

مباراة للتعاقد مع مراقبين مساعدين في مديرية حماية المستهلك
في وزارة الاقتصاد والتجارة

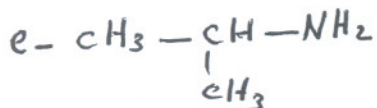
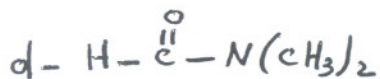
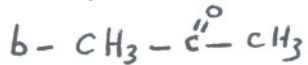
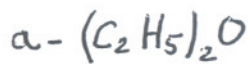
المهام : مراقب مساعد (كيميائي)

مسابقة في الكيمياء العضوية

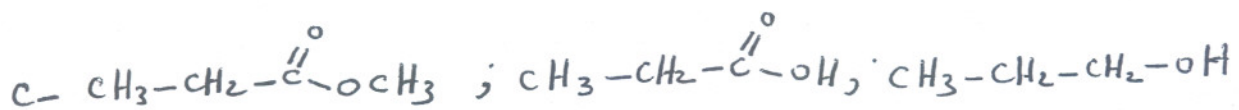
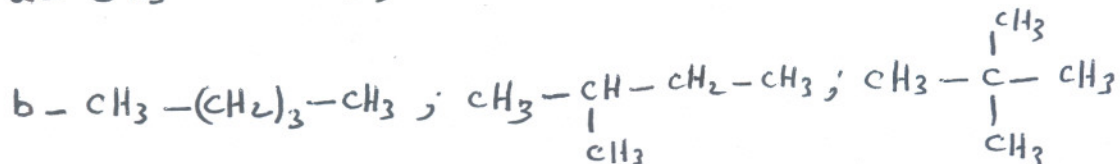
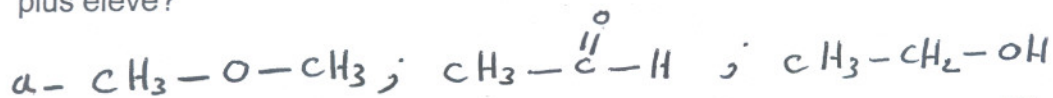
المدة : ساعتان

Problème I

1) Indiquer si chacun des composés organiques suivants est "protique" ou "aprotique":



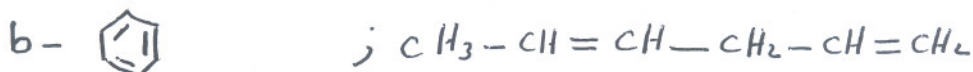
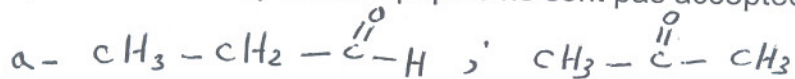
2) Dans chaque série de composés, lequel doit-il avoir le point d'ébullition le plus élevé?



Problème II

1) En utilisant des tests chimiques visuels, comment pouvez-vous différencier chaque composé dans chacune des paires suivantes (qu'est-ce que vous observez)?

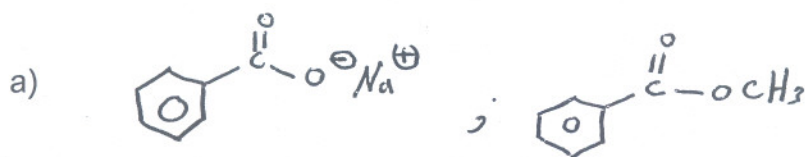
(Les méthodes spectroscopiques ne sont pas acceptées).

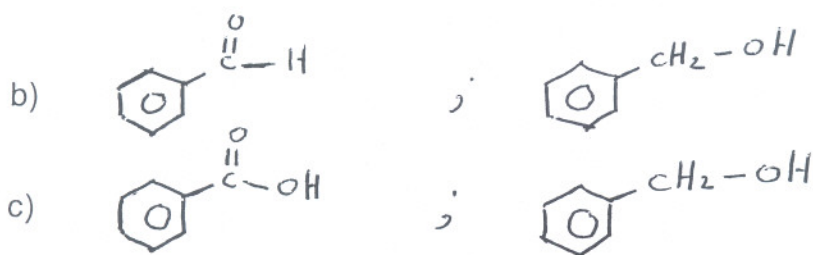


2) Les composés dans chaque paire sont séparés par chromatographie sur couche mince (CCM). Comment pouvez-vous révéler la présence de chaque composé dans chaque paire?



