

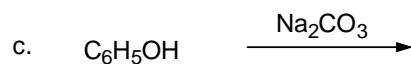
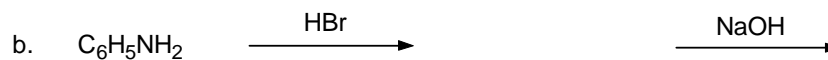
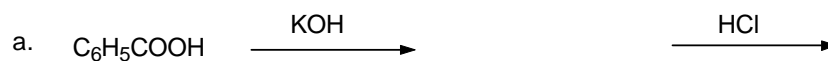
King Saud University  
College of Pharmacy  
Dept. of Pharm. Chem.

Pharm. Chem. 211  
Final Exam

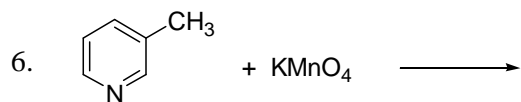
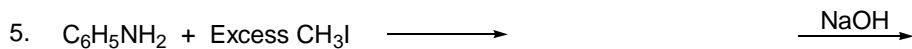
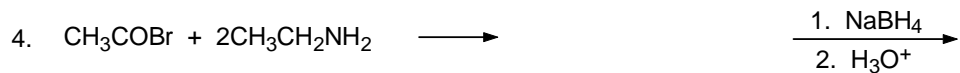
I. 1. The chemical classes for some common classes of organic compounds are tabulated below. Give the corresponding general formula for each chemical class (4 M).

Chemical class	General formula	Chemical class	General formula
1. Sulfonamides		5. Acid halides	
2. Esters		6. 3° Amides	
3. Quaternary ammonium salts.		7. Aldehydes	
4. Amino acids.		8. Salts of 3°amines	

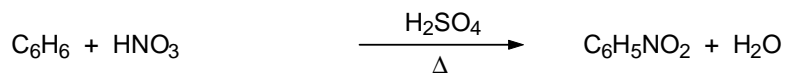
2. Complete each of the following acid-base reactions. If no reaction occurs write "no reaction", and give the name(s) of the major product(s) (4 M).



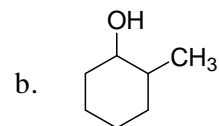
II. Complete **each** of the following chemical reactions. If no reaction occurs write “no reaction” and give the name(s) of the major product(s) (6 M):



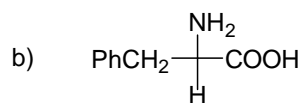
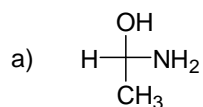
III. Suggest a mechanism for the following chemical reaction (1.5 M):



- IV. 1. Draw the possible isomers of the following molecule and indicate the type of both isomerism and resulting isomers. (3 M)

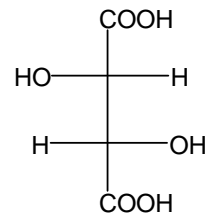
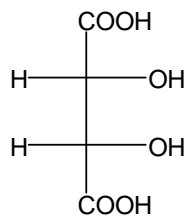
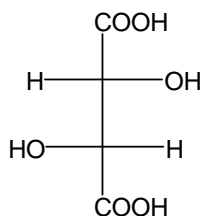


2. Assign (R)- or (S)- to each of the following Fischer projection formula. (2 M)

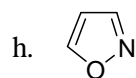
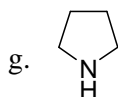
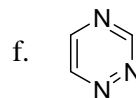
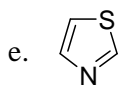
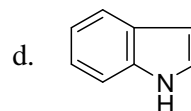
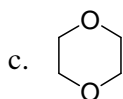
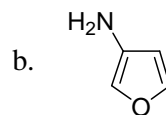
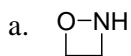


3. Which of the following Fischer projections represent (1.5 M)

- (a) enantiomers.  
 (b) which are diastereoisomers.  
 (c) which is a meso form.



IV. 1. Name **each** of the following molecules (4 M):



2. Draw the structural formula for **each** of the following molecules (4 M).

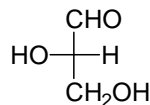
a. 3-Hydroazepine.      b. 6-Hydro-1,3-oxazine      c. Piperidine

d. Furan      e. Pyrimidine      f. Quinoline

g. 4,5-Dihydro-1,3-thiazole.      h. Piperazine.

