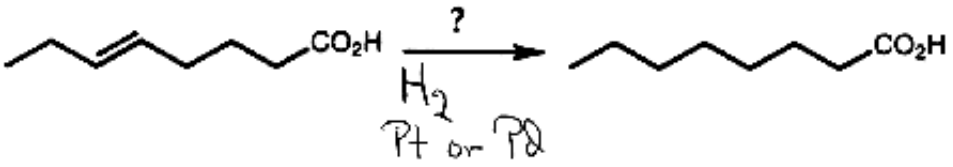
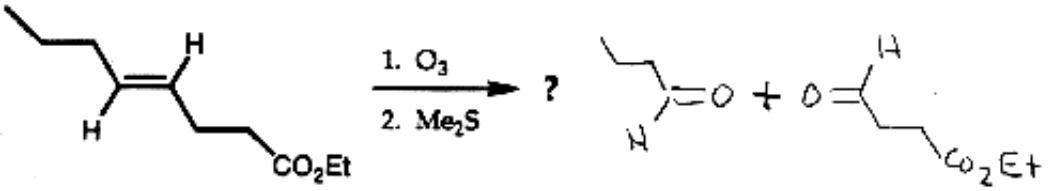
NAME _____

1. (30 points) Provide the missing reagents or products for the following reactions. If more than one product will result, show both the major and minor products and indicate which is the major. Carefully show the stereochemistry of each product if pertinent.

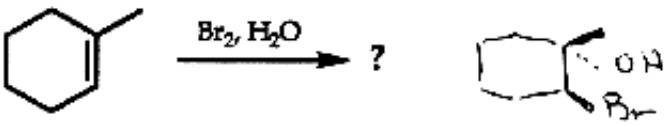
a.



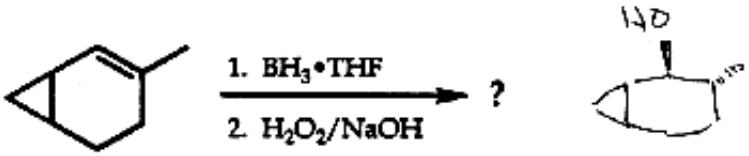
b.



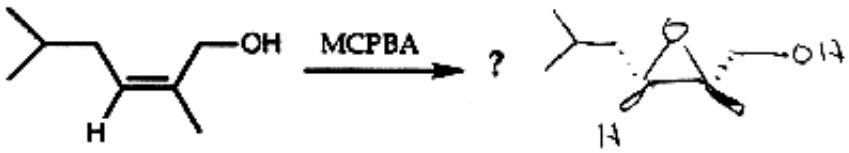
c.



d.

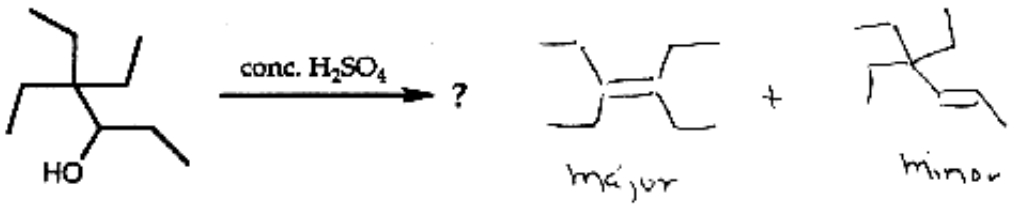


e.

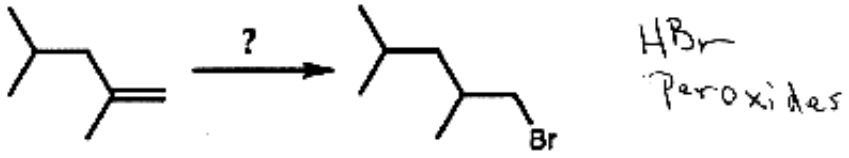


NAME_____

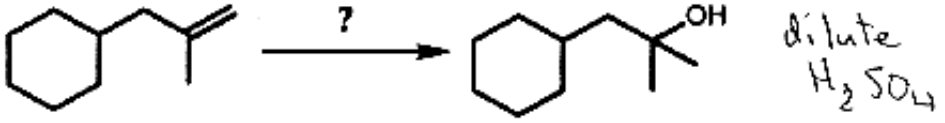
f.


conc. H_2SO_4
?
HO
major
+
minor

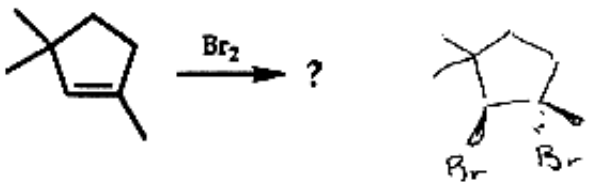
g.