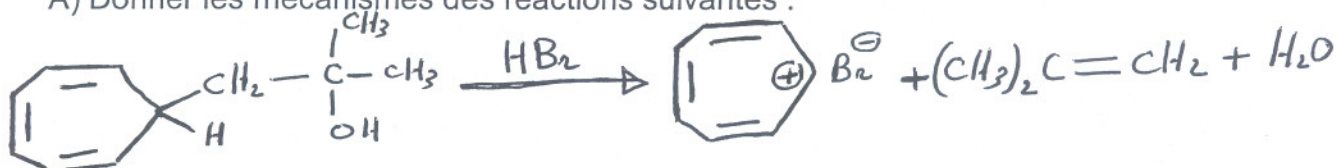
3) Suggérer une méthode convenable (non chromatographique) pour la séparation des composés des mélanges suivants:





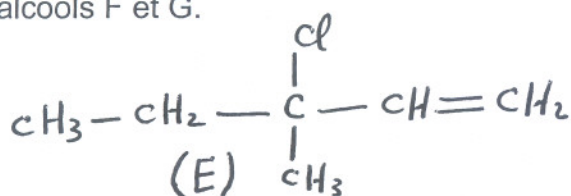
Problème III

A) Donner les mécanismes des réactions suivantes :



- Justifier la formation des produits formés.

B) L'hydrolyse du 3-chloro-3-méthylpent-1-ène (E) donne un mélange de deux alcools F et G.

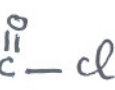


1 – Ecrire les structures de F et de G.

2 – Donner le mécanisme détaillé de leur formation.

3 – Quel autre précurseur halogéné, par hydrolyse, pourrait donner exactement le même mélange ?

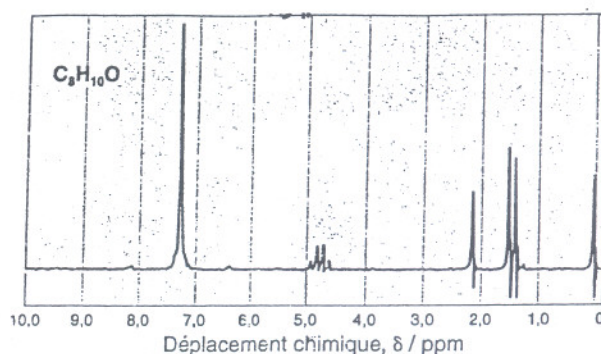
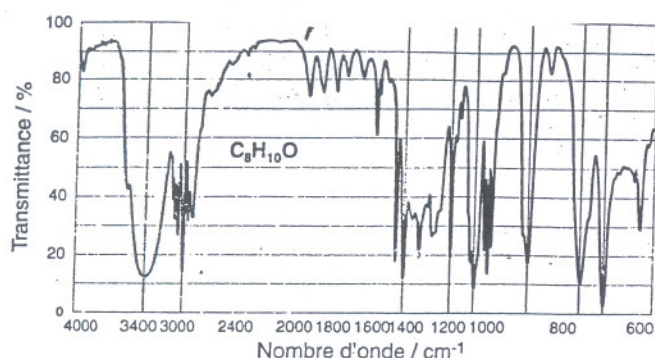
C) Prévoir le(s) produit(s) de la réaction de l'anisole () et du

chlorure d'acétyl () en présence de $AlCl_3$ dans un milieu

aprotique. Donner le mécanisme détaillé de cette réaction.

Problème IV

A – L'ion moléculaire d'un composé de formule brute $C_8H_{10}O$ se trouve à $m/z = 122$. Le spectre de masse contient également des pics à $m/z = 107$, 104 et 77. Le spectre IR et le spectre 1H -RMN sont représentés ci-dessous :



Proposer une structure pour ce composé. Interpréter les pics caractéristiques dans chaque spectre.

