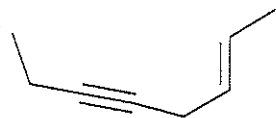
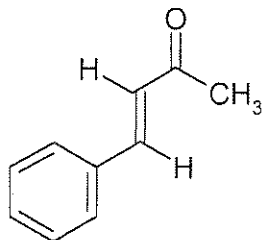


1. (3 pts) Give the IUPAC name for the following compound.



\_\_\_\_\_

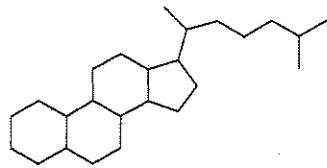
2. (5 pts) What starting materials are needed to synthesize the following compound by a crossed-Aldol condensation reaction followed by dehydration?



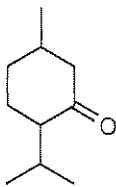
3. (6 pts) Explain why 1,3-butadiene is a planar molecule using molecular orbital theory and diagrams of the bonding molecular orbitals of 1,3-butadiene.

4. (1 pt) **True** or **False** Isoprene units are usually linked together in a head-to-tail fashion when isoprene undergoes enzymatic reactions to produce terpenes or other natural products derived from isoprene.

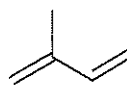
5. (4 pts) Give the most appropriate name of the following structures. Possible names are: isoprene, a steroid, a carotenoid, and a terpene.



A



B



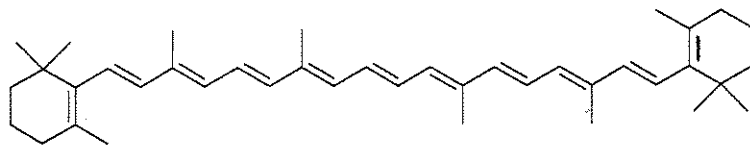
C

A = \_\_\_\_\_

B = \_\_\_\_\_

C = \_\_\_\_\_

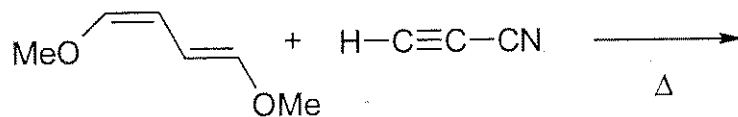
D = \_\_\_\_\_



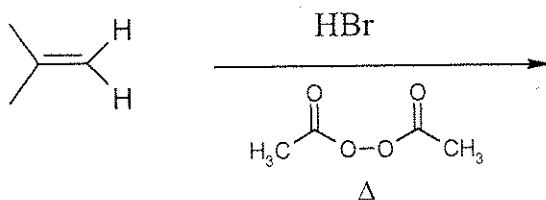
D

6. (44 pts, 4 each) Give structures for the **major products** for the following transformations. If no reaction occurs, write **No RXN**.

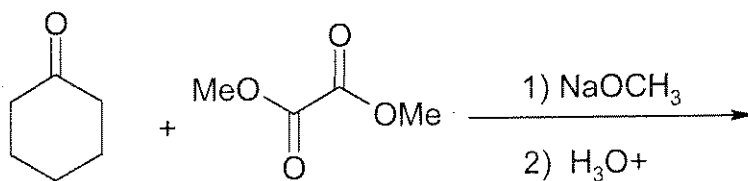
a)



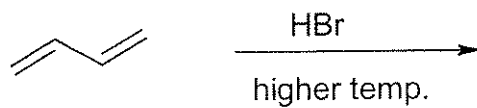
b)



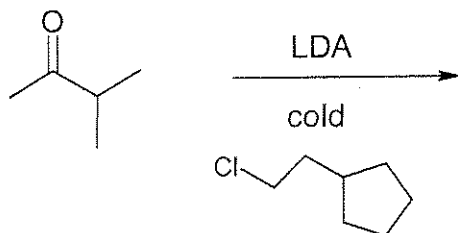
c)



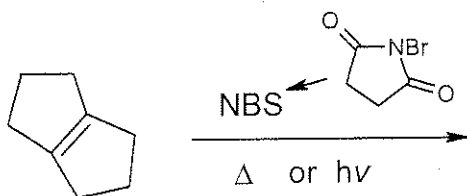
d)