?
Br
HBr
Peroxides

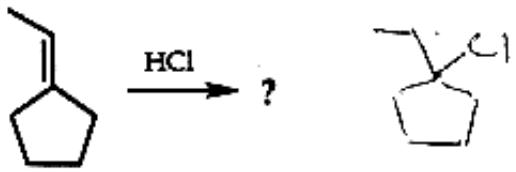
h.


?
OH
dilute
H_2SO_4

i.

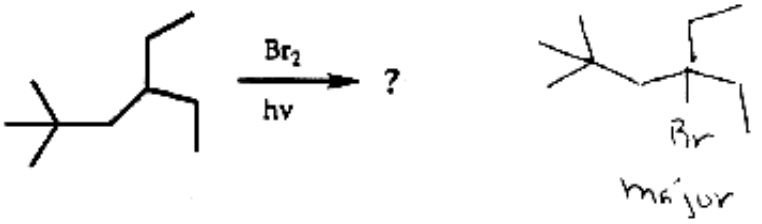

Br_2
?
Br
Br

j.

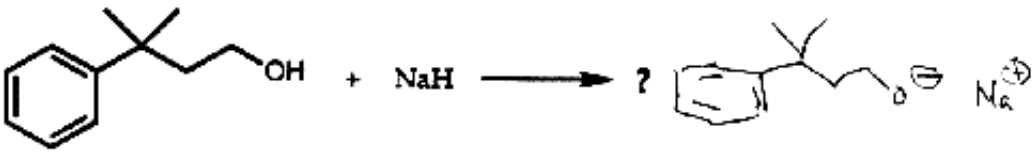

HCl
?
Cl

NAME_____

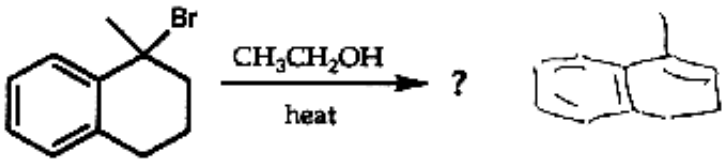
k.


Br_2
hv
?
Br
major

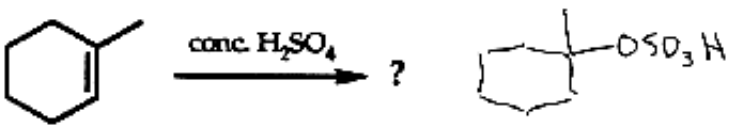
l.


OH
+ NaH
?
O
Na

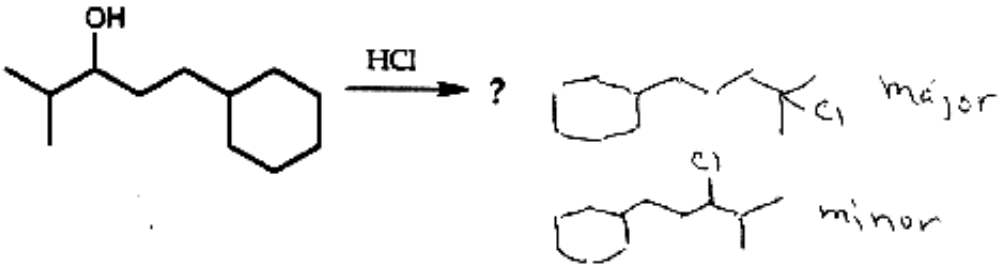
m.


