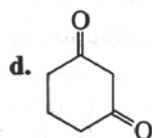
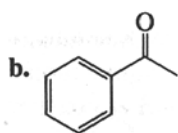
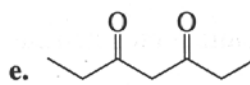
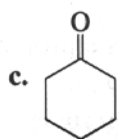
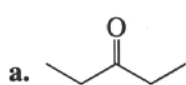


系級	微生物學系三年級	考試時間	100 分鐘
科目	有機化學	本科總分	100 分

注意事項： 共十題，每題各十分。請依題號順序答題。

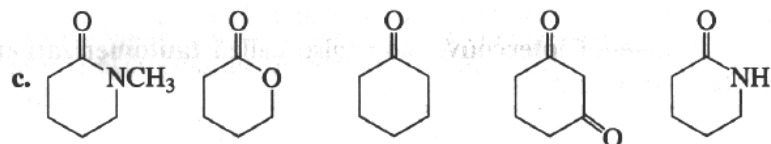
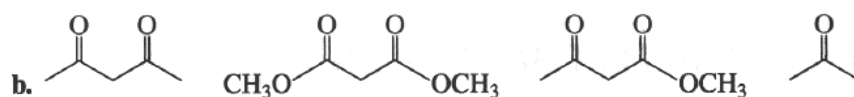
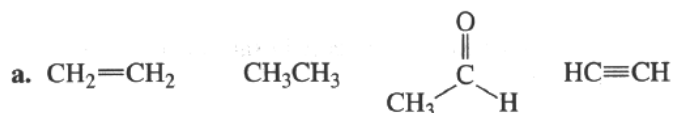
1.

Draw the enol tautomers for each of the following compounds. For compounds that have more than one enol tautomer, indicate which one is more stable.



2.

List the compounds in each of the following groups in order from strongest acid to weakest acid:



3.

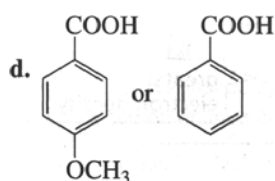
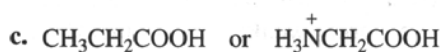
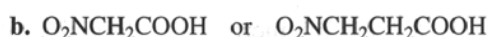
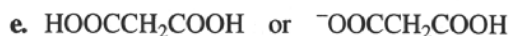
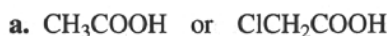
What is the major product(s) of each of the following reactions?

- a. bromination of *p*-methylbenzoic acid d. nitration of *p*-fluoroanisole
 b. chlorination of *o*-benzenedicarboxylic acid e. nitration of *p*-methoxybenzaldehyde
 c. bromination of *p*-chlorobenzoic acid

系級	微生物學系三年級	考試時間	100 分鐘
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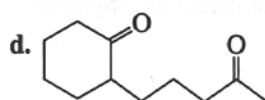
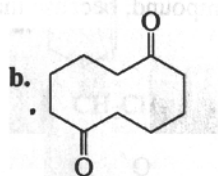
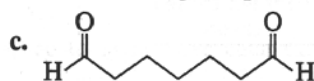
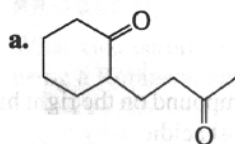
4.

Which species in each of the following pairs is more acidic?



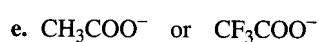
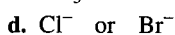
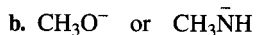
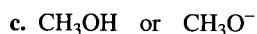
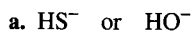
5.

Draw the product of the reaction of each of the following compounds with a base:



6.

Which is a stronger base?



7.

a. Draw the more stable chair conformer of *cis*-1-ethyl-2-methylcyclohexane.

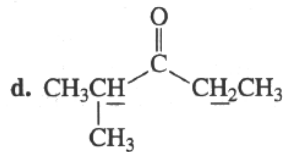
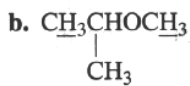
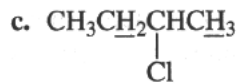
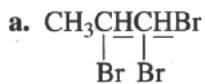
b. Draw the more stable chair conformer of *trans*-1-ethyl-2-methylcyclohexane.

c. Which is more stable, *cis*-1-ethyl-2-methylcyclohexane or *trans*-1-ethyl-2-methylcyclohexane?

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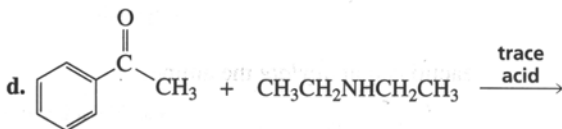
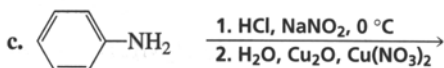
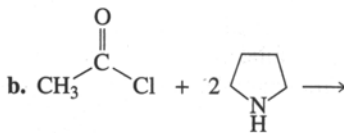
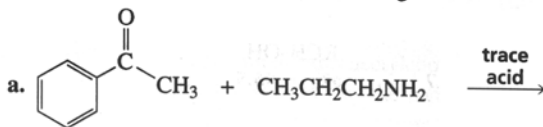
8.

Which of the underlined protons (or sets of protons) has the greater chemical shift (that is, the higher frequency signal)?



9.

Draw the product of each of the following reactions:



10.

Which of the following are

a. hemiacetals?

b. acetals?

c. hydrates?

