CHEM1907/1908 (1LS Advanced Courses) - June 2005

2005-J-2

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	sulfur trioxide	+IV	0
	potassium permanganate	+VII	0
$Mg(ClO_4)_2$	cobalt(II) chloride-6-water	+II	7
$(NH_4)_2SO_4$			

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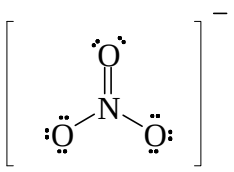	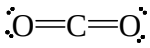	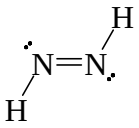
YES	NO	NO

- 3.42×10^4

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- 1.6×10^{-3} mol
  0.032 M

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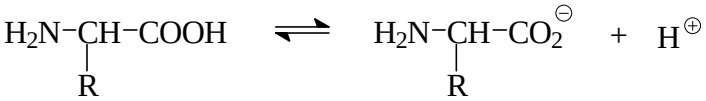
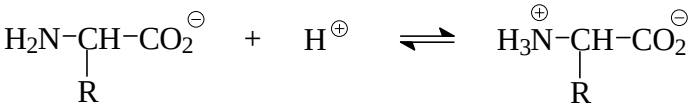
- ion-ion, ion-dipole, ion-induced dipole
  dispersion
  hydrogen bonding, dipole-dipole, dipole-induced dipole

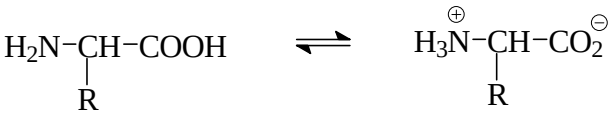
tetrahedral	sp^3	tetrahedral
trigonal planar	sp^2	trigonal planar
tetrahedral	sp^3	bent



$K_{a(COOH)} = 10^{-2.32}$



$K = 1/K_{a(NH_3^+)} = 1/10^{-9.76} = 10^{+9.76}$



$K = K_{a(COOH)} \times 1/K_{a(NH_3^+)}$

$= 10^{-2.32} \times 10^{+9.76}$

$= 10^{+7.44} >> 1$

Therefore equilibrium lies far to the right and the zwitterionic form predominates.

2005-J-5

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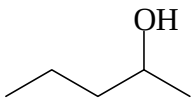
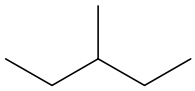
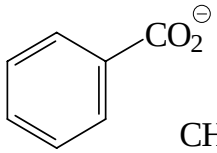
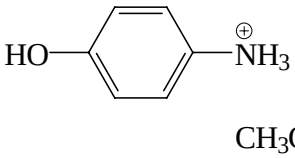
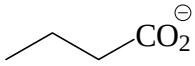
3-bromopentane	$N(CH_3)_3$	
2-pentanone		
(*E*)-3-methyl-2-pentene		
		
	CH_3COCl	
		
		
	$OH^{\ominus}$ / heat	

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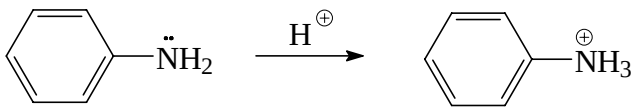
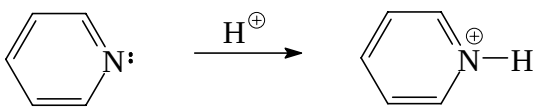
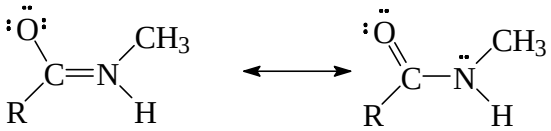
- Pyridine and aniline are bases. Both compounds have lone pair of electrons on the N atom that can form bond to H^+ ion.





The "lone pair" of electrons in pyrrole is part of the aromatic sextet and not available for bonding to H^+ ion.

The amide functional group (in acetanilide) is non-basic due to resonance stabilsation.



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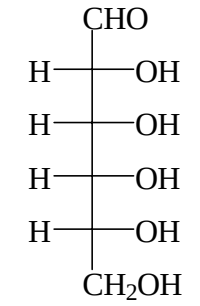

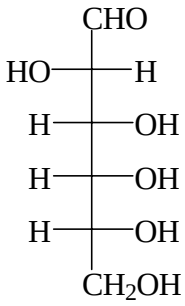

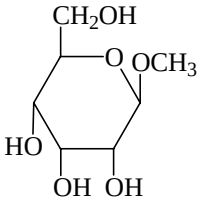

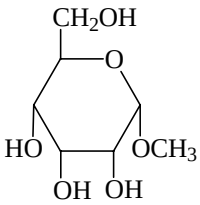

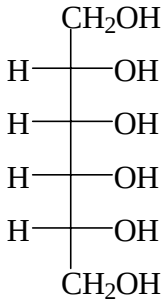

Zero. It is a meso compound and is therefore achiral and optically inactive.

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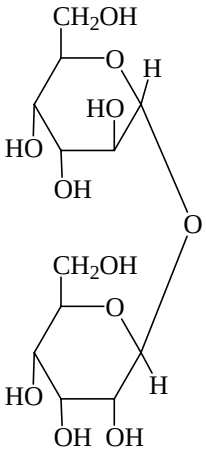

No, not reducing sugar. No hemiacetal functional group in equilibrium with open chain aldehyde.

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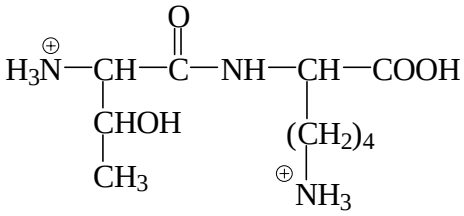
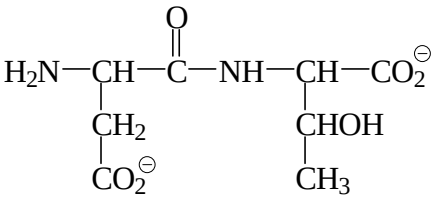
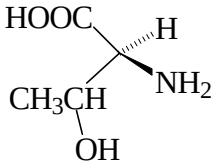
- 





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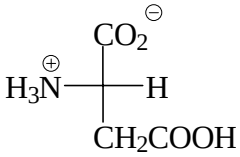

2.77

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