عضوية لقسم طلبة الكيمياء

First Exam Chemistry 233 Date 30/ 03.2011

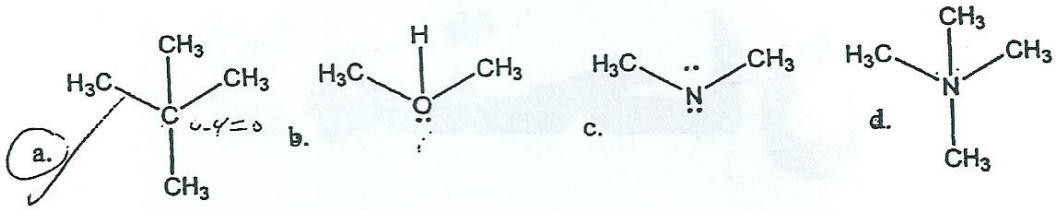
Name (in Arabic):.....Section.....

Registration Number:.....Time: 60 min

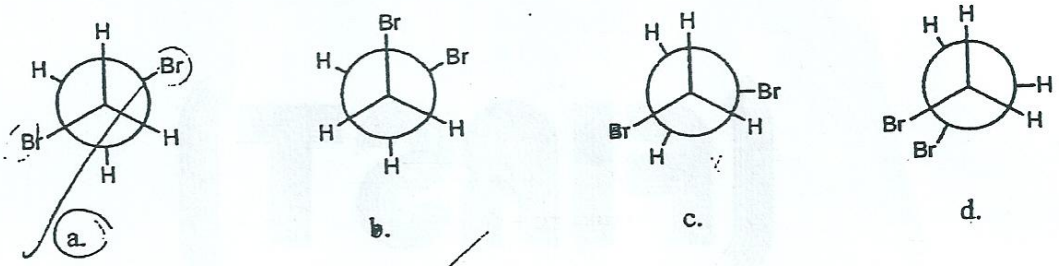
****

Q1.(8 pts) Choose the correct answer in each of the following:

1) In which of the following structures, does the central atom have a zero formal charge?



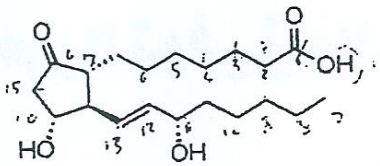
2) The most stable conformation of 1,2-Dibromoethane is :



3) Which of the following bonds is the least polar?

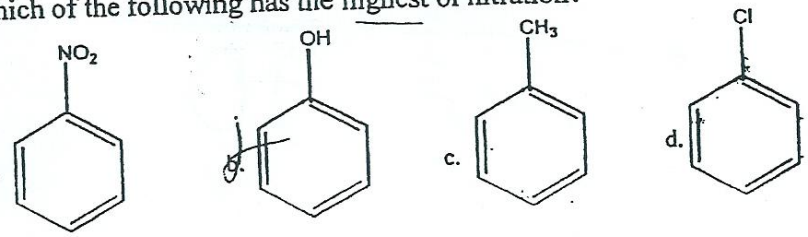
a. H-F b. H-C c. H-N d. H-O

4) The structure of prostaglandin is given bellow, then the molecular formula of the compound is

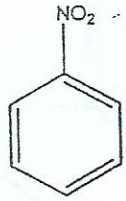


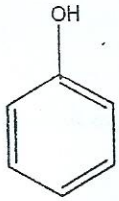
a. $C_{20}H_{42}O_5$ b. $C_{20}H_{36}O_5$ c. $C_{20}H_{34}O_5$ d. $C_{21}H_{34}O_5$

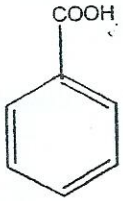
5) Which of the following has the highest of nitration?

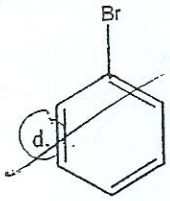


6) Which of the following is deactivating and *o*- and *p*-director?

a. 

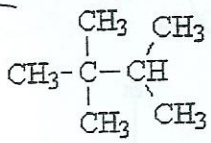
b. 

c. 

d. 

7) Which of the following alkanes would have the highest boiling point?

