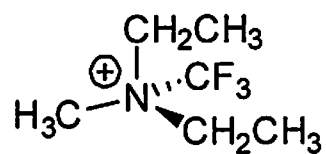


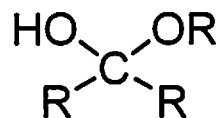
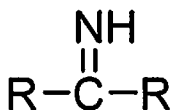
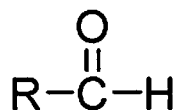
Name: _____

1-10) are True or False (10pts)

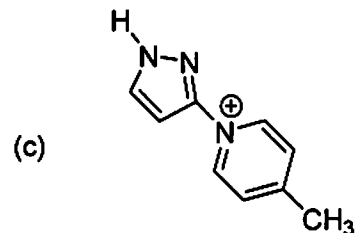
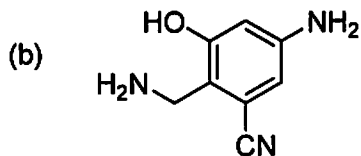
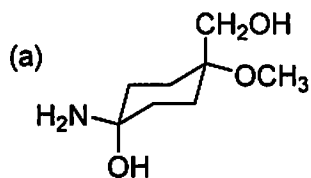
- 1) Aldehydes can undergo nucleophilic addition reactions.
- 2) Ketones can undergo condensation reactions.
- 3) Three membered rings with one Nitrogen are called Aziridines.
- 4) Wittig reactions generate alkenes.
- 5) Tollen's reagent reacts with aldehydes to give a silver mirror.
- 6) The cyanide anion contains three nitrogens.
- 7) Diazonium salts contain three nitrogens, and one of them is positively charged.
- 8) Wolff-Kishner reductions produce alkanes.
- 9) Ketones are more reactive than aldehydes.
- 10) This cation is chiral.



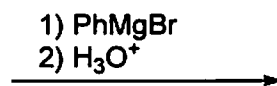
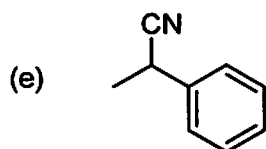
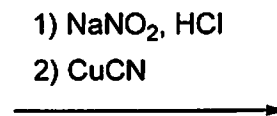
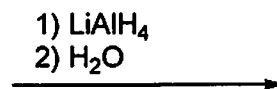
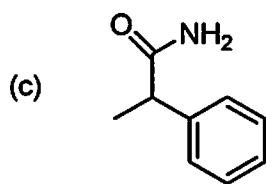
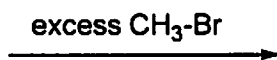
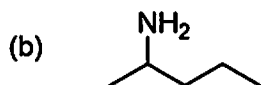
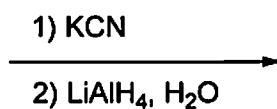
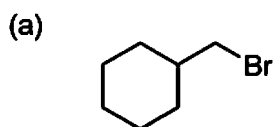
11) (3pts) Name the general class of organic compound (*functional group*) that each of these molecules belong to.



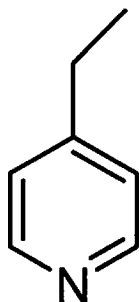
12) Circle the *most basic atom* in each of the following species. (3pts)



13) Give the products formed in these reactions. (10pts)



14) a) Name the following molecule in IUPAC acceptable terms. (2pts)

