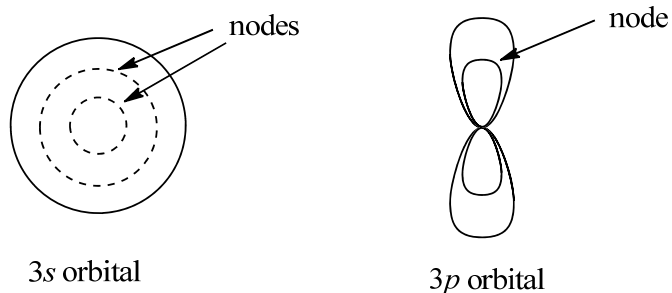


CHEM1611 Chemistry 1A (Pharmacy) - June 2010

2010-J-2

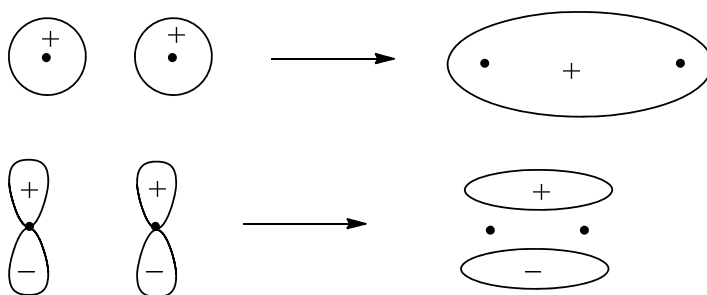
- ${}^4_2\text{He}$
 ${}^{11}_5\text{B}$

- $3.4 \times 10^{-19} \text{ J}$ $2.0 \times 10^2 \text{ kJ mol}^{-1}$



A node represents the region where there is zero probability of finding the electron.

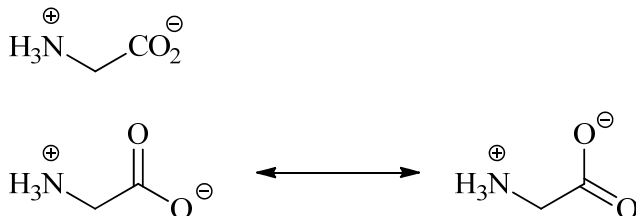
2010-J-3



- There is an increase in resonance stabilisation energy when a free HPO_4^{2-} ion is produced.
ATP is a high energy molecule due to the 4 negative charges near each other. This is reduced when it's converted to ADP which has only 2 close negative charges.

2010-J-4

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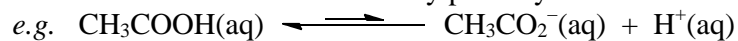
Carbon 1 (acid group) is sp^2 hybridised and the geometry is trigonal planar.
Carbon 2 (CH_2 group) is sp^3 hybridised and the geometry is tetrahedral.
The nitrogen is sp^3 hybridised and the geometry is tetrahedral.

Propionic acid has strong hydrogen bonds, giving it a relatively high m.p. However, glycine has very strong ionic bonds between the NH_3^+ and CO_2^- groups giving it very high m.p.

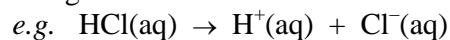
2010-J-5

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A weak acid or base is one which only partially dissociates in water:



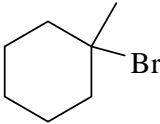
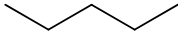
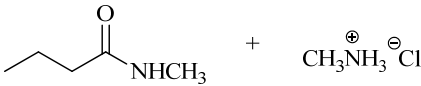
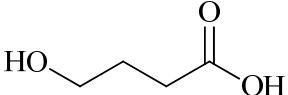
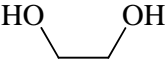
A strong acid or base is one which completely dissociates in water:



Concentrated and dilute are terms that can be used in reference to any solute, describing the number of moles of solute relative to the volume of solvent. A concentrated solution has a high solute:solvent ratio, whilst a dilute solution has a low solute:solvent ratio.

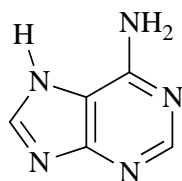
- NH_3 and HF both have two H-bond per molecule and their b.p.'s are in the expected order - HF has the stronger H-bonds and the higher b.p.
 H_2O has 4 H-bonds per molecule, so although the bonds are not as strong as those of HF , there are twice as many of them. As a result the b.p. of H_2O is greater than that of HF .

2010-J-6

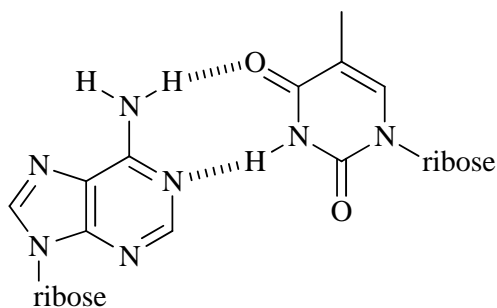
		
	1. NaOH 2. CH_3I	
(E)-2-pentene		
	$\text{Cr}_2\text{O}_7^{2-} / \text{H}^+$	
		
		
cyclohexanone	 + H^+ catalyst	

2010-J-7

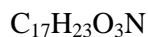
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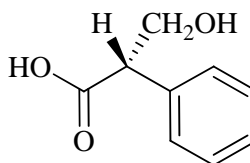
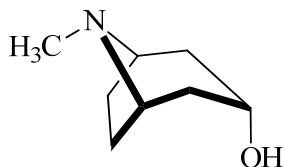
DNA consists of a double strand of polynucleotides. The strands are complementary with C, G, A and T on one strand being paired with G, C, T and A respectively on the other. C (cytosine) and G (guanine) are therefore known as a base pair. Similarly A (adenine) and T (thymine) are another base pair. The two DNA strands are held together by H-bonding between the bases in a base pair.