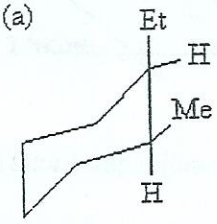
(a) $CH_3-CH_2-CH_2-CH_2-CH_2-CH_2-CH_3$

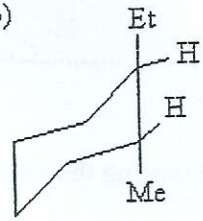
(b) 

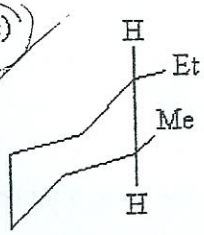
(c) $CH_3-CH_2-CH_2-CH_2-CH(CH_3)-CH_3$

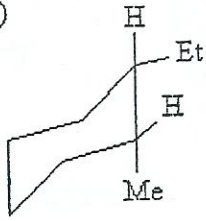
(d) $CH_3-CH(CH_3)-CH_2-CH(CH_3)-CH_3$

8) The most stable conformational isomer of *trans*-1-ethyl-2-methylcyclohexane is:

(a) 

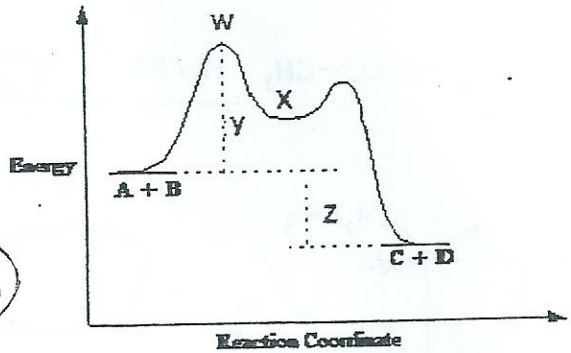
(b) 

(c) 

(d) 

Q2.(2pts) Examine the reaction energy diagram for the following reaction and answer the questions bellow.

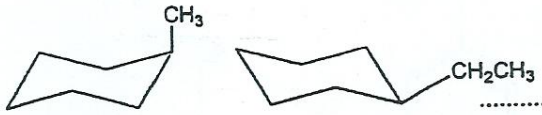
$$A + B \longrightarrow C + D$$



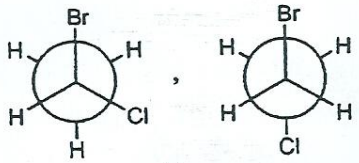
W represents...transition state..... X represents.....intermediate.....

Y represents...activating....energy.... Z represents.....ΔH.....
enthalpy

Q3.(5 pts) Classify the following pairs of structures as structural isomers, conformers, cis-trans isomers, or not isomers.

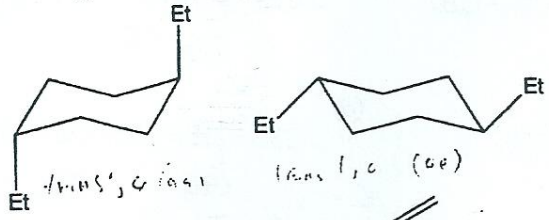
a. 

not isomers

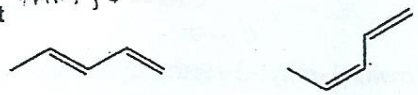
b. 

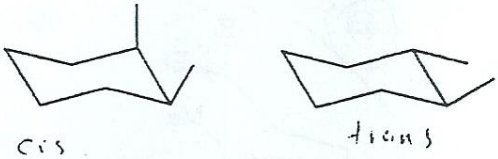
constitutional

5

c. 

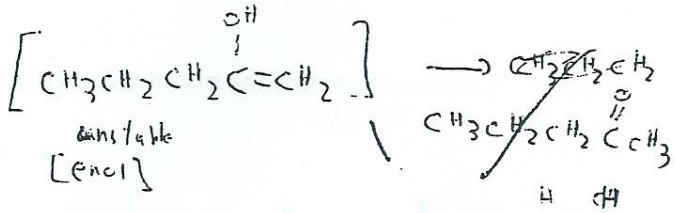
conformers

d. 
cis trans isomers

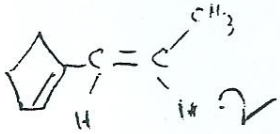
e. 

cis – trans isomers

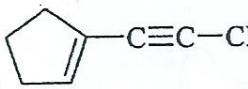
Q4.(9 pts) Complete the following reactions by writing the structure of the major product(s). Indicate the stereochemistry where appropriate.

