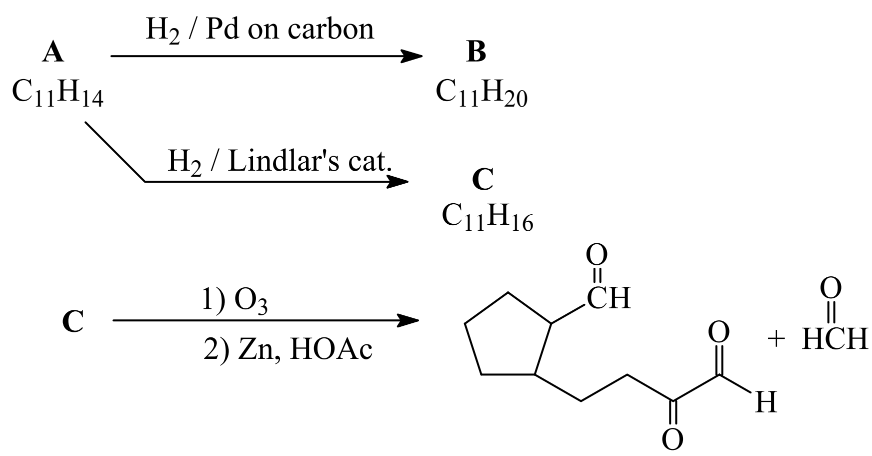
CHM 201 Name____________________________

An unknown compound (**A**) has a formula of **$C_{11}H_{14}$**. Treatment of **A** with H_2/Pd-carbon gives **B** ($C_{11}H_{20}$). Treatment of **A** with H_2 on a Lindlar catalyst gives **C** ($C_{11}H_{16}$). Ozonolysis of **C** followed by workup with Zn, HOAc affords formaldehyde and the tricarbonyl compound shown below.



An initial approach to this problem is to determine the number of degrees of unsaturation in each of the molecules **A**, **B**, and **C**.

When **A** ($C_{11}H_{14}$, 5° unsat.) is hydrogenated, **B** ($C_{11}H_{20}$, 2° unsat.) is formed. That means that 3 π bonds reacted (3 mol. Equivalents) to form **B**.

a) How many π bonds does **A** have? ______3______

When **A** is treated with H_2 over a Lindlar (poisoned) catalyst, 1 mol equiv. of H_2 reacts. Since this reaction is specific for the reduction of alkynes to alkenes, 2 of the 3 π bonds in A are in the form of a triple bond. The remaining π bond must be an alkene.

b) How many double bonds does **A** have? ______1______

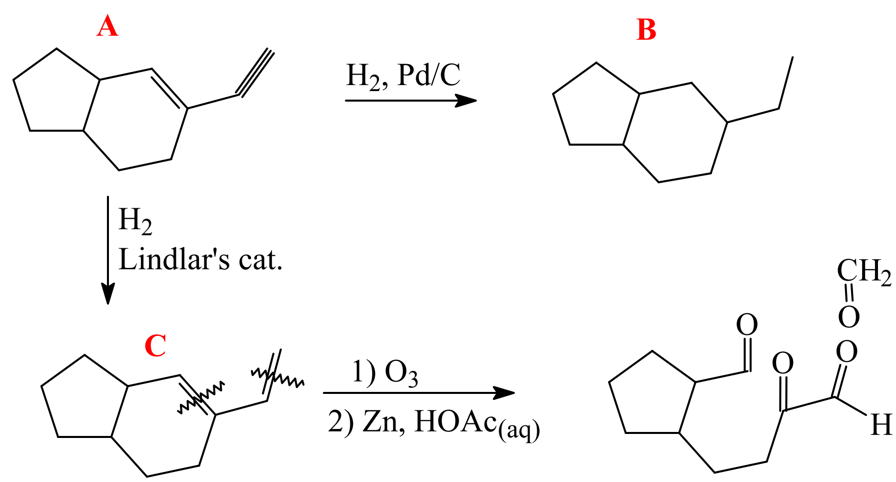
c) How many triple bonds does **A** have? ______1______

We have accounted for three of the five degrees of unsaturation in **A**, therefore the other two must be rings since they do not react with H_2.

d) How many rings does **A** have? _____2______

e) Propose structures for **A**, **B and C** that are consistent with these data.

See next page.


A
H_2, Pd/C
B
H_2
Lindlar's cat.
C
1) O_3
2) Zn, $HOAc_{(aq)}$
CH_2
O
O
O
O
H