**CHM 1321** **Second Midterm** **March 9 – 2012**

**(Prof. S. Gambarotta)**

**Your Name: _____**
**Student #: _____**

| Exercise | key |
|---|---|
| 1 | |
| 2 | |
| 3 | |
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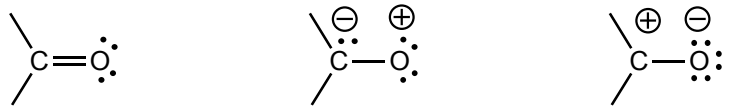
| 17 | |
| 18 | xxxxxxxxxx |

1. Deliver only the solution key in the above table. You can keep the text. The solution key will be posted today on the web.

2. You must respond to all exercises.

1. Which of the following resonance structures is not a significant contributor to the hybrid for the carbonyl group?



I II III

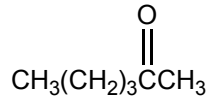
A) I
B) II
C) III
D) Neither II nor III is important.
E) All are significant contributors.
Ans: B

2. Which reagent(s) will distinguish between 2-methylcyclopentanol and 1-methylcyclopentanol?

A) $Br_2/CCl_4$
B) $KMnO_4$
C) $CrO_3$/aqueous $H_2SO_4$
D) NaOH (aq)
E) B) and C)
Ans: E

3. What is the predominant product from the reaction of 2-hexanol with $H_2CrO_4$?

A) $CH_3CO_2H$
B) $CH_3(CH_2)_3CO_2H$

C) 

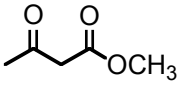
D) $CH_3(CH_2)_4CO_2H$
E) A) and B)
Ans: C

4. Which of the reagents listed below would efficiently accomplish the transformation of $CH_3CH_2CH{=}CHCH_2CH_2CHO$ into $CH_3CH_2CH_2CH_2CH_2CH_2CH_2OH$?

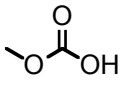
A) $KMnO_4$
B) $NaBH_4$
C) $Br_2$ in $CCl_4$
D) $H_2$, Ni
E) Two of the above

Ans: D

5. Which of the following compounds is an acetal?




I

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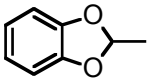
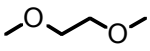



III

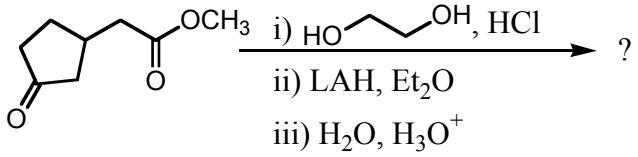


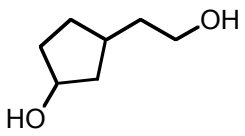

IV

A) I
B) II
C) III
D) IV
E) None of these

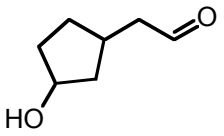
Ans: C

6. What is the major product of the following reaction sequence (LAH = $LiAlH_4$)?




I

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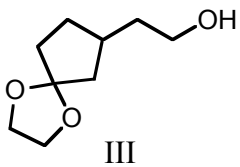


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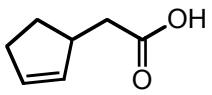


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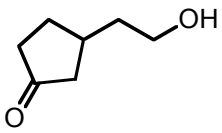



V

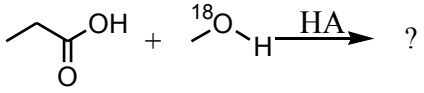
A) I
B) II
C) III
D) IV
E) V
Ans: E

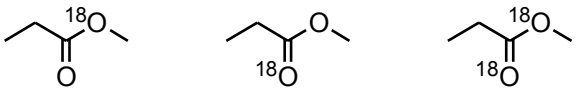
7. Which compound would be the strongest acid?
A) $CHCl_2CH_2CH_2CO_2H$
B) $ClCH_2CHClCH_2CO_2H$
C) $CH_3CCl_2CH_2CO_2H$
D) $CH_3CHClCHClCO_2H$
E) $CH_3CH_2CCl_2CO_2H$
Ans: E

8. Which compound would be most reactive toward nucleophilic acyl substitution?

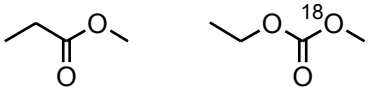
A) $CH_3CO_2Na$
B) $CH_3COCl$
C) $(CH_3CO)_2O$
D) $CH_3CONH_2$
E) $CH_3CO_2CH_3$
Ans: B

9. What would be the product of the following reaction ?



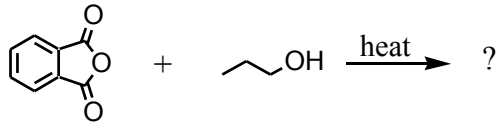

I II III



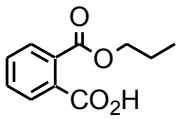

II III

A) I
B) II
C) III
D) IV
E) V
Ans: A

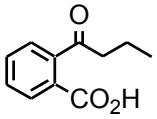
10. The product of the following reaction is:



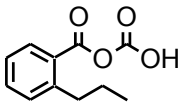

(1 mol) (1 mol)



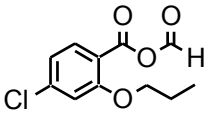

I




II




III

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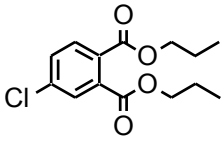
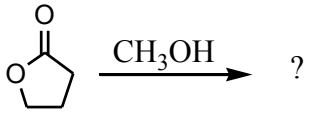
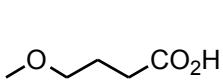



V

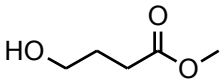
A) I
B) II
C) III
D) IV
E) V
Ans: A

11. What is the product of this reaction?

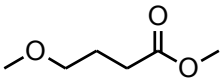



I




II

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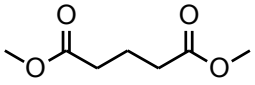
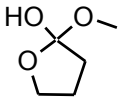


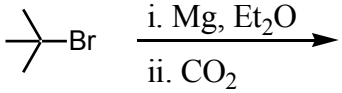

IV

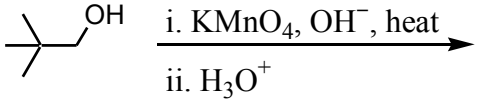


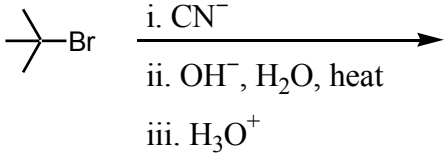

V

A) I
B) II
C) III
D) IV
E) V
Ans: B

12. Which of the following would serve as a synthesis of 2,2-dimethylpropanoic acid?

A) 

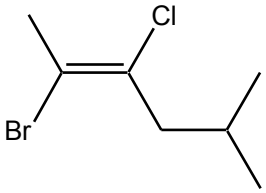

B) 


C) 


D) All of these
E) Answers A) and B) only

Ans: E and D equally acceptable

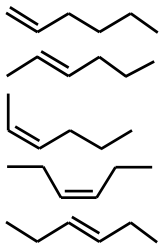
13. The correct IUPAC name for the following compound is:




(E)-2-Bromo-3-chloro-5-methyl-2-hexene
(E)-2-Bromo-3-chloro-5-methyl-3-hexene
(Z)-2-Bromo-3-chloro-5-methyl-3-hexene
(Z)-2-Bromo-3-chloro-5-methyl-2-hexene
(E)-2-Methyl-5-bromo-4-chloro-4-hexene

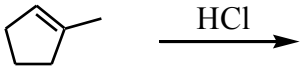
Answ: A

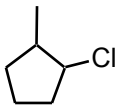
14. Which alkene would liberate the most heat per mole when subjected to catalytic hydrogenation?



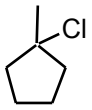
Ans: A

15. What would be the major product of the following reaction?




I

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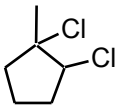
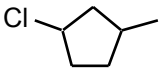



III

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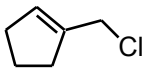
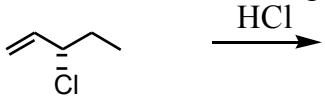


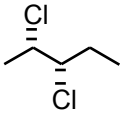

V

A) I
B) II
C) III
D) IV
E) V

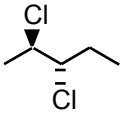
Ans: B

16. Addition of hydrogen chloride to the following molecule would produce:

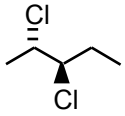


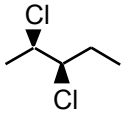

I



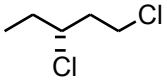

II




III




IV

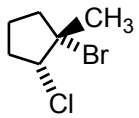



V

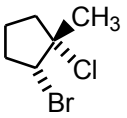
A) I and II
B) II and III
C) I and IV
D) V
E) All of the above are equally likely to be formed

Ans: A

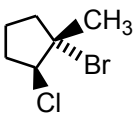
17. The reaction of BrCl (bromine monochloride) with 1-methylcyclopentene will produce as the predominant product:



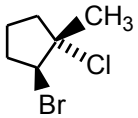

+ enantiomer I



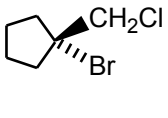

+ enantiomer II




+ enantiomer III




+ enantiomer IV




+ enantiomer V

A) I
B) II
C) III
D) IV
E) V

Ans: D

18. Draw the mechanism for the hydromercuriation demercuriation reaction of 1-methylcyclohene