CHEM1611 Chemistry 1A (Pharmacy) - June 2014

2014-J-2

- $^{14}_{7}\mathrm{N} + {}^{1}_{0}\mathrm{n} \rightarrow {}^{14}_{6}\mathrm{C} + {}^{1}_{1}\mathrm{p}$

  $^{14}_{6}\mathrm{C} \rightarrow {}^{14}_{7}\mathrm{N} + {}^{0}_{-1}\mathrm{e}$

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4*s*	4	3	3	0
3*p*	3	1	1	1
3*d*	3	2	0	2

- 792 nm

2014-J-3

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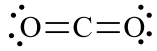
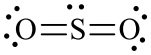
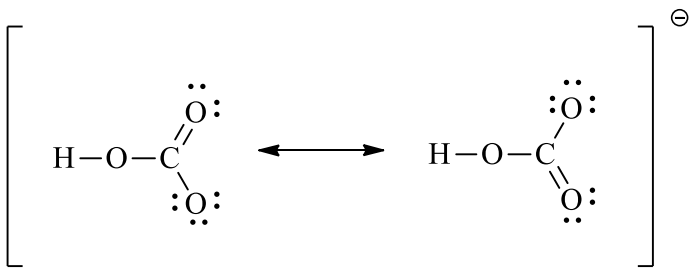
	
linear	bent (approx 120°)
No. The molecule is linear so the dipoles in the C=O bonds cancel each other out.	Yes. The molecule is bent so the dipoles in the S=O bonds do not cancel each other out.
sp	sp^2

The π-bond is stronger in CO_2 because the overlapping orbitals (2*p* in C and 2*p* in O) are of similar size allowing maximum overlap. In SO_2, the 3*p* orbital in S is bigger than the 2*p* orbital in O so the overlap is not as good.

$SO_2(g) + H_2O(l) \rightarrow H_2SO_3(aq) \rightarrow H^+(aq) + HSO_3^-(aq)$

$CO_2(g) + H_2O(l) \rightarrow H_2CO_3(aq) \rightarrow H^+(aq) + HCO_3^-(aq)$



2014-J-4

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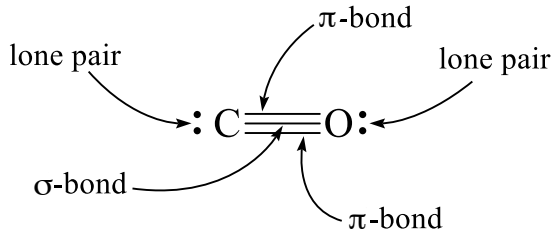

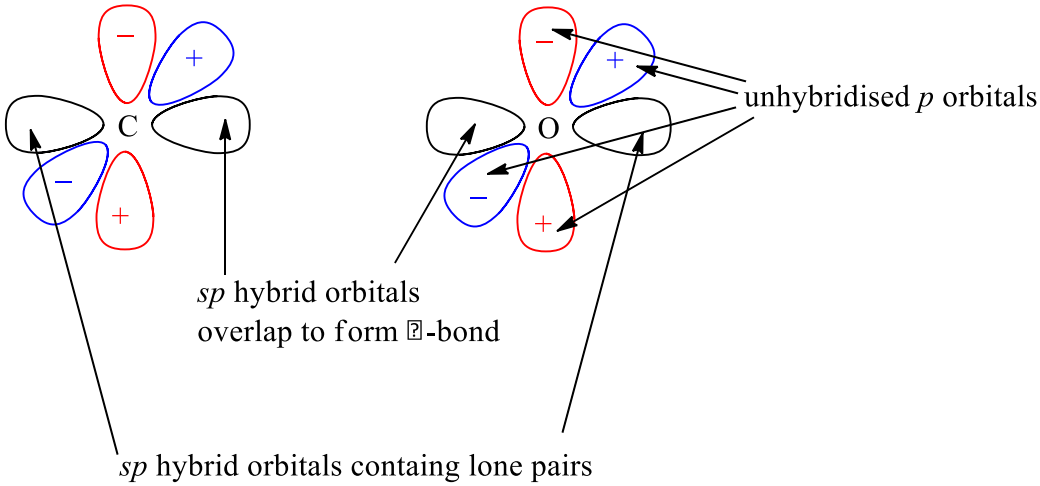

Unhybridised atomic *p* orbitals overlap to form a π-bond. The lobes of the red orbitals are in the plane of the paper whilst those of the blue orbitals are perpendicular to the plane of the paper.