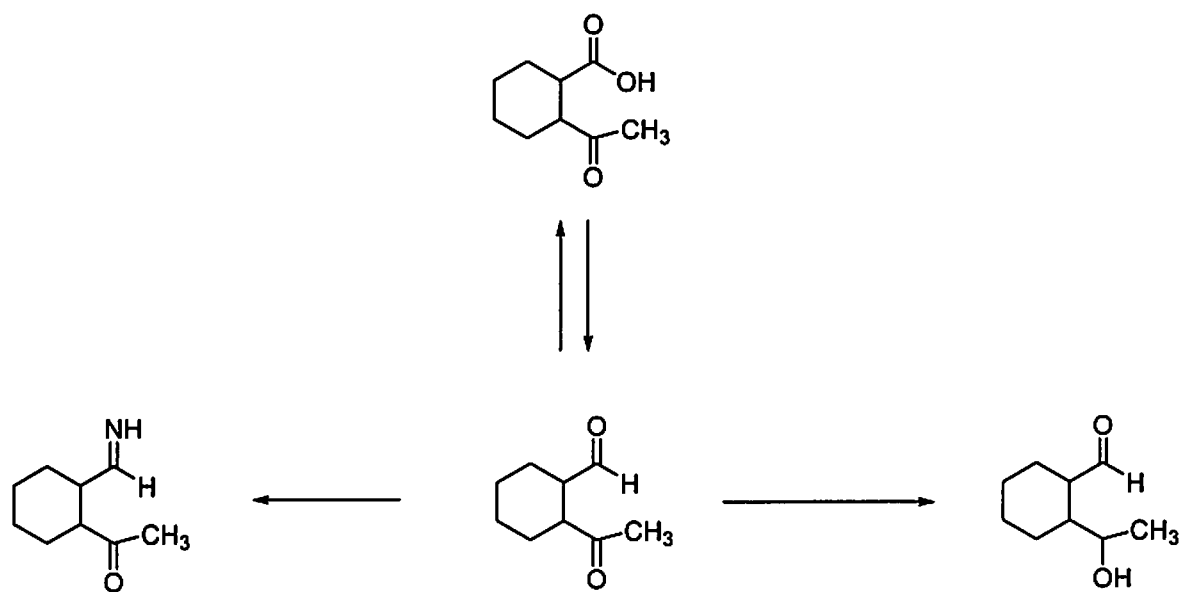


b) Using any format you wish, draw *cis*-3,4-dimethylcyclopentanone. (3pts)

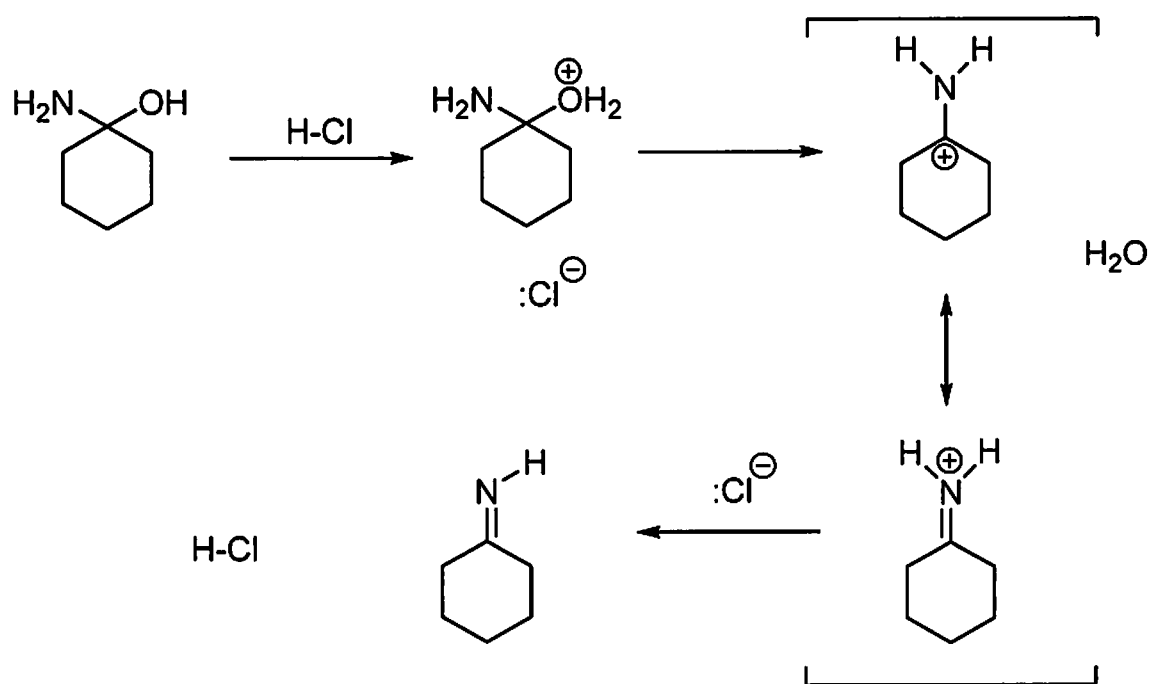
15) (4pts) Write the mechanism (i.e. curly arrows) for the reaction of:



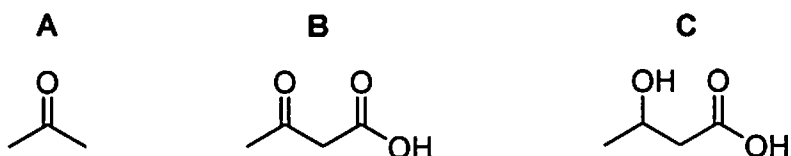
16) Provide sets of reagents for the following **four** transformations (including both the *forward* and *reverse* versions for the vertical transformation). (4x2=8pts)