- V. Circle the most appropriate answer: (10 M)
- Homolytic bond cleavage results in the formation of :
    - Carbocation.
    - Carbanion.
    - Free radicals.
    - Ionic species.
  - Nucleophilic reagents are:
    - Electron deficient.
    - Electron donor.
    - Electron acceptor.
    - Lewis acids.
  - $S_N1$  reactions proceed through the formation of:
    - Carbocation.
    - Carbanion.
    - Transition state.
    - Free radical.
  - Lactones are:
    - Cyclic esters.
    - Cyclic amides.
    - Cyclic amines.
    - Cyclic ethers.
  - A racemic mixture is an equal mixture of:
    - Diastereoisomers.
    - Enantiomers.
    - Stereoisomers.
    - Meso compounds.
  - Aldehydes and ketones could be distinguished by:
    - Iodoform test.
    - $Na_2CO_3$  solubility test.
    - Hinsberg test.
    - Tollen's test.
  - Which of the following compounds can form a zwitter ion:
    - $CH_3CH(NH_2)COOH$ .
    - $CH_3NH_2$ .
    - $CH_3COOH$ .
    - $CH_2(^+NH_3)COO^-$ .

8. Which of the following compounds can undergo tautomerism:
- $\text{CH}_3\text{COCH}_3$ .
  - $\text{C}_6\text{H}_5\text{OH}$ .
  - $\text{CH}_3\text{CONH}_2$ .
  - $\text{C}_6\text{H}_5\text{CHO}$ .
9. The D,L-system of nomenclature is used to determine the:
- Absolute configuration of carbohydrates and related compounds.
  - Relative configuration of carbohydrates and related compounds.
  - Absolute conformation of carbohydrates and related compounds.
  - Relative conformation of carbohydrates and related compounds.
10. Acetamide is not basic, because:
- The lone pair of electrons is not available for acid.
  - The lone pair of electrons is available for acid.
  - The lone pair of electrons is involved in electron ring resonance.
  - It has no lone pair of electrons.
11. In 1,3-disubstituted cyclohexane, the axial-axial and equatorial-equatorial derivatives are:
- The trans (E) isomer.
  - The R-enantiomer.
  - The cis (Z) isomer.
  - The S-enantiomer.
12. The chair and boat forms of cyclohexane are called:
- Diastereoisomers.
  - Enantiomers.
  - Structural isomers.
  - Conformers.
13. The formula shown below is that of:
- (D)-(+)-Glyceraldehyde.
  - (L)-(+)-Glyceraldehyde.
  - (D)-(-)-Glyceraldehyde.
  - (L)-(-)-Glyceraldehyde.



14. A chiral carbon is that:
- With four different substituents.
  - Which can't be superimposed on its mirror image.
  - With four similar substituents.
  - Which can be superimposed on its mirror image.

15. Which of the following is a fused 1,3-azole:
- Quinoline.
  - Benzimidazole.
  - Indole.
  - Dibenzazepine.
16. Ethanol and dimethyl ether are:
- Diastereoisomers.
  - Enantiomers.
  - Structural isomers.
  - Structural isomerism.
17. The infrared (IR) spectroscopic technique is very useful for identification of:
- Structural formula.
  - Molecular formula.
  - Chemical name.
  - Functional groups.
18. 1,2- and 1,3-Dimethylcyclohexanes are:
- Diastereoisomers.
  - Geometrical isomers.
  - Optical isomers.
  - Structural isomers.
19.  $\text{H}_2\text{O}$ ,  $\text{C}_6\text{H}_5\text{OH}$ ,  $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ ,  $\text{CH}_3\text{COOH}$  and  $\text{HBr}$  could be listed in order of increasing acidity as follows:
- $\text{H}_2\text{O} < \text{C}_6\text{H}_5\text{OH} < \text{C}_6\text{H}_5\text{CH}_2\text{OH} < \text{CH}_3\text{COOH} < \text{HBr}$ .
  - $\text{C}_6\text{H}_5\text{OH} < \text{H}_2\text{O} < \text{HBr} < \text{C}_6\text{H}_5\text{CH}_2\text{OH} < \text{CH}_3\text{COOH}$ .
  - $\text{H}_2\text{O} < \text{C}_6\text{H}_5\text{CH}_2\text{OH} < \text{C}_6\text{H}_5\text{OH} < \text{CH}_3\text{COOH} < \text{HBr}$ .
  - $\text{HBr} > \text{CH}_3\text{COOH} > \text{C}_6\text{H}_5\text{OH} > \text{C}_6\text{H}_5\text{CH}_2\text{OH} > \text{H}_2\text{O}$ .
20. Pyrrole is:
- Weak acid.
  - Basic.
  - Strong acid.
  - Neutral.