2014-J-5

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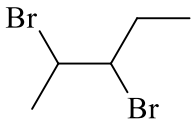
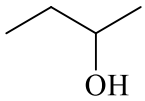
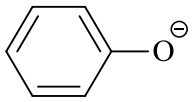
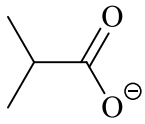
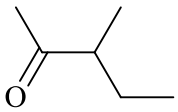
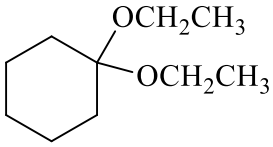
(*E*)-2-pentene		
butanone		
phenol		
		
		
cyclohexanone		

2014-J-6

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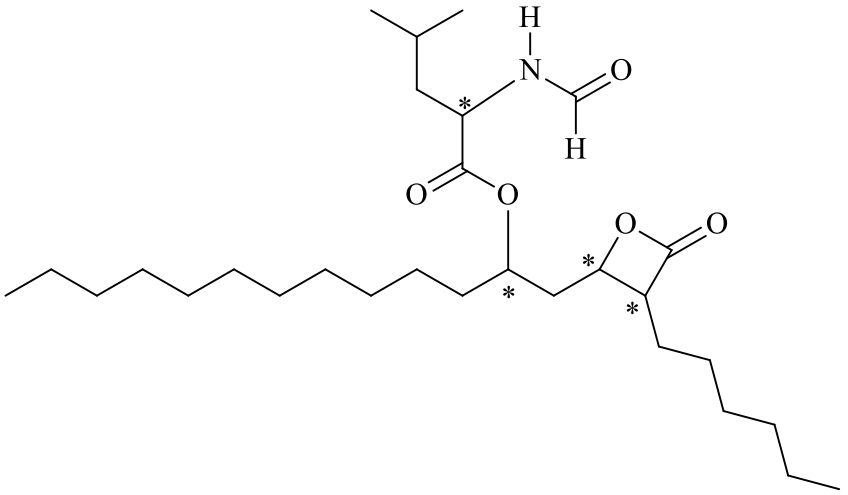
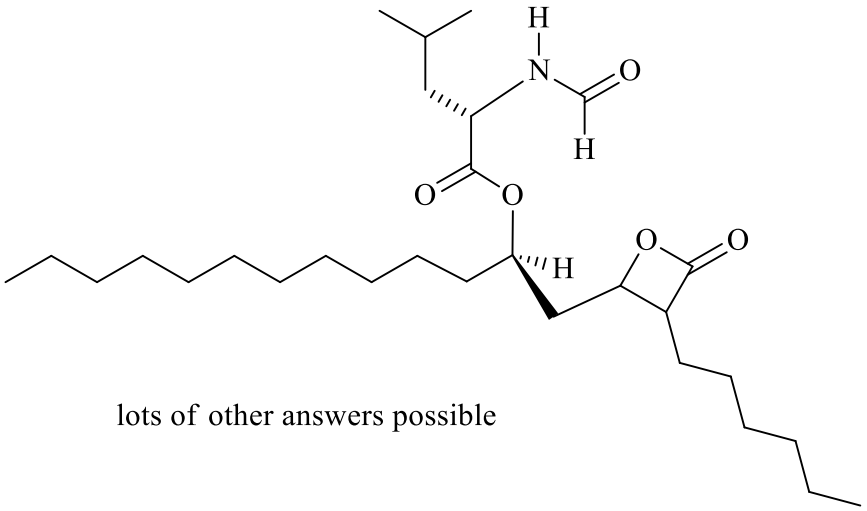


2014-J-6 (cont.)

