




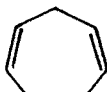
系別：化學學系三年級

科目：有機化學

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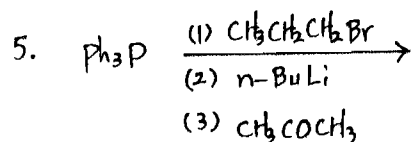
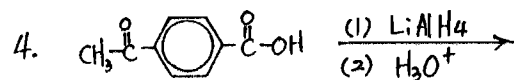
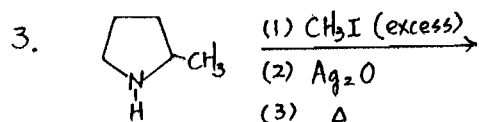
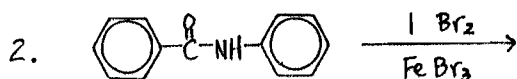
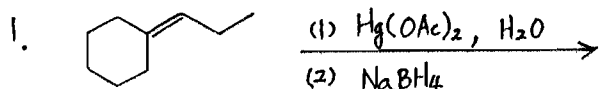
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— Multiple choices: Choose the most appropriate answer for the following questions. (4 points each)

- Energy is _____ when bonds are formed and is _____ when bonds are broken; therefore, bond dissociation energies are always _____.
 a. released / consumed / exothermic b. released / consumed / endothermic
 c. consumed / released / exothermic d. consumed / released / endothermic
- If a mixture contains 75 % of one compound and 25 % of its enantiomer, what is the e.e. of the mixture?
 a. 100 b. 75 c. 50 d. 25
- Predict the two most likely mechanisms for the reaction of 2-iodohexane with sodium ethoxide.
 a. E1 and S_N2 b. E2 and S_N2 c. E1 and S_N1 d. E2 and S_N1
- Using Saytzeff's rule, choose the most stable alkene among the following.
 a. 4-methylcyclohexene b. 3-methylcyclohexene
 c. 1-methylcyclohexene d. They are all of equal stability according to Saytzeff's rule
- Which of the following reagents should be used to convert 3-hexyne to (E)-3-hexene?
 a. H₂, Pt b. Na, NH₃ c. H₂, Lindlar's catalyst d. H₂SO₄, H₂O
- Which of the following alkyl halides would be suitable to use when forming a Grignard reagent?
 a. (CH₃)₂NCH₂CH₂Br b. CH₃CH₂CH₂Br c. BrCH₂CH₂CH₂CN d. H₂NCH₂CH₂CH₂Br
- The reaction of CH₃CH₂MgBr with CH₃COCH₂CH₃ gives:
 a. an achiral product b. a mixture of diastereomers
 c. the racemate of a chiral product d. a single enantiomer
- When 1-hexanol is treated with conc. H₂SO₄ at moderate temperature, _____ is formed via a (an) _____ mechanism.
 a. di-n-propylether, E1 b. di-n-hexylether, E2
 c. di-n-hexylether, S_N1 d. di-n-hexylether, S_N2
- How many electrons are present in the nonbonding π molecular orbital of the allyl cation?
 a. 3 b. 2 c. 1 d. 0
- Which of the following is aromatic? (assuming planarity of the π network)
 a.  b.  c.  d. 

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二. Predict the structures of the major organic products of the following reactions. (4 points each)



三. Propose a sequence of steps to carry out the following conversion. (10 points)



四. Propose a method for the synthesis of 3-methyl-2-hexanone from $\text{CH}_3\text{C}(=\text{O})\text{CH}_2\text{C}(=\text{O})\text{OEt}$ by an "acetoacetic ester synthesis" method. (10 points)

五. Propose a stepwise mechanism for each of the following reactions. (10 points each)