17) Draw in the curly arrows for the following mechanism. (4pts)



18) (1+1+1=3pts) Recently it has become popular to use *keto*-genic diets, (intermittent) fasting or carbohydrate deprivation to put your body into “Ketosis”, which is a metabolic state in which most of the body's energy supply comes from “ketone bodies” in the blood, in contrast to a state of glycolysis in which blood glucose provides energy. The human liver produces the three “ketone bodies” (A-C) shown below.



a) Despite the name, one of these “ketone bodies” does NOT actually contain a *ketone* functional group. Is that molecule A, B or C?

b) For conversion of B \rightarrow C, is that a *reduction*, *oxidation*, or *neither*?

c) What reagent could you use for conversion of C \rightarrow B?

****Bonus question** (up to 2pts)**

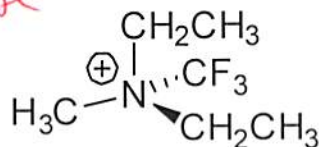
For the three “ketone bodies” in Q18, one is chiral. State which one is chiral.

The human liver produces exclusively the R enantiomer of that molecule, draw this specific enantiomer.

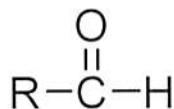
Name: PROTECTING or CONDENSATION?

1-10) are True or False (10pts)

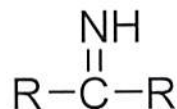
- 1) Aldehydes can undergo nucleophilic addition reactions. T
- 2) Ketones can undergo condensation reactions. T
- 3) Three membered rings with one Nitrogen are called Aziridines. T
- 4) Wittig reactions generate alkenes. T
- 5) Tollen's reagent reacts with aldehydes to give a silver mirror. T
- 6) The cyanide anion contains three nitrogens. False
- 7) Diazonium salts contain three nitrogens, and one of them is positively charged. False
- 8) Wolff-Kishner reductions produce alkanes. T
- 9) Ketones are more reactive than aldehydes. False
- 10) This cation is chiral. False



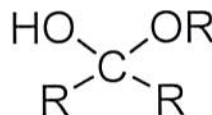
11) (3pts) Name the general class of organic compound (*functional group*) that each of these molecules belong to.



Aldehyde

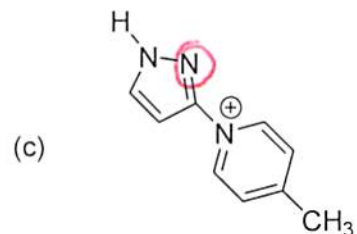
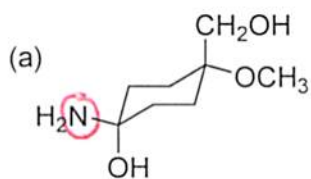


Imine

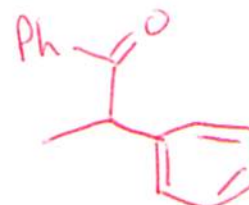
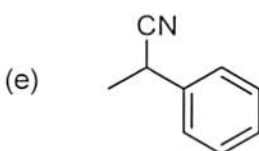
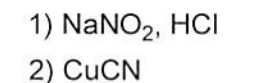
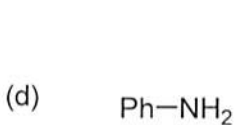
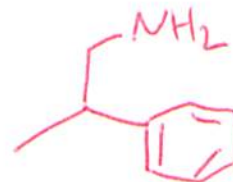
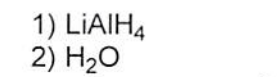
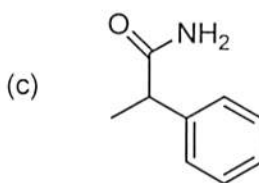
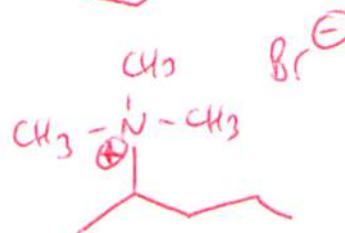
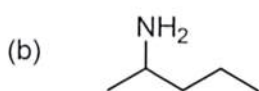
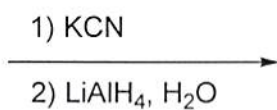
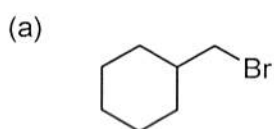