- $C_{16}H_{28}N_2O_4$



lots of other answers possible

amide, ester

No. Long hydrocarbon chains means that the molecule is hydrophobic and will not dissolve in water, which is a polar solvent.

2014-J-7

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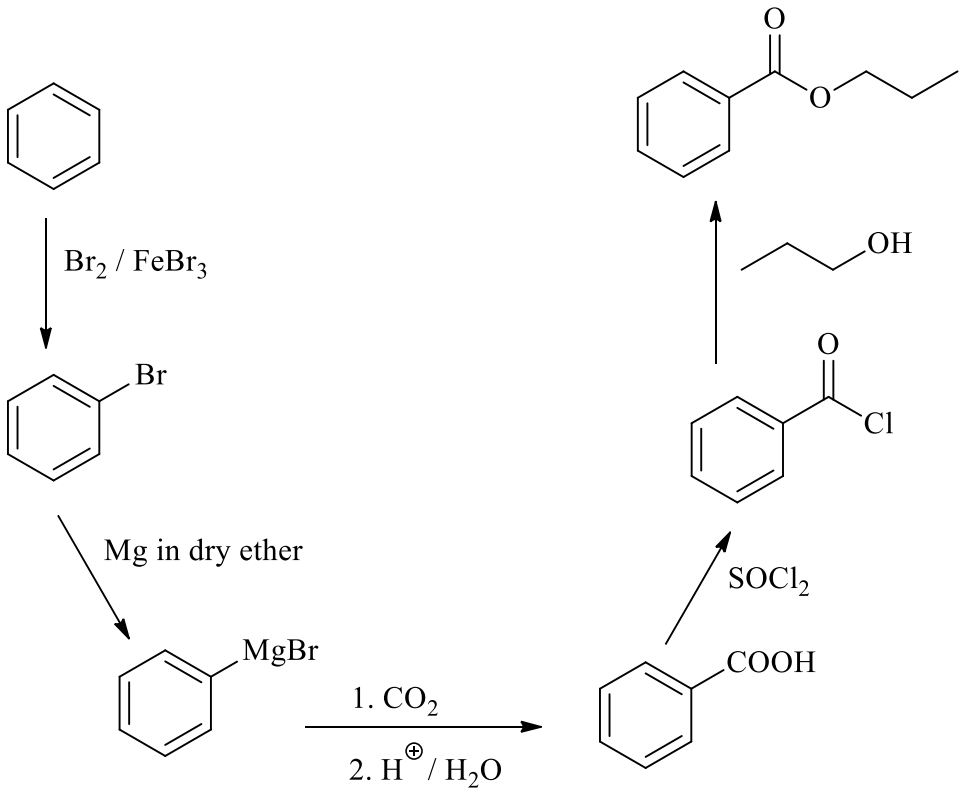

2014-J-7 (cont.)

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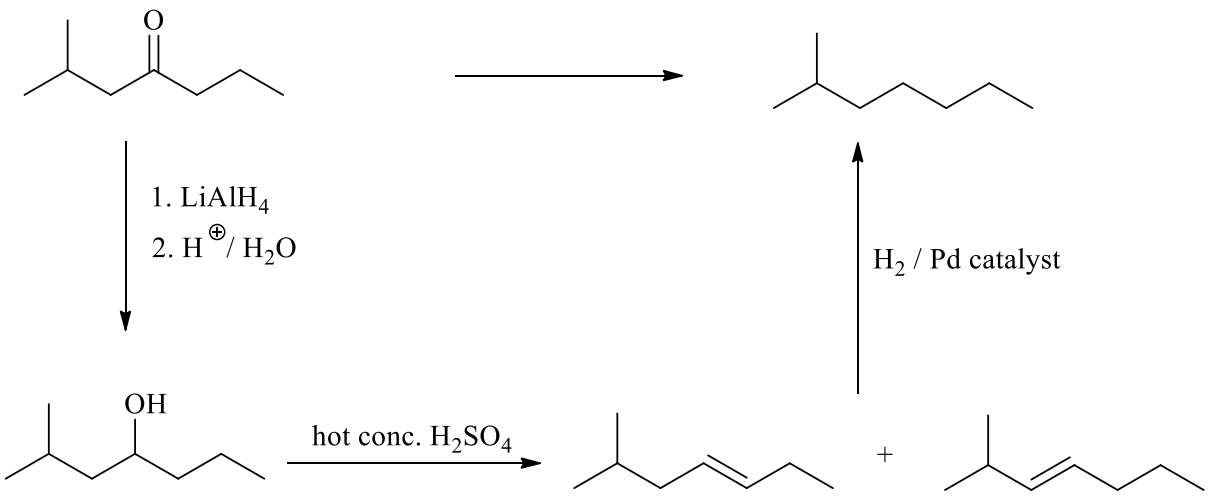

