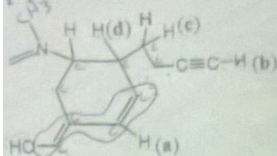


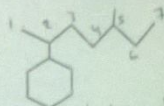
السؤال (9-8)

[I] Consider the following structure and answer the questions below. (3 points)

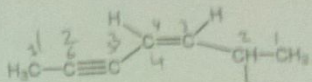


- (a) Molecular formula of the compound: $C_{13}H_{12}NO$
 (b) The number of sp^2 carbons present: (5).
 (c) The most acidic hydrogen (a, b, c, or d): (b).
 (d) The formal charge of N atom: (+1).
 (e) On the drawing, circle the conjugated multiple bonds.

[II] Give IUPAC name for each of the following structures. (8 points)



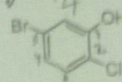
2-cyclohexylheptane



2-methyl-3-heptene-7-yne



1-methylcyclopentene

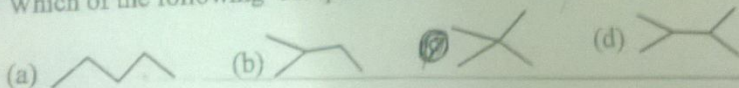


5-bromo-2-chlorophenol

[III] Circle the correct answer for each of the following questions. (10 points)

- What is the maximum number of constitutional (structural) isomers for C_4H_9Br ?
 (a) two (b) three (c) four (d) five

- Which of the following compounds has the lowest boiling point?



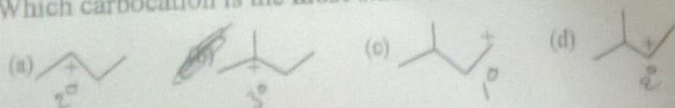
- Which cyclohexane derivative is the most stable?

- (a) cis-1,2-dimethylcyclohexane (b) trans-1,3-dimethylcyclohexane
 (c) 1,1-dimethylcyclohexane (d) cis-1,3-dimethylcyclohexane

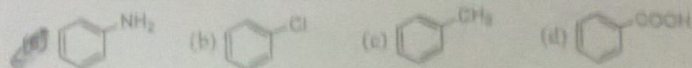
- Which compound is the least stable (most strained)?

- (a) benzene (b) Cyclohexane (c) cyclopentane (d) cyclopropane

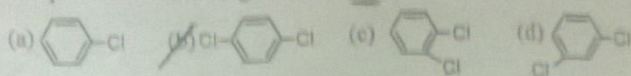
- Which carbocation is the most stable?



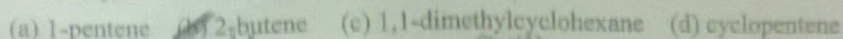
- Which compound is **most** reactive in electrophilic aromatic substitution?



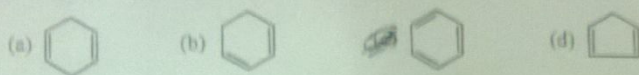
- The compound which can give only **one** mono-bromination derivative.



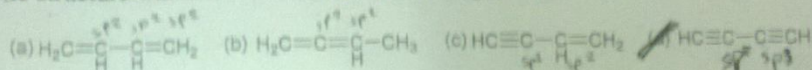
- The compound which can have **cis/trans**-isomeric forms.



- Which substance has the highest amount of resonance energy?

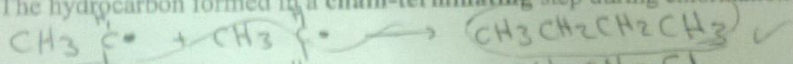


- The structure which has the **shortest** C-C single bond.

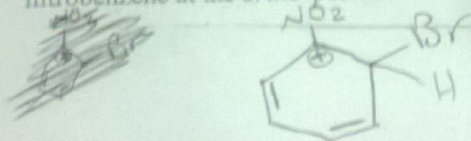


[IV] Draw the required structure in each of the following. (20 points)

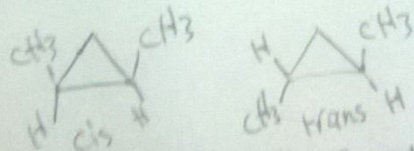
- The hydrocarbon formed in a **chain-terminating** step during chlorination of ethane.