**2010-J-8**

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amine, alcohol, ester, aromatic ring (arene)

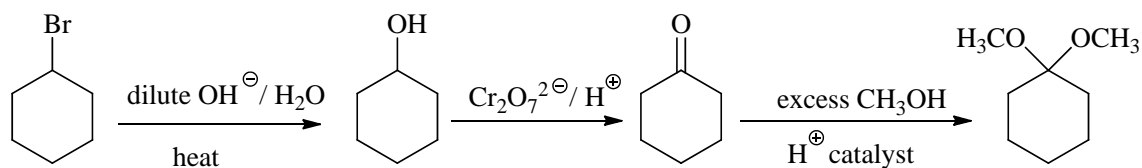


(S)-

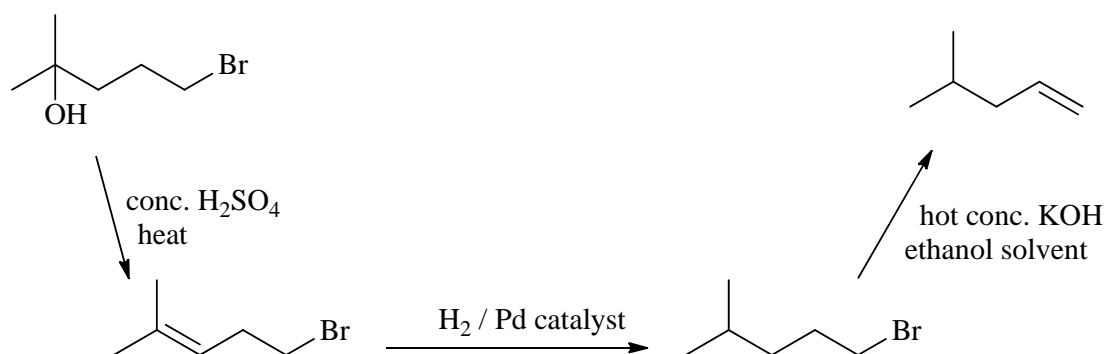
No. It is a *meso*-isomer (*i.e.* has a plane of symmetry) and therefore optically inactive.

2010-J-9

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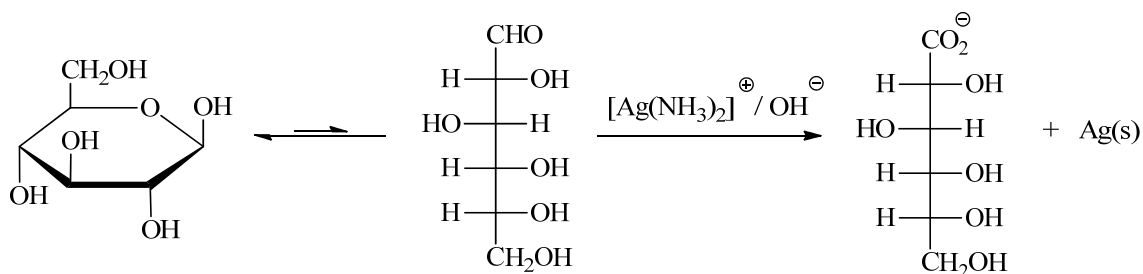


2010-J-9 (continued)



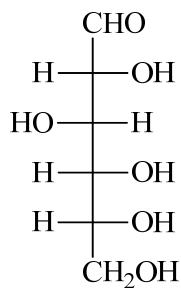
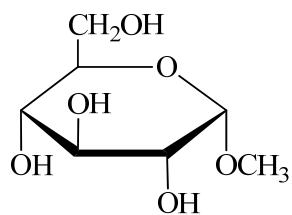
2010-J-10

- Tollens reagent, $[\text{Ag}(\text{NH}_3)_2]^+ / \text{OH}^-$.
 This will give no reaction with (L), but will oxidise (M). In the process, the $[\text{Ag}(\text{NH}_3)_2]^+$ ion is reduced to metallic Ag which deposits as a silver mirror.



$\text{H}^+ / \text{H}_2\text{O} / \text{heat}$

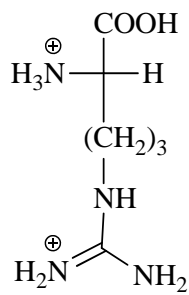
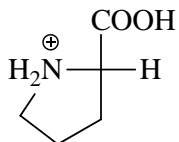
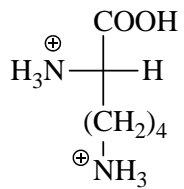
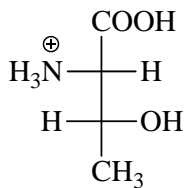
excess $\text{CH}_3\text{OH} / \text{H}^+$ catalyst



primary alcohol, secondary alcohol, acetal

2010-J-11

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2010-J-12