2014-J-8

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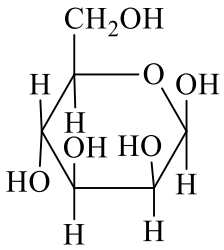
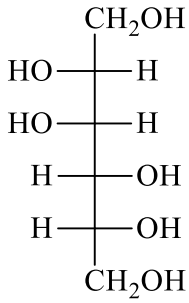
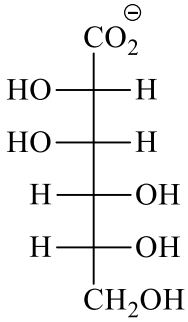
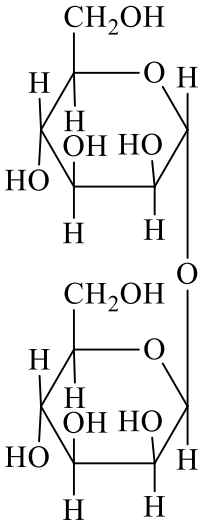


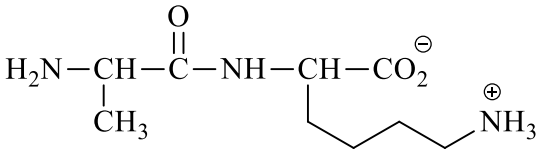




A sugar that reduces Tollens' or Fehling's reagent. Sugars containing aldehyde or hemiacetal groups are reducing sugars.



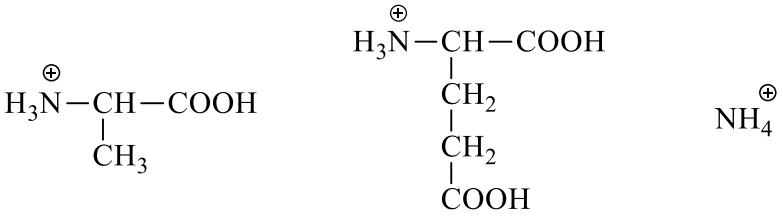
2014-J-9



Basic. The side chain in lysine is basic whilst that in alanine is neutral.

pI = 10.2

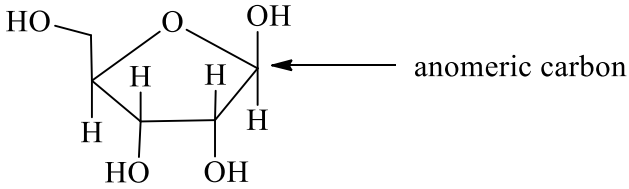
2014-J-10

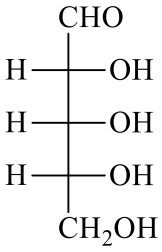


2014-J-11

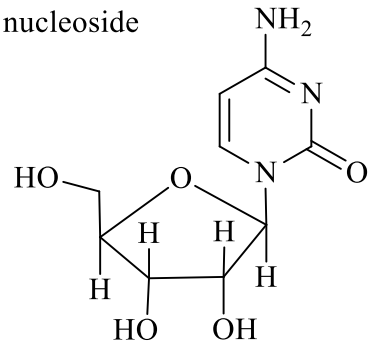
- β

reducing





nucleoside



nucleotide