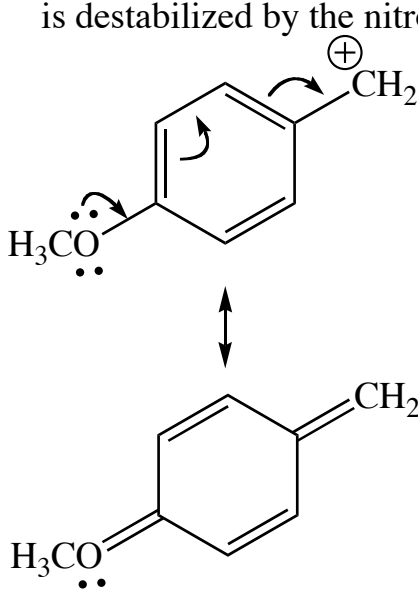
Bad. 1° carbocation.

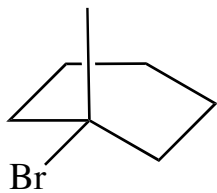


Worse. Vinyl carbocation.

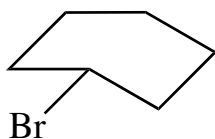


All of these are benzylic and have the charge delocalized. The difference is how the charge interacts with the substituents. In the first, the charge is stabilized. In the last it is destabilized by the nitro group.

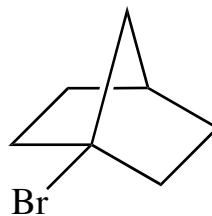




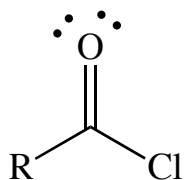
Good. 3° Carbocation.



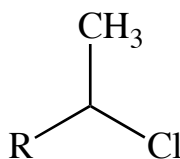
Bad. 2° Carbocation.



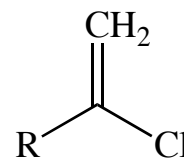
Worse. Though 3°, this carbocation cannot be stabilized by hyperconjugation since ring straining prevents the sp² hybridized carbon from being planar.



Good. The carbocation is stabilized by a lone pair on O. This type of carbocation has its own name -- the acylium cation.



Bad. 2° carbocation.



Worse. Vinyl carbocation.