Br
CH_3CH_2OH
heat
?

n.


conc. H_2SO_4
?
OSO_3H

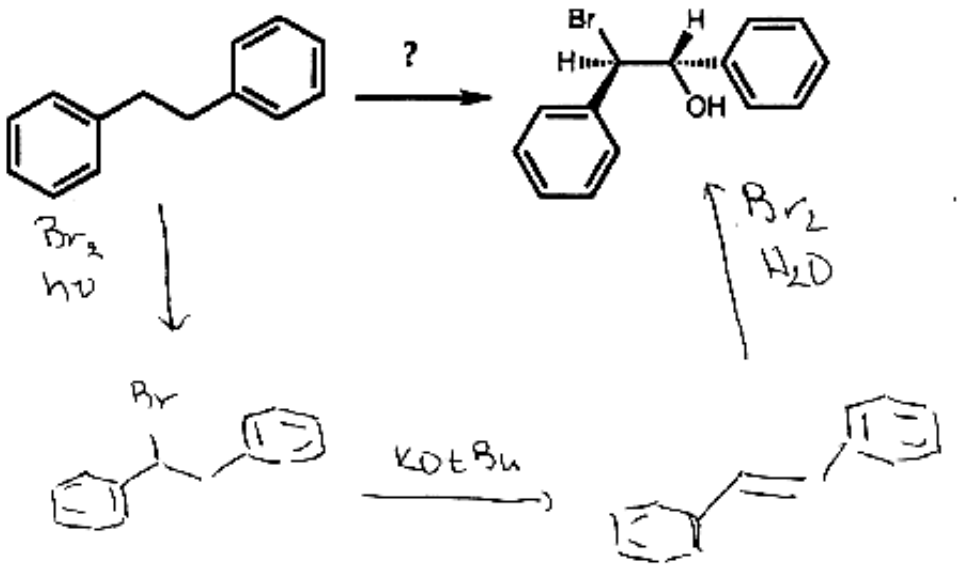
o.


OH
HCl
?
Cl
major
Cl
minor

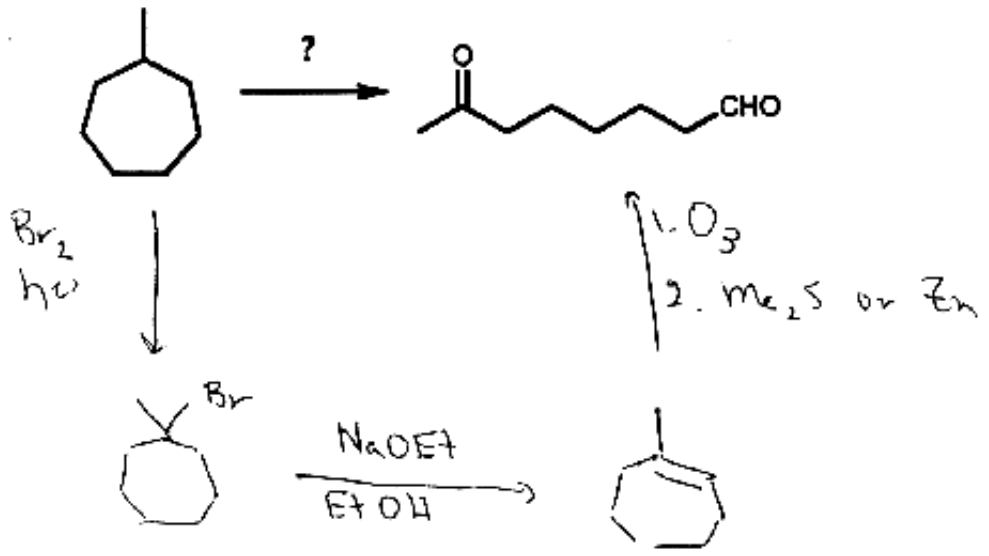
NAME_____

2. (20 points) **Propose a synthesis of the target compounds starting with the substrate provided and any other chemical reagents. Several steps are required in each case. You do not have to show mechanisms for each of the individual steps, but do show the products formed (including any stereochemistry) from each of the reactions you use.**

A.



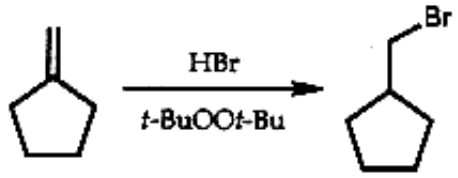
B.



