Department of Chemistry and Biochemistry

Chemistry 59-230 **Lab Exam**
Time: 50 min. **Nov. 29, 2007**

NAME _____ **ID#**_____

LAB SECTION ***(and TA name)***_____

Note: Read all questions and these instructions CAREFULLY! Answer all questions on the test paper **by indicating in the box beside the question** the letter of the answer you select as the ***BEST*** answer. There are 21 questions; **do any 20.**
MAKE SURE YOUR NAME, STUDENT NUMBER AND LAB SECTION ARE *CORRECTLY ENTERED ABOVE. Tests written in pencil will be marked, but cannot be returned for remarking.*

1. Recrystallization is an isolation technique that takes advantage of :
   a. Difference in solubilities of components in a mixture so that the desired compound can be selectively precipitated out of the solution.
   b. Difference in volatility and thus the desired compound can be evaporated and isolated as a gas.
   c. Pure luck and thus it can never be used in a reproducible manner.
   d. The reaction of the solvent with the impurities to leave the desired compound unchanged.

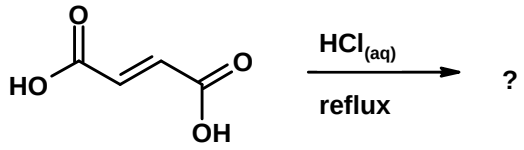
2. For an **extraction**, which of the following statements is **TRUE**?

   a) Solubility of organic materials in water is small except for some low molecular weight alcohols, ketones, acids, and amines.
   b) As the molecular weight increases, its solubility decreases.
   c) Non-polar solvents (i.e. benzene, ether, and acetone) dissolve most organic materials very easily but ionic inorganic materials dissolve very poorly.
   d) all of the above

3. What is the purpose of venting the separatory funnel during an extraction?

   a) To allow for proper separation of the immiscible layers
   b) To release pressure build-up
   c) To allow for precipitation of impurities.
   d) To allow for re-adjustment of temperature.

4. The reaction of fumaric acid with aqueous HCl as shown below, gives mostly:



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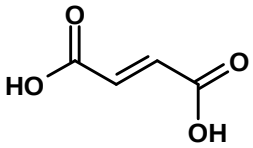

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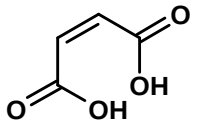

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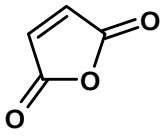

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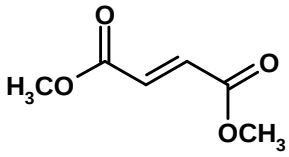
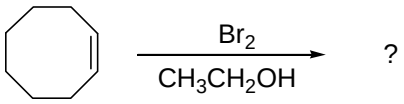


5)

The IUPAC name of trans-stilbene is

a. (E)-1,2-dibromoethene
b. (Z)-1,2-dicholoroethene
c. (E)-1,2-diphenylethene
d. (Z)-1,2-diiodoethene

6. Bromination of cyclooctene was carried out in ethanol, what is the major product formed in the reaction?



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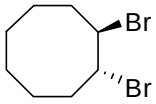

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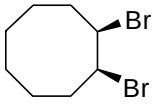

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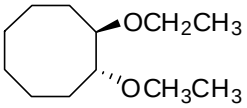

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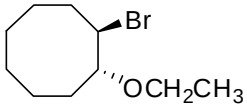
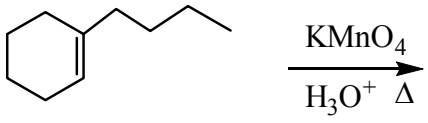
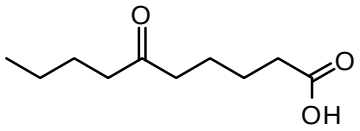


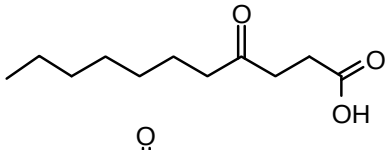
7. Which of the following is <u>NOT</u> an example of a common drying agent?

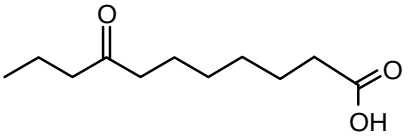
a) Magnesium Sulfate
b) Sodium Sulfate
c) Silver Nitrate
d) Calcium Chloride

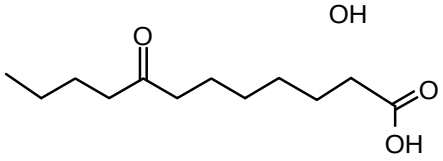
8) Predict the product for the following reaction:



a.) 

c.) 

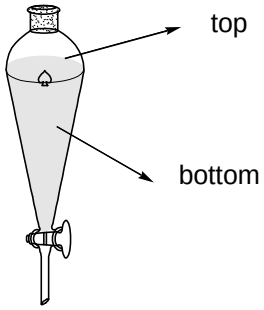
b.) 

d.) 

