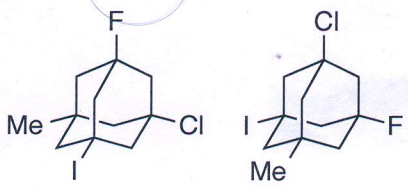
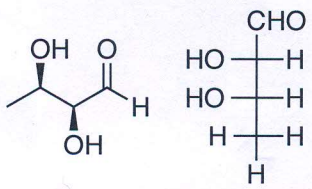
1. Identify the following pairs as "Identical / Enantiomers / Diastereomers / Constitutional isomers".

a.



IDENTICAL (1 MARK)

b.



DIASTEREOMERS (1 MARK)

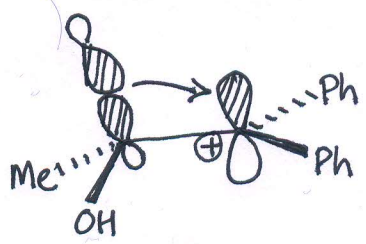
(2). $(\sigma_{C-CH_3})^2 \rightarrow (n_c)^0$

OR

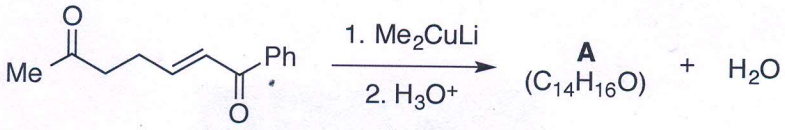
$(\sigma_{C-CH_3})^2 \rightarrow$ p orbital on carbon

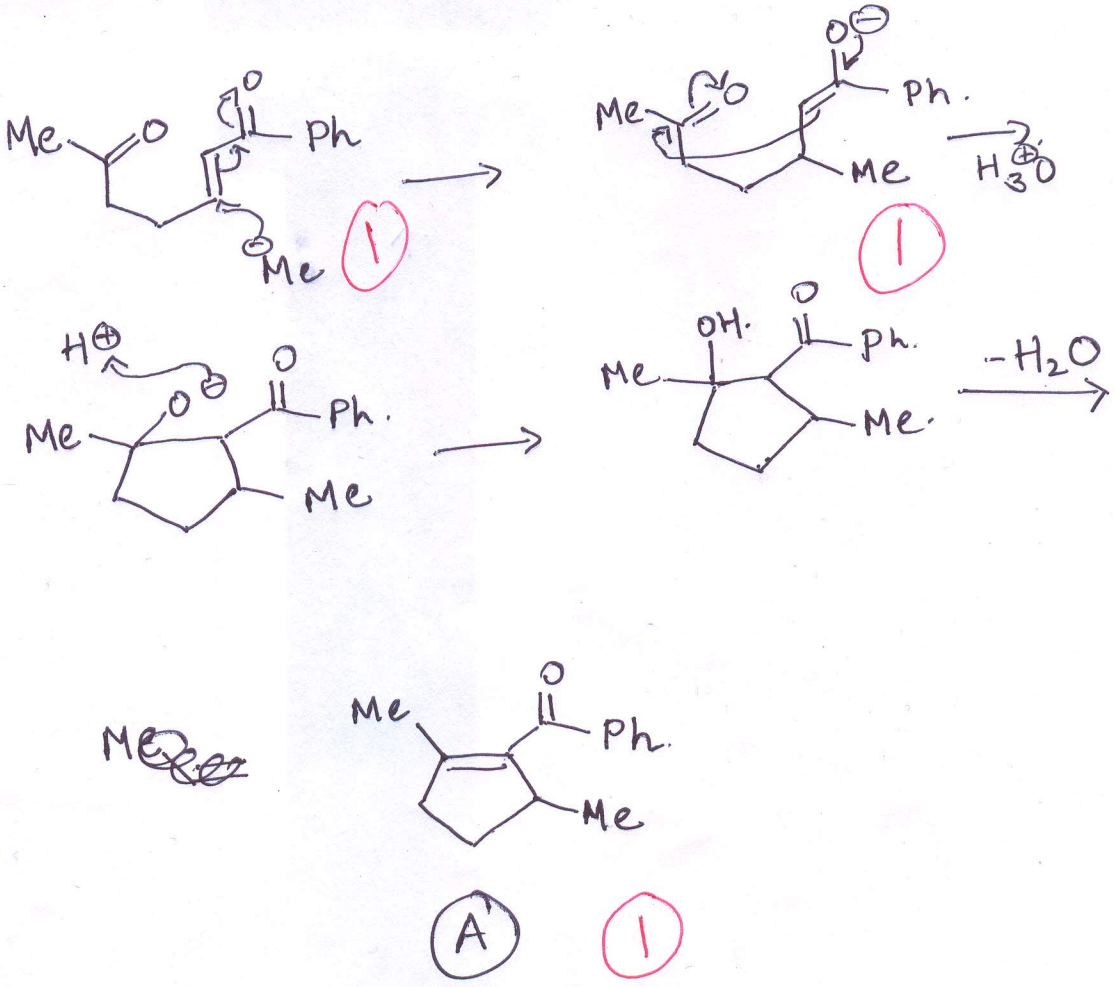
(1 Mark)