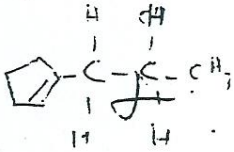
1. $CH_3CH_2CH_2C{\equiv}CH \xrightarrow[H_2SO_4]{H_2O,\ HgSO_4}$ 

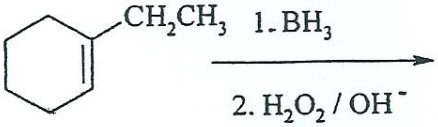
1

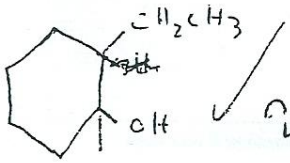
2. 

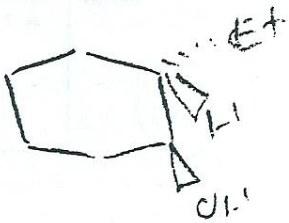
syn addition

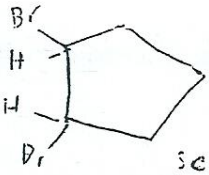
$\xleftarrow[\text{Lindlar's catalyst}]{H_2}$ 

$\xrightarrow{H_2\ /\ Pd}$ 

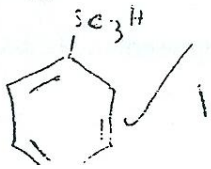
3. 

$\xrightarrow[2.\ H_2O_2\ /\ OH^-]{1.\ BH_3}$ 



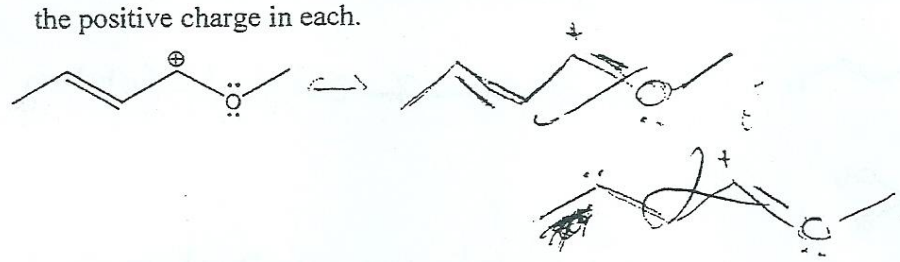
4. 
+ $Br_2 \xrightarrow{CCl_4}$ 

anti addition

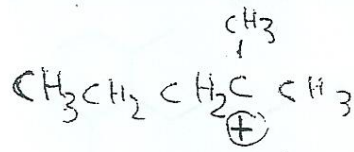
5. 
$\xrightarrow{SO_3/\ H_2SO_4}$ 

Q5. (16 pts) Draw the required structure in each of the following:

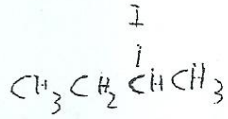
1. Two resonance structures for the following cation; indicating the atom that is going to bear the positive charge in each.



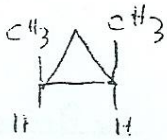
2. The Structure of the intermediate formed upon addition of H_2O/H^+ to 2-methyl-2-pentene.



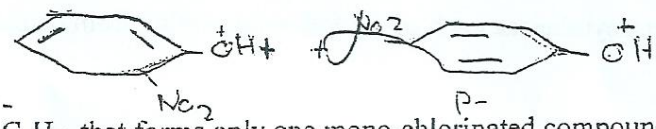
3. Sec-butyl iodide

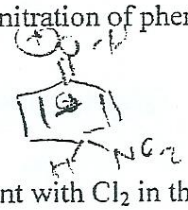


4. C_5H_{10} that shows *cis - trans* isomerism.

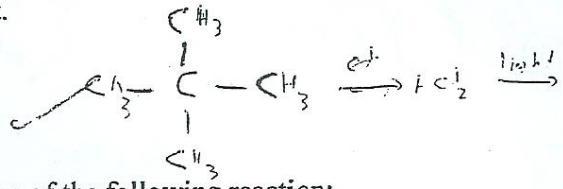


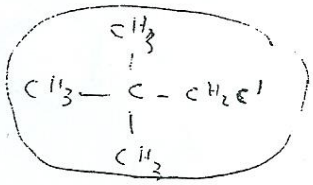
5. The most stable resonance structure of the intermediate formed upon nitration of phenol.