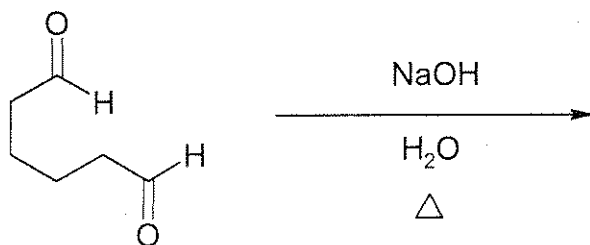
e)



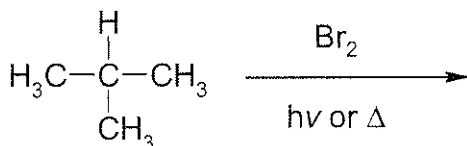
f)



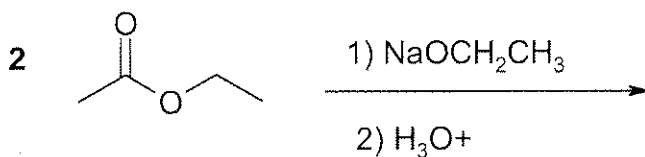
g)



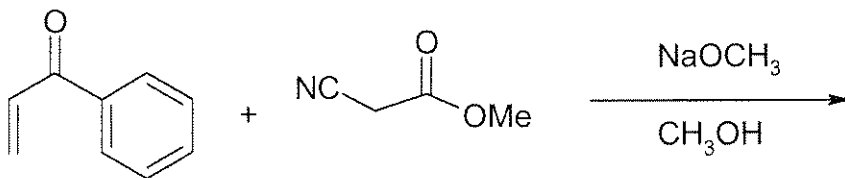
h)



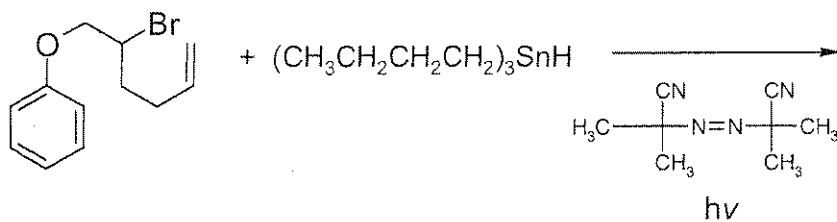
i)



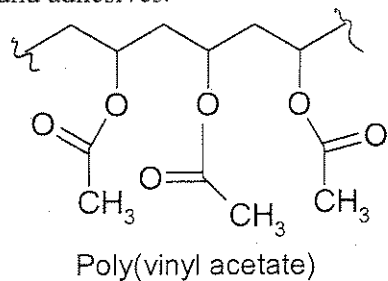
j)



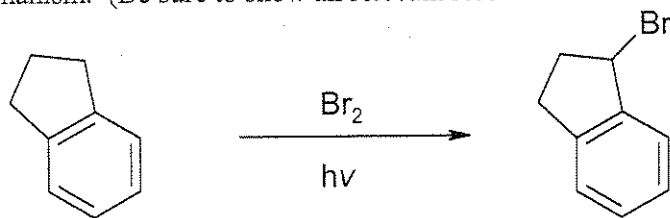
k)



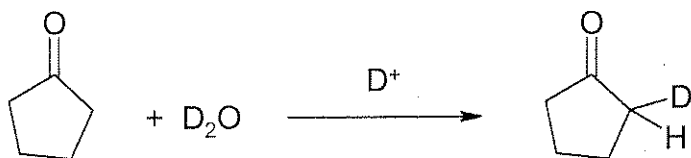
7. (4 pts) Give the structure of the **monomer** that is used to form poly(vinyl acetate), a polymer used in paints and adhesives.



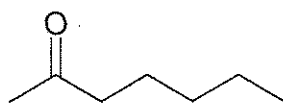
8. (12 pts) Give the **complete mechanism** for the following reaction. Include two possible termination steps in your mechanism. (Be sure to show all relevant resonance structures for intermediates formed).



9. (9 pts) Write the **complete mechanism** for the following reaction.

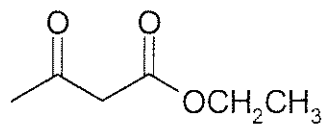


10. (7 pts) Give a synthesis of how the following compound, 2-heptanone, would be produced using the given starting material.



2-heptanone

starting from



11. (5 pts) What starting materials are needed to prepare the following compound by a Micheal reaction?