Hemiacetal

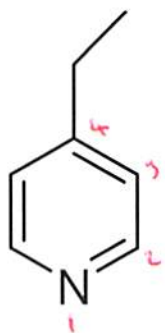
12) Circle the *most basic atom* in each of the following species. (3pts)



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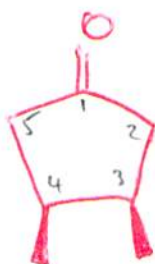


14) a) Name the following molecule in IUPAC acceptable terms. (2pts)

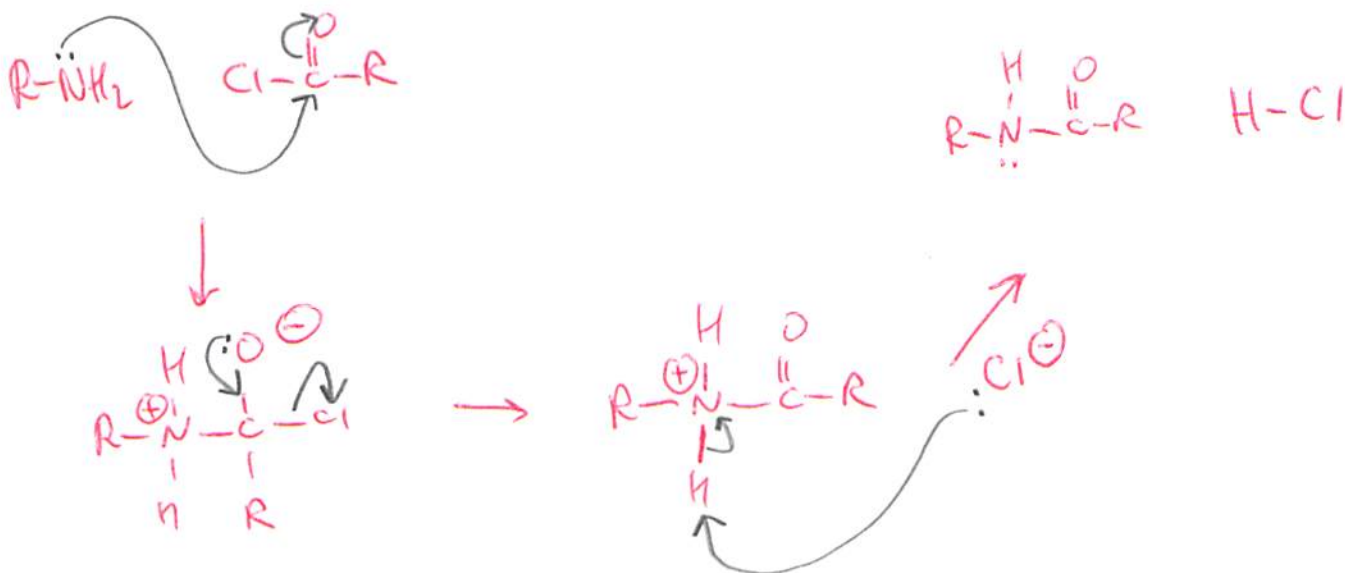


4-Ethylpyridine

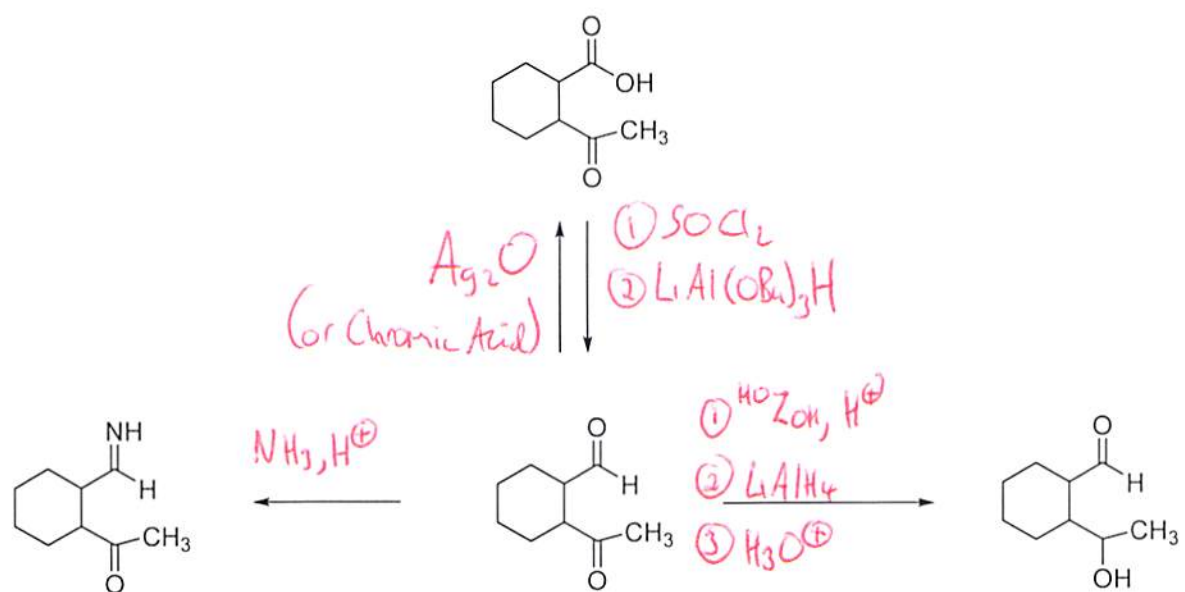
b) Using any format you wish, draw *cis*-3,4-dimethylcyclopentanone. (3pts)