9. The purpose of adding methyltrioctylammonium chloride (Aliquat 336) during the Na_2WO_4 induced oxidation of cyclohexene is:

a) to reoxidize the tungsten compound so that it can be present in catalytic amounts
b) as a phase transfer catalyst to 'transport' reagents to the organic phase and back
c) to convert the organoborane to an alcohol
d) so that only the π-bond and not the σ-bond of cyclohexene reacts

10. A young chemist was preparing to do an extraction between chloroform and water but could not remember what layer will be on top of the separatory funnel - can you help?



a) Chloroform on top
b) Chloroform on bottom
c) No separation, as they are miscible
d) No separation, as they will react with each other

11. In lab we went over S_N1 and S_N2 mechanisms. What of the following statements does not apply to the S_N1 type reaction?

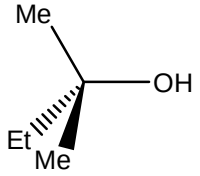
A. Has a rate determining step, which is the formation of a carbocation
B. Happens through a concerted mechanism with a bimolecular transition state.
C. Would prefer polar, protic solvent.
D. Tertiary compounds are better suited for this type of reaction

12)

Which one of the following doesn't show a positive silver nitrate test?

a. Primary halides
b. Secondary halides
c. Tertiary halides
d. None of the above

13. The following molecule undergoes a nucleophilic substitution reaction with HCl. Which statement is true?

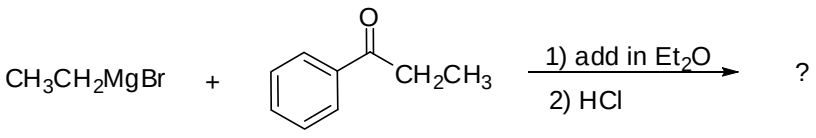


a) An S enantiomer is formed.
b) An R enantiomer is formed.
c) A racemic mixture is formed.
d) None of the above.

14. Benzoic acid synthesized by Grignard reaction can be isolated from the crude reaction mixture (containing non polar side products) by:

a. Treating the mixture with an aqueous solution of NaOH and the re-acidifying the collected aqueous layer to an acidic pH.
b. Dissolving the mixture in ether and heat up until all the ether evaporates
c. There is no need for any of the above to isolate the benzoic acid since the reaction is 100% efficient and no side product is expected.
d. Both a and b.

15. Grignard reagents of Ethyl magnesium bromide was prepared and reacts with ethyl phenyl ketone to form what type of product.

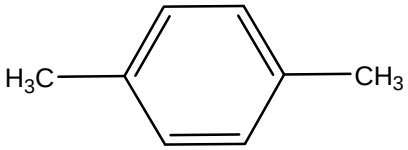


a. primary alcohol
b. secondary alcohol
c. tertiary alcohol
d. ketone

16. Two (and only two) compounds, benzoic Acid and methanol (in excess) are refluxed together. What will the main products be after 1 hour?

a) Methyl benzoate and water
b) Methyl benzoate, water, and methanol
c) Benzoic acid and methanol
d) Methyl benzoate, water, methanol and benzoic acid

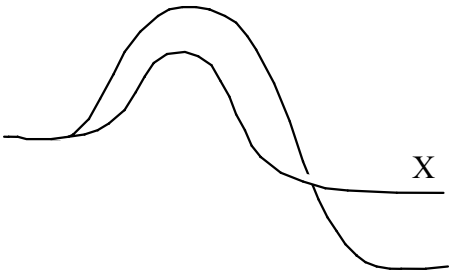
17. How many distinct proton chemical environments does 1,4-dimethylbenzene possess?



a. 10
b. 6
c. 2
d. 1

18. Imines are nitrogen analogues of :
(a) alcohols
(b) ethers
(c) amines
(d) aldehydes

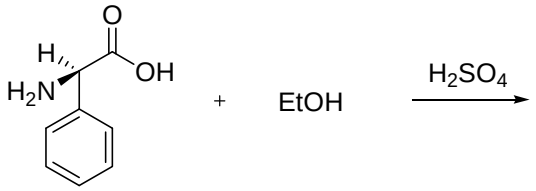
19. On the following Diagram what is X:



A Thermodynamic product
B Kinetic product
C Reactant
D Transition State.

20. Which of the following reactions does <u>NOT</u> produce an optically active product?

a)



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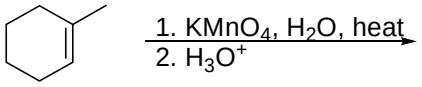
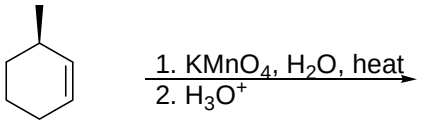


c)



d) b and c

21. For S_N1 and S_N2 mechanisms, the 1 & 2 stand for:

a. The number of reactants in the reaction
b. The order of the reaction (unimolecular/bimolecular)
c. The number of steps in the reaction mechanism
d. The order in which the mechanisms were discovered