1. (7 pts) (Parts a and b each have 2 answers) On yellow sheet, which of the structures A-F:
   - (a) Represent the same compound as Structure I? B, C, F
   - (b) Represent the enantiomer of Structure I? C, E, F
   - (c) Represent a diastereomer of Structure I? D, G
   - (d) Do not have any of the above relationships to Structure I? A, H
   - (e) Which of the structures A-F represents a meso compound? B

2. (4 pts) (Each part has one answer) On the yellow sheet, which of the structures P-S:
   - (f) Represents the same compound as Structure II? P
   - (g) Represents the enantiomer of Structure II? Q
   - (h) Represents a diastereomer of Structure II? R
   - (i) Does not have any of the above relationships to Structure II? S, R

3. (2 pts) For each of the structures, X and Y, on the yellow sheet, give the total number of chiral carbons.
   - Structure X: 4
   - Structure Y: 2

4. (4 pts) Complete the two structures pictured below so that they represent:
   - (a) A meso-1,2,3,4-tetra-bromo-cyclohexane
   - (b) One enantiomer of racemic 2,3-dibromobutane
   - (c) One enantiomer of racemic 3,4-dichlorocyclobutane
   - (d) Meso-2,5-dichloro-octane
STEREOCHEMISTRY AND CONFORMATIONAL ANALYSIS QUIZ WITH MODELS

TEAR-OFF WORKSHEET WITH STRUCTURES FOR PROBLEMS 1, 2, AND 3
(KEEP THIS SHEET FOR FUTURE REFERENCE)

PROBLEM 1:

A)

B)

C)

D)

E)

F)

G)

H)

I)

This year, 6 structures instead of 8

PROBLEM 2:

P)

Q)

R)

S)

PROBLEM 3:

STRUCTURE X:

STRUCTURE Y:
Second Example

Stereochemistry and Conformational Analysis Quiz with Models

Tearoff Worksheet with Structures for Problems 1, 2, and 3 (Keep this sheet for future reference)

PROBLEM 1:

- **A**
  - Diestereomer
  - CH₃
  - H
  - H
  - F
  - F
  - H

- **B**
  - None
  - CH₃
  - H
  - H
  - F
  - F
  - H

- **C**
  - Same
  - CH₃
  - H
  - H
  - F
  - F
  - H

- **D**
  - None
  - CH₃
  - H
  - H
  - F
  - F
  - H

- **E**
  - Enantiomer
  - CH₃
  - H
  - H
  - F
  - F
  - H

- **F**
  - Same
  - CH₃
  - H
  - H
  - F
  - F
  - H

- **G**
  - Diastereomer
  - CH₃
  - H
  - H
  - F
  - F
  - H

- **H**
  - Enantiomer
  - CH₃
  - H
  - H
  - F
  - F
  - H

**STRUCTURE I:**

**STRUCTURE II:**

PROBLEM 2:

- **P**
  - Same
  - CH₃
  - H
  - H
  - F
  - Cl
  - Cl

- **Q**
  - Diastereomer
  - CH₃
  - H
  - H
  - F
  - Cl
  - Cl

- **R**
  - None
  - CH₃
  - H
  - H
  - F
  - Cl
  - Cl

- **S**
  - Enantiomer
  - CH₃
  - H
  - H
  - F
  - Cl
  - Cl

**STRUCTURE X:**

**STRUCTURE Y:**

PROBLEM 3:

**STRUCTURE X:**

**STRUCTURE Y:**

HO
5. (2 pts) One of the products drawn to the right of each of the equations below is a major or the only product of each reaction in its correct stereochemistry (not necessarily in its best conformation). For each reaction, circle the structure corresponding to the major product.

6. (10 pts) Draw the main carbon containing product for each of the reactions below.

7. (3 pts) Write equations to show how the following conversion can be carried out. The conversion will require more than one step.
Extra Example Reactions & Syntheses for 6 and 7

6. (10 pts) Draw the main carbon containing product for each of the reactions below.

\[
\text{Ph} - H + H - C = N \xrightarrow{\text{Catalyst}} \quad \text{Ph} - C = N
\]

\[
\text{CH}_3\text{O} + \text{MgBr} \quad + \quad \text{Cyclohexane} \xrightarrow{\text{H}_2\text{O}^+ \text{ then \ Hydride}} \quad \text{CH}_3\text{OH} + \text{OCC}
\]

\[
\text{CH}_3\text{CH}_2\text{C} - H + \text{PhNH}_2 \xrightarrow{\text{H}^+ \text{ Catalyst}} \quad \text{CH}_3\text{CH}_2\text{C} - \text{N}_H
\]

\[
\text{Cyclohexanol} + \text{CuO}_3 \longrightarrow \quad \text{Cyclohexanone}
\]

\[
\text{CH}_2\text{OH} + \text{PCC} \longrightarrow \quad \text{Cyclohexanone}
\]

7. (3 pts) Write equations to show how the following conversion can be carried out. The conversion will require more than one step.

\[
\text{Ph} - \text{CH}_2\text{CH}_2\text{C} - \text{H} \xrightarrow{\text{CuO}_3} \quad \text{Ph} - \text{CH}_2\text{CH}_2\text{CH}_3
\]

\[
\text{Ph} - \text{CH}_2\text{CH}_2\text{C} - \text{H} \xrightarrow{\text{H}_2\text{O}^+} \quad \text{Ph} - \text{CH}_2\text{CH}_2\text{CH}_3
\]

\[
\text{Ph} - \text{CH}_2\text{CH}_2\text{N}_2 \xrightarrow{\text{RMgX}} \quad \text{Ph} - \text{CH}_2\text{CH}_2\text{N}_2
\]

\[
\text{OH} \xrightarrow{\text{H}_2\text{O}^+ \text{ Catalyst}} \quad \text{CH}_3\text{C} - \text{CH}_3
\]

\[
\text{CH}_3\text{C} - \text{CH}_3 \xrightarrow{\text{CuO}_3} \quad \text{CH}_3\text{C} - \text{CH}_3
\]

\[
\text{OH} \xrightarrow{\text{H}_2\text{O}^+ \text{ Catalyst}} \quad \text{CH}_3\text{C} - \text{CH}_3
\]

\[
\text{OH} \xrightarrow{\text{H}_2\text{O}^+ \text{ Catalyst}} \quad \text{CH}_3\text{C} - \text{CH}_3
\]