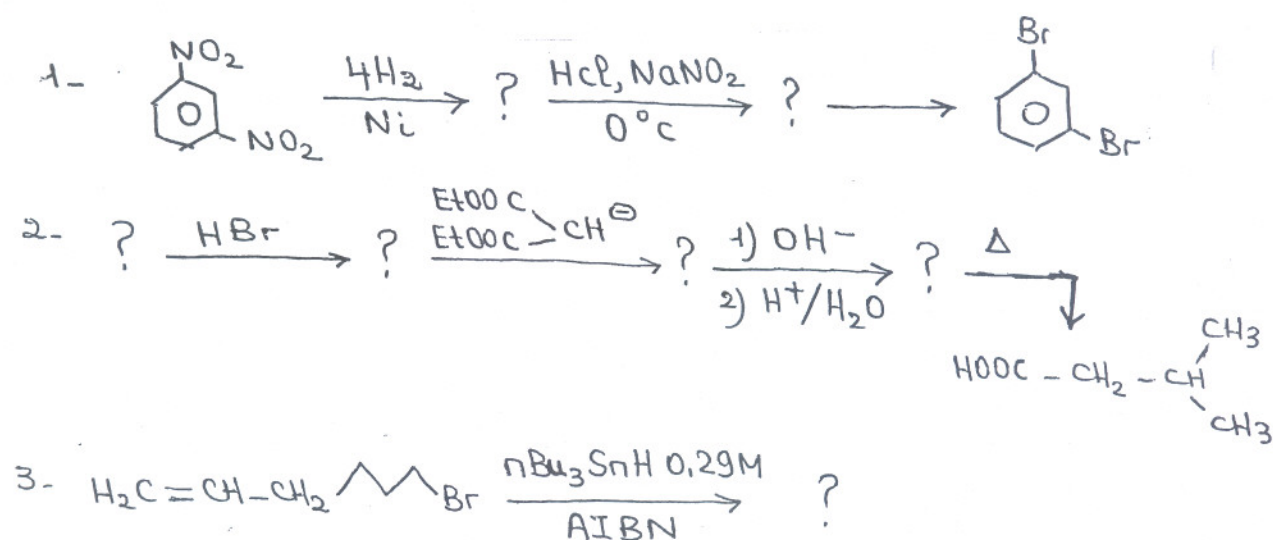
B – Un composé de formule C_8H_8O présente les caractéristiques spectrographiques suivantes :

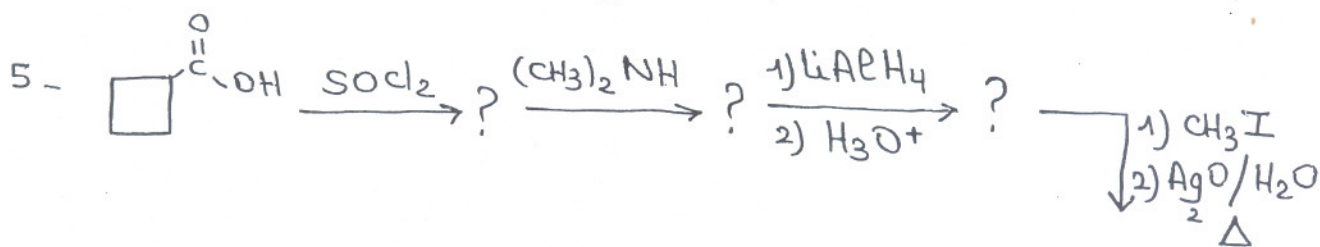
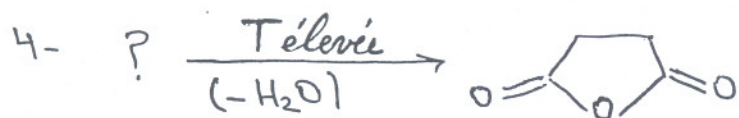
- IR : Absorption intense à 1720 cm^{-1} .
- Masse : 120 (A.r. 24,3) ; 105 (A.r. 100) ; 77 (A.r. 77) ; avec A.r. = Absorbance relative.
- RMN de 1H : 2,46 ppm (s, 3H) ; 7,4 ppm (m, 3H) ; 7,9 ppm (m, 2H).

