CHEM1907/1908 (1LS Advanced Courses) - June 2002

2002-J-2

$Ba(OH)_2$		$Ba^{2+}(aq)$, $OH^-(aq)$
	hypobromous acid	$H^+(aq)$, $BrO^-(aq)$
KNO_2		$K^+(aq)$, $NO_2^-(aq)$
$(NH_4)_2SO_4$	ammonium sulfate	
	copper(II) chloride-2-water	$Cu^{2+}(aq)$, $Cl^-(aq)$

- Zn^{2+}

- Sodium chloride is an ionic compound and water is a very polar solvent. The energy required to overcome the crystal lattice enthalpy $NaCl(s) \rightarrow Na^+(g) + Cl^-(g)$ is provided by the large release of energy due to the enthalpy of solvation of the Na^+ and Cl^- ions.
  $Na^+(g) + xH_2O \rightarrow Na^+(aq)$ $Cl^-(g) + xH_2O \rightarrow Cl^-(aq)$
  Dispersion forces are the major intermolecular attractions in ether. The attractive forces between the Na^+ and Cl^- ions and the ether are relatively weak.

2002-J-3

$(NH_2)_2CO(s) + H_2O(l) \rightarrow 2NH_3(g) + CO_2(g)$

0.024 L

8.4×10^4 g mol^{-1}

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8$

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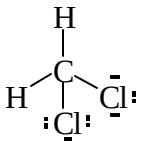
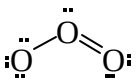
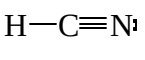
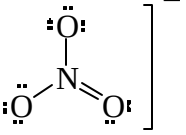
a)				
b)	tetrahedral	trigonal planar	linear	trigonal planar
c)	tetrahedral	bent	linear	trigonal planar
d)	sp^3	sp^2	sp	sp^2

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- 0.36 g L^{-1}

  4 tablets

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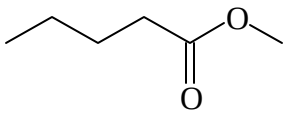
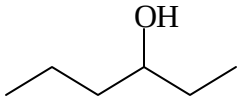
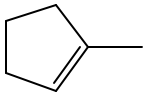
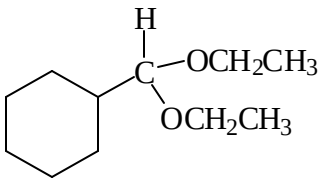
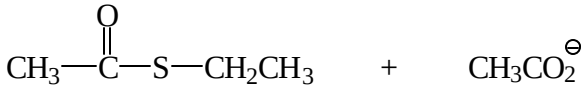
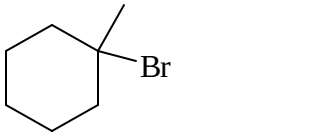
pentanoic acid		
	1. NaOH 2. CH_3Br	
3-hexanone		
		
		
		
		
		

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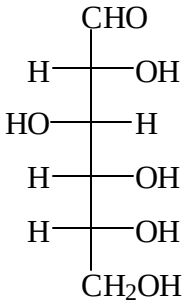
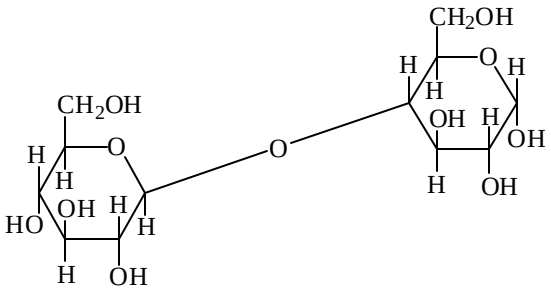
- Add Tollen's reagent, $[Ag(NH_3)_2]^+/OH^-$ to each compound. Compound (L) will not react. Compound (M) contains a hemiacetal group which is in equilibrium with the open chain aldehyde form. The aldehyde is oxidised to the carboxylate ion and the silver complex is reduced to metallic silver which is deposited as a silver mirror.

  H^+ / H_2O / heat

  excess CH_3OH / H^+ /heat



  acetal, alcohol



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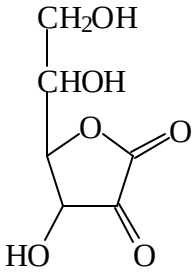

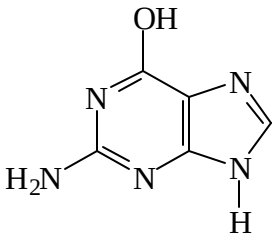

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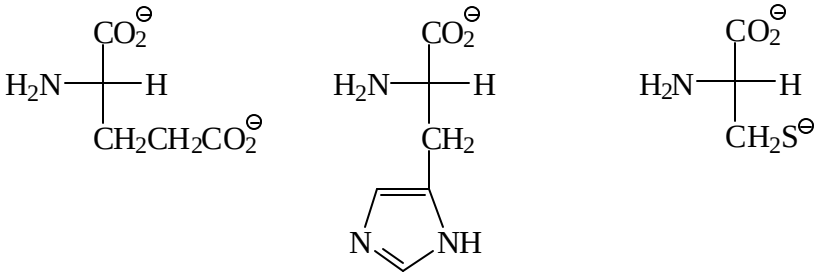
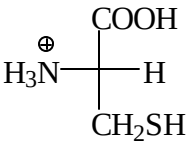
- 

pH 1.00



pH 5.02