OR



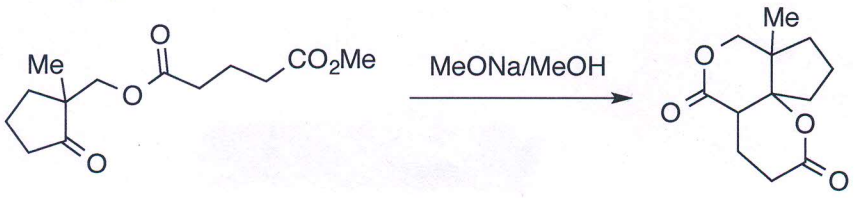
3. Identify the structure of the product of the following reaction. Explain its formation with the help of arrow-pushing mechanism. (3 marks)

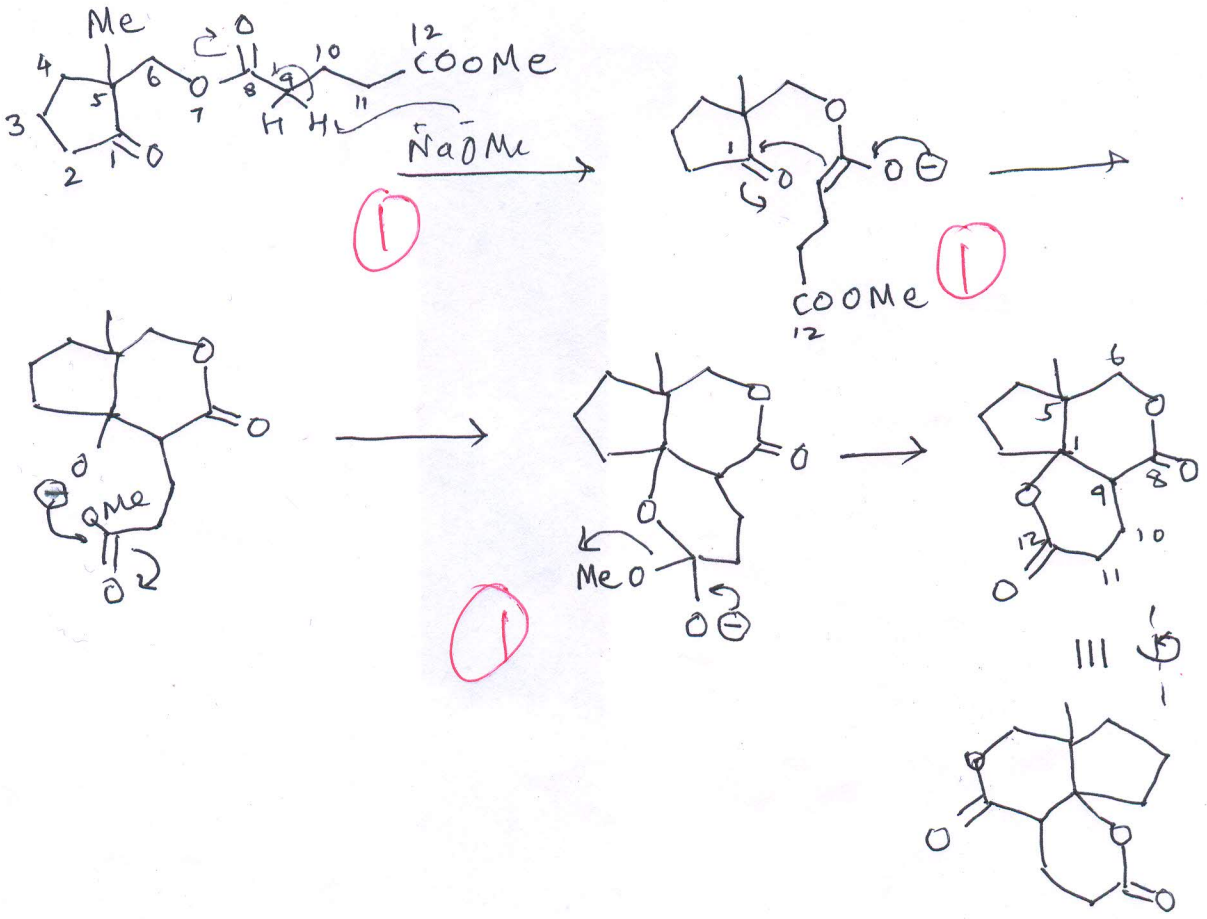




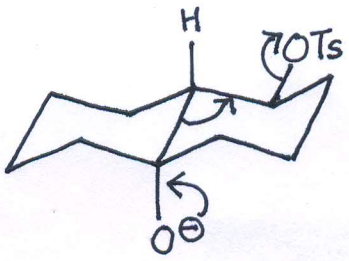
A 1

4. Provide an arrow-pushing mechanism for the formation of the product in the following reaction. (3 marks)

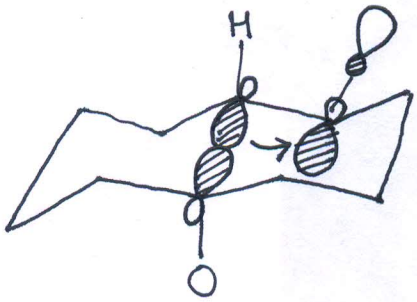




(5)

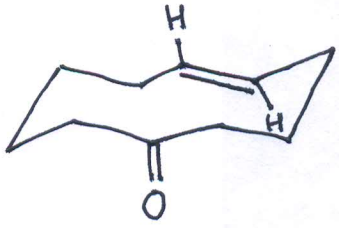
(A) 

conformation (1 Mark)

(B) 

$(\sigma_{C-C})^2 \rightarrow (\sigma^*_{C-O})^0$

(1 Mark)

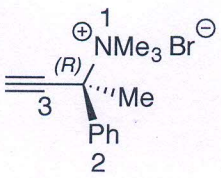
(C) 

trans geometry at the olefin

(1 Mark)

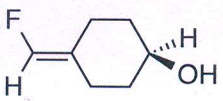
6. Assign the absolute configuration (*R*/*S*) for the following molecules. (2 marks)

a)



R (1 mark)

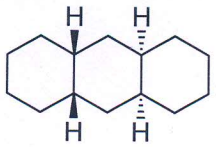
b)

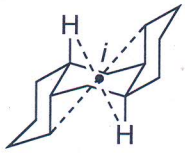


S (1 mark)

7. Draw the most stable conformation of the following molecules. Identify and pictorially show the symmetry elements present in that conformer. (4 marks)

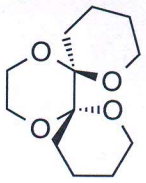
a)

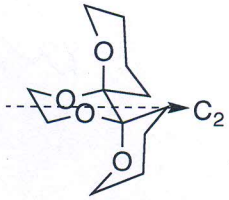




Conformation: 1 mark
I – Inversion Centre: 1 mark

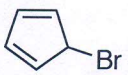
b)



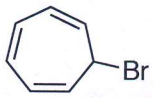


Conformation: 1 mark
C2: 1 mark