Donner la formule développée du composé ci-dessus.

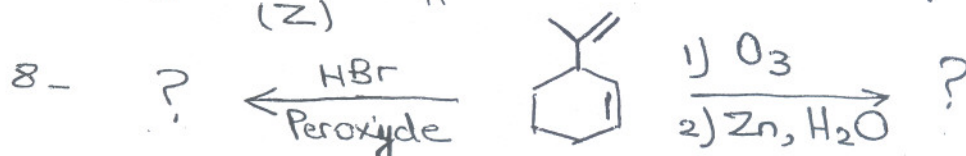
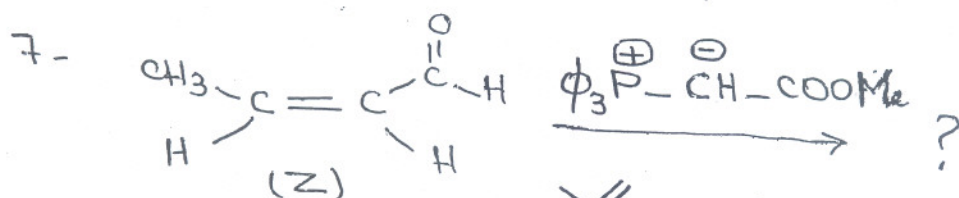
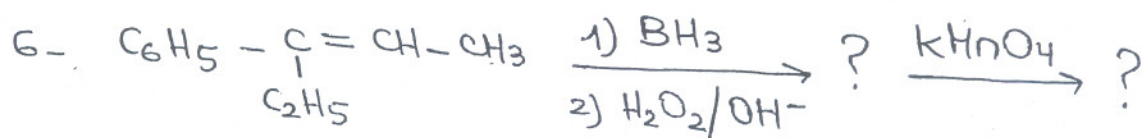
Problème V

Compléter, sans mécanisme les reactions suivantes.





? + ?



بيروت، في ٢٨/٧/٢٠١٠

اللجنة الفاحصة

5/5

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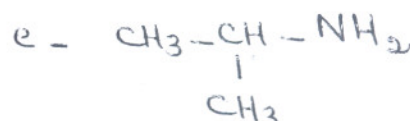
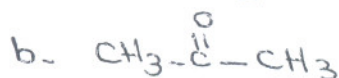
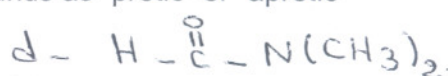
المهام : مراقب مساعد (كيميائي)

مسابقة في الكيمياء العضوية

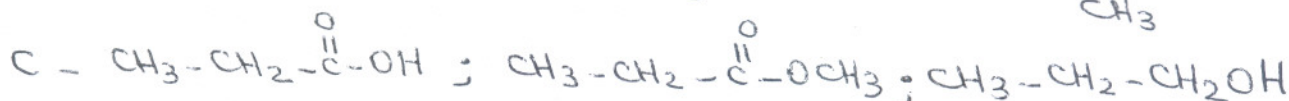
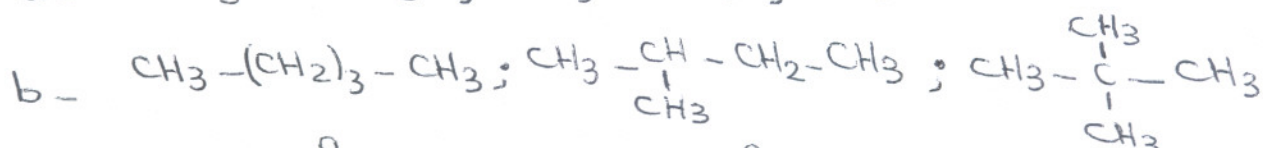
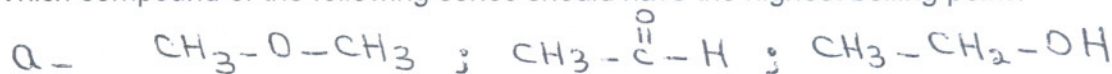
المدة : ساعتان