6. C_5H_{12} that forms only one mono-chlorinated compound upon treatment with Cl_2 in the presence of light.





one mono-chlorinate.

7. The initiation step of the following reaction:

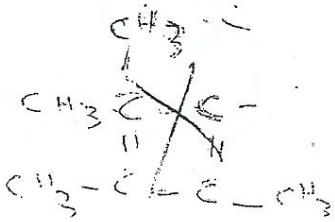
$$H_3C{-}CH_3 + Cl_2 \xrightarrow{\text{light}} H_3C{-}CH_2Cl + HCl$$

$Cl{-}Cl \longrightarrow 2\,Cl^{\cdot}$

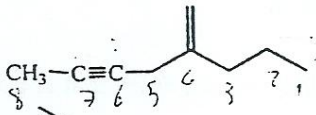
Free radical

8. The structure of A in the following ozonolysis reaction is

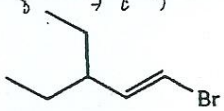
$$A \xrightarrow[\text{2. Zn / } H_3O^+]{\text{1. } O_3} CH_3\overset{O}{\overset{\|}{C}}CH_2\overset{O}{\overset{\|}{C}}CH_3 + CH_3\overset{O}{\overset{\|}{C}}{-}\overset{O}{\overset{\|}{C}}CH_3$$



Q6. (12 pts) Write a correct IUPAC name for each of the follwoing structures:

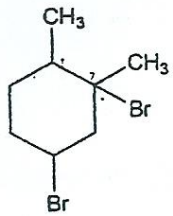
1. 

5-octene-2-yne 2

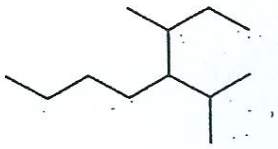
2. 

1-Bromo-3-Ethyl-1-penten 1

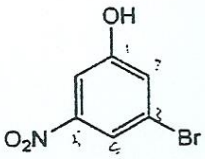
(4)

3. 

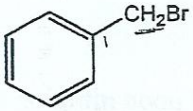
1,5-dibromo-1,2-dimethyl cyclohexan. 1

4. 

4-isopropyl-3-Methyl octane 2

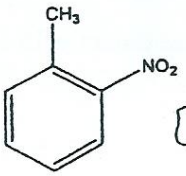
5. 

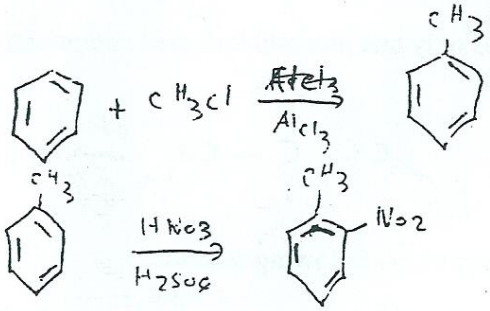
3-Bromo-5-nitro phenol 2

6. 

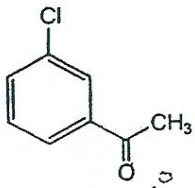
1-Bromo-1-phenyl methane 2

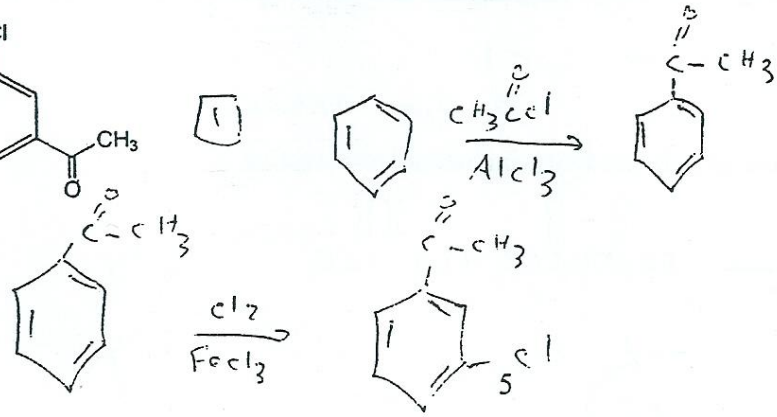
Q7. (4 pts) Show how you can synthesize each of the following stating from benzene.

1. 



(2)

2. 



m-