8. Which of the following bromides will give a more stable ionized form in a polar medium such as acetic acid?



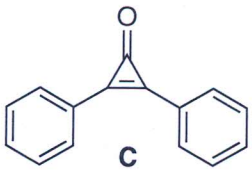
A



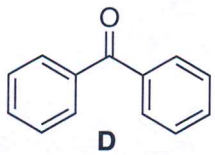
B

B will give more stable ionized form. (1 mark)

9. Which of the following ketones will have a higher dipole moment?



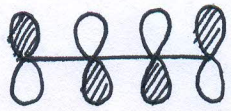
C

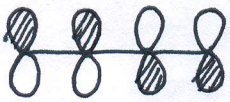


D

C will have a higher dipole moment (1 mark)

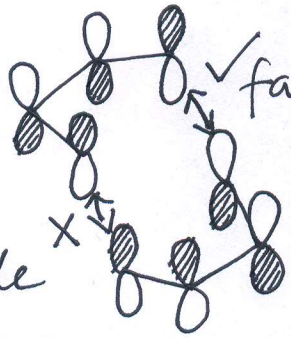
(10)

LUMO  ½

HOMO  ½

} (1 Mark)

When two molecules of butadiene are combined using HOMO-LUMO interaction the following orbital interaction should take pla

LUMO 

✓ favarable interaction

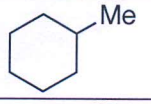
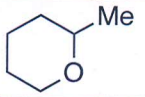
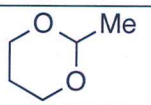
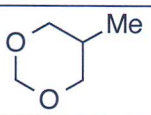
(2 Marks)

unfavorable interaction

Favorend ~~Orbital interactions at both ends of the reacting butadienes~~

Due to the unfavorable out-of-phase orbital interaction at one end of the reactant the cyclization as shown in the question is not feasible.

11. Match the structures in **Column P** with the '**A values**' in **Column Q**. (2 marks)
('**A value**' = $G_{axial} - G_{equatorial}$)

	Column P		**Column Q** (kcal/mol)
1.		a.	0.8
2.		b.	1.8
3.		c.	2.9
4.		d.	4.0

1 – b (0.5 marks)
2 – c (0.5 marks)
3 – d (0.5 marks)
4 – a (0.5 marks)