Problem I

1- Indicate each of the following organic compounds as "protic" or "aprotic"

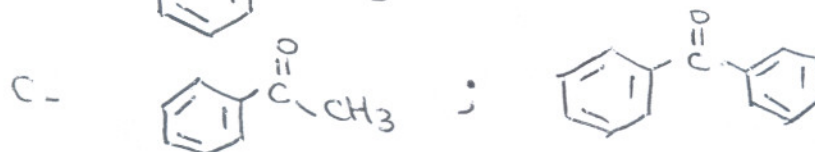
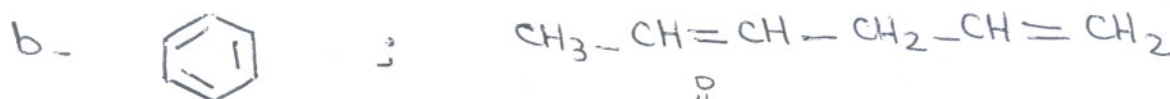
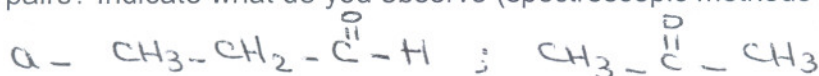


2- Which compound of the following series should have the highest boiling point?



Problem II

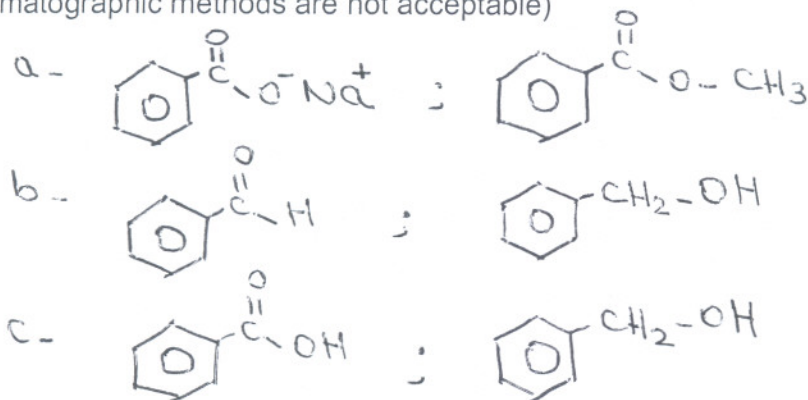
1- By using chemical visual tests, how can you distinguish each compound in each of the following pairs? Indicate what do you observe (spectroscopic methods are not acceptable)



2- The compounds in each pair were separated by using Thin Layer Chromatography TLC. How can you reveal the presence of each compound in each pair.

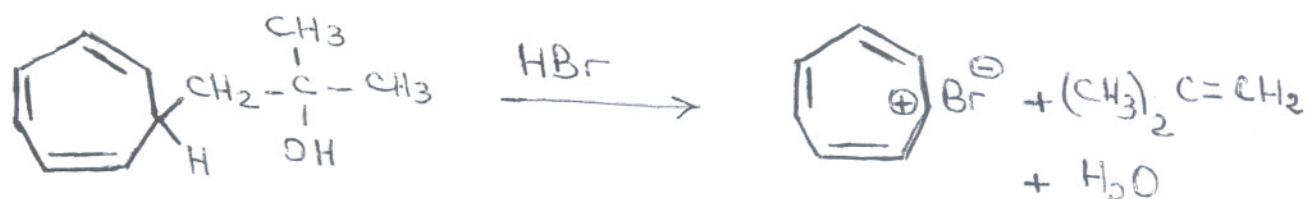


3- Suggest a convenient method for the separation of the compounds of the following mixtures (chromatographic methods are not acceptable)



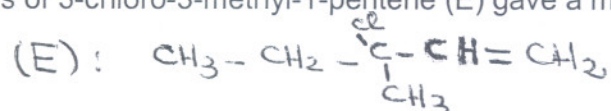
Problem III

A- Give mechanisms for the following reactions:



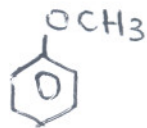
Justify the formation of the products formed

B- Hydrolysis of 3-chloro-3-methyl-1-pentene (E) gave a mixture of two alcohols (F) and (G)

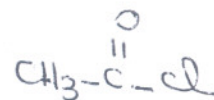


1. Write the structure of (F) and (G)
2. Give the detailed mechanism for their formation
3. What other halogenated precursor can give by hydrolysis exactly the same mixture?

C- Predict the product(s) of the reaction of anisole



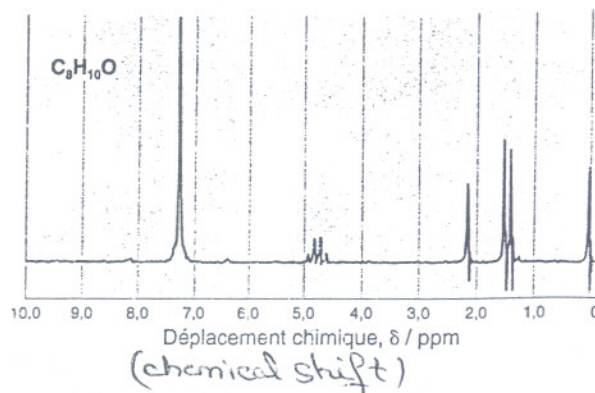
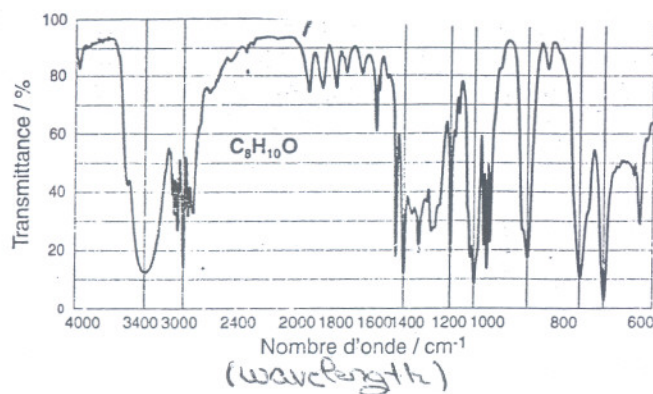
and acetyl chloride



in the presence of AlCl_3 in an aprotic medium. Give the detailed mechanism of this reaction

Problem IV

A- Mass spectrometry analysis of $\text{C}_8\text{H}_{10}\text{O}$ gave peaks at $m/z = 122, 107, 104$ and 77 . IR and ^1H NMR spectrums are given below.



Propose the structure of this compound and interpret each peak in each spectrum

B- The spectroscopic analysis of C_8H_8O gave the following results:

IR analysis: intense absorption at 1720 cm^{-1}

MS analysis: $m/z = 120$ (relative abundance 24.3)

$m/z = 105$ (relative abundance 100)

$m/z = 77$ (relative abundance 77)

$^1\text{H NMR}$ analysis: 2.46 ppm (s, 3H)

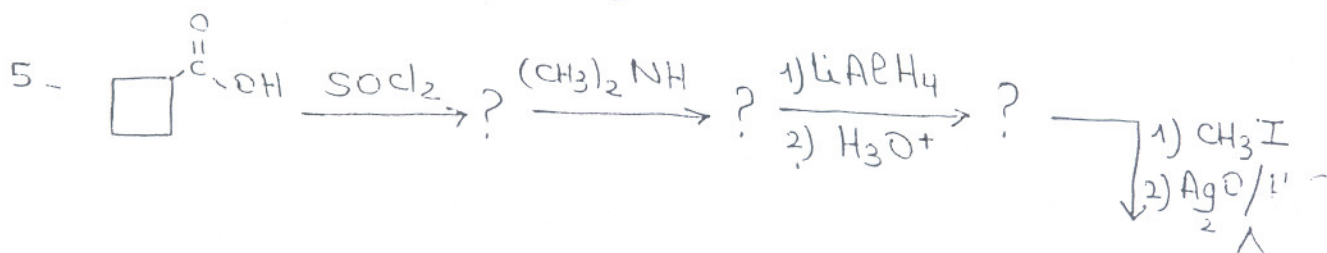
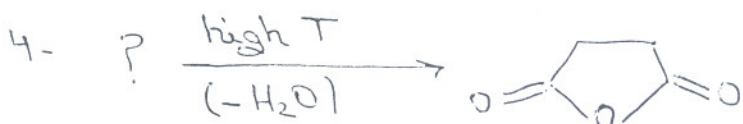
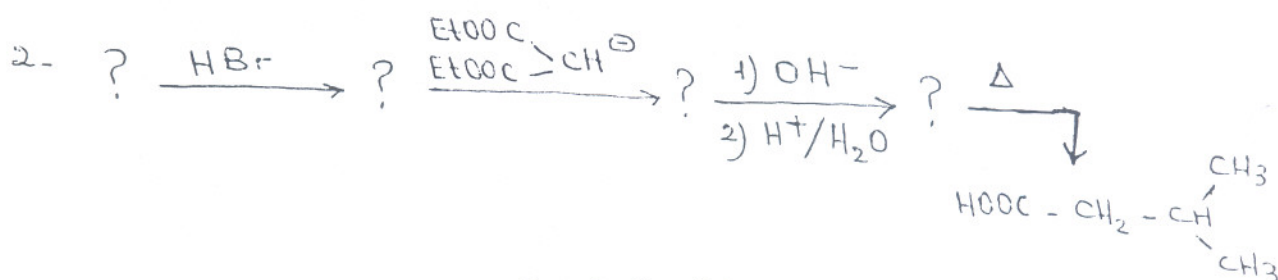
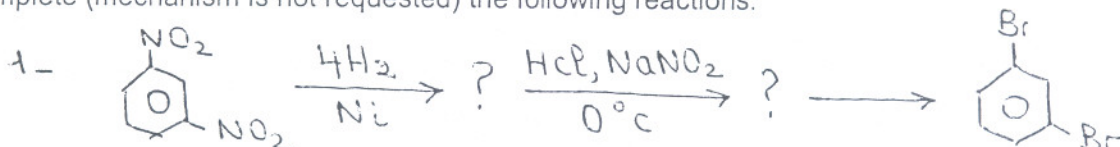
7.4 ppm (m, 3H)

7.9 ppm (m, 2H)

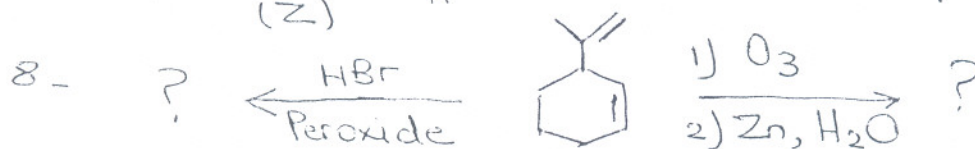
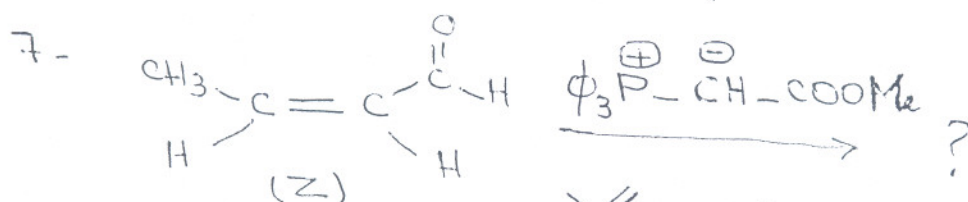
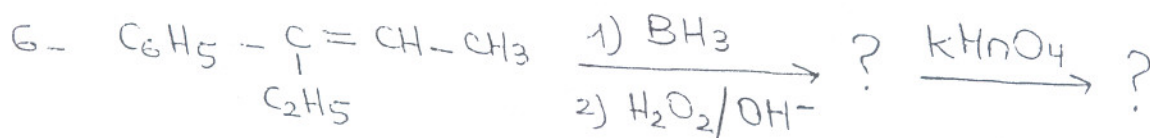
Give the developed structure of this compound

Problem V

Complete (mechanism is not requested) the following reactions:



? + ?



في ١٠/٧/٩٨

البنة العاصنة