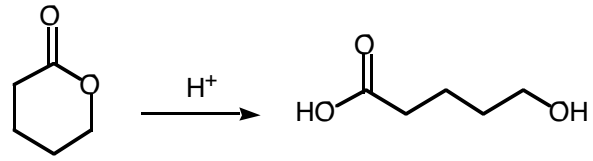
Exam 3 Answer sheet
Spring 2002

1. A

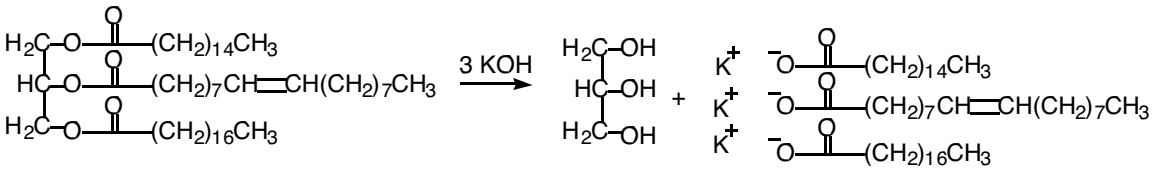
2. b < c < d < a

a.	CH_3CH_2COOH	140.7 ºC
b.	$CH_3CH_2CH_2CH_2CH_3$	36.1
c.	$CH_3CH_2COOCH_3$	79.7
d.	$CH_3CH_2CH_2CH_2OH$	117.6

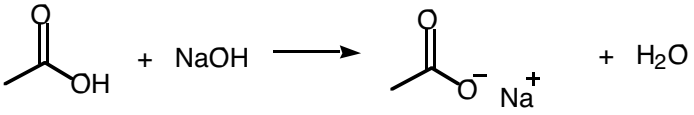
3.



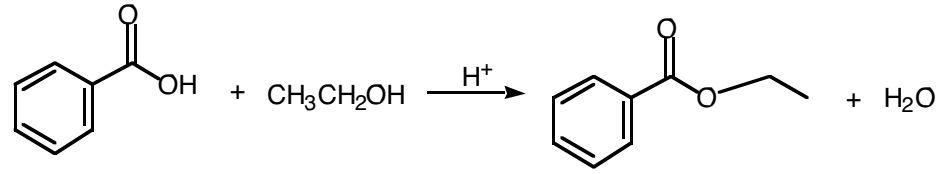
4.



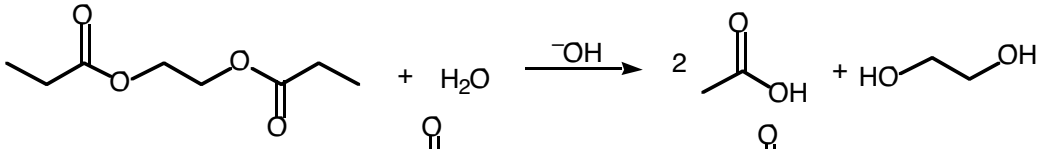
a.



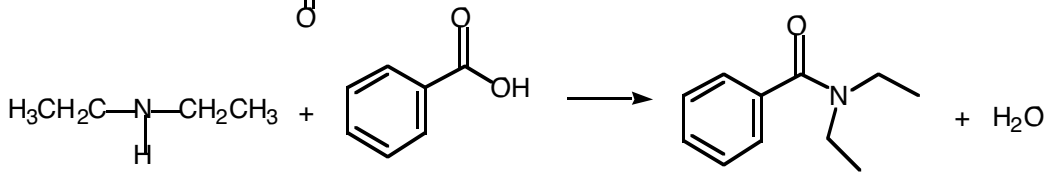
b.



c.



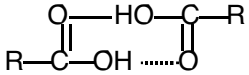
d.

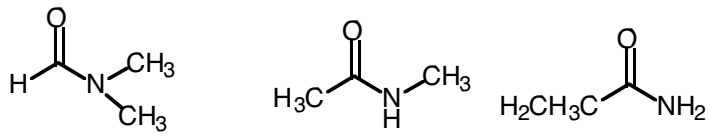


5.

Took partial answer for c.

6.



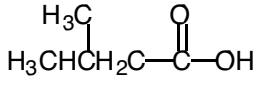


b.p.	153 ºC	202 ºC	213 ºC

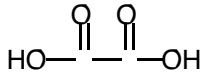
7.

Propanamide can from more hydrogen bonds than the other compounds. A hydrogen bond is a stable interaction and as a compound forms more of them with itself, the more energy is needed to vaporize the compound. By analogy *N*-methylacetamide can from more hydrogen bonds than *N,N*-dimethylformamide.

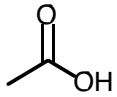
8.

a. 

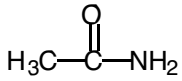
3-methylbutanoic acid

b. 

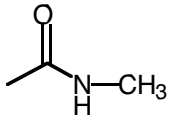
ethanedioic acid

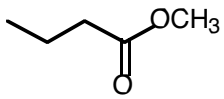
c. 

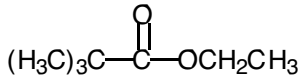
Acetic acid or ethanoic acid

d. 

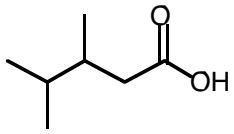
Ethanamide or acetamide

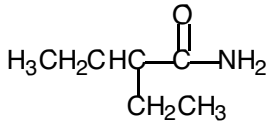
e. *N*-Methylacetamide 

f. Methyl butanoate 

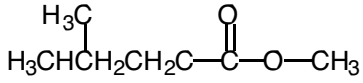
g. 

Ethyl 2,2-dimethylpropanoate

h. 3,4-Dimethylpentanoic acid 

i. 

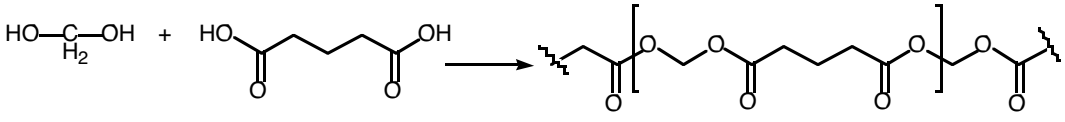
2-ethylbutanamide

j. 

Methyl 4-methylpentanoate

Extra Credit:

1. The acidic hydrogen is removed from caprylic acid in presence of a base (NaOH). This is a simple acid/base reaction and a product is the carboxylate ion of caprylic acid. Since the ion is charged it is soluble in polar solvents like water. Caprylaldehyde is a neutral compound and does not react with the base. So, no ionic compound is produced.

2. 

repeating unit in brackets