淡江大學九十四學年度碩士班招生考試試題

381

系別：化學學系　　科目：有 機 化 學

准帶項目請打「V」	
X	簡單型計算機

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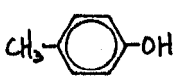
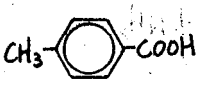
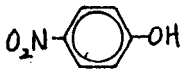
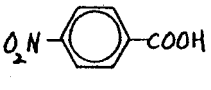
本試題雙面印製

一、Choose the most appropriate answers for the following questions (30%)

1. What is the major constituent of natural gas?
   a. methane　b. ethane　c. butane　d. octane
2. Which of the following reactive intermediates can be described as nucleophilic?
   a. carbanions　b. carbenes　c. free radicals　d. carbocation
3. Which of the following statements is (are) true for the compound cis-1,2-dichlorocyclopropane?
   a. The compound is chiral.
   b. The enantiomer of this compound is trans-1,2-dichlorocyclopropane.
   c. This compound contains no asymmetric carbons.
   d. None of the above
4. Which of the following alkyl halides is most likely to undergo rearrangement in an S_N1 reaction?
   a. 3-bromopentane　b. 2-chloro-3,3-dimethylpentane
   c. 3-chloropentane　d. bromocyclohexane
5. 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
6. Which of the following reagents should be used to convert 3-hexyne to (E)-3-hexene?
   a. H_2, Pt　b. Na, NH_3　c. H_2, Lindlar's catalyst　d. H_2SO_4, H_2O
7. Which of the following most closely matches the C≡C stretching frequency (cm^{-1})?
   a. 3300　b. 2980　c. 2200　d. 1710
8. How many electrons are present in the nonbonding π molecular orbital of the allyl cation?
   a. 3　b. 2　c. 1　d. 0
9. Which of the following compounds has the lowest boiling point?
   a. 1,2,3-trichlorobenzene　b. 1,2,4-trichlorobenzene
   c. p-dichlorobenzene　d. o-dichlorobenzene
10. Which of the following is the strongest acid?
    a.  　b.  　c.  　d. 

◀注意背面尚有試題▶

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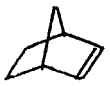
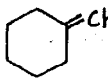
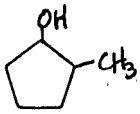
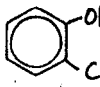
二. Give the structures of the major organic products for the following reactions (30%)

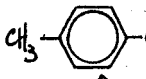
1.  $\xrightarrow{Br_2}$

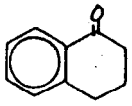
2.  $\xrightarrow[ROOR,\ \Delta]{HBr}$

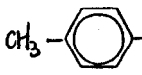
3. $CH_3CH_2CH_2CHO \xrightarrow[(2)\ H_3O^+]{(1)\ (CH_3)_2CHMgBr}$

4.  $\xrightarrow[\Delta]{H_2SO_4}$

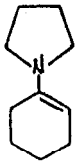
5.  $\xrightarrow[(2)\ CH_3CH_2OTs]{(1)\ NaOH}$

6.  $\xrightarrow[acetone]{NaCN}$

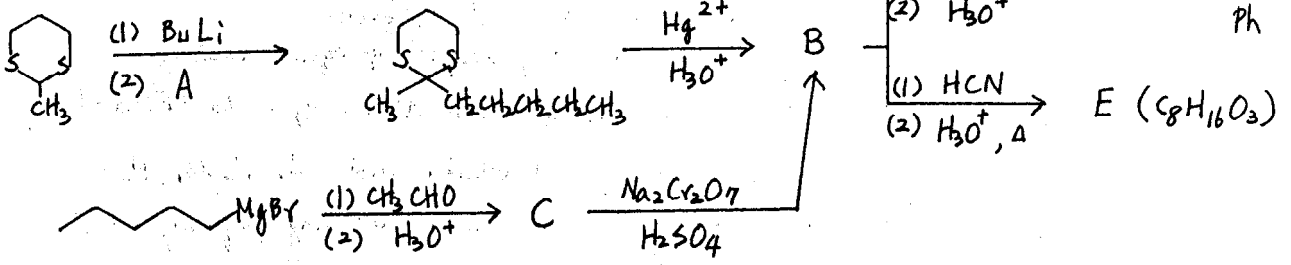
7.  $\xrightarrow[\Delta]{Zn(Hg),\ HCl}$

8.  $\xrightarrow[(2)\ CuCN]{(1)\ NaNO_2,\ HCl}$

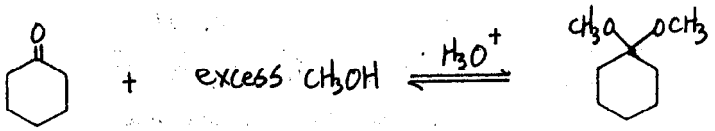
9.  $\xrightarrow[h\nu]{1\ mole\ Br_2}$

10.  $\xrightarrow[(2)\ H_3O^+]{(1)\ CH_3\overset{O}{\overset{\|}{C}}Cl}$

三. Give structures A—E for the following reaction sequence: (20%)



四. Give the detailed mechanism for the following reaction: (10%)



五. Propose a synthetic sequence for the following conversion: (10%)