

March 29, 2010

The University of Jordan
Chemistry Department
Organic Chemistry 233

First Exam (60 min.)

Name:

Registration No.: 0094224

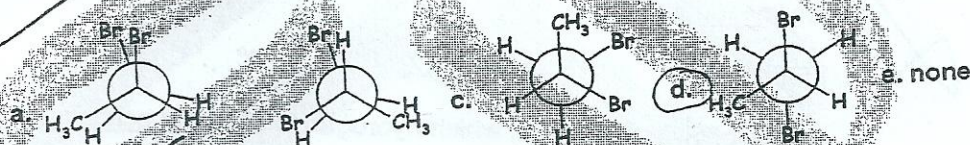
Section 6

Q1: Circle the correct answer in each of the following (10 pts)

1- If the following compounds are arranged according to the boiling points, which one has the lowest?

- a. 2-methylhexane b. 2-methylpentane c. 2,2-Dimethylbutane
d. 2,3-dimethylbutane e. n-Hexane

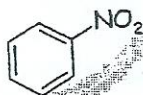
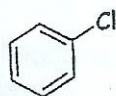
2- The most stable conformation of 1,2-dibromopropane is:



3- In which of the following compounds is the carbon the lowest oxidation state?

- a. CO_2 b. HCO_2H c. CO d. H_2CO e. H_3COH

4- The reactivity of the following compounds towards $\text{HNO}_3 / \text{H}_2\text{SO}_4$ is:



- a. I > II > III b. I > III > II c. II > I > III d. II > III > I e. III > I > II

5- The most stable conformation of cis-1-bromo-2-tert-butylcyclohexane is the one in which:

- a. the bromo is axial and the tert-butyl group is equatorial.
b. the tert-butyl group is axial and the bromo is equatorial.

- c. both groups are axial.
 d. both groups are equatorial.
 e. the compound is in the boat conformation.

6-How many configurational (cis-trans) isomers are possible for the formula 2,4,6-octatriene.

- a. 8 b. 12 c. 6 d. 2 **e. 4**

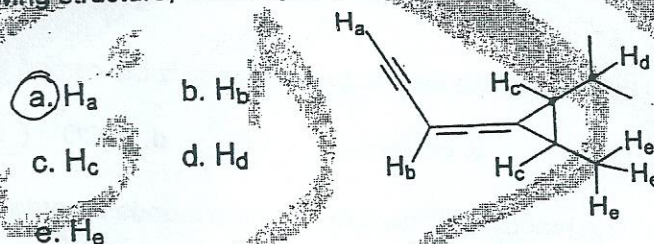
7- In which structure below does nitrogen have a formal charge of +1?

- a. $\text{CH}_3-\ddot{\text{N}}(\text{CH}_3)_2$ b. $\text{CH}_3-\ddot{\text{N}}-\text{H}$ c. $\text{H}-\ddot{\text{N}}(\text{OH})-\text{H}$ **d. $\text{CH}_3-\text{N}=\text{CH}_2$**
 e. $\text{CH}_3-\ddot{\text{N}}\text{H}_2$

8- What type of carbocation will form from the addition of a H^+ to 1-methylcyclopentene

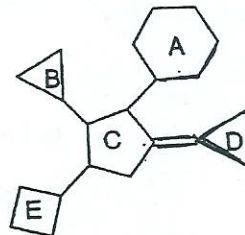
- a. Methylene b. 1° **c. 2°** d. 3° e. allyl

9- In the following structure, which hydrogen is the most acidic



10- In the structure below, the rings can be arranged according to angle strain as following:

- a. $A > B > C > D > E$ **b. $D > B > E > C > A$**
 c. $B = D > E > C > A$ d. $C > D > B > E > A$
e. $B > D > C > E > A$

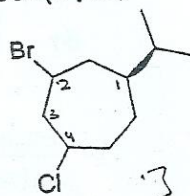


Q2: Provide IUPAC names for the following structures: (9 pts)

Cis -1-ethyl-3-Iodo cyclo hexane.



A- ~~Cis-1-ethyl-3-(1-methylethyl) cyclohexane~~

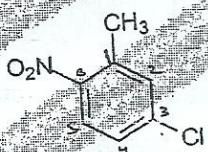


B- ~~1-(1-methylethyl)-2-Bromo-4-chloro cyclohexane~~

2-isopropyl-3-Bromo-1-chloro cyclohexane

C- ~~3-(1-methylethyl)-3-heptene~~

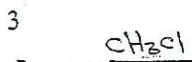
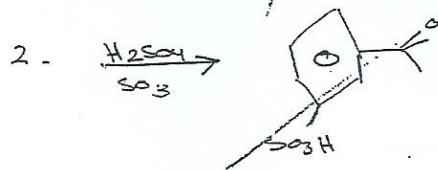
D- ~~4-methyl-6-octene-2-yne~~

