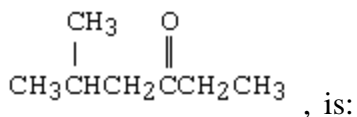


Part A (51 points, 3 each): Enter on answer sheet with number 2 pencil

1.



A correct name for the compound, is:

- A) 2-Methyl-4-hexanone                      D) Ethyl isopropyl ketone  
 B) 2-Methyl-3-hexanone                     E) Isobutylpropanone  
 C) 5-Methyl-3-hexanone

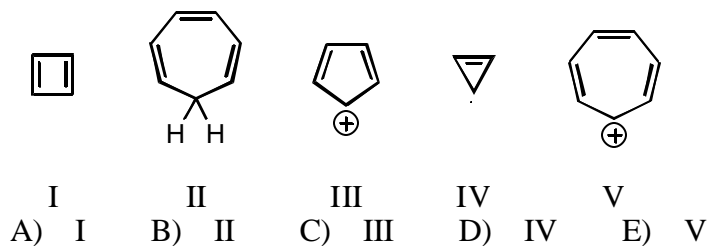
2. Which of the following is NOT true of benzene?

- A) Benzene tends to undergo substitution rather than addition reactions, even though it has a high index of hydrogen deficiency.  
 B) All of the hydrogen atoms of benzene are equivalent.  
 C) The carbon-carbon bonds of benzene are alternately short and long around the ring.  
 D) Only one *o*-dichlorobenzene has ever been found.  
 E) Benzene is more stable than the hypothetical compound 1,3,5-cyclohexatriene.

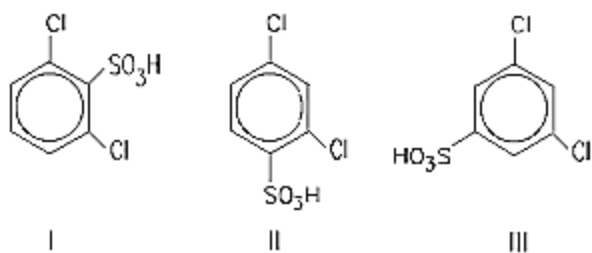
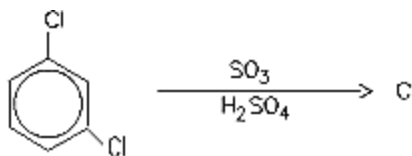
3. Which annulene would you NOT expect to be aromatic?

- A) [6]-Annulene                                      D) [18]-Annulene  
 B) [14]-Annulene                                  E) [22]-Annulene  
 C) [16]-Annulene

4. On the basis of molecular orbital theory and Huckel's rule, which of these compounds should be aromatic?



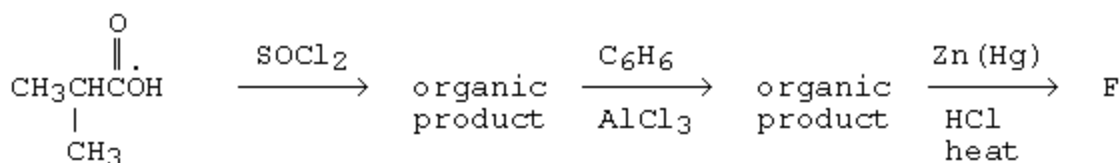
5. The major product(s), C, of the following reaction,



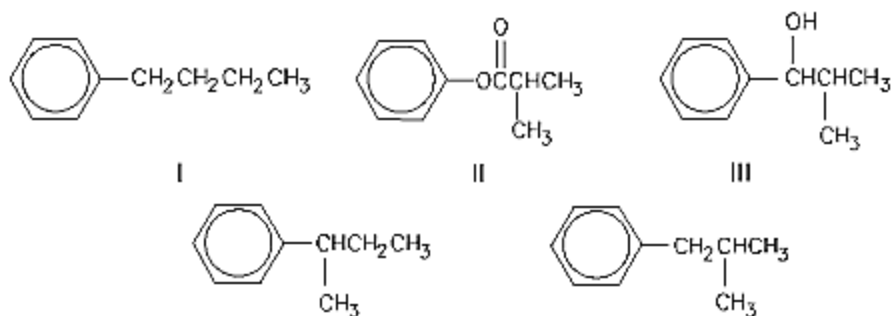
would be:

- A) I    B) II    C) III    D) Equal amounts of I and II    E) Equal amounts of I and III

6. The product, F, of the following reaction sequence,

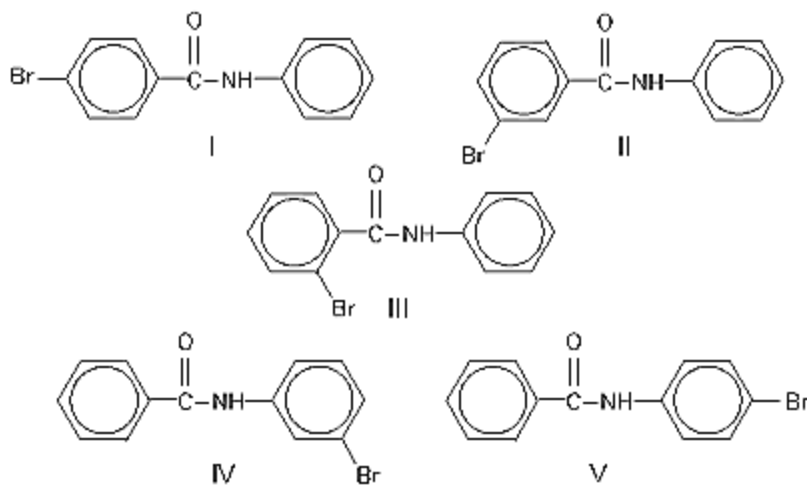
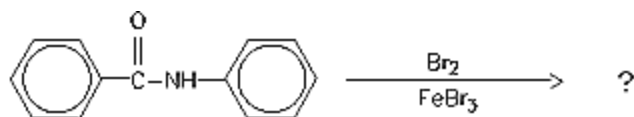


would be:



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

7. What would you expect to be the major product obtained from the following reaction?

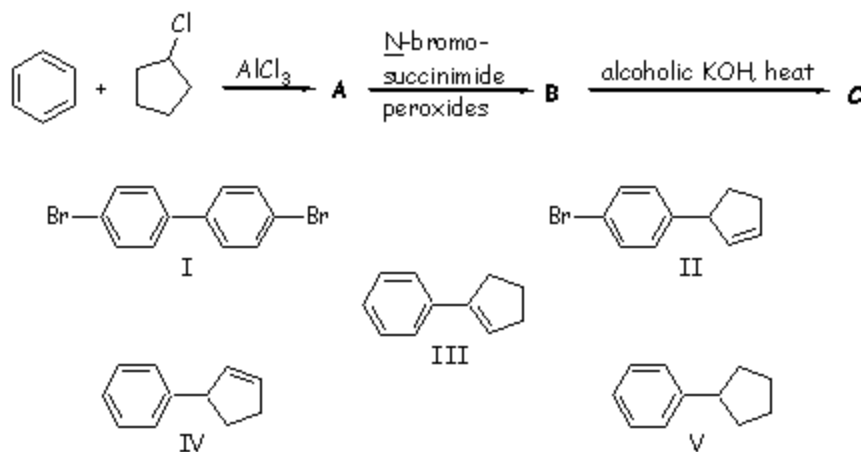


A) I    B) II    C) III    D) IV    E) V

8. Consider the molecular orbital model of benzene. In the ground state how many molecular orbitals are filled with electrons?

A) 1    B) 2    C) 3    D) 4    E) 5

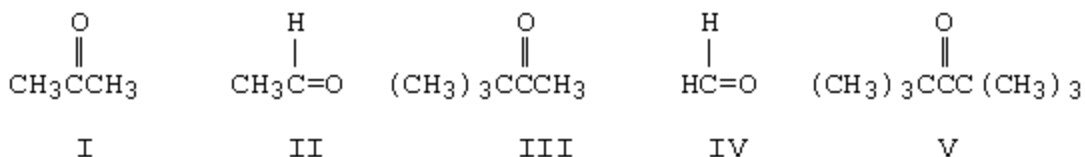
9. The product, C, that would result from the following series of reactions,



would be:

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

10. What, in general, is the order of decreasing reactivity of these carbonyl compounds towards nucleophilic reagents?



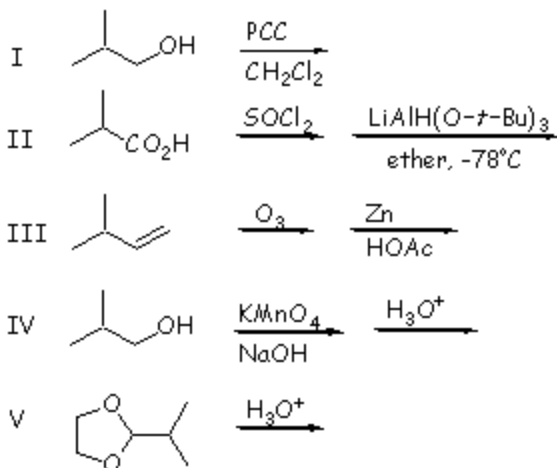
- |                          |                          |
|--------------------------|--------------------------|
| A) I > III > V > II > IV | D) II > I > V > III > IV |
| B) IV > II > I > III > V | E) III > V > IV > II > I |
| C) V > III > I > II > IV |                          |

11. The relationship of propanone and propen-2-ol is designated by the term:

- |                           |                         |
|---------------------------|-------------------------|
| A) Tautomers              | D) Resonance structures |
| B) Conformational isomers | E) Stereoisomers        |
| C) Diastereomers          |                         |

12.

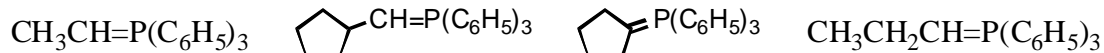
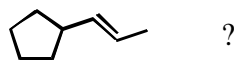
Which of the following procedures would not yield  $(\text{CH}_3)_2\overset{\text{O}}{\parallel}\text{CHCH}_3$  as a product?



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



16. Which Wittig reagent would be used to synthesize



- A) I    B) II    C) III    D) IV    E) III    F) IV    G) Either I or II could be used.

17. Cyclopentadiene is unusually acidic for a hydrocarbon. An explanation for this is the following statement.

- A) The carbon atoms of cyclopentadiene are all  $\text{sp}^2$ -hybridized.  
 B) Cyclopentadiene is aromatic.  
 C) Removal of a proton from cyclopentadiene yields an aromatic anion.  
 D) Removal of a hydrogen atom from cyclopentadiene yields a highly stable free radical.  
 E) Removal of a hydride ion from cyclopentadiene produces an aromatic cation.

## Answer Key

1. C
2. C
3. C
4. E
5. B
6. E
7. E
8. C
9. C
10. B
11. A
12. D
13. D
14. D
15. B
16. E
17. C