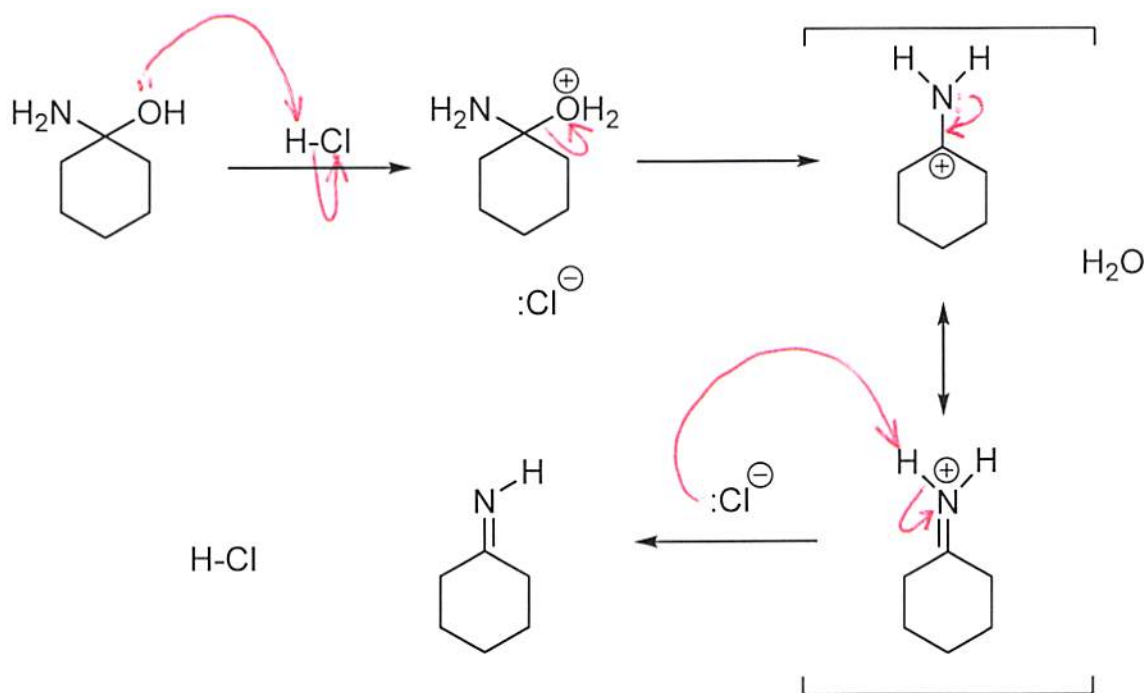
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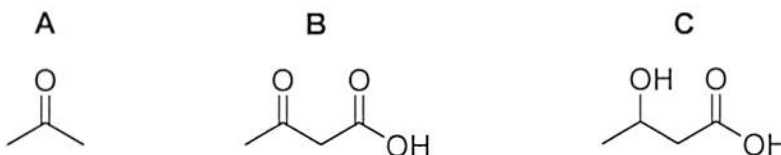
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Chromic Acid

****Bonus question** (up to 2pts)**

For the three “ketone bodies” in Q18, one is chiral. State which one is chiral.

C

The human liver produces exclusively the R enantiomer of that molecule, draw this specific enantiomer.