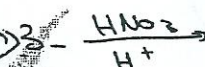
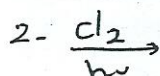
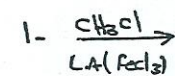
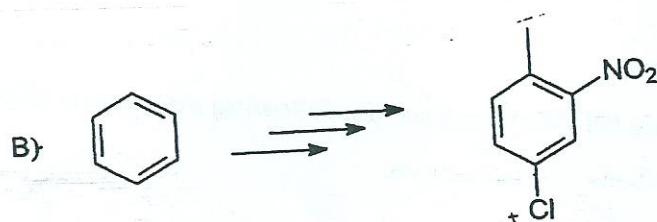


E- ~~3-Chloro-6-Nitro-toluene~~

F- ~~2-Bromo-3-cumene-5,5-dimethyl hexane~~

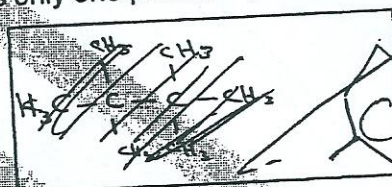
Q3: With the help of equations, outline the steps required for the synthesis of the following compounds from the indicated starting materials. Use any needed reagents (No mechanism). (6 pts)



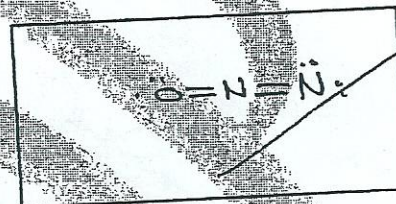


Q4. Draw in the box the structure of each the following: (6 pts)

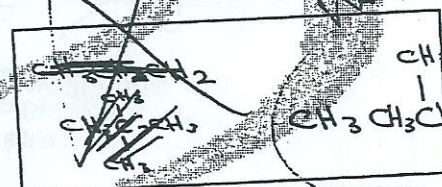
a. The aromatic hydrocarbon (C_8H_{10}) which gives only one product upon reaction with one mole $\text{CH}_3\text{COCl}/\text{AlCl}_3$:



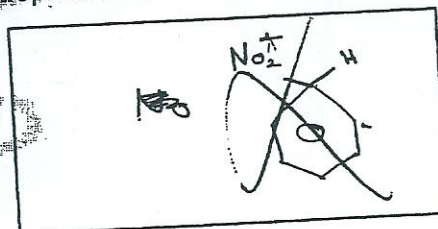
b. A resonance structure for



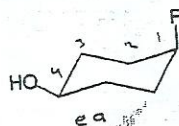
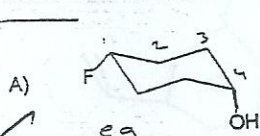
c. The constitutional isomer of C_5H_{10} which gives only two compounds upon monobrominated with $\text{Br}_2/\text{h}\nu$.



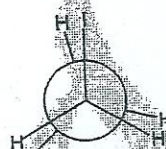
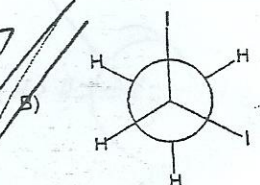
d. The most unstable intermediate in the electrophilic reaction of nitrobenzene.



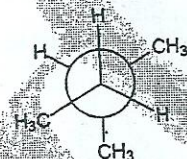
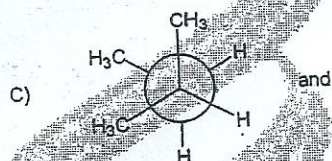
Q5: Classify each pair of compounds as constitutional (structural) isomers, configurational (cis-trans) isomers, resonance, conformational isomers or identical: (6 pts)



~~Identical~~



~~constitutional~~



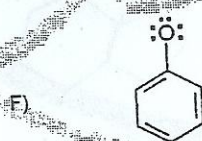
~~conformational~~



~~Identical~~

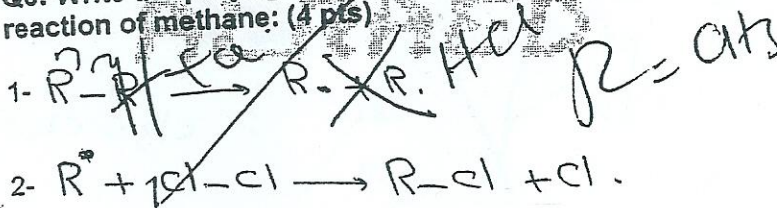


~~constitutional~~



~~Resonance~~

Q6: Write the propagation steps in the mechanism of the chlorination reaction of methane: (4 pts)



Q7: Complete the following reactions (9 pts)