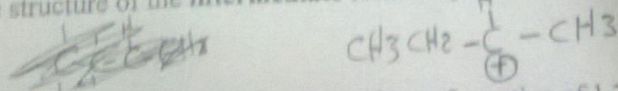
- The **least** stable resonance structure for the intermediate of bromination of nitrobenzene at the **ortho**-position.



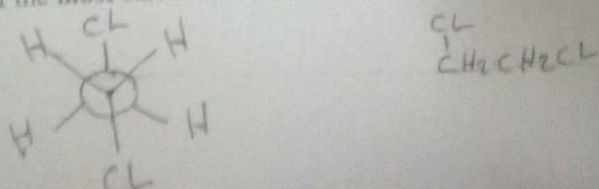
- C_5H_{10} which exhibits **cis/trans**-isomerism and does not react with $\text{Br}_2 / \text{CCl}_4$.



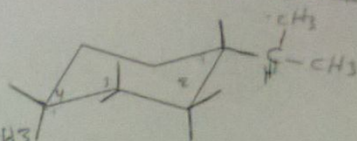
- The structure of the **intermediate** formed upon the addition of H^+ to 1-butene.



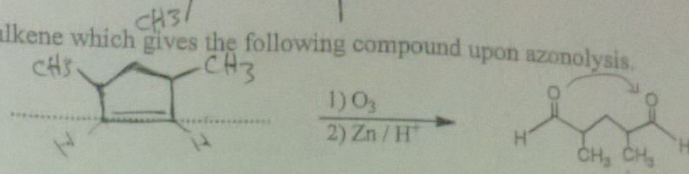
- Newman projection of the **most** stable conformation of 1,2-dichloroethane.



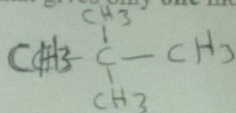
- The most stable conformation of cis-1-isopropyl-4-methylcyclohexane.



- The alkene which gives the following compound upon ozonolysis.



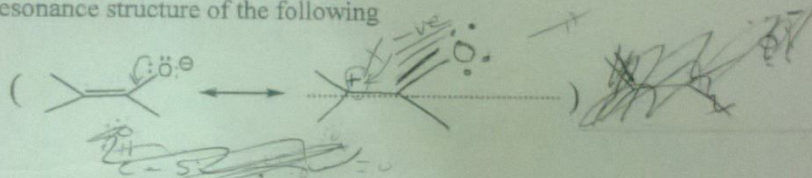
- C_5H_{12} that gives only one monobromo-derivative with Br_2 / uv light.



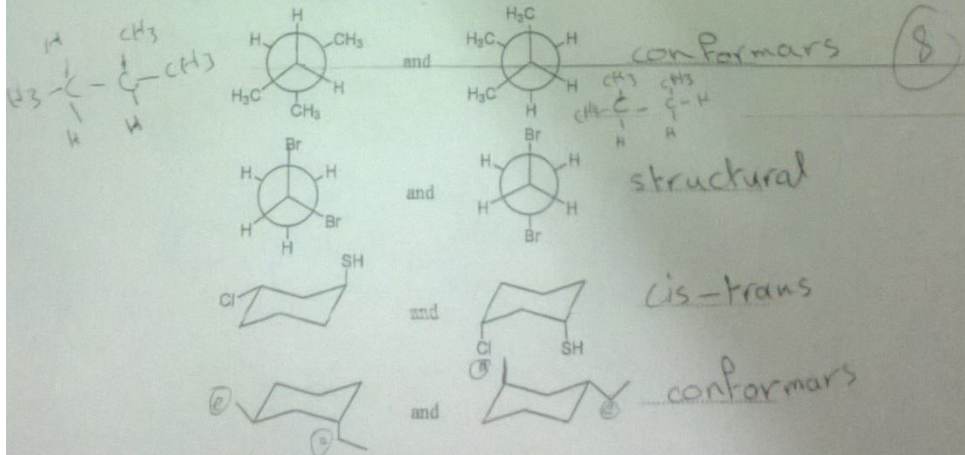
- The electrophile formed in the nitration of benzene.



- A resonance structure of the following



- [V] Classify each pair of compounds as constitutional (structural) isomers, configurational (*cis-trans*) stereoisomers, conformational stereoisomers (conformations), or identical. (8 points)



[VI] Complete the reactions. Show stereochemistry for the first two. (24 points)

