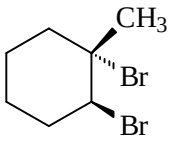
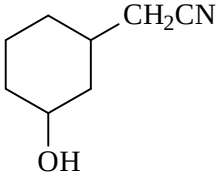
FINAL EXAMINATION, 59-135, 1991

1.

(a) 

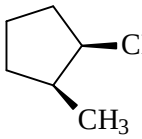
(b) $(CH_3)_2CHC(=O)OH + CH_3OH$

(c) $CH_3CH_2CH_2C(OH)(CH_3)CH_2CH_3$

(d) 

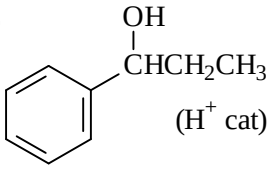
(e) $CH_3CH_2CH_2CH(OCH_2CH_3)_2$ (H^+ cat)

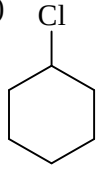
(f) $CH_3CH_2CH=C(CH(CH_3)_2)(CH_3)$

(g)  (Ni cat)

(h) $CH_3CH_2CH(OH)CH(CH_3)CH_2CH_3$

(i) H_2O (H^+, Hg^{++} cat)

(j)  (H^+ cat)

(k) 

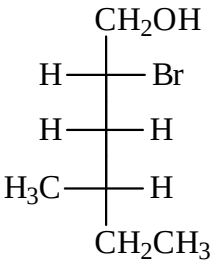
2. (a) (i) enantiomers (ii) identical (iii) diastereomers (iv) diastereomers

(b) The chiral center is S and the double bond is Z. The priorities around the chiral center are:

$OH > C{=}C > CH_2CH_3 > CH_3$

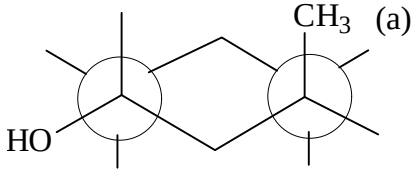
The complete name is (3S,5Z) 3-methyl-5-chloro-4-hexen-3-ol

(c) One possible answer is



(d) (i) conformations (both are S,S) (ii) configurations (left one is S,R and right one is S,S)

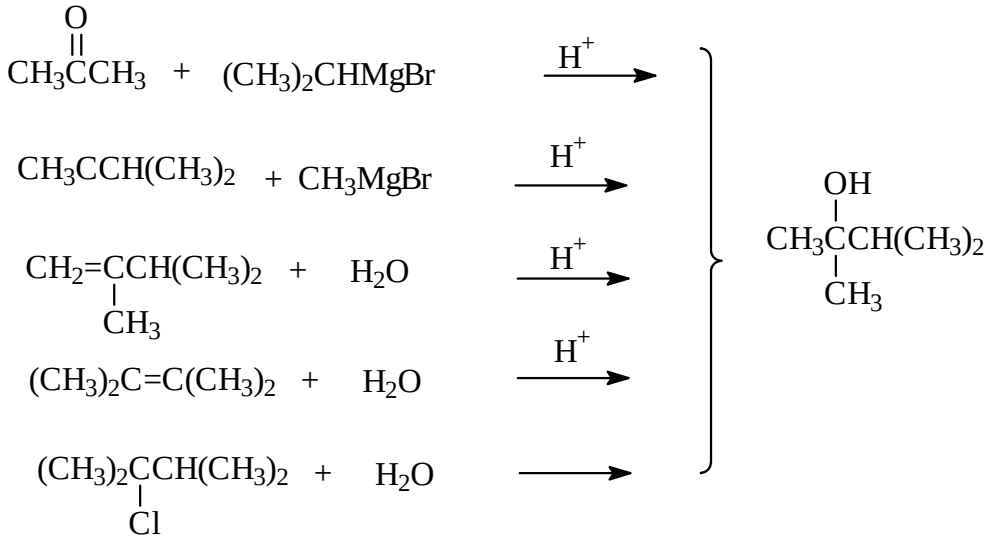
(e)



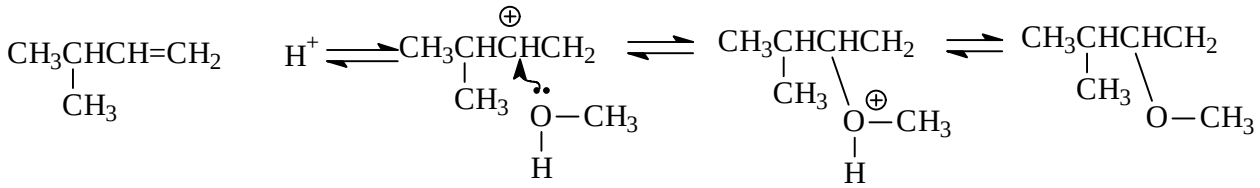
(f) both in part (i)
both n part (ii) [They are the same!!]
neither of part (iii) [Both are meso forms]
only left one of part (iv). Right one is a meso form.

3. (a) Both are Sn2 and therefore the second one will be faster with a better nucleophile
(b) Second one. Intermediate would not be resonance stabilized [look at the position of the double bond!]
(c) First one. It would give a resonance stabilized intermediate and react like a tertiary alcohol.
(d) Left one. It is a hemi-acetal and the other is an alcohol.
(e) $CH_3CH_2CHF_2$. The electron withdrawing effect of tthe two fluorine atoms weakens the C-H bond and stabilizes the anion.

4.

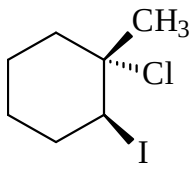


5. The product will not be optically active. It will be a racemic mixture. An acceptable IUPAC name would be methyl 3-methyl-2-butyl ether. The mechanism is:



6. The two products are CH_3OH and $CH_3CH_2CHC(OH)(CH_2CH_3)_2$. The CH_3OH contains the ^{18}O

7. The product is formed by a <u>trans</u> addition with the I atom as the more positive species. The product is


CH3
Cl
I