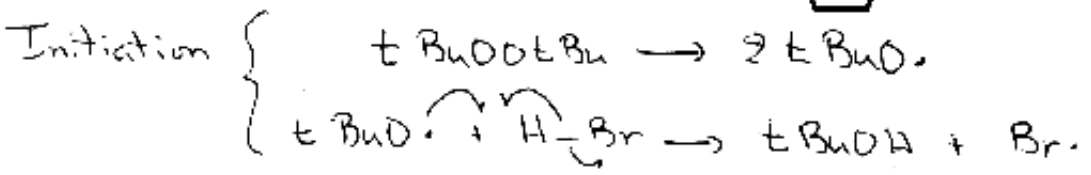
NAME_____

3. (20 points) **Using the arrow formalism, draw a detailed, stepwise mechanism for the following reactions.**

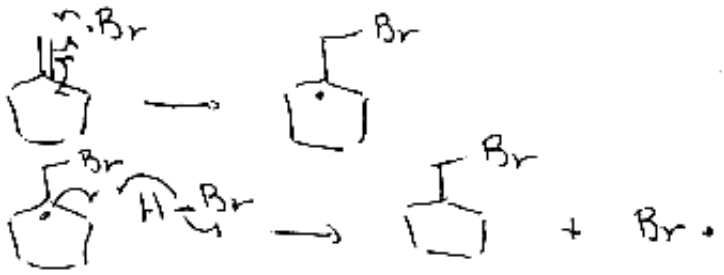
a.



Initiation

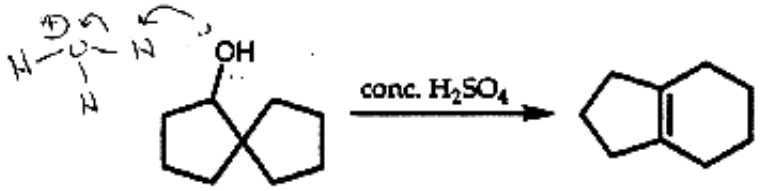


Propagation



Termination $Br\cdot + Br\cdot \rightarrow Br_2$

b.

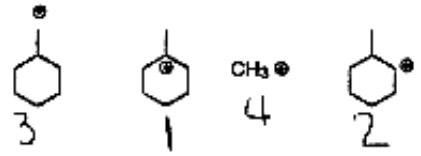


NAME_____

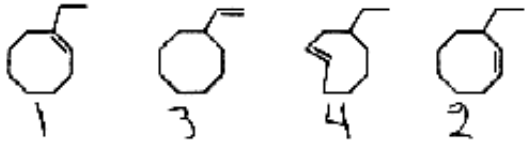
4. (30 points)

A. Rank the following (1→4, 1 = greatest or most) according to the indicated criteria.

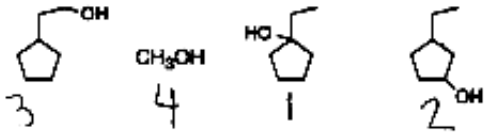
i. Stability



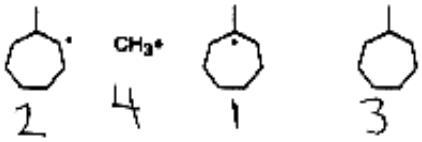
ii. Stability



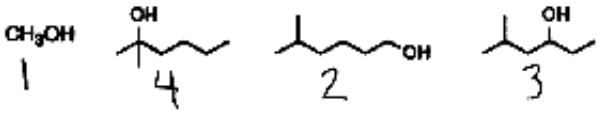
iii. Reactivity under S_N1 Conditions



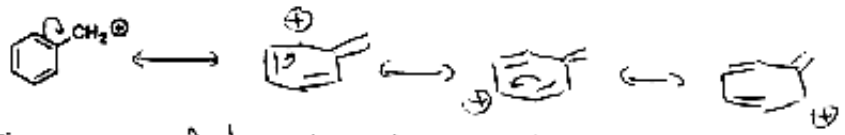
iv. Stability



v. Reactivity under S_N2 Conditions



B. The benzylic cation shown below is actually more stable that a tertiary carbocation even though it is formally a primary carbocation. ***Very briefly*** explain why this might be the case, and provide structures to bolster your reasoning.



Resonance delocalization stabilizes a benzylic carbocation