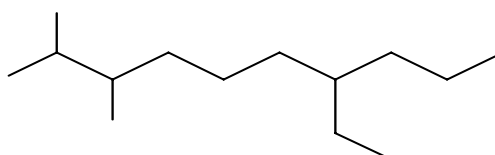
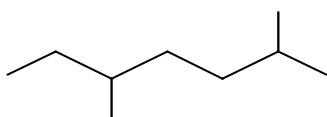
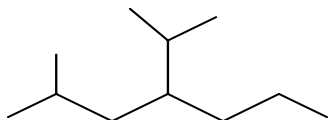


Nomenclatura degli alcani

Assegnare il nome IUPAC alle seguenti strutture:



Disegnare la formula di struttura dei seguenti prodotti

2,4-dimetil-eptano

3-etil-2-metil-nonano

4-propil-5,6-dimetil decano

DEFINIZIONE DEGLI ENANTIOMERI ED ESERCIZI DI NOMENCLATURA STEREOCHIMICA

Utilizzare capitolo 6.2 del libro "Chimica Organica " di Schmid, pag 213- 220
Il libro e' reperibile presso la Biblioteca Chimica

Esercizi di stereochimica on line:

The stereochemistry game- Università dell' Arizona

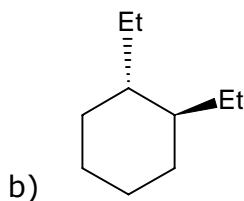
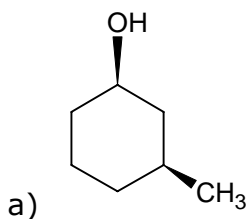
<http://www.chem.arizona.edu/courses/chem242/stereochem4/stereo.html>

Colby College:

<http://www.colby.edu/chemistry/OChem/STEREOCHEM/index.html>

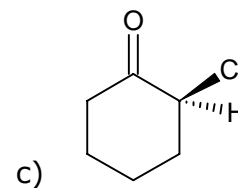
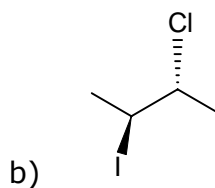
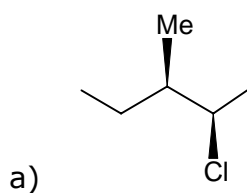
Esercizi sui cicloalcani e sugli stereoisomeri:

1) Dai il nome hai seguenti prodotti, e scrivili nella conformazione a sedia più stabile



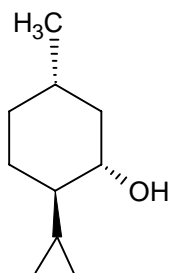
Scrivi tutti gli stereoisomeri di a

2) Assegna le configurazioni (R) o (S) a ciascun stereocentro

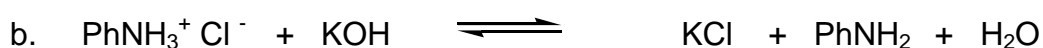
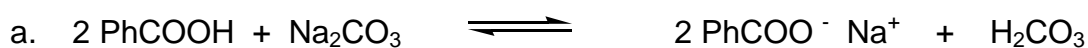
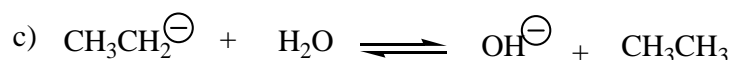
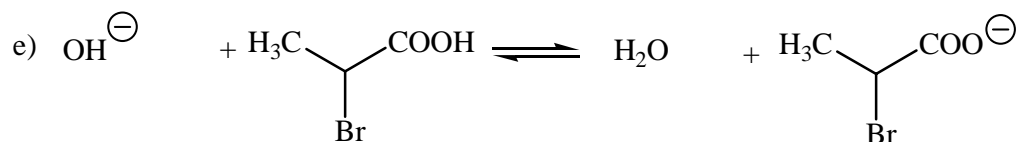
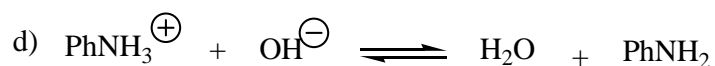
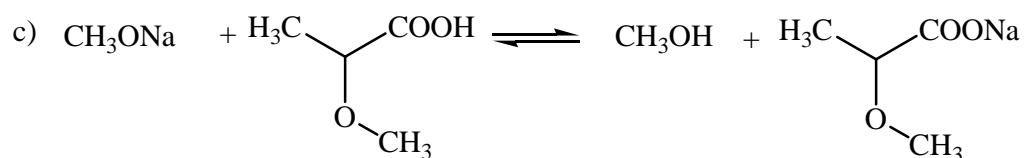
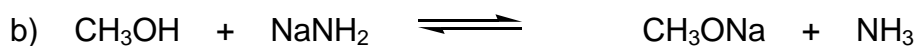


Assegna il nome IUPAC ad a e b

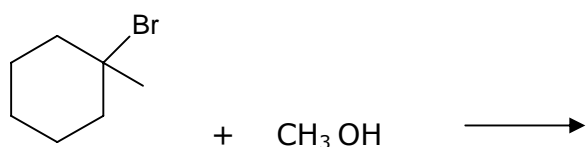
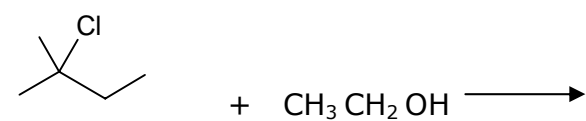
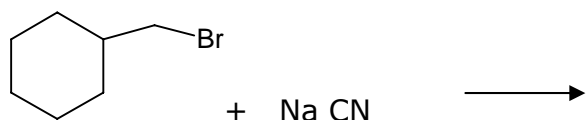
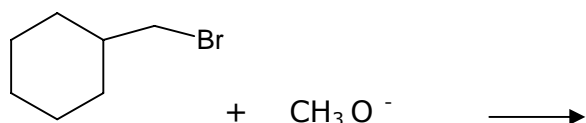
3) Quanti stereoisomeri ha il (-) mentolo (aroma di menta) ? Disegnali



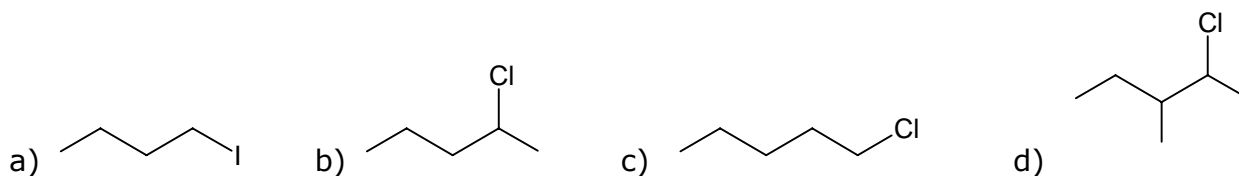
Stabilire la posizione dell'equilibrio nelle seguenti reazioni acido-base:



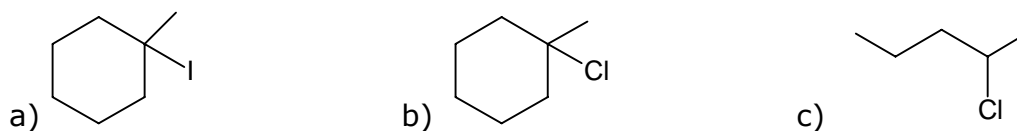
1) Completa le seguenti reazioni:



2) Qual è l'ordine di reattività di questi composti in una reazione S_N2



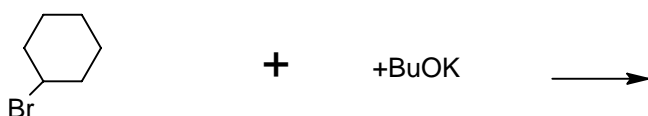
3) Qual è l'ordine di reattività di questi composti in una reazione S_N1

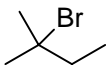


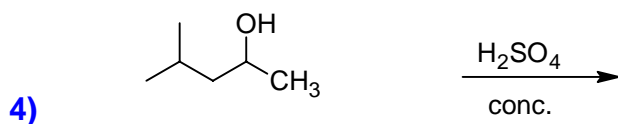
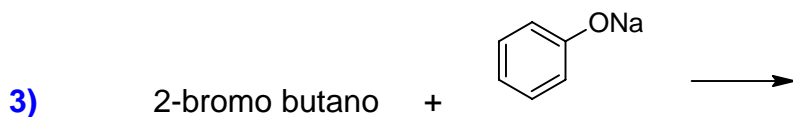
4) Assegna i nomi IUPAC ai substrati degli esercizi 2 e 3
Quanti stereoisomeri può avere 2b? e 2d?

Reazioni di ELIMINAZIONE e SOSTITUZIONE

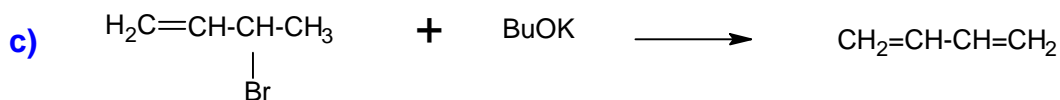
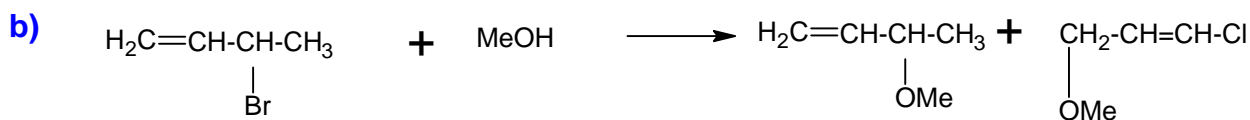
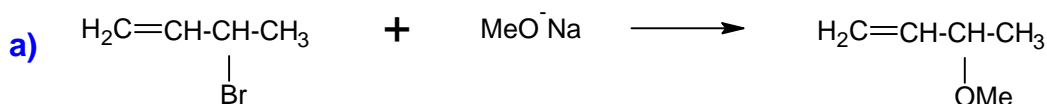
1) Cosa si forma nelle seguenti reazioni? Con quale meccanismo?



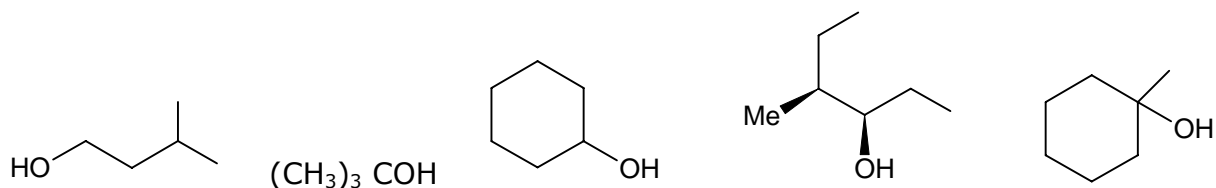
2)  Scrivere la struttura di tutti i possibili prodotti di eliminazione.



5) Spiegare perché si formano prodotti diversi nelle reazioni seguenti. Scrivere il meccanismo.



A) Assegna il nome ai seguenti alcol

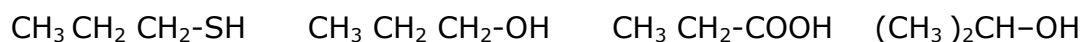


Quali di questi sono alcool secondari?

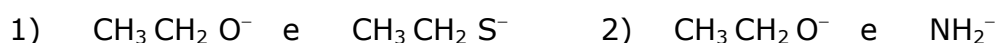
B) Scrivi la formula di struttura di:

- 2,2-dimetil-1-propanolo
- trans-2-etossi ciclopentanololo
- (R)-5-metil-2-esanololo
- 2-metil-2-propil-1,3-propandiolo
- cis-1,4-cicloesandiolo

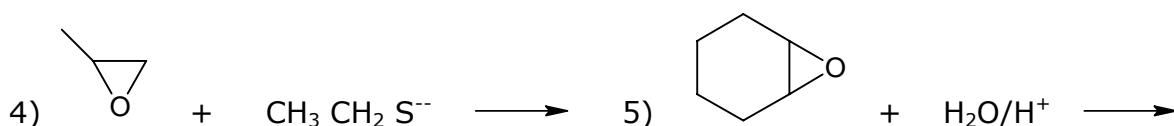
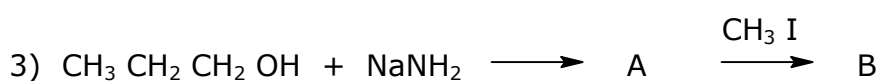
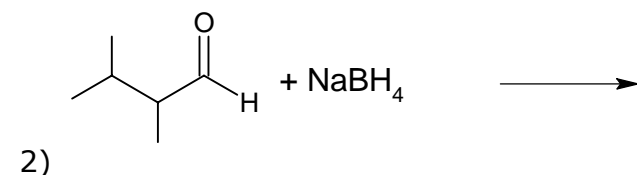
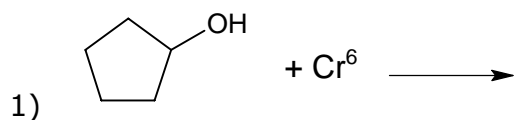
C) Sistema i seguenti composti in ordine di acidità crescente:



D) Scegli la base più forte nell'ambito di ogni coppia e scrivi il suo acido coniugato:



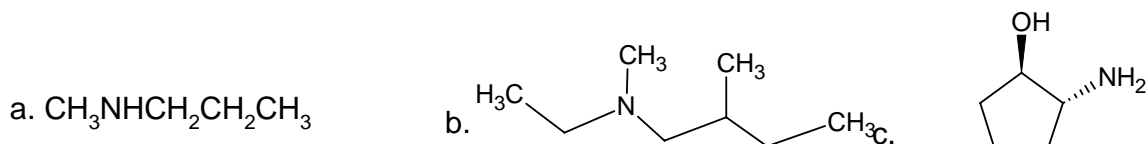
E) Completa le seguenti reazioni:



1) Scrivi le formule dei seguenti prodotti:

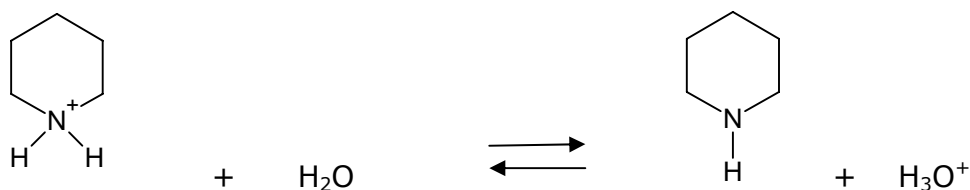
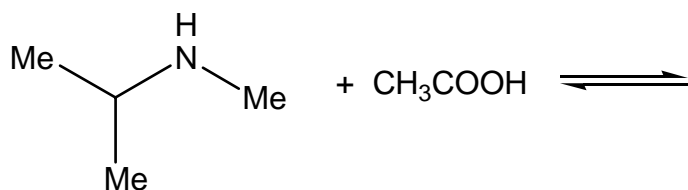
- 5-bromo-1,3-pentadiamina
- cis-4-amminocicloesano
- un'ammina secondaria
- N-etilcicloesanammina
- N,N-dimetilbutanammina

2) Assegna il nome alle seguenti strutture:

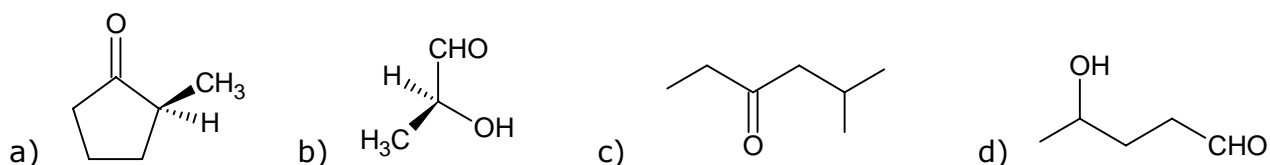


3) Classifica i composti degli esercizi 1 e 2 come ammine 1°, 2°, 3°.

4) Completa le seguenti reazioni acido/base e prevedi per ognuna la posizione dell'equilibrio usando la tabella della pK_a :



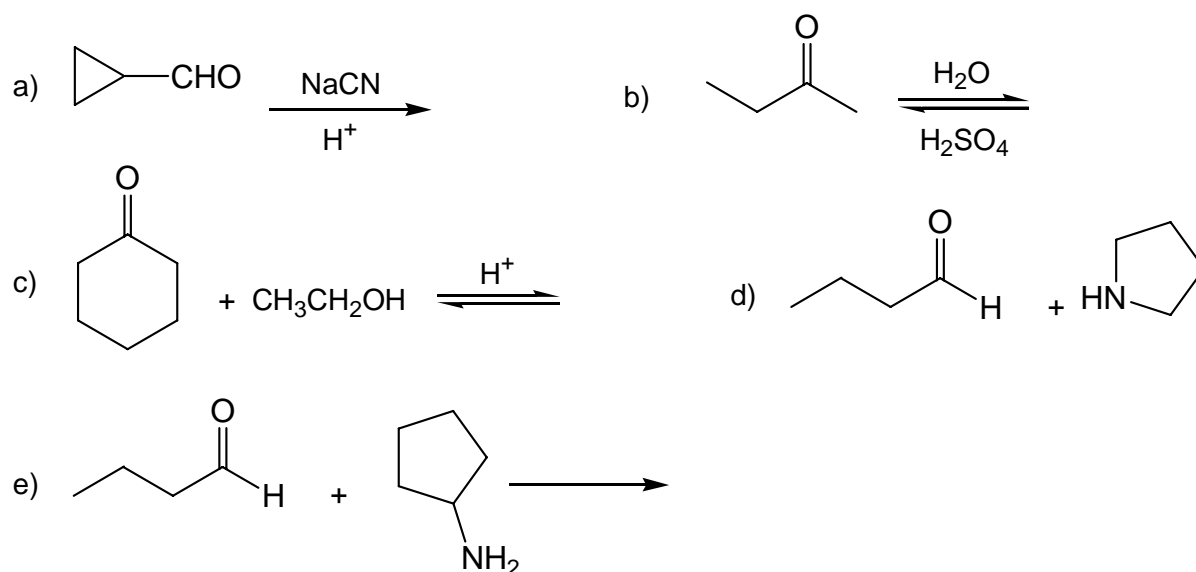
1) Assegna il nome IUPAC a questi composti:



2) Disegna le formule di struttura dei seguenti composti:

- a) 1-cloropropanone b) 4-idrossi-4-metil-2-pentanone c) 1,3-ciclopentandione

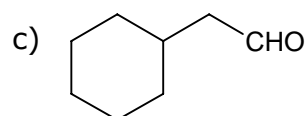
3) Completa le seguenti reazioni:



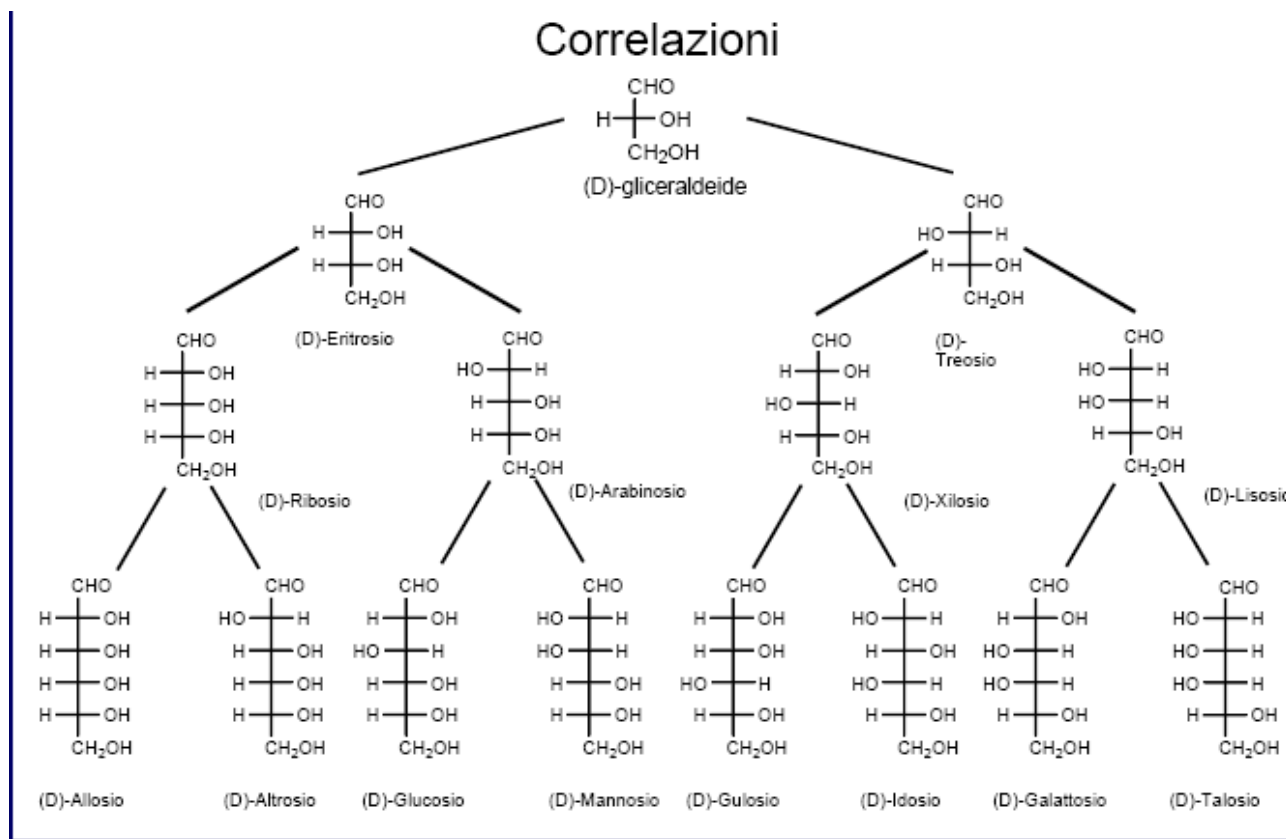
4) Scrivi le formule di tutti i possibili enoli dei seguenti composti:

a) 2-butanone

b) 2,4-pentandione

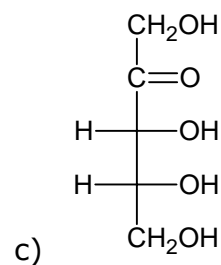
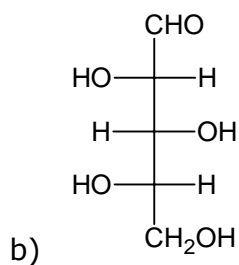
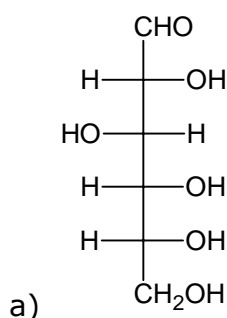


CARBOIDRATI



Problema:

Quali dei seguenti composti sono D- e quali L- monosaccaridi



assegnare il nome ad a) e a b)

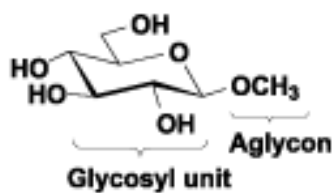
- Scrivi l'enantiomero di a)

A) Scrivere il (D)-glucosio in proiezione di Fischer, di Haworth e nella conformazione a sedia.

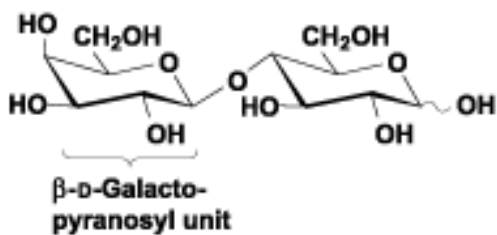
B) Scrivere il D-ribosio in proiezione di Haworth.

C) Il D-mannosio è l'isomero al C₂ del D-glucosio.
Scrivere il β-D-mannopiranoside in proiezione a sedia

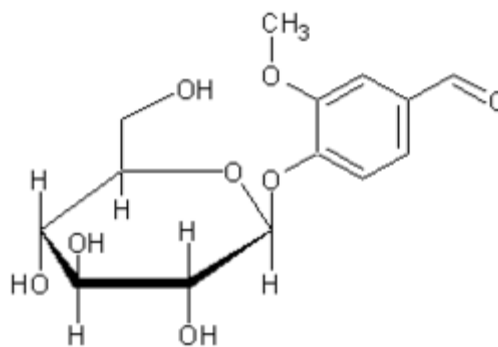
Glicosidi



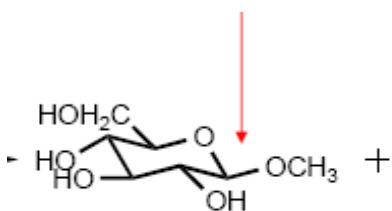
(a)



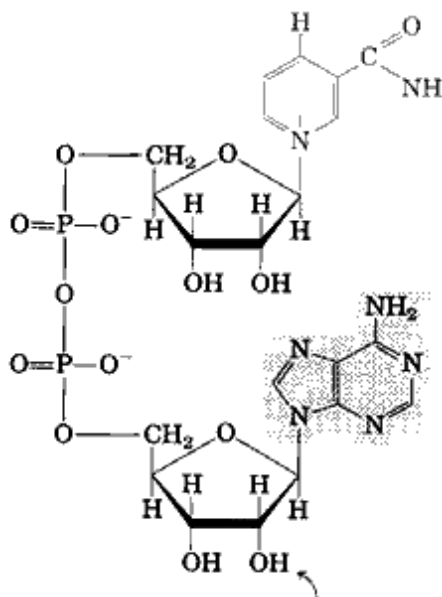
(b)



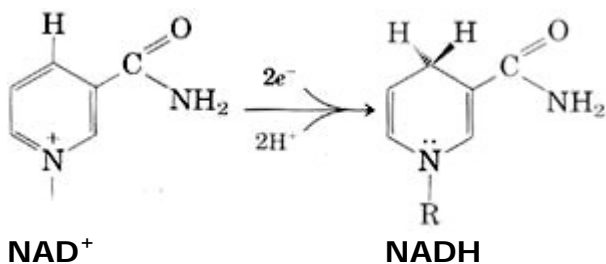
vanillina



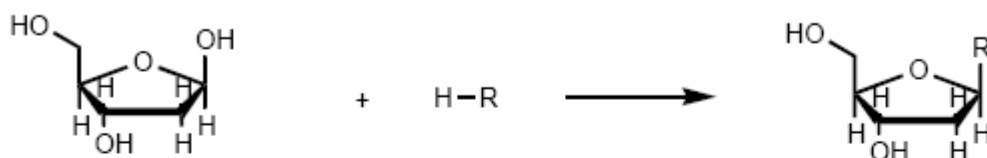
metil β-glucopiranoside



NAD

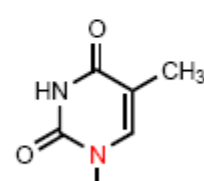
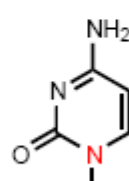
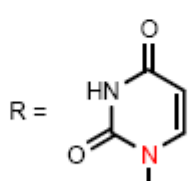
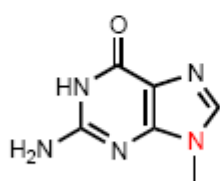
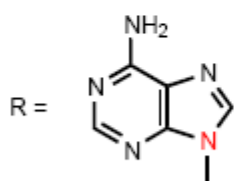


Formazione di N-glicosidi



2-desossi-D-ribosio

N-glicoside del 2-desossi D-ribosio



adenina

guanina

uracile

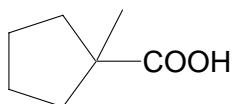
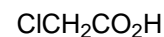
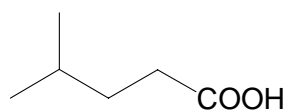
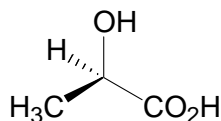
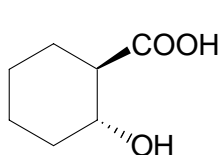
citosina

timina

basi puriniche

basi pirimidiniche

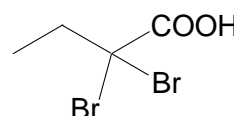
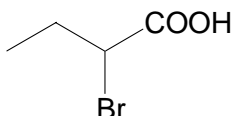
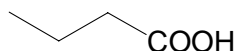
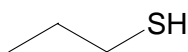
1) Assegna il nome IUPAC dei seguenti acidi:



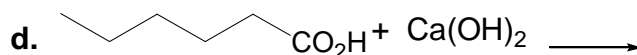
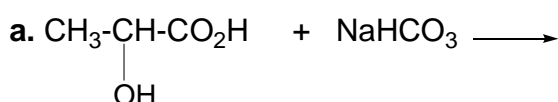
2. Disegna le formule di struttura di:

- Acido 2,3-diidrossipropanoico
- Acido 4-amminobutanoico
- Acido 3-oxopentanoico
- Acido formico

3. Disponi i seguenti prodotti in ordine di acidità crescente



4. Completa e bilancia le seguenti reazioni



5. Scrivere le formule di struttura dei seguenti composti

a) acetato di sodio

b) formiato di ammonio

c) 2-clorobutanoato di potassio

d) acetato di etile

e) metil 3-idrossibutanoato

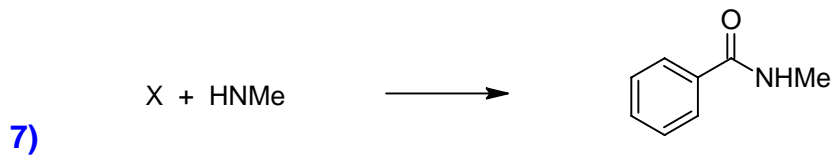
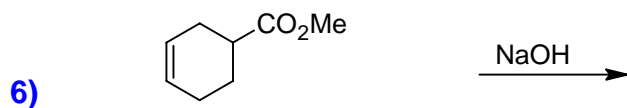
f) ottanoil cloruro

g) dodecanammide

h) N-etil-2-idrossiacetammide

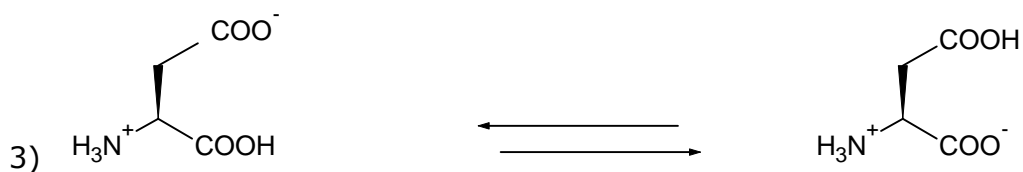
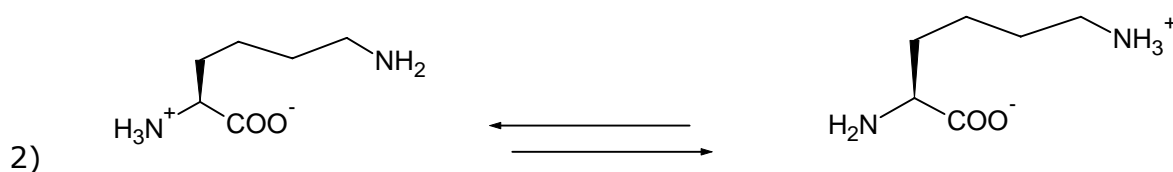
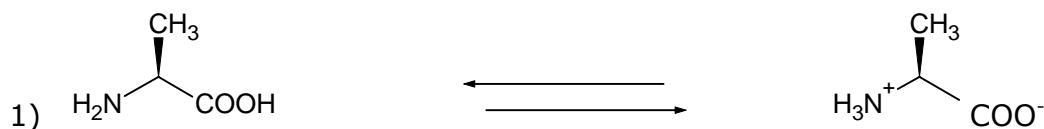
i) propanoato di 2-propile

l) N.N-dimetilformammide



ESERCIZI RELATIVI ALLA CHIMICA DEGLI AMMINOACIDI:

Indicare da che parte sono spostati i seguenti equilibri:



4) Disegnare al punto isoelettrico Arg, Trp, His

5) Disegnare e classificare come polari/apolari e idrofili/idrofobi i residui laterali di:

Ser

Phe

Lys

Met

Val

Gln

6) Disegnare Tyr a pH 12

7) Disegnare Arg a pH 1

8) Indicare quale dei tre azoti del gruppo basico di Arg si protona e spiegare perchè

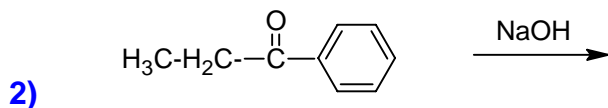
9) Disegnare il dipeptide Ala/Arg al pI

10) Disegnare il dipeptide Lys/Glu al pI

Siti da consultare per la visualizzazione e l'animazione di amminoacidi e derivati

<http://www.johnkyrk.com/aminoacid.swf>

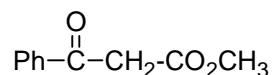
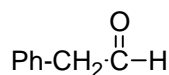
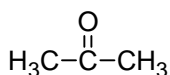
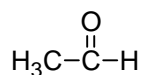
PROBLEMI:



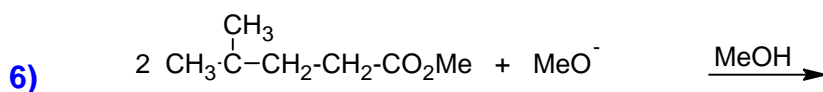
3) Scrivere le formule di tutti gli enoli possibili dei seguenti composti:

- a) 2 – butanone
- b) fenilacetaldeide
- c) 2,4 -pentandione

4) Mettere in ordine di acidità i seguenti acidi al carbonio:



5) Scrivere gli enolati dei prodotti dell' esercizio 3.



7) Realizzare la seguente trasformazione.

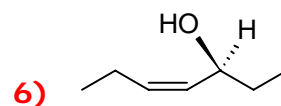
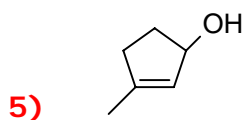
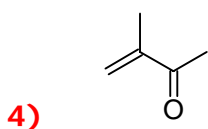
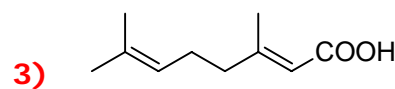
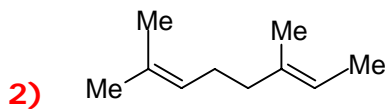
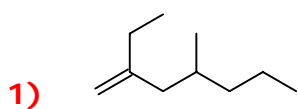


ALCHENI

A) Disegna le strutture dei seguenti composti:

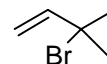
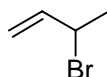
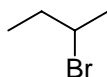
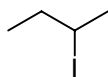
- | | |
|----------------------------------|-----------------------|
| 1) E-2metil-3-esane | 4) 1.4-cicloesadiene |
| 2) Z-1-cloropropene | 5) 2-metil butadiene |
| 3) 1-isopropil-4-metilcicloesene | 6) 3-metil-2-butenale |

B) Scrivi il nome IUPAC dei seguenti composti:

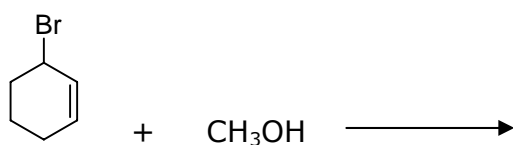


C) Per il 3-penten-2-olo esistono quattro stereoisomeri, disegnalì:

D) Mettere in ordine di reattività i seguenti composti in una reazione SN1:

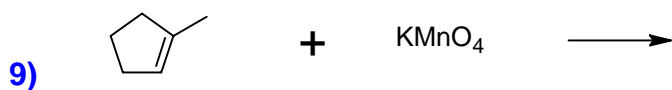
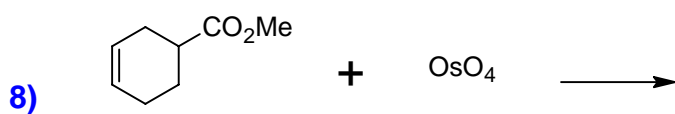
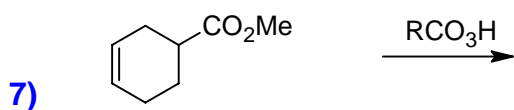
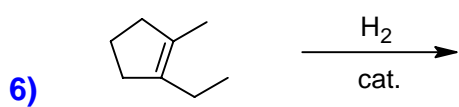
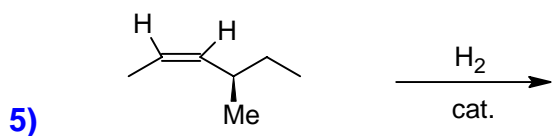
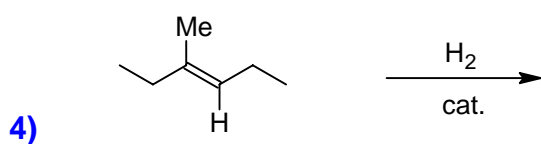
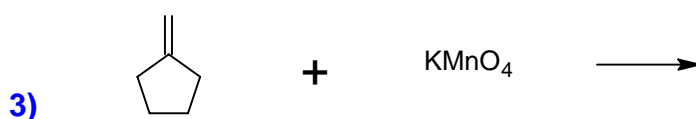


E) Completare la seguente reazione:

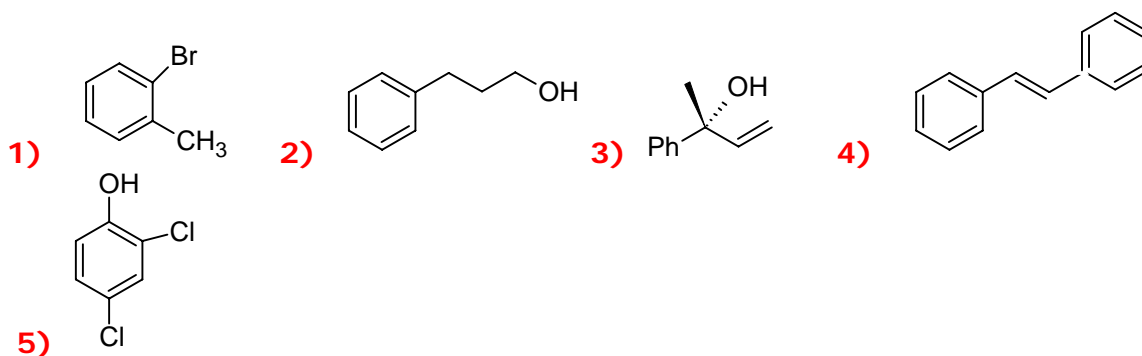


REAZIONI DEGLI ALCENI

17



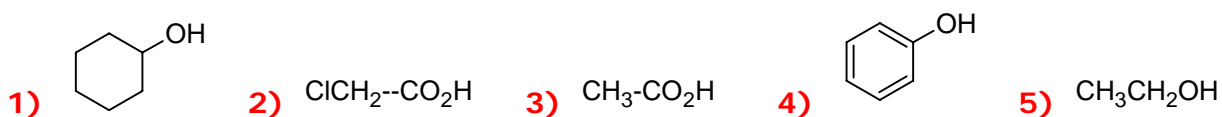
A) Assegna il nome ai seguenti composti:



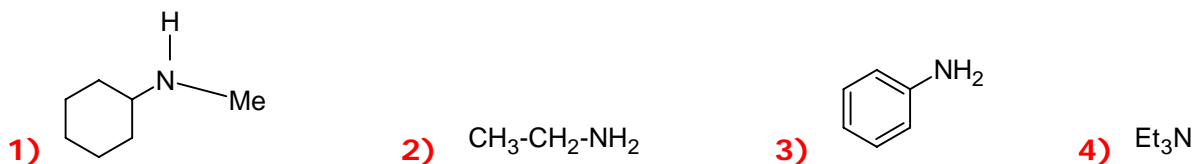
B) Disegna le formule di struttura dei seguenti composti:

- 1) 1-bromo-2-cloro-4-etilbenzene 4) acido 2-fenilacetico
 2) *m*-bromofenolo 5) 3-fenil-2-butanone
 3) 2,4-dimetilalanina

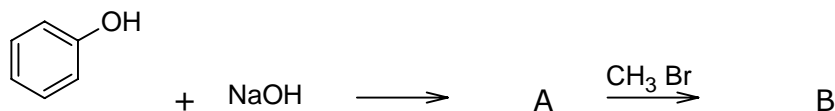
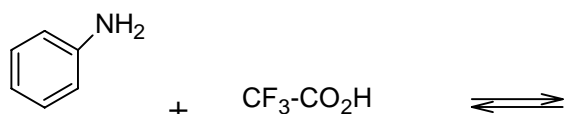
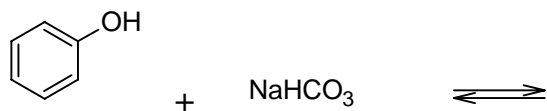
C) Sistema in ordine di acidità crescente:



D) Sistema in ordine di basicità crescente:



E) Completa le seguenti reazioni:



SE_{Ar} : SOSTITUENTI – ATTIVANTI – DISATTIVANTI

1) Disponi ognuna delle serie seguenti in ordine di reattività crescente nei confronti di HNO₃ in H₂SO₄ :

- a) Nitrobenzene, benzene, clorobenzene
- b) Fenolo, acido benzensolfonico, toluene
- c) Benzoato di etile, acetato di fenile, benzene
- d) Toluene, piridina, anilina

2) Scrivi le strutture di reagenti e prodotti delle seguenti reazioni di monosostituzione

a) Toluene + acido solforico fumante

b) Clorobenzene + HNO₃ / H₂SO₄

c) Benzaldeide + Br₂ / FeBr₃

d) Acido benzoico + HNO₃ / H₂SO₄

e)  + CH₃COCl / AlCl₃

f) Benzoato di etile + Cl₂ / FeCl₃

BASI NUCLEICHE

Scrivere la formula di struttura di:

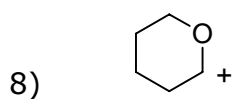
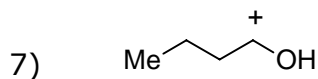
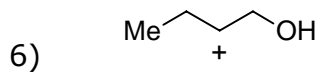
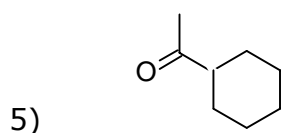
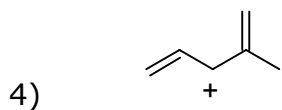
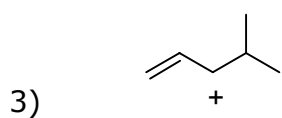
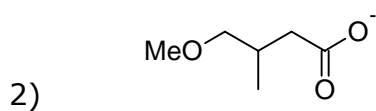
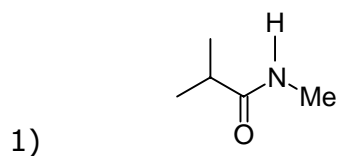
- a) una base purinica
- b) una base pirimidinica

Scrivete una struttura che mette in evidenza i legami a idrogeno tra adenina e uracile.

Scrivere una struttura che metta in evidenza i legami a idrogeno nella coppia C-G

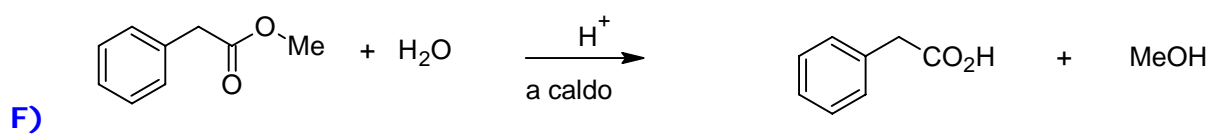
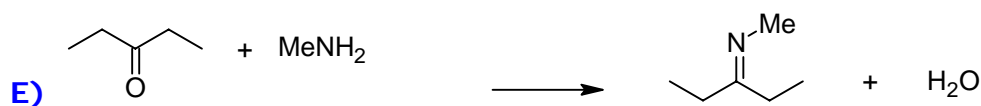
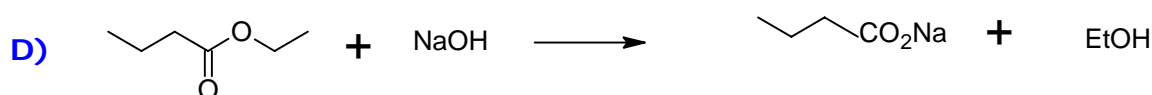
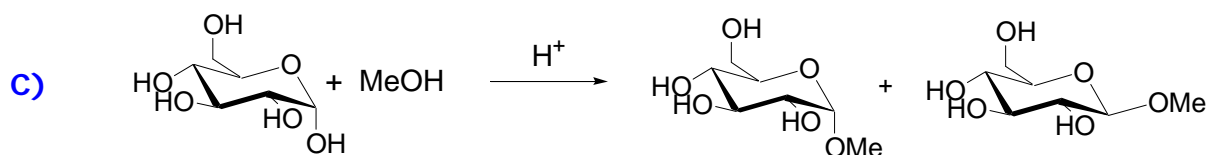
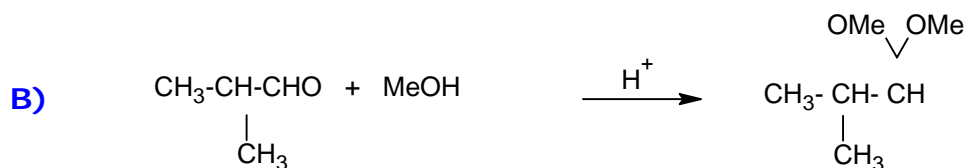
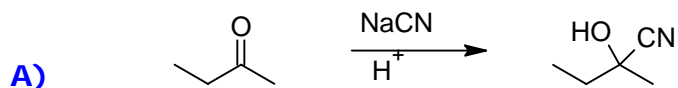
ESERCIZI SULLE FORME DI RISONANZA

Scrivere tutte le forme di risonanza principali per i seguenti composti:

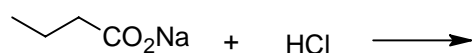


ESERCIZI DI RICAPITOLAZIONE

Scrivere il meccanismo delle seguenti reazioni:

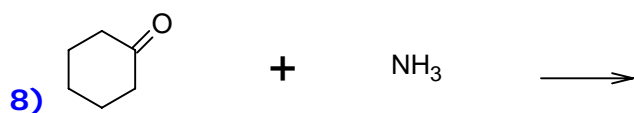
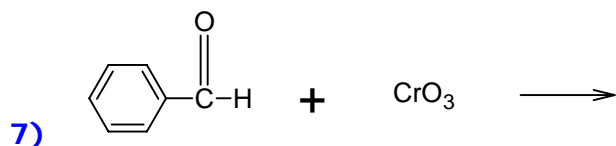
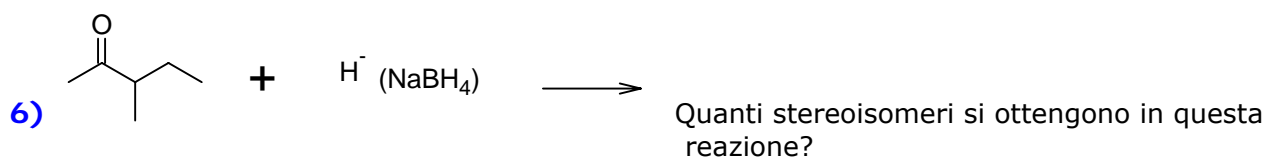
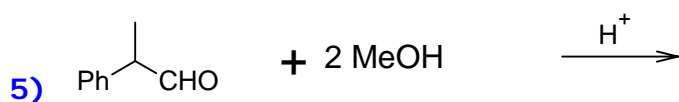
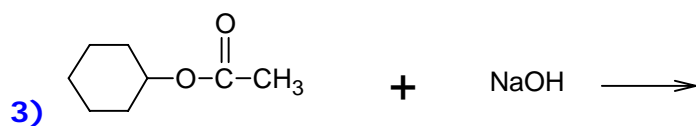
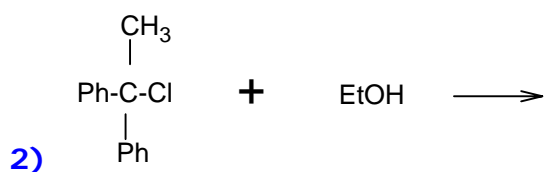
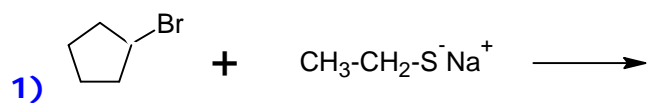


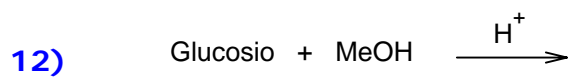
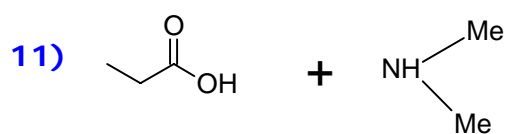
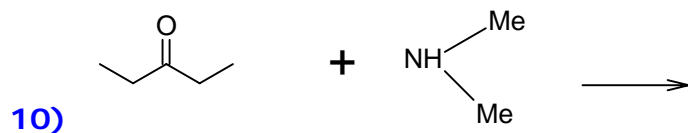
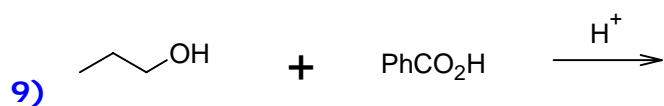
Scrivi il prodotto della seguente reazione:



ESERCIZI DI RICAPITOLAZIONE

COMPLETA LE SEGUENTI REAZIONI:





ESERCIZI LABORATORIO

A. Si hanno a disposizione i seguenti reagenti e solventi: NaOH 1M; HCl 1M; NaBH₄; Na₂SO₄ anidro; acetone; acqua distillata; etile acetato; etanolo; esano; lastre per TLC. Descrivere in dettaglio una procedura di laboratorio che permetta di separare una miscela composta da 1.54 g di difenile (PM 154 g/mol) e 2 g di acido 3-bromo-benzoico (PM 200 g/mol), calcolando con gli opportuni calcoli stechiometrici anche la quantità di reagenti necessaria (N.B.: non tutti i reagenti e solventi sono necessari).

B. Indicare l'ordine di eluizione atteso in una separazione cromatografica fra il difenile e l'acido bromobenzoico, giustificando la risposta

C) Descrivere una procedura di laboratorio che permetta di ridurre il benzoilformiato di metile **1** (PM 164 g/mol) all'alcol **2** con NaBH₄. Come è possibile verificare l'avvenuta reazione?

Tenendo presente il meccanismo della reazione, calcolare la quantità di NaBH₄ necessaria per ridurre 164